Contents

1 INTRODUCTION

1.1 ABOUT THE MANUAL

This manual describes all the functions of ArCon and ArCon+. Additionally, the separately available ArCon auxiliary modules are described and indicated with an ARCON+ icon: . Some ArCon macros are also documented.

When a function or macro is available only for ArCon+, it is identified in the heading of the appropriate chapter.

Options – Program – Program options… This is a reference to the activation of a menu function and is normally in bold type. This example means: Click on the **Options** menu which will open a menu selection containing an entry **Program**. Click on **Program** which will then open a sub menu containing an entry **Program options…**

The … that follow **Program options…** is an indication that this option will open a dialog box.

Eleco Software GmbH believes that the quality of software also needs to be measured against the quality of its documentation. We have set high quality standards for ourselves in both cases.

1.2 WHAT IS ARCON?

ArCon is planning and project software, with which you can simultaneously plan and photo-realistically represent your creative ideas. You do not need special CAD knowledge. Simply place your objects, i.e. walls, doors, windows, stairs and roof, in the 2D project. With one mouse click you'll immediately see these objects in a 3D environment. This enables the 3D control of drafting elements possible for both the entire building and all its construction details. In this 3D environment you can also examine and control illumination effects of objects. It is completely up to you whether you plan a single house, a large office complex or just the interior design of a single room.

Whether you're an architect, interior designer, builder, contractor, real estate agent, furniture manufacturer, or a building material manufacturer, ArCon not only gives you high performance planning and project software but also an effective instrument for presentations. Often, substantial differences exist between a project plan and an artists impression. ArCon's rendering and walkthrough in the building project will help you avoid planning mistakes and laborious contracting work at the site.

Since ArCon has a graphical, user-friendly, and intuitive interface, you don't need any real tuition. ArCon is self-explanatory. For support you can read or consult the manual for reference and ideas. In order to spare you the annoying and time-consuming task of looking for an instruction in the printed manual, ArCon additionally offers online help. With a single mouse click, context-sensitive help appears immediately on-screen to guide you through the current task. Project planning and construction will be easier, as results are quickly made evident.

In Construction mode you work with the building project. To assist your construction, you have a ruler, guidelines and grid. Additionally ArCon+ allows numeric input and supports HPGL/DXF. High performance functions let you quickly place windows, doors and stairs, easily examined for suitability in the 3D preview window. The roof structure also works with a 3D preview and supports all major types of roofing. With a mouse click you can move into Design mode, which shows you the building in a photo-realistic 3D view. In Design mode, you can plan the interior arrangement and environment. In addition, ArCon includes a catalog with over 3,000 objects and surface textures. By simply using *drag and drop* you can place wallpaper on walls and furniture objects into living spaces. By placing lights you can include light and shadow in your plan. The integrated rendering module determines photo-realistic representations of light, shadows, and reflections. Entering the time of day, time of year and location will also add the lighting effects of the sun and moon.

And now you are familiar with ArCon: Convert your creative ideas and enjoy the interaction of project planning and construction, supported by a real-time visualization of virtual architecture.

1.3   WHAT IS ARCON+?

As the name suggests the + version contains all of ArCon's standard functions, plus additional program features for the professional user. These additions are mainly suitable for professional use and give the user an ideal tool with which detailed and

fastidious project planning can be accomplished quickly and easily. This involves the extension of ArCon's design features and window dialogs, the available door and roof structures, as well as the range of adjustments for different draft and output functions, all created to meet the practical requirements of the everyday planner. All project elements can also be represented and used in the format typically used by architects. ArCon+ also supports numeric data input, and allows additional dimensioning and corrections of all project units. Any number of desired horizontal or vertical sections can be produced at any time.

Detailed spatial information is displayed with a single mouse click. You can also specify surface area and volume measurements, or generate a cost calculations. The software can access data produced as a text document in Microsoft Word for Windows, which can contain expressions.

With the built-in import and export protocol, you can export your ArCon projects as DXF, or HPGL, VRML, ProCad (another CAD application from Eleco Software GmbH), or Enhanced Windows Metafiles. A further advantage of ArCon+ is its extended program functions for optimizing the visualization of your projects. Because your ArCon project is accessible in Design mode as virtual 3D, you can save this building to video with ArCon+. To accomplish this, ArCon+ uses the standard Windows video formats (AVI).

In this manual the program functions are described for both ArCon and ArCon+. All functions which apply exclusively to ArCon+ (and not to ArCon) are noted in both the printed manual and in the online help. You can identify ArCon+ auxiliary functions by the fact that the appropriate sections are identified with . This symbol can be found at the beginning of each section.

The functions that are actually different in ArCon+ from ArCon are described separately for each program version in separate chapters.

1.4   ADDITIONAL FUNCTIONS IN ARCON+

In the following list you'll find short descriptions of functions exclusive to the ArCon+ version.

- **Numeric input:** In Construction mode, elements can be entered accurately with the keyboard. This numeric input is an extension of using the mouse for input. Additionally you can use expressions in those ArCon+ input boxes where numeric values are expected. For example, you can specify a value as

50.0 + 20.0 in such an input box.

- **Improved dimension system and display as well as improved control over windows and doors**.

- **Import and export of projects:** With ArCon+'s import and export interface, you can export ArCon projects as DXF files or HPGL files.

- **Building:** In ArCon+, multiple and different plans can be used in a project. For each individual plan, different ground zero levels are supported, so you can design, for example, several buildings on a slope.

- **Skylights:** In ArCon+ you can place skylights automatically.

- **Area info:** With ArCon+ you can provide detailed area information of your entire plan. For this you can use the provided default forms or define your own. The results are formatted text files, which can be read in Microsoft Word.

- **Video production:** Since ArCon makes it possible to move through a virtual building, ArCon+ lets you save this to video. In doing so ArCon+ uses the standard Windows video formats (AVI).

1.5   WHAT'S NEW IN ARCON 3.1?

In the following list you'll find the most important function extensions of ArCon 3.1, compared to version 2.0. The extensions' aim in ArCon+ is essentially to make available all the necessary functions for a professional plan and to achieve the most realistic views possible of both the building and the environment.

In Construction mode, this means adding new design features such as dormers (a freely installed window in a roof or slanted surface) as well as additional objects and textures. In Design mode the previews were extended. Due to accurately calculating the position of the sun, the interior lighting conditions can be rendered realistically.

Here is a brief overview of the extensions in ArCon 3.1:

- **Angle grid:** Angles can now be set orthogonal or freely. This allows walls or other design features to be placed quickly, with precise and exact angles.

- **Dormers:** This function lets you build into existing roofs dormers of different types. Altogether, three types of dormers are available. When shifting the dormers you can control details of the roof opening. The wood construction of the dormer as well as the entire roof is computed and rendered automatically.

- **New freely constructed window:** With this window type, which consists of

the parts-basis element, skylight element, and sill element, you can vary the window construction at will, and adapt it to your own concept. Skylight and sill elements can alternatively be switched on or off.

- **New project into the current project:** Additional projects can be inserted between and/or over pre-existing floors. The respective presets of the current project are automatically used.

- **Wood cross sections for the roof structure:** You can specify the width and thickness for all types of wood in the roof structure. This way, a realistic picture of the interior can be produced, for example, displaying an attic space with visible wood construction.

- **Threshold assistant:** For controlling the height of gutters and thresholds, an assistant is now available in a separate dialog box for you to use.

- **Area:** With this function you can represent the direct environment of your building, realistically. You can specify properties and surrounding areas as well as elevation definitions over an area. Thus buildings can be fitted into uneven areas.

- **Landscape:** The landscape surface used by ArCon can be switched on or off. You can also adjust default values for the size.

- **Position of the sun:** The program can consider the position of the sun to accurately preview lighting conditions both inside and outside your building. The position of the sun is determined automatically, using hour, time of year, and degree of latitude and longitude.

- **Rotate about other axis:** In this ArCon version objects as well as whole groups of objects can be moved and rotated around all three axes, using user-defined arbitrary values. This function helps you accurately place articles in your apartment, as you desire.

- **Viewer point of view:** You can define multiple points of view for your presentation and save them in a list box for recall later.

- **Compass:** An arrow pointing north can be positioned on your construction plans. Furthermore, this is used to accurately determine the position of the sun and moon.

- **Building/object shadow:** In earlier versions, external walls threw no shadow. Now you can specify whether the house throws a shadow or not (the building shadow is useful, for example, in external videos, where you require a realistic outdoor appearance). Furthermore this option can be set for objects as

well. Thus you can not only use shadows, but also control them. This function is an addition to the existing function where lamps produce shadows.

- **Wall cutouts:** You can now create wall cutouts. Besides cutouts in walls, for example, for door hatches, you can model them for extended window construction.

- **Foreground picture:** In Design mode a bitmap can be used as a foreground picture, and in places such as a company logo, for example. This picture can also be faded in, and is included on rendered pictures and videos.

- **Roofs with textured areas:** Previously, the walls of the attic were pulled up automatically to the roof. Now the areas are completely textured under the roof. This means you can divide the roof space into individual spaces, with each space having its own roof lining.

1.6 ADDITIONAL FUNCTIONS IN ARCON+ 3.1

The additional function of ArCon+ makes the program an ideal project-planning tool for the architect. Beside the realistic illustration quality, here the emphasis lies in the architectural representation view, from the initial concept, through to the draft and up to the building application.

- **Dormers:** In ArCon+ five more dormer types are available. Here you also have the option of solving special roof range cases and of modeling failed dormer types or a roof terrace.

- **Sections and views:** In ArCon+ you can produce cross sections of a building in Construction mode. These sections can be placed as pictures in the current project or saved as a separate page. Section surfaces are hatched displayed. Additionally you can specify which objects in the selected range should be displayed. The sections created in Construction mode can also be displayed in Design mode from all sides.

- **Improved video recorder:** ArCon+ now allows not only video recording of movements, but also of lighting changes. You can make a recording over time, where the positions of the sun and shade change over the course of a day.

- **2D Editor:** With this 2D-editing program you can edit your plan later on in Construction mode. The editor includes macro support and integrated online help for macros.

- **Area calculations:** Besides producing detailed spatial information, which you

could produce in previous versions of ArCon+, you can now execute computations and generate appropriate spatial information. For this you can use the templates provided or create your own. ArCon contains special registers depending upon the context of the work, into which values can be entered. These values are considered for the computation of the floor spaces and volumes.

- **Engineering drawing block:** You have the choice of selecting from four different engineering drawing information blocks or none. You can modify the appearance of the variants within a wide range.
- **Rotate buildings:** Now all buildings are moveable. You can even specify the rotation angle with the push of a button.
- **Shift windows and doors numerically:** If you would like to correct the position of your windows or doors later on, you can do this simply with numeric input. The point of reference for shifting can be set freely.
- **Improved dimensioning:** In the architectural representation view, the dimension lines can be shifted freely. Furthermore, character font and character size can be changed. Additionally sill height as well as window and door height is measured automatically.
- **Improved representation of stairs, roofs, and garage doors:** In the previous version, walls, windows, and doors could be represented in the architect's format. Now, this is enabled for stairs, roofs, and garage doors.
- **Colored representation of walls and areas:** In Construction mode walls can be represented with colors. Like the shaded walls, you can use color in the 2D view of rooms.
- **Accelerated raytracing:** The speed of the raytracer is substantially increased, especially with complex scenes.
- **Data export:** ArCon+ now supports data export as a VRML file.

1.7 NEW FUNCTIONS IN ARCON 4.0

In ArCon 4.0 we again substantially increased the number of its functions. The following list contains brief descriptions of this extended functions, along with references to the manual pages where you can find more information.

- **Undo/Redo** (cancel/restore changes) : This function is one of the most important innovations in ArCon 4.0. You can cancel out or restore as

many inputs and changes as you desire. You are probably familiar with this function from other Windows programs, and it works no differently here. But it will change the way you work with ArCon. More information on undo and redo can be found on page 87.

- With the special select option (right-click ⌖ the selectable elements in Construction mode can be adjusted.

- The toolbars can now be shifted within ArCon, if the ArCon window is too small for the display of all buttons of a toolbar. This is particularly useful when using laptops (see page 67).

- Likewise, useful for laptops, the keyboard interface was somewhat simplified. This is particularly useful for laptops lacking a number pad. To increase and decrease a picture's size, you can use the + and - keys on the number pad, or the + and - keys on the main keyboard while holding down the **Ctrl** key.

- If the mouse pointer stays on a multi-function icon, it's automatically unfolded after a short elapsed time.

Besides these improvements, which essentially concern ArCon's user interface, some design features were extended or added:

- **Ramp:** You can now insert ramps into your plans, along with stairs (see page 244).

- **Supports/Chimneys:** These design features can now be rotated with numeric inputs - the workaround that would avoid conflicts with other design features enabled is no longer necessary or useful (see page 282).

- **Changing walls:** If the thickness of a wall is later changed, you can select which wall side and/or whether the wall axis is to remain unchanged (see page 211).

- New alignment features make it easier to position elements in Construction mode.

- You can load a project as a template, upon which you can build a new project. When doing so, you cannot overwrite the existing project – you must save the new project under a new name. In addition ArCon keeps track of the folders for projects and project templates separately (see page 112).

Besides these innovations, which involve Construction mode, the following innovations were implemented:

24

- The raytracer (see page 389) now supports multiprocessing on PCs with up to 4 processors. The speed increase is almost linear with the increase in number of processors. Thus, if you use two processors, the raytracer will finish about twice as quickly as it would with only one processor.

- When using external bitmap files for textures, the file formats Windows BMP, JPEG -, TIFF -, PCX -, GIF and PNG are supported (see page 453).

- **Animated objects:** New in version 4, ArCon can animate objects. For example, it's possible to open a cabinet door. Note however that this applies only to newly modeled objects, as only objects made in ArCon 4.0 contain the necessary data. Existing objects made in ArCon 3.11 do not have this data and so cannot be animated (see page 424).

- **Improvements in the Explorer:** The object, texture, and material explorer of ArCon have been improved. For example, additional information can be assigned to objects, textures and materials (if they are defined). In addition, you can now define your own materials. A detailed dialog box was made to accommodate this capability (see page 454).

- By indicating a material path in the **Program parameters** dialog box, you will change the set of available materials in the Explorer (see page 101).

Besides the improvements to Construction and Design mode, the following changes were made to increase the general function of ArCon:

- ArCon now has a material library of about 1000 different materials.

- Both in Construction and Design mode, you can export ArCon projects to the 2D-Editing program eLines (see page 467) by using the switching surface eLines. This makes it simple, and fast, to switch between ArCon and eLines.

- The programming interface to ArCon was substantially improved and now utilizes a modern technology (DCOM). As a user, you will probably notice this only indirectly, when using auxiliary modules to ArCon. These modules can now be much faster, and more powerful than in ArCon 3.1.

Besides the many new functions in ArCon 4.0, the manual was edited and improved. Some sections have notable differences:

- Roof inside paneling (see page 313),

- Direct input of the location over the second horizontal toolbar; the use of joysticks (see page 665),

25

- Automatic construction of roof changes, and other minor details.

1.8 ADDITIONAL FUNCTIONS IN ARCON+ 4.0

In addition to the innovations in ArCon 4.0, which are described in the previous section, ArCon+ 4.0 contains the following new function:

- **Virtual walls:** With virtual walls, areas can be produced that are not generally enclosed by walls. In addition, virtual walls and multiple buildings can simulate buildings with different levels in a project (see page 204).
- **Mirroring of buildings:** This substantial innovation in ArCon 4.0 makes it possible for you to reflect whole buildings, for example, to easily design the second half of a duplex building. When a building is mirrored, the complete interior arrangements as well as all design features (window, stairs, etc.) are also reflected (see page 146).
- **Rooms:** Area floors and ceilings can be switched off (see page 155). The confinement following TYPE 1 is now automatically recognized.
- **Numerical input:** Besides using the **F2** key to switch numeric input on and off, you also have the switching icon located towards the bottom in the second vertical bar in Construction mode (see page 172).
- **Polygonal numeric wall input:** During the input of the walls, the wall start point and/or wall end point can be specified by pressing **Ctrl+Q,W,E** (see page 179).
- The **Export project** dialog of HPGL, DXF, ProCad, and VRML files was improved (see page 463).
- **Window notices:** For windows, the notice can also be defined (see page 237).
- **Spiral staircase:** A new type of stair has been added – polygonal stairs (see page 244).
- **Timber list:** With the wood construction of a roof, a list can now be created and/or saved as a text file (see page 309).
- Already implemented in version 3.1, but not yet documented, is the ability in Construction mode to define a color and filling the area freely.

The following changes to Design mode:

- **Exporting pictures from Design mode:** Exporting a project as a bitmap file is not possible, but vector formats can be exported (including HPGL, DXF,

Windows Metafile, etc.). ArCon+ always exports these types of files with opaque edges (see page 463) type of display.

- Already implemented in version 3.1, but not yet documented, is the ability to enter the video frame rate (frames per second) when recording videos (see page 528).

- The 3DS-Import filter for ArCon has the following new functions:
- Importing animation sequences from 3DS-data is file inclusive. Fragmentation in sub animations is possible.
- You can determine whether homogeneous textures of different sub objects are stored separately in the generated ACO files or together.

1.9   ADDITIONAL OPTIONS IN ARCON 4.1

This section provides a short overview of the new developments and modifications available in version 4.1 and later.

Roof editor: You can now define whether each individual roof side is a basic, gable, hipped-gable with and without false building line, mansard or pent roof side. The required parameters are entered using a wizard process and can be clarified using diagrams if required. The underlying roof structure is automatically adjusted to the construction during this process. The undo/redo functions can be used to undo or redo all functions. There are three different top shapes available for displaying the purlins.

Sill wizard: The expanded Sill Wizard allows you to transfer existing horizontal roof edges (eaves, ridges and angles).

Ready-made roof types: For rectangular roof shapes, the following ready-made constructions are available: lean-to, gable, hip, mansard and tilt roofs. Each roof shape has a specific dialog box assigned to it.

Kenngott stairs: Over 45 stair designs with various outline shapes from the manufacturer Kenngott are included in ArCon 4.1 and can be modified in detailed dialog boxes.

Banisters: (ArCon+ only) Various banister designs can be added to stairs with a polygonal shape. The varied setting options can be modified to match various different styles. 3D objects can also be used as supports. The banisters can be filled in using horizontal or vertical poles, or using a glass surface.

DXF/DWG import: (ArCon+ only) The dialog box for opening transparencies has a new preview window which provides zoom and move functions for the transparencies to be inserted. In addition, an extra interpreter has been implemented for the import process, which can also be used to read files in DWG format and to paste them into ArCon.

1.10 ARCON ONLINE

ArCon Online is a package of programs and other services from mb, which allows you to publish your ArCon plans on the Internet. It permits you to do much more than export whole projects as objects, which can be viewed on the Internet. This is because ArCon Online supports the highly compressed o2c format, which allows you to keep the files to be sent via the Internet. The o2c format is around ten times more compact than the ACO format (in exceptional cases, such as for roof structures or stairs, it can be significantly more compact. Ratios of 1:100 are entirely possible). An object occupying 100 KB on your hard drive as an ACO files (a typical object size) will be only 1 KB in size as an o2c object. Even the textures an object like this uses, are saved in the object itself so that only one file needs to be sent over the Internet.

1.11 ADDITIONAL FUNCTIONS IN ARCON ONLINE

ArCon Online is basically the same as the ArCon+ version incl. the 3DS-import filter add-on module and the o2c add-on module (see page 32). In addition, the ArCon Online package contains a few more extras, which are described in a separate manual. The following new features have been included in ArCon itself:

- **Export entire projects** as an object (*.ACO file) or as an o2c object (*.o2c file). With the last option in particular, individual ArCon objects or even entire projects can be made available for use on the Internet, in connection with the o2c Player, and even in Microsoft Office applications.
- **Reading o2c objects:** Just as the versions preceding ArCon 4.1 could be used to open ArCon objects (*.ACO files) using the ArCon explorer or the menu, it is now also possible to open o2c objects. These can be downloaded from suitable providers on the Internet using the o2c Player integrated into websites, for example.
- The option already included in the 3DS-import filter add-on module for

exporting selected objects in Design mode has been enhanced with an option for exporting these objects as o2c objects. There is a new icon included to do this o2c. In addition, the dialog box which appears immediately after saving ACO or o2c objects has been enhanced with an option for entering www addresses.

- In the **3DS-import** dialog box there is an option for saving the imported 3DS-object directly as an o2c object.

These new features in ArCon Online allow you to prepare 3D objects for the Internet and to integrate o2c objects from the Internet into your own plans.

1.12 ADDITIONAL OPTIONS IN ARCON 5.0

This section provides a short overview of the new developments and modifications available in version 5.0 and later.

- **Multiple selection in Construction mode for deleting elements** (see page 189)

  Selectable elements can be selected by clicking them individually (groups with **Shift** key) or using a rectangular box. All selected elements can be deleted in one go.

- **Multiple copy for elements and objects** (see page 190)

  Selected elements copied along with details on the spacing, quantity and rotation. The positioning process is controlled by choosing the positioning points for the relevant elements or by specifying an angle (displacement). A preview with the copying options currently set is displayed as a positioning aid. The multiple copy function is available for all elements in Design and Construction modes : Windows, doors, supports, tiles, ready-made lines, text

- Design mode: Furnishing objects, elements

- **Arc wall** automatically rounds off the corners of buildings. For example, quarter-circle is an example application for this construction macro. Superfluous wall sections are automatically deleted in this process. Various construction options permit the construction of any arc-shaped walls.

- **Load o2c objects:** Objects in o2c format downloaded directly from the Internet can be selected directly in Design mode in ArCon Explorer and inserted into a project using drag & drop. This function is therefore identical to the corresponding function in ArCon Online. Information on the relevant

Internet site can be found in the object properties on the **Internet** tab. This means it is possible to obtain additional information on the product from the manufacturer online, for example, when creating a plan with furnishing objects downloaded from the Internet.

- **Snap function in Design mode:** Positioning furnishing objects exactly against a wall in Perspective view in Design mode? The new snapping mechanism automatically snaps a furnishing object to the wall or any other nearby object. Objects can therefore be positioned directly against a diagonal wall, without having to calculate the precise angle of the wall. Construction objects such as handrails can therefore be positioned next to one another automatically.

- **Collision control during a walkthrough:** The ⚡ icon can be used to prevent you walking through walls during a walkthrough

1.13 ADDITIONAL OPTIONS IN ARCON+ 5.0

In addition to the new functions, which have been implemented in ArCon 5.0, ArCon+ 5.0 contains the following improvements:

- **Photovoltaic elements and thermo-collectors:** Photovoltaic and thermo-collectors from the Braas company can be integrated into a roof using a similar process as for skylights.

- **Roof blending for several buildings** (see page 285)
  Walls in several buildings can be blended under one single roof.

- **Area calculation regulations (TYPE 2 for short)** (see page 503) dialog for calculating residential areas (German Official Federal Gazette I, p. 2178) in a new tab for the room data. Output of residential areas conforming to TYPE 2 for floors, apartments and buildings, also in the **Room info**.

- **Adjustable level for height contours/factor** (see page 517) defines the level of the 1st and 2nd height contours. A factor for calculating the surface can be defined, for example, 0.5 in Germany in this section.

- **Platform designer:** Generation of polygonal platforms in Construction mode. Any polygonal surface can be constructed in a 2D top view. Guide elements (line, circles, ellipses) and different edge shapes included (rectangular, round, arc-shaped) facilitate the construction of complex geometry. Specifying a lower level, a height and defining an angle for the sides can create a 3D

shape. This shape can be modified using any textures or bitmaps. Each individual object may be assigned the property *Edge* or *Hole*. This permits any cutout shapes to be made in the objects. Selecting the fill pattern and color provides an individual 2D substitute display type for displaying the shape in the plan. The platforms created can be used in other plans (saved in a catalog under individual names).

- **Block designer:** Generation of 3D blocks in Design mode. Planning of any polygonal surfaces with construction options as for the **Platform designer**. The outlines are constructed in a similar way to the **Platform designer** in a 2D view.

- **Sill height for doors:** Defining a *sill height* means that doors can be constructed which do not reach to the floor of the current floor. This can be used when constructing split-level floors, for example.

- **2D substitute display for windows:** Display of butting direction for windows in Construction mode

Already included in version 4.0, but only documented in version 5.0 and later is the option to set the accuracy for formula outputs in the various dialog boxes and **Room info**, using a relevant dialog box (see page 517).

1.14 EXTENSION MODULES FOR ARCON

In the following sections you'll find a short description of auxiliary modules for ArCon, which are not part of the standard ArCon package. You'll find specifications of the modules in the appropriate chapters in this manual.

1.14.1 ArCon VR (Virtual Reality)

By using a special graphics card, which like a joystick (not included) you can extend the range of ArCon+ functions to allow you to move through the apartment in real-time. The graphics card, which is installed parallel to the normal graphic card and automatically activated and deactivated by ArCon+, offers fluid movement without jerks or pauses, and very high quality due to its extremely high frame rate. Just like the normal mode of moving through a building, this mode lets you save the movements and

sequences. With this recording a video for Windows (AVI) file can be produced by ArCon VR. Additionally, this file can be processed for demonstrations and presentations. In sales rooms (and kiosks) the customer can explore by using the joystick interactively, without having to expose the customer to ArCon or your own files.

1.14.2   3DS-Import filter for ArCon

With this auxiliary module, which is supported by both ArCon and ArCon+, you can load objects, which were created with the 3D-Studio program from Autodesk into ArCon. They are then treated like normal ArCon objects. Additional properties of these objects (like animation parameters) can be entered separately. Once loaded, such an object can then be saved as an ArCon object (ACO file). You can also convert many objects simultaneously (batch conversion). 3D objects in other formats, for example, DWF, DXF, GARB, AMK must first be converted into a 3DS-format object before they can be loaded into ArCon.

1.14.3   o2c add-on module

This add-on module, which is available for ArCon version 5.0 and later, can be used not only to load o2c objects, but also to save them for publishing on the Internet, for example.

The function of the o2c add-on module, together with the 3DS-Import filter add-on (see previous section) and the ArCon+ version is basically the same as the ArCon Online version (see page 28).

The use of the add-on modules o2c and 3DS-Import filter in combination also expands the import function for 3DS-objects so that you can generate o2c objects when importing 3DS-objects, with no separate conversion process.

1.14.4   Storyboard add-on module

This module allows you to become the director for the animation of objects in ArCon.

The sequences of movements for animated objects can be displayed as you wish within a storyboard in the form of defined sequences for movements and camera paths for any

points in time, and you can also include non-animated objects. The sequence you have put together can then be viewed directly in ArCon. In addition, it can be output direct to a video file in AVI format. These *film scenes* can therefore be integrated into video animation. In addition, this add-on can be used to generate automatic camera paths through the virtual house.

The new object *camera* can be used to wander through the individual rooms like a cameraman and to capture the various viewing angles and camera settings when recording moments. The various views looking through the lens of the camera are produced directly by the movement in those views. Moving the mouse or using animation in the storyboard controls this.

1.14.5   Interior 3D

This extension module offers 250 high-quality 3D objects produced by prominent furniture manufacturers. You can use the rich selection of chairs, lamps, tables and accessories in order to achieve the most realistic visualization possible. Whether for architecture, interior decoration, industrial design, trade show plans, virtual reality design, virtual studios or for animation – the designer furniture collection Interior 3D for ArCon helps you provide convincing presentation documents for sales and presentation. Interior 3D is compatible with both ArCon and ArCon+.

1.14.6   ArCon OS, the Open Programming Interface

ArCon OS, the open interface for programming, is aimed at developers who want to program ArCon add-ons for special applications. The package contains programming aids and example programs, which provide comprehensive, support and tools for developing additional functions. If you don't want to program the enhancements yourself, you can also commission the programming work from the publisher, Eleco Software GmbH or their representatives. (See also the *Support for ArCon* section at the end of the manual).

Using the ArCon OS programming environment as a basis, the function of ArCon can be expanded, while still using the existing functions of the program. All enhancements are fully integrated into the ArCon interface. All menu options and new tabs in the dialog boxes originating from an add-on are identified using a special icon. The complete integration of the add-ons created using ArCon OS into the ArCon interface

gives the impression that the add-ons have always been included in ArCon. All ArCon OS applications can be run in the standard version of ArCon or ArCon+ without using any extra programs. The user can therefore utilize the new functions as normal without any special knowledge.

1.14.7   WETO Roof Designer

The WETO Roof Designer is an ArCon add-on module for carrying out specific additional editing on roofs created in ArCon. Roofs created in ArCon with dormer windows, chimneys and skylight openings can be transferred into the WETO Roof Designer and prepared for editing at the touch of a button. The existing roof features can be manually edited to create breaks and cutout sections in the roof, etc. using wooden constructions aligned with the joints. It is also possible to blend standalone roofs subsequently. The modifications to the roof shape and wood structure are automatically transferred from ArCon. Transferring the exact roof dimensions into the COSOBA module provides a much more accurate calculation. In addition, roofs can be forwarded directly to wood working operations as projects in WETO format.

1.14.8   Multi-layered Masonry

A powerful module, which provides extensive options for building multi-layered wall constructions when creating, plans. This means exterior walls can be modified using wall constructions, which can be edited freely.

1.14.9   Schenker 3D objects

A collection of 3D interior architecture objects containing in excess of 700 high quality 3D objects from traditional chimney designs to English garden loungers.

1.14.10   3D-GaLa

A collection for garden and landscape design with 500 high quality objects

1.14.11   ArCon ARTS 500+

ArCon ARTS 500+ provides over 500 objects in the areas of office, furniture and fittings, garden and vehicles for improved planning and a clearer representation of your planned construction work.

1.15   INSTALLATION NOTES

Start the ArCon setup by double-clicking SETUP.EXE in the Explorer window of the ArCon CD. A dialog box appears while the installation is being prepared. Subsequently, you will be guided through the installation. In the simplest option, which is the **Typical** installation with confirmation of all presets, you'll press the **Enter** key during the installation only seven times. At each stage of the dialog sequence, you'll have the opportunity to exit the installation procedure or to continue.

1.15.1   Welcome

This dialog box contains general notes about the installation of ArCon, which you should read.

1.15.2   Software license contract

With the purchase of ArCon you are presented with a license (legal contract) from the publisher, that is described to you in detail here. By pressing the **Yes** button you acknowledge these terms. Please read the license agreement carefully before you accept it.

1.15.3   Type of setup

ArCon can be installed on your computer in different ways. These so-called *Types* differ in their storage requirements on your hard disk. The **Typical** setup corresponds to the selection of all components belonging to ArCon. In the **Minimum** setup, objects and textures are installed but not videos and demo files. If you select the **Custom** type of setup, the following dialog box lets you select components individually. Regardless of

the type of setup, you'll be asked to select and confirm a destination folder on your hard disk where the files will be copied.

1.15.4   Select components

Here you can select (or exclude) individual components for installation. You'll only see this dialog box if you selected the **Custom** installation. As you select and deselect files and options, the necessary and available disk space is updated, in real-time, to reflect the current selections. Selectable options include program files, objects and textures, example projects, videos, and demo files.

1.15.5   Objects and textures

Since objects and textures require a relatively large amount of storage space on your hard drive, you have a few options for installing these. If you install them directly to your hard drive, they will always be accessible there. If you do not install them to your hard drive, you'll have to insert the CD whenever you want to use them (and especially with the case of textures, this will likely be every time you use ArCon). A final option is that you can install these files to another computer on the network. If you choose this option, the network settings and file locations are saved in ArCon's INI file for later access.

1.15.6   Select program group

In this dialog box you can specify which program group will contain the ArCon program files. The default folder is *ArCon – visual architecture* but of course you can create a new group with a different name, or you can select an existing group.

1.15.7   Copying process

Before the files are copied, you'll see a dialog box displaying all the parameters collected in the previous dialog boxes. Here you can review your selections, and choose to back up if you have changed your mind about any setting. If all is okay, confirm the selections to complete the installation.

36

1.15.8   Copying the ArCon files

During copying, different progress bars are displayed. The vertical progress bars on the left side have the following meaning:

Copying progress related to the file currently being copied.

Copying progress related to the whole set of all files to be copied. It corresponds directly to the horizontal progress bar in the middle of the screen.

Available storage on the selected disk.

The time required to copy the files depends upon the speed of your computer, and will take approximately 2 to 5 minutes. For a complete installation of all files you'll need about 200 MB of hard disk space, and for a **Custom** installation, will more than likely be a lot less.

1.15.9   Completing setup

Finally upon successfully completing the installation of ArCon, a final dialog box appears. Confirm to close this box and open the Program group window.

The ArCon Setup furnishes the following program icons:

ArCon starts the program ArCon - visual architecture.

ArCon help opens the help file, for ArCon.

Uninstall removes all ArCon files from the hard disk.

The installation of ArCon+ runs in the same steps and order as the installation of ArCon. Due to ArCon+'s extended function, you are asked at the end of the installation whether you would like to install the Microsoft Word Viewer. If you do not have a word processing program with which you can read or work with RTF files (Microsoft Word is useful for working on the area information files) then this additional installation is recommended. The Microsoft Word Viewer lets you view files and print, but you cannot edit the files.

1.16   ONLINE HELP IN ARCON

ArCon has a detailed online help that can help you whenever you are unsure about a certain function, icon etc. You have several ways of accessing ArCon help:

First you can press the **F1** function key. You can press **F1** at any time; ArCon's contents page will open, from which you can select a topic of your choice. Pressing **F1** has the

same effect as selecting **Contents** from the **Help** menu.

The second way to receive help is to select the menu option **Index** in the **Help** menu. Here you can enter a keyword to search for the online help file will present a list of every occurrence of that word in the file.

The third way is to click the icon. If you click this icon your mouse pointer changes to a mouse pointer with an attached question mark. With this, click the place you would like to receive information. ArCon jumps to the appropriate place in the help file and displays the information on screen.

Finally, there is help as you move the mouse around the ArCon window. As you move the mouse over icons, descriptions are displayed at the bottom of the window in the status bar. Also, if you hold the mouse over an icon for a second, pop-up help text is displayed to help you identify the function that each icon opens. You can switch this feature off from the **Help** menu.

2   QUICK START

In order to learn how to use ArCon as quickly and easily as possible, we have provided some example projects. These steps are not meant to replace the rest of the manual. If during any individual lesson something is unclear, please do not hesitate to consult the relevant sections of the manual.

2.1   BEFORE YOU BEGIN

Individual lessons of this tutorial are installed with ArCon and can be found in the folder **Projects\Exercise**, which is within the folder you selected during the installation. In the **Exercise** folder you'll find the files **Exercise01.acp** through **Exercise10.acp**. When beginning each lesson you should load the appropriate project into ArCon.

Note: Projects in ArCon have the file extension *.**acp**.

To load a project, proceed as follows:

> Start ArCon
>
> Click the **Open project** icon
>
> You should find that the projects is already in **Construction mode**.
>
> In the dialog box that appears select the appropriate project and click **OK**. Subsequently, you can begin the lesson.

2.1.1   Operating multi-function icons

As you go through the tutorial exercises, you will have to use the multi-function icons in ArCon at some points. These are the icons with small black triangles in the lower right corner. Such icons can take different forms, with different functions; in order to change the icon and function from the one currently displayed, left-click the mouse on the icon and move the mouse pointer away. The alternative functions are displayed. Next, position the mouse on the alternative icon you would like to select and release the left mouse button.

Also note that the different variations will appear automatically (without clicking) if you move the mouse pointer over the multi-function icon.
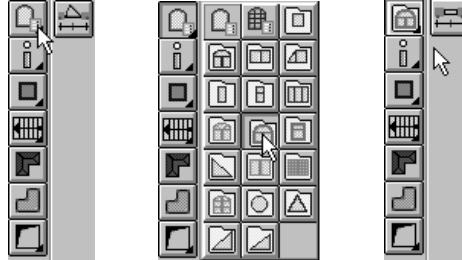
2.1.2   Selecting objects

Before you can make selections in Construction mode, you must click the **Select element** icon at the top of the vertical toolbar to the left of the display. When this icon is selected, you can then select elements in your plan to delete them or change their properties, for example. Left-click the desired element to select it. The selected element is marked red. If you click an area with multiple elements on top of one other, the smallest element is selected first. If you click again, the next largest element will be selected, and so forth. Selectable elements are walls, windows, doors, text, floors and ceilings, floor slabs, cutouts, stairs, and roofs. For example, if you click in a room and a roof is situated above this room, the floor is selected first, along with the room's ceiling. If you click again, the roof will be selected.

Note: When you change from Design mode to Construction mode, the **Select element** icon is automatically selected.

2.2   CONFIGURING ARCON BEFORE YOU BEGIN

ArCon lets you configure its capabilities from a range of options, to make the program work best with your computer. Although ArCon runs on older PCs, we strongly recommend a Pentium PC with 32 MB of memory (RAM) or more.

In order to configure ArCon for your PC, please proceed as follows:

1) Start ArCon

2) Select the **Options** menu, then the **Program** submenu, then **Program options**. A dialog box appears where you can make the following adjustments depending on your

computer configuration.

For computers with less than 32 MB memory:

3D pixel size	*2 x 2 pixels*
Color depth of a 3D pixel	*High Color*
Pregenerated (Mipmaps)	*unchecked*
Buffer size for textures	*256 KB*
Path for objects, alternative object paths	*unchanged*
Path for textures, alternative texture paths	*unchanged*
Path for materials	*unchanged*

For computers with more than 16 MB memory:

3D pixel size	*One pixel*
Color depth of a 3D pixel	*High Color*
Pre-generate (Mipmaps)	*checked*
Buffer size for textures	*256 KB*
Path for objects, alternative object paths	*unchanged*
Path for textures, alternative texture paths	*unchanged*
Path for materials	*unchanged*

In addition to the object, texture, and material paths, which are automatically created during the installation of ArCon, you can specify alternative paths for objects and textures. ArCon searches the alternative paths for objects and textures, which are not found in the normal paths. For example, you can have a different CD in your drive and tell ArCon to search it, to automatically locate objects and textures on the CD and integrate them into your projects. You can have multiple alternative paths but you must separate each path with a semicolon.

3) Acknowledge the settings in the **Program options** dialog box with **OK**.

4) Select the menu **Options – Program – General**. The following dialog box appears:
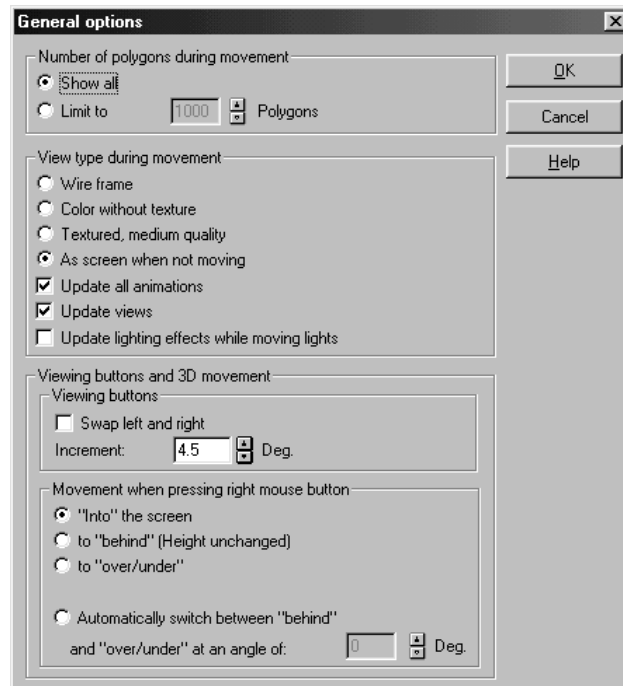
5) You can limit the number of polygons displayed to keep the program working smoothly. If you have a very fast Pentium, select **Show all**. Otherwise, select **Limit to** and enter a number between 1,000 and 2,000 - depending upon the speed of your computer. In the **View type during movement** section select either **Wire frame**, **Color without texture**, **Textured**, **medium quality** or **As screen when not moving**, depending on the speed of your computer. The first option is the fastest, requiring the least amount of processor performance, and the last option is the slowest, requiring the most amount of processor performance. Uncheck **Update lighting effects while moving lights**.

6) In the **Viewing buttons and 3D movement** section uncheck **Swap left and right**. In the **Movement when pressing right mouse button** section, select the switch **"Into" the screen**. Acknowledge your selections and close this dialog box with **OK**.

Exit ArCon by selecting the menu **File - Exit**.

Note: The adjustment, which you have made in the **Program options** dialog only becomes active after starting ArCon, so when you make a change here you must exit

and restart the program. In general, you will need to make changes here only once.

Having made the above changes, ArCon is now configured to your PC.

Since the above settings are dependent on the speed of your computer, you may want to change them later to suit your style and preference. For example, you may be willing to accept a slower display in exchange for a more accurate display. You can change the **Program options** and **General options** anytime; just remember to restart the program for them to take effect.

2.3 TUTORIALS

2.3.1 Tutorial01.acp

Objective: Position furnishings in Design mode

Load **Tutorial01.acp**. The following picture appears:
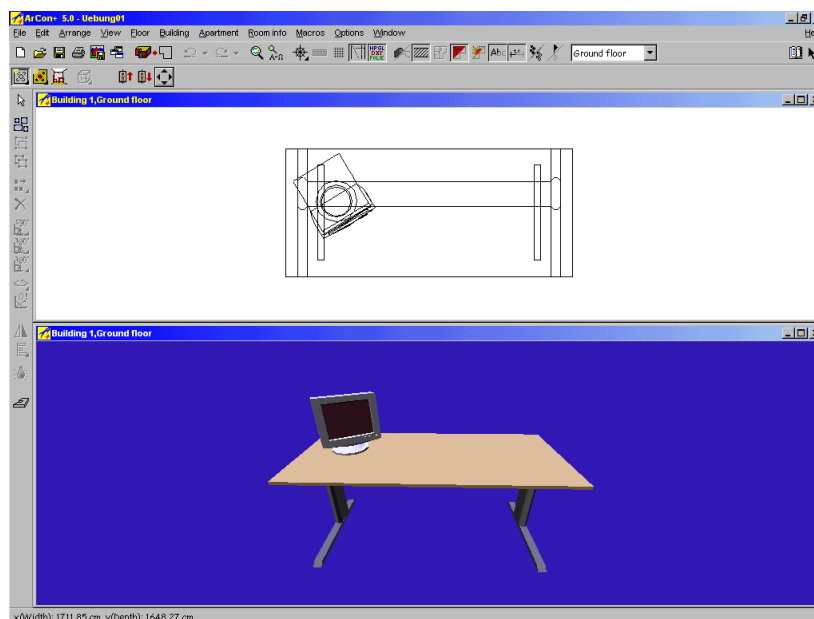
The objective is to move the monitor on the desk from left to right.

Because the snapping function needs to be deactivated in Design mode during this

process, first of all right-click the top icon in the left-hand toolbar. Then select the **Off** option in the dialog box that appears.

In the colored view, move the mouse over the monitor and click it to select.
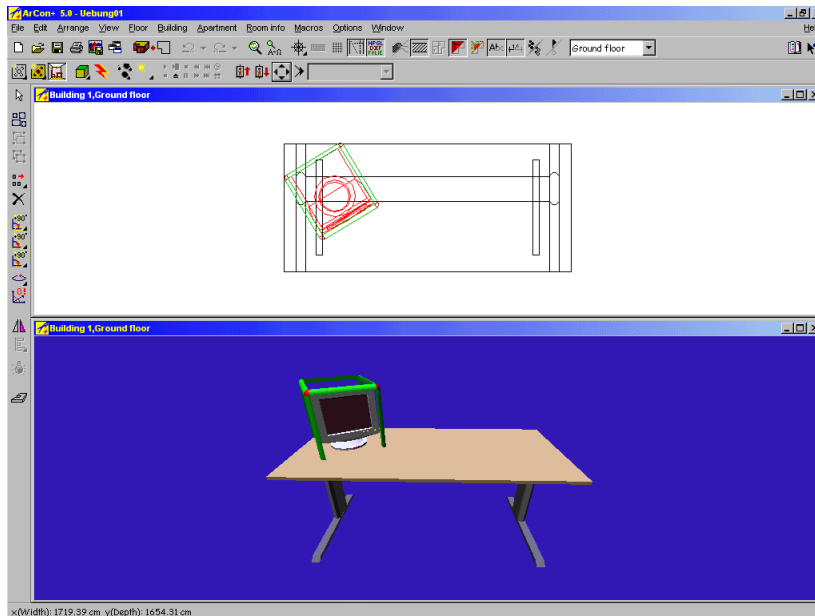
Click again on the monitor and now keep the left mouse button held down. If you move the mouse, the monitor will move. If you move the mouse up or down, the monitor moves up or down, parallel to the display. If you move the mouse left or right, the object moves likewise in that direction. Move the mouse while holding down the right and left mouse button, and the monitor is moved forwards and backwards through the display.

Position the monitor on the right side of the desk, with its foot placed on the desk surface. The monitor will cast a shadow upon the desk, showing you where the monitor will sit. Release the left mouse button. The monitor will fall onto the desk and remain there.

Click in the second view window (the line display, viewed from above) and move the monitor back to the left side of the desk, where it was at the beginning. Do this by clicking the monitor and, keeping the left mouse button held down, move it to the original location. When it's in a suitable position, release the mouse button. You will see that the colored view is updated accordingly.

2.3.2   Tutorial02.acp

Objective: Create, copy, and move groups

Load **Tutorial02.acp**.

Select the monitor, as in tutorial 1. Now press and hold the **Shift** key and select the desk and the chair. All three objects are displayed with selection frames.
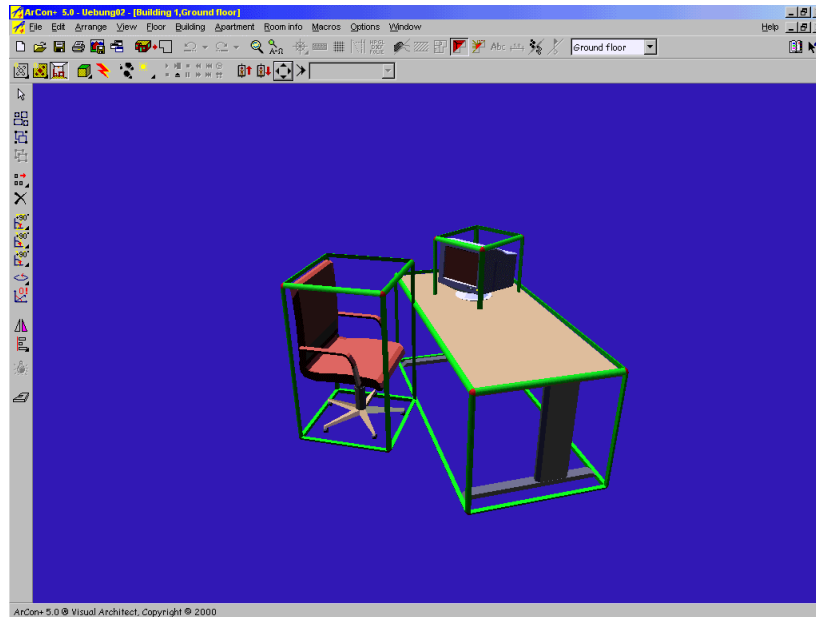
Click the Group objects icon (see page 431). This icon lets you create a group. In order to identify this group later, ArCon will ask you to name the group. Go ahead and click **OK**, since the suggested name is acceptable.

Around the three selected objects a single frame is displayed.
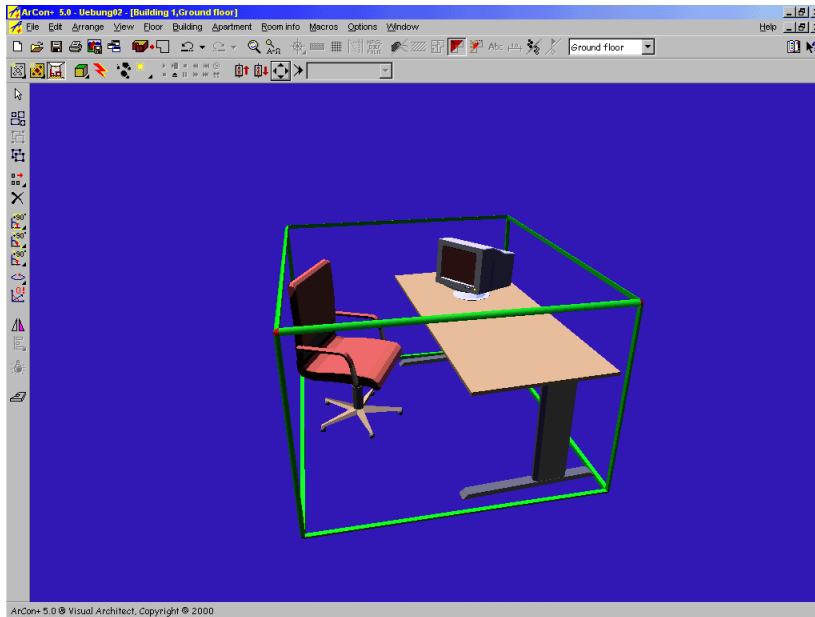
Right-click the **Copy** icon ![icon] (see page 432). In the dialog box that appears, select **To right**.
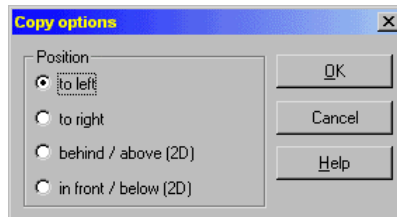
Acknowledge the dialog box with **OK**.

Now left-click the **Copy** icon ![icon]. The group, including the desk, chair, and monitor is copied to the right, giving you two copies of each object.
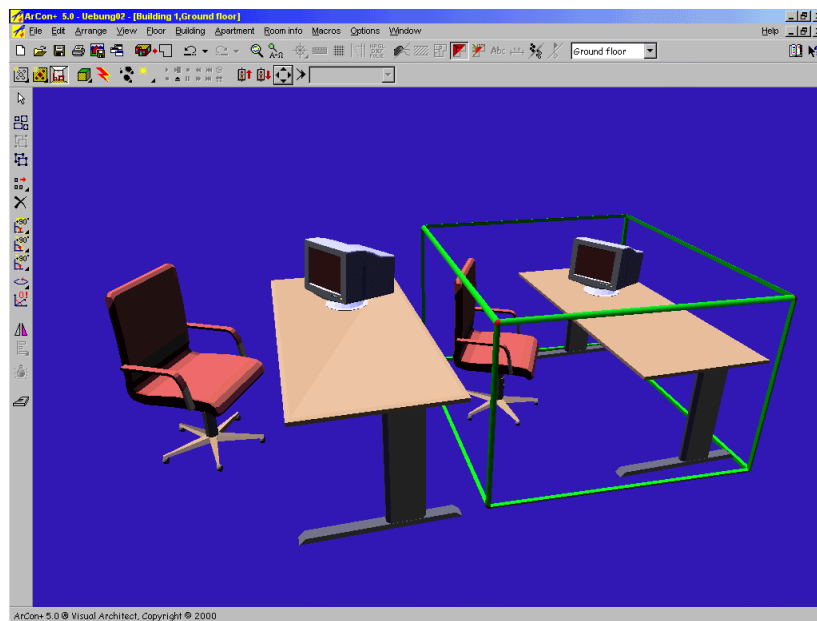
2.3.3   Tutorial03.acp

Objective: Position and configure lamps, switch from day to night, and raytrace the picture.

Load **Tutorial03.acp**. The following picture appears:
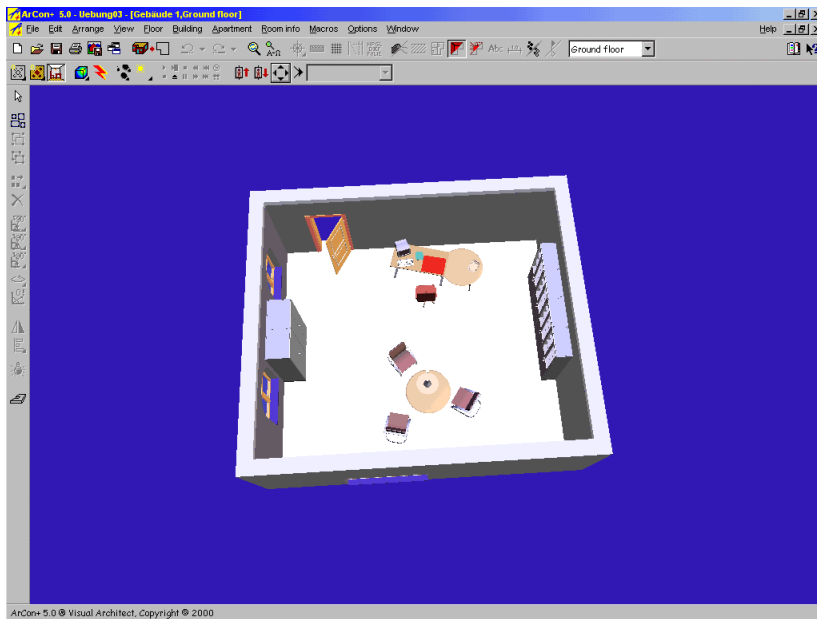
Click the ![icon] icon (see page 396). Here you can change the setting from day to night. Click the **Night** icon. You will see that the lamp in the room lights the interior and objects.

Because the snapping function needs to be deactivated in Design mode in this exercise, right-click the **Select** icon ![icon]. Then select the **Off** option in the dialog box that appears. Select the lamp and copy it by clicking the ![icon] icon (see page 431). Position the second lamp over the desk.
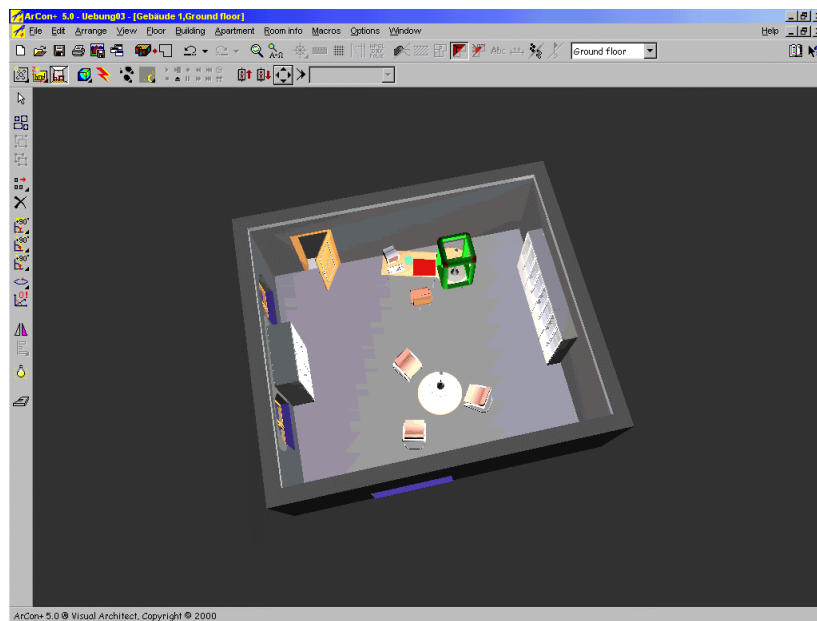
Note that the lamp rises when releasing the mouse button, contrary to the monitor from the first tutorial that fell downward.

Double-click the second lamp (the one above the computer desk); the following dialog box appears:
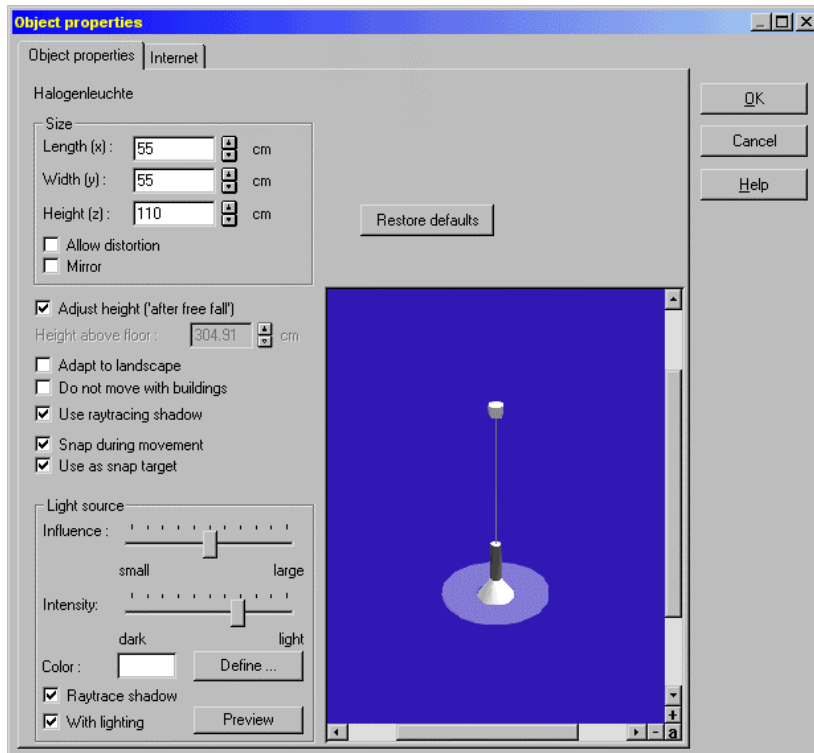
Select **Define…** in the **Light source** section and in the **Color** dialog box that appears, select the color red.
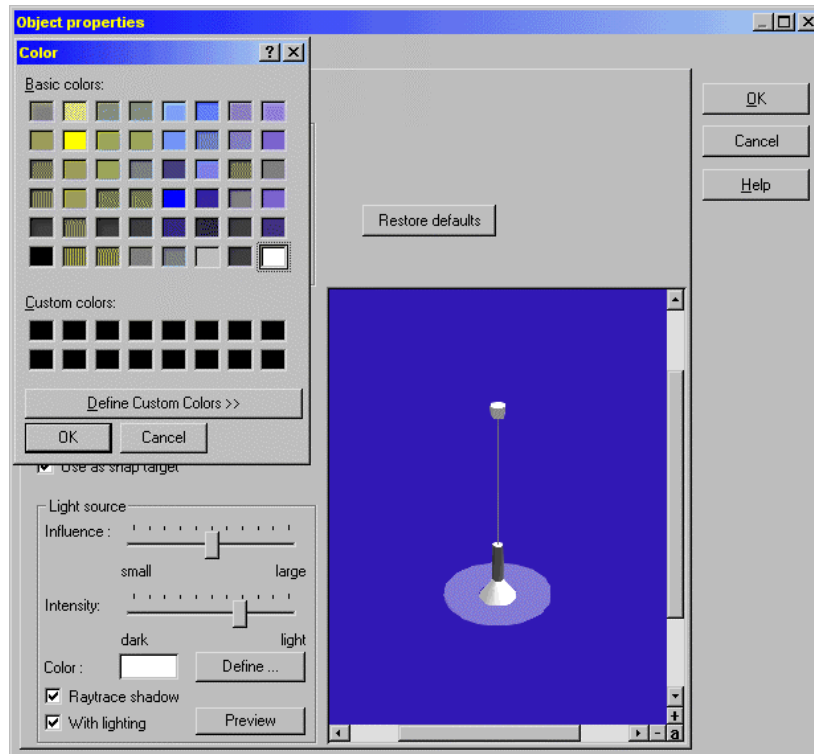
Acknowledge this dialog box with **OK**, then close the **Object properties** dialog box with **OK**. You will see that the lamp on the desk is now a red light.

Right-click the **Raytracer** icon and in the dialog that appears, select **Raytracing**, and activate **Shadows**, **Reflections**, and **Refraction**. Acknowledge and exit the dialog with **OK**.
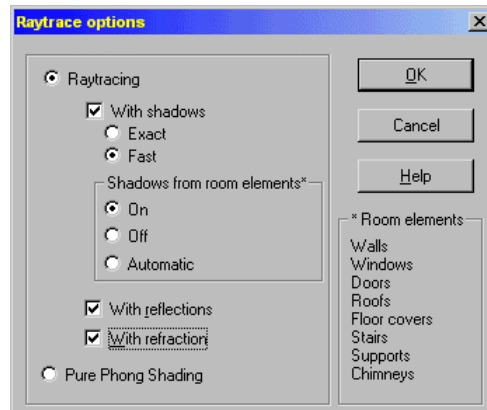
Now left-click the **Raytracer** icon to begin raytracing (see page 389). A progress bar is displayed at the bottom of the screen. You'll see the picture gradually refine itself, until the final raytraced picture is displayed:
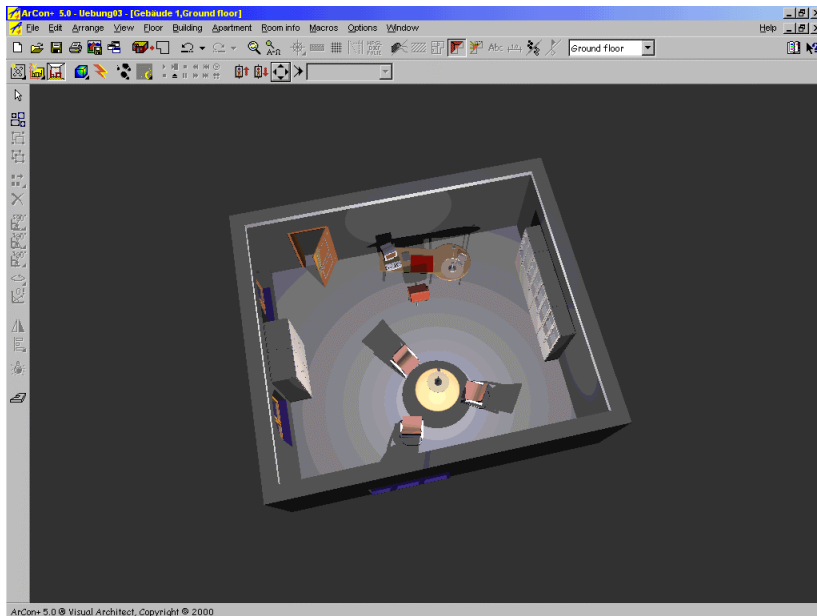
You have now created your first raytraced picture with ArCon!

2.3.4   Tutorial04.acp

Objective: Change object size

Load **Tutorial04.acp**.

Select the desk.

Double-click the desk to open its **Object properties** dialog box.

In the **Dimensions** section activate the **Allow distortion** switch and set the width of the desk to 180 cm. Acknowledge the dialog box with **OK**; you'll see that the size of the desk has changed.

With the desk still selected in Perspective view, move the mouse pointer over the corner points on each side of the desk. You'll see that the mouse pointer changes to a set of arrows. Left-click one of the corner points.

With the left mouse button held down, move the mouse and you'll see how you can change the size of the desk accordingly.
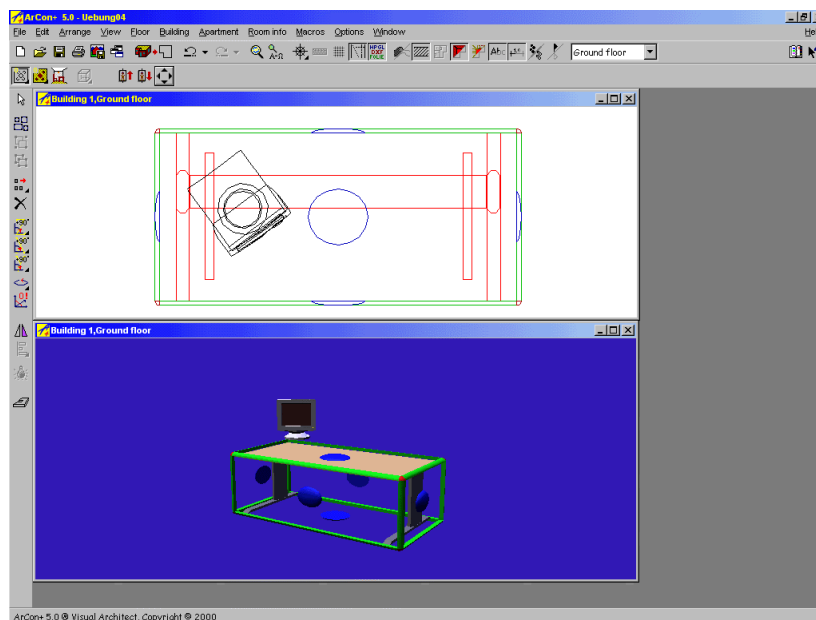
Release the mouse button.

Change into plan view, and click one of the corner points found on each side of the desk. With the left mouse button held down and moving the mouse, you'll see that you can resize the desk, just as in the previous step.

53

2.3.5   Tutorial05.acp

Objective: Walk through a building

Load the project **Tutorial05.acp**.

Click the **Walkthrough** icon (see page 394).

Position the mouse in the center of the window. You'll see that the mouse pointer changes.

1. Now move the mouse pointer over the display, without clicking any mouse button. You will see how the pointer changes depending on its position in the display. The pointer symbols suggests which direction you would move if you were to click the left mouse button.

    No movement

    Walk forward

    Walk backward

    Step right

    Step left

    Walk left and forward

    Walk right and forward

    Rotate left

    Rotate right

2. Position the mouse in the center of the window, then click and hold down the left mouse button. As you slowly move the mouse upwards (and around) you will see that

you move around in the appropriate direction. Note that the farther the pointer is from the center, the faster you'll move in that direction.

3. Practice the movement and walk through the loaded project.

Note: If a Joystick or a Spacemouse is connected to your computer, you can use this controller for walking through.

Additional information on the Spacemouse can be found on page 667. The operation and button assignments for joysticks can be found on page 665.

2.3.6   Tutorial06.acp

Objective: Work with the object, material, and texture catalogs

Open the file **Tutorial06.acp**.

ArCon's Design mode is opened (see page 90) without any loaded objects. On the right side of the display is ArCon's catalog of objects, materials, and textures. If for some reason you do not see the catalog, click the [icon] icon to the left of the question mark in the upper right corner of the display. This icon opens and closes the catalog.
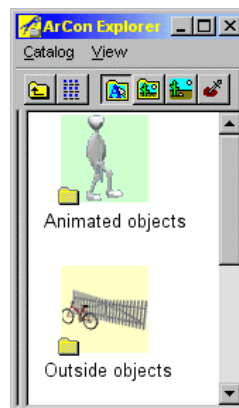
In the catalog, scroll down to the folder **Outside objects** and open it by double-clicking it. Next, open the folder **Balconies**. Select one of the objects named **Balcony** by clicking it. Click it and hold down the left mouse button and drag it into the project window. Release the mouse button to place the object. The balcony is positioned accordingly.

The top row of icons in the catalog lets you switch between objects, textures, and materials. Click the **Textures** icon [icon] to display the available textures. Like objects,

55

textures are saved in folders so they're easy to find.

Double-click the folder **Floor** and then the folder **Wood**.

Select one of the types of wood by left-clicking it and holding down the mouse button. As above, drag the texture into your project and place it on an object where you want to the new texture. Release the mouse button to place it.

Note: Not all elements in ArCon can be provided with a texture. If the mouse pointer is over an element, which can receive a texture, the mouse pointer changes to:

otherwise the pointer looks like:

With this method you can provide furnishings, walls, floors, and ceilings with textures.

Note: If you provide a wall with a texture, ArCon automatically applies it to the entire room. If you want to apply the texture to only one wall and not the whole room, in Construction mode (see page 88), double-click the desired wall and change its properties there.

There is much more you can do with the catalog of objects, textures, and materials. For more information, please see the appropriate section in the manual (see page 443).

2.3.7   Tutorial07.acp

Objective: Construct a simple room in Construction mode

Open the project Tutorial07.acp. An empty work area appears.

Select from the left toolbar the **Insert wall** icon .

Click once in the empty work area in the bottom left, and again in the lower right (keep the wall perfectly horizontal). Continue by clicking at the upper right (again, keeping the line straight), and again at the upper left (keeping the width of the wall the same as the one you just drew below). Click one last time at your starting point (in the lower left) to complete the four walls. Make sure you click a grid point, i.e. the red cross, which appears during the input, is positioned on one of the many small points. This helps you achieve accurately vertical and horizontal walls.

After clicking again at the first point, press the **Esc** key to stop drawing walls. The picture should look like the following:
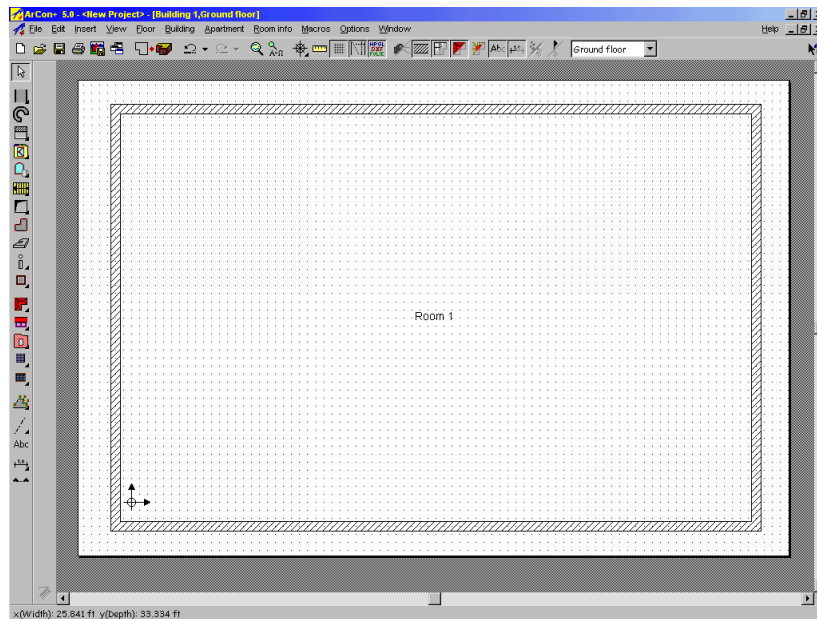
Next, the room is to be divided centrally with another wall. For this, click the ⚔ icon (see page 207), in the right vertical toolbar.

First click at the left lower interior corner of the room, then in the right lower interior corner of the room. After the second click you can see a center point in the middle of the lower wall (which defines the horizontal location), and by moving the mouse up and down a line is drawn through the center of the room, following the mouse. Now you can set the (vertical) start and end points of the wall. Move the mouse to the upper wall and click again. This sets the starting point of the wall. Move the mouse back down to the lower wall and click a final time to complete the central wall.
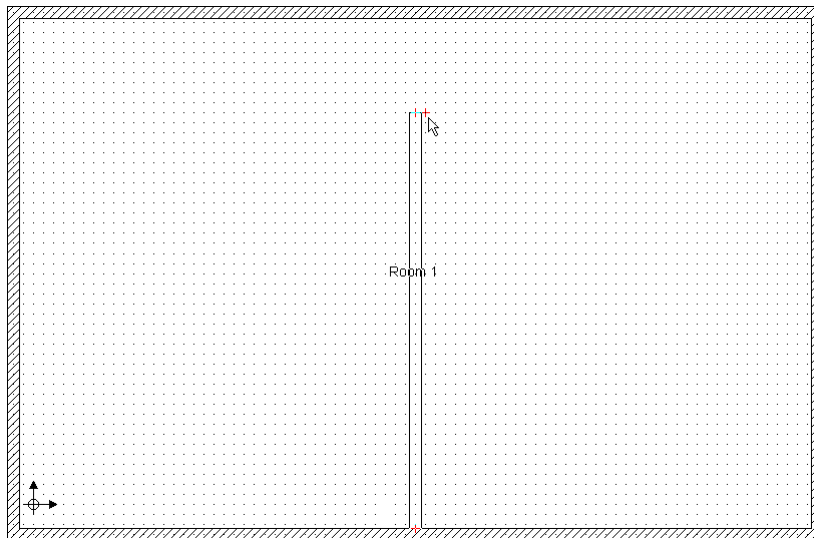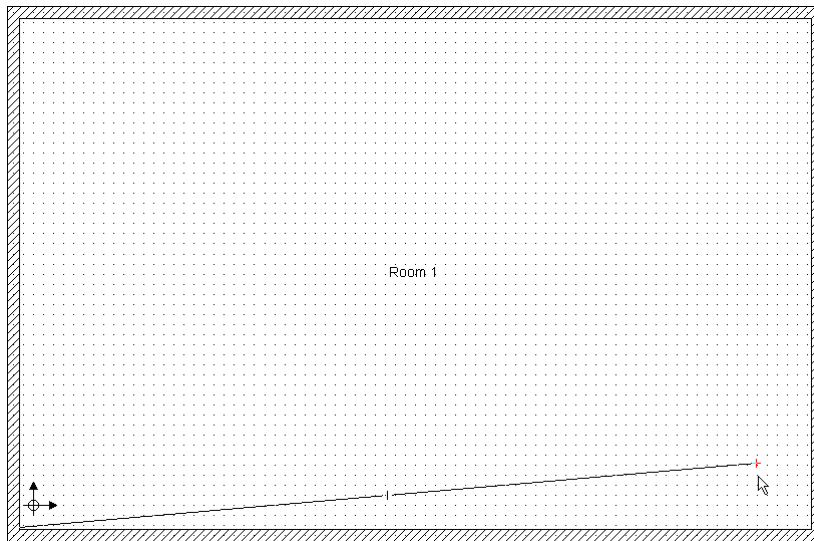
2.3.8   Tutorial08.acp

Objective: Add windows and doors

Open the project **Tutorial08.acp.** This is a result of previous tutorials. You must be in

58

Construction mode to add doors and windows. Click the **Door** icon 🖾 and select a door type.

In the right vertical column you have three icons (options) for placing the door. Select the first icon (door, free position). Position the mouse in the center-dividing wall, and the selected door appears.
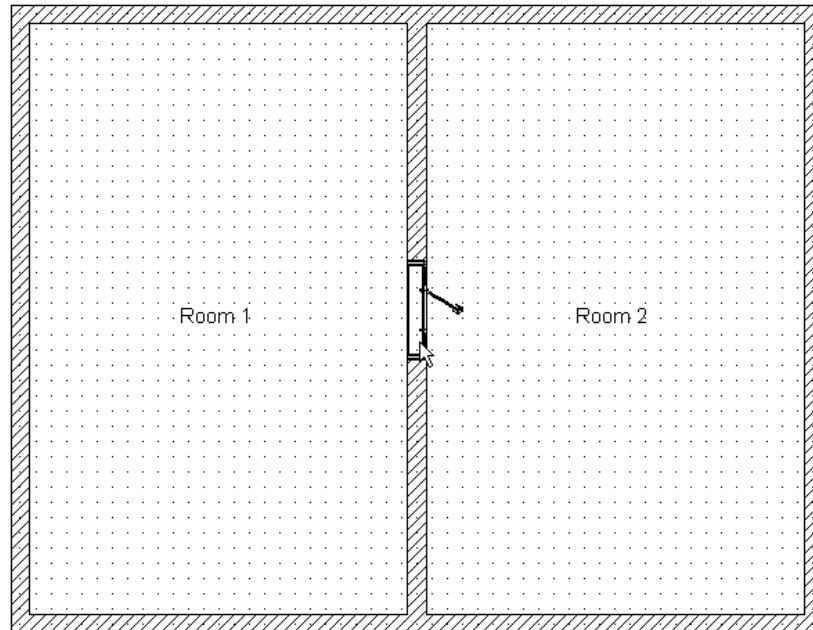
Click once to insert the door in the wall.

Now click the **Windows** icon 🖾 and select a window type. This time, select the option **Insert window midway** 🖾 (see page 227).

In the right room, click once in the upper left corner of the room and then in the upper right corner of the room. The selected window is positioned centrally in the upper wall of the room.
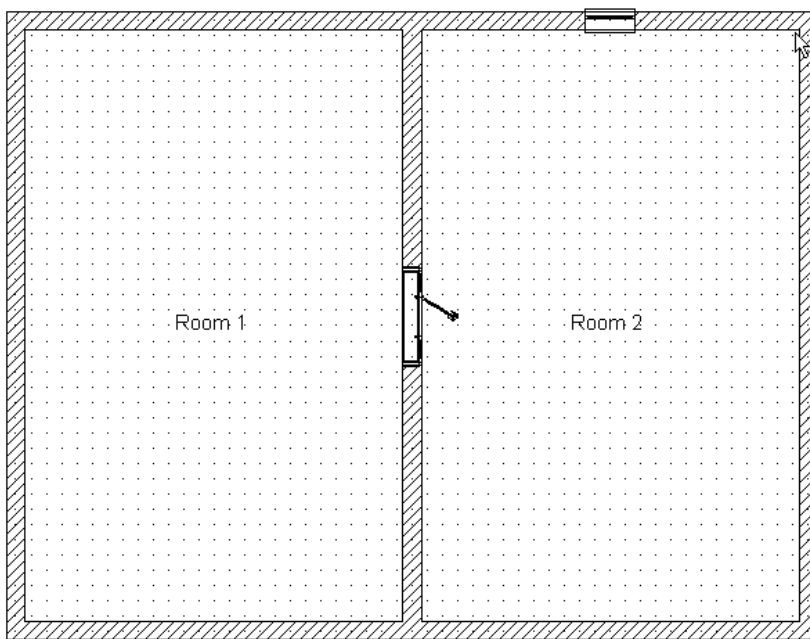
Position as many doors and windows as you like.

Tip: By clicking the Design mode icon 🔲▸🏠 you can view your doors and windows from any direction.

2.3.9   Tutorial09.acp

Objective: Place stairs

Load the project **Tutorial09.acp**. This is a result of previous tutorials.

In Construction mode, click the **Stairs** icon 🔲 and select one of the *yellow* multi-function icons 🔲 (wooden stairs).

Move the mouse into the work area and you'll see the following symbol:
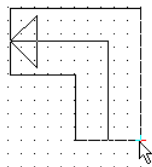
Now click as shown in the following diagrams in order to position the stairs.
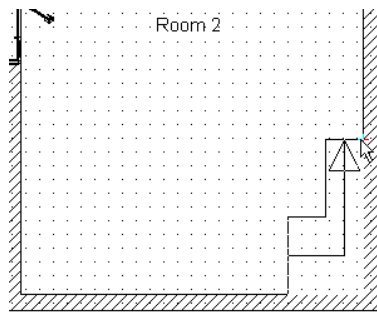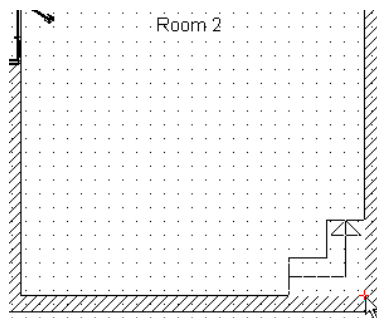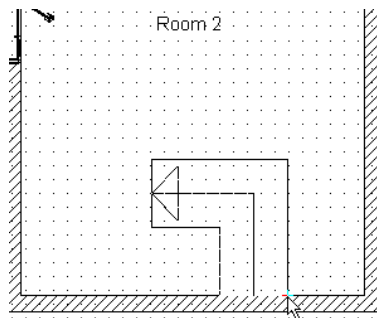
After the third mouse click a dialog box will appear, with a preview of the stairs. For now you do not need to make any modifications, so go ahead and close the dialog with **OK**.

Change back to Design mode by clicking the ⬜▸🟥 icon (see page 106) to view the finished stairs.
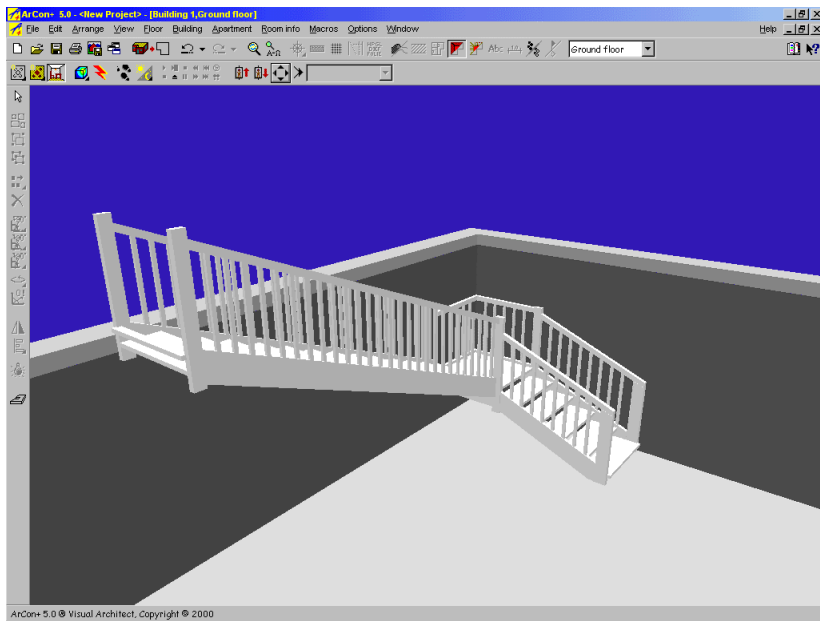
Click the **Show all** icon , then the **Move viewer** icon (the *down* arrow), until you see your complete floor from below. Then you'll see that ArCon automatically generates a ceiling cutout in the ceiling of your room over the stairs.

Again select the icon to go back to Construction mode. The blue dashed line at the edge of the stairs indicates the ceiling cutout.

Click the icon (see page 189) and then click inside the blue area around the stairs. The line is now marked in red, with boxes at the corner points cutout.

Now click the points shown in order to move it.
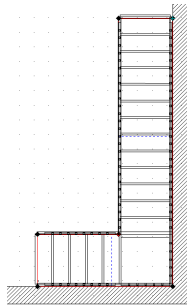
When clicking the corner points to move them, keep the mouse button held down you move the point around; releasing the mouse button sets the point.
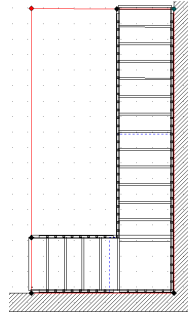
To check your changed cutout, go back to Design mode and again view your room from below. The ceiling cutout over the stairs will have changed size and shape, according to how you adjusted it.
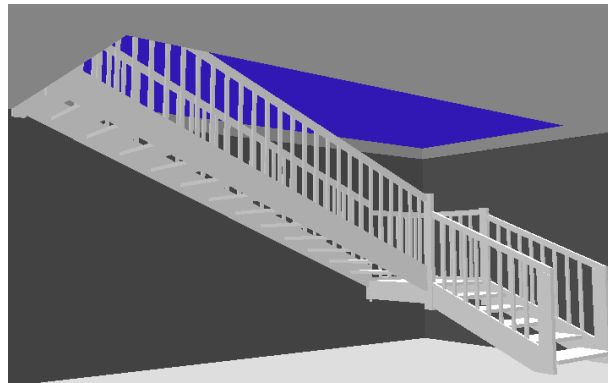
2.3.10   Tutorial10.acp

Objective: Learn to work with floors

Load **Tutorial10.acp**. A complete floor is loaded.

Select the menu **Floor – New top floor…**

Change the settings in the dialog box that appears:
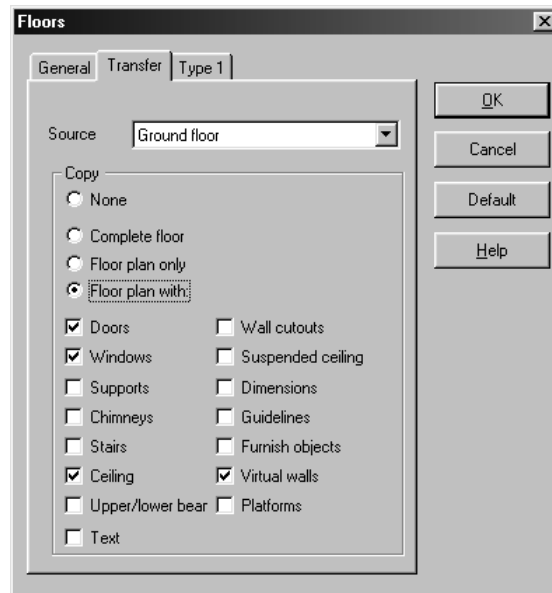
Confirm your entry with **OK**.

Note: Virtual walls and Type 1 tab are only available in ArCon+.

Notice how a new floor is created and structured, without any effort on your part. Observe that all doors and windows, but no furnishings have been copied from the previous floor. According to other adjustments in the **New floor** dialog box, you can also copy the furnishings.

Select the menu **Floor –Visible floors…** and in the dialog box that appears select **Current floor**. Confirm your choice with **OK**. In the display you will now see only the upper floor.

Next click the floor selection list:
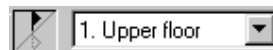
Then select the **Ground floor**. Observe that now the upper floor has disappeared and the ground floor is shown.

Select the menu **Floor – Edit current floor…** and input in the dialog box a floor height of 3.50m. Confirm with **OK**. In the following **Floor height** dialog box accept the default **Move all floors up** and confirm with **OK**. See how the floor height is automatically changed to meet the new height. Nothing else is affected, except the stairs (which are adjusted to reach the new top floor).

3 BASICS

3.1 OVERVIEW

While using ArCon you will find many things in common with other Windows programs. Of course, the individual program functions and details are different, being adapted to the special needs of design and planning. If you have already worked with other Windows programs, you know the basic operation of the Windows user interface. You know, for example, how to select a menu option from a menu, how to open and minimize windows, and how to launch and exit a program. If these operations sound unfamiliar, or if you aren't comfortable with the Windows user interface, the time has now come to reread your Windows documentation.

Standard Dialog box
The Load, Save, Print dialogs are standard dialogs from Windows 95/98

Standard Dialog box with Preview
The Object Load and Texture Load dialogs have preview windows to preview the object or texture that you intend to load. This option can be disabled.

3.2 DISPLAY STRUCTURE
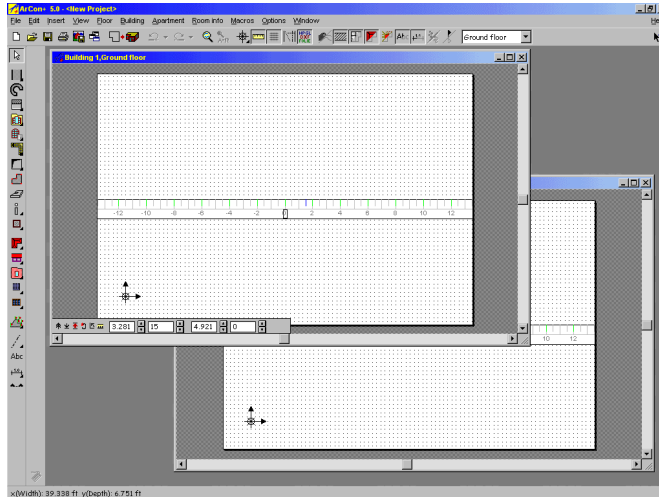
As with other Windows programs, ArCon consists of a menu bar at the top of the screen, as well as one or two toolbars under the menu bar, and one or two at the left side of the display. The menu bar has three different views (variations). The first is displayed when all projects are closed. It consists only of three menu options: **File**, **Macros** and **Options**. The second view of the menu bar is displayed when you're editing a project in Construction mode (see page 88). This version of the menu bar lets you carry out adjustments, which are valid in this mode. The third variation of the menu bar appears in Design mode (see page 90). Some sections of the menus are the same in both Design and Construction mode, but other sections are different because the program adapts according to the functions used singularly in one mode or another.

Besides the menu bars are the toolbars. The toolbars are arranged sets of icons, which serve to access program functions or change the view. In the horizontal toolbar that appears at the top, under the menu bar, you'll find icons, which are used throughout the whole project. The second horizontal toolbar, located directly under the first, is available only in Design mode. Here you can make adjustments related to Design mode functions, and changes to the view.

Besides the horizontal toolbars, ArCon uses vertical toolbars, which are always arranged at the left-hand side of the display. In Construction mode, these let you select different tools. In Design mode you can edit your furnishings with these icons. Both the

upper horizontal and the left vertical toolbars are always displayed, in both Design and Construction mode. But the icons in them change depending on the mode. The second horizontal bar appears, as already mentioned, only in Design mode. The icons in it serve to make adjustments that apply to your work and current view. If you have several open views of your project, any change of view applies only to the topmost window. The second vertical toolbar appears only in Construction mode. Where the first (leftmost) vertical bar lets you select *what* to input, the second bar lets you decide *how* to input the desired component.

3.3   DETAILS OF THE TOOLBAR

The individual icons on the toolbars behave similarly to icons in Windows programs. By left-clicking them you can activate or deactivate functions. You can also open dialog boxes for additional procedures with these icons. Many Windows programs also behave like ArCon's toolbar because you can access multiple functions from a single icon. These multi-function icons can be identified with a small black triangle in the lower right corner. To access the alternative functions of these multi-function icons place the pointer over the icon and move it over the alternative icon and select it by left-clicking it. When you select a new function, that icon appears in the toolbar. You can also open the multi-function icons by simply holding the mouse pointer over that icon in the toolbar. As you move the mouse over the alternative icons with the mouse button held down, descriptions for each icon are displayed in the status bar at the bottom of the display. When you encounter multi-function icons in this manual, all alternatives are shown next to each other.

Besides using multi-function icons, you can right-click an icon to open a dialog where you can make adjustments.

If the resolution of your display is not high enough to display all icons in an toolbar, you can move the contents of the bar to access all icons as follows: Position the mouse pointer over the toolbar so that it is not over an icon. The simplest place is between two icons, which are not placed directly next to each other where there is a small gap. The mouse pointer changes to a hand. Then click and hold the left mouse button and move the mouse (depending upon the bar, either left/ right or up/down). The contents of the toolbar are shifted accordingly. Note that this function is only available if some icons cannot be seen on screen.

3.3.1 ArCon OS enhancements on the screen

Both ArCon and ArCon+ can execute macros using ActiveX. Some of these macros are available from Eleco Software GmbH. They can also be created with the help of an additional module for an ArCon OS programming environment (see also *support for ArCon* section at the end of this manual).

Macros, which result from an ArCon OS extension, can be called from within ArCon as a new menu or as a new menu in an existing menu. Also there can be additional icons in the vertical or horizontal toolbars, or additional register and fields within a dialog box.

Please note that additional new menus are specifically identified. New menus are identified with a small icon before the function text.
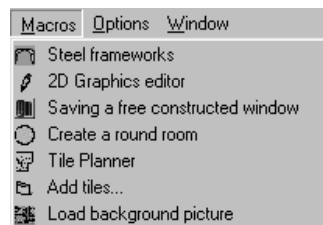
New toolbars are likewise characterized; they are simply added to the appropriate toolbar. A special icon identifies additional tabs that appear in certain dialog boxes.

Because of the complete integration of the ActiveX extensions into ArCon, they appear as if they were always part of the basic ArCon program. You can use these new program functions without special or previous knowledge.

Macro files must be located in the subfolder STANDARD\MACROS. They will be loaded into ArCon together with the respective program icons, and added to the **Macros** menu.

In the file MACROS.INI which must likewise be stored in the MACROS folder, you can specify individual macros to be loaded. This way you can specify, for example, that a particular macro appears only in Construction mode and not in Design mode.

The **Macros** menu is available to you in the menu bar even if no project is loaded. But only macros that function in this mode (with no project loaded) are available.

3.4   CONSTRUCTION AND DESIGN MODE

A principle concept of ArCon is operating in two different modes - Construction mode and Design mode.

In Construction mode you enter all structural elements of your apartment or house. These include walls, windows, doors, chimneys, and roofs. In Design mode you place your objects, such as furniture and accessories. You can also change the appearance of your plan, for example, choosing wallpapers, bricks and tiles.

In Construction mode you always operate in a 2D view. In Design mode you can use different views: 2D view similar to Construction mode view, Plan view (color) or Perspective view in which you can change the viewpoint.

3.5   WORKING WITH FLOORS

ArCon lets you plan and visualize buildings with virtually as many floors as required. Only your hard disk space limits the number of floors you can use, however generally little hard disk space is required for most buildings.

In order to work easily with a number of floors, you can make additions and changes to any particular floor in Construction mode. You can switch at any time between floors, but you can only view and edit one floor at a time. In Design mode you can show all floors simultaneously, in order to get a complete view of a building or you can limit the display to a single floor.
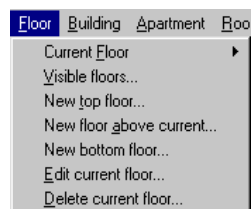
You will find details on floors beginning on page 129.

3.6   SPECIAL KEYS

ArCon is almost completely controlled with the mouse. Exceptions include the input of

values (numbers), entries in dialog boxes and some special keyboard controls. In the appendix you will find a list of all defined key assignments and their uses. The control key (**Ctrl**) in ArCon has a special use, as does the **Shift** key. These two keys are used in ArCon to modify certain functions and behaviors.

3.6.1   Control key (Ctrl)

The Control key (**Ctrl**) suppresses certain dialog boxes, which normally appear after clicking an icon in ArCon. If you press the **Ctrl** key while clicking an icon, the dialog box that normally appears does not appear. In such cases where the dialog box does not appear, the settings, which you previously made, are used. If you made no changes to the default settings, the default settings are used. In general, pressing the **Ctrl** key while clicking an icon has the same effect as clicking the icon without pressing the **Ctrl** key, then closing the dialog box with **OK**.

3.6.2   Shift key

In contrast to the **Ctrl** key, the **Shift** key adds control to certain operations. Pressing the **Shift** key during certain operations in Construction mode extends the function of the operation. The **Shift** key thus can help you complete difficult constructional functions. Details on using the **Shift** key in such operations can be found in the descriptions of the individual functions in Construction mode (see page 161).

Using the **Shift** key (and the **Ctrl** key) when walking through (see page 394) a project has a special purpose. If you are walking through a project and you press **Shift** or **Ctrl**, the speed of the movement is accelerated by a factor of 4; if you press both keys simultaneously, the speed of movement is accelerated by a factor of 16. You can use this function to quickly move from one area of a project to another.

3.7   LAYOUT VIEW

ArCon uses WYSIWYG (what you see is what you get) technology for your 3D plans. Your printouts will match exactly what you see on the screen. To facilitate this there are two different views: **Normal view** in Construction mode (see page 88), in which your work area is *unlimited*, and **Layout view**, in which the edges of the paper are also

displayed in the work area. If you are in the **Layout view** you will see what you will receive on the printout. Also in **Layout view**, there is the menu **View – Whole page** to show the entire page (this option is not available in **Normal view** since it's only applicable to the **Layout view**). From the **View** menu, the menus **Normal view** and **Layout view** let you switch between the two display modes. The two display modes are also available in the 2D view of Design mode. Note that the **Layout view** is particularly useful if you want to shift your entire plan on the page (see page 71).

3.8   POSITIONING A PROJECT

In the 2D views, in both Construction and Design mode, you can increase or decrease the zoom level, or display size, arbitrarily to see and work on details of the project. This is controlled with the two icons 🔍 and 🔍, the menus **Zoom in**, **Zoom out** and **Show all** from the **View** menu. If you are in the **Layout view** (see page 70) you can also display the entire printed page with the menu **View - Whole page**. If you notice in this view that it is only partially on the page, then it would also only appear partially on a printout. You have several options to move your plan to the *correct* position.

1.   You can change the scale to make your project smaller and relative to the page.
2.   You can change (enlarge) the paper format.
3.   You can shift the page under your plan (without disturbing the plan).

To do this, proceed as follows: Change to **View - Layout view** (in Construction mode) and zoom out (see page 127) so the page is small enough that you see the gray margin area around your page on all sides or select **View - Whole page**.
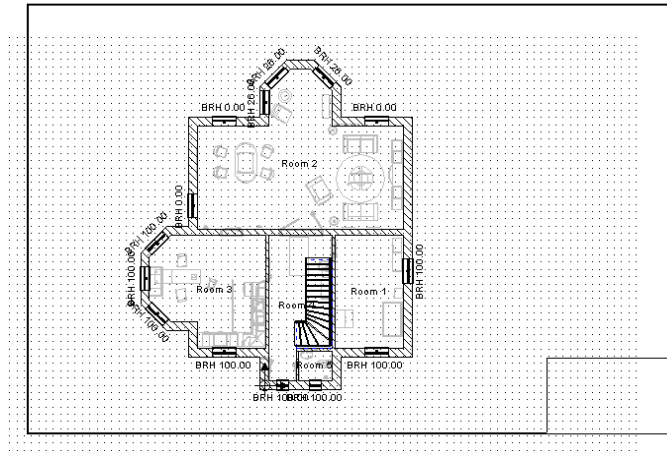
Next, click the page margin (at the edge of the page) and keeping the left mouse button held down, move the mouse to move the page. This moves the page but does not affect the plan, so you can position the page so that the entire plan is visible on the page and in the desired location on the page. Release the mouse button to set the page.

3.9   SOUND

ArCon can make sounds upon certain actions. These actions include opening and closing doors and walking through a project, for instance. These sounds can only be heard if your PC is equipped with a sound card.

There are three good reasons to disable these sounds:

You do not have a sound card. In this case you should switch the sounds off to prevent the program from using CPU cycles to generate sounds you cannot hear.

You find the sounds distracting or loud.

You want to achieve an optimal rate when walking through a project. Since generating sounds require CPU cycles and can slow down the graphics, switch off the sounds to assure the fastest possible display and rendering speed.

3.9.1   Sound dialog box

The **Sound** dialog box lets you enable or disable individual sound actions:
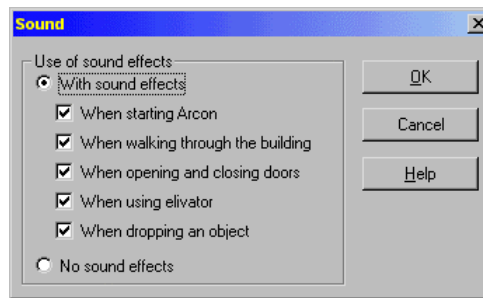
You can open this dialog box with the menu **Options – Program – Sound**.

3.10 OBJECT PREVIEW WINDOW

In each dialog box for adjusting object properties, ArCon gives you a preview window. This window shows you the object with the current settings and values. Any changes or modifications you make in the dialog box, whether object dimensions, surface properties or otherwise are immediately reflected in the preview. However, if a dialog box has a **Preview** button, it's there because this object requires complex calculations that make constant updating of the preview window prohibitive (stairs are one such object). So after making changes, you can click this button and the preview window will be updated to reflect the changes. Objects can be viewed from any angle in the preview window.

The following shows an example of the preview window:
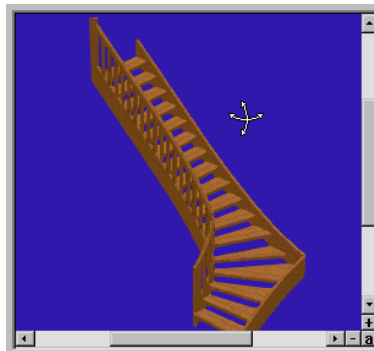
If you position the mouse pointer in the preview window, the pointer changes to:

3.10.1   Rotation

Left-click in the preview window and keep held down. Move the pointer back and forth and you'll see how you can rotate the object in all directions.

3.10.2   Zoom

At the lower right corner of the preview window, you'll see three small icons. The **+** icon on the right side lets you zoom in on the object. The **-** icon on the bottom lets you zoom out. In the corner lies a small **a**, which returns the zoom level to its original size.
You can also zoom in and out with the mouse pointer in the window itself. Click and hold down the right mouse button, and you can move the mouse upwards to zoom in, and downwards to zoom out.

3.10.3   Movement

At the bottom right of the preview window are sliding controls. They work like regular Windows scrollbars; click them and move the mouse to move the view around the object. Click the small **a** in the lower right corner to reposition the object in the center of the preview window.

3.10.4   Animation

If you are working with an animated object (see page 424) there are additional controls in the preview window. Underneath the preview window is a sliding control that you can grab with the mouse pointer and move forwards and backwards through the animation. To the right of this slider are **Play** and **Stop** controls so you can let the animation run automatically.

3.10.5   *Using a spacemouse in the preview window*

If a Spacemouse is connected to your computer, you can use this along with the mouse for rotation, zoom and movement of the object in the preview window.

Additional information on the Spacemouse can be found on page 667.

3.11   DIAGRAMS IN DIALOG BOXES

Some dialog boxes (windows, dormers, wall cutouts etc.) contain diagrams, which are displayed to clarify the values to be entered.

In order to position the pointer in the input box inorder to change it's value, you have two methods: you can either click with the mouse directly in the input box, or you can click the relevant part of the plan. Besides entering a value into the input box, you can double-click the relevant part of the plan, which will open a dialog box to enter the value directly.

3.12   OUTLINE EDITOR

In version 5.0 and later, a number of dialog boxes can be used to define the 2D outline of objects and construct elements. The Outline Editor is *A program within a program.* This comprises of a working area with a toolbar above it.
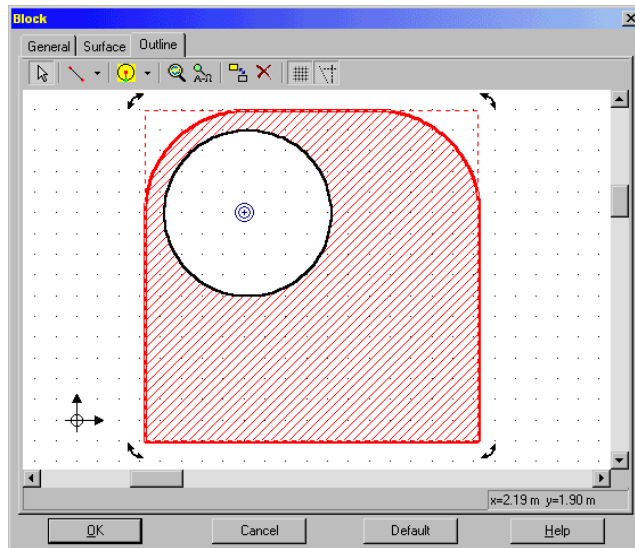
There is also a status bar below the working area, which displays information on using this function. At the right of the status bar is a display of the current position of the cursor relative to the origin point for the working area. Before dealing with the individual elements of the outline editor in more detail, here are a few basic notes on its use:

- The outline editor is used only for creating one or more 2D surfaces which consists of lines, circles and ellipses. Cutout holes can be added to these surfaces.
- The outline editor is used to enter outlines. This is carried out separately for the exterior outlines of a surface and the outlines for any holes. Just as in Construction mode in ArCon, the editor provides guidelines for you to use, as well as guide squares, circles, ellipses and segments of circles and ellipses.

Entering the actual outlines, whether for holes or external borders, is normally carried out in *two* stages:

1) Guide elements are used to create an *image* in the working area, which contains the actual edge to be created.

2) Once the edge (and usually other design elements) has been created using guide elements, the edge is completed using the relevant editing tools (or) to define the actual border for a surface or hole.

76

The entire process is comparable to constructing surfaces using a pencil, set square, ruler and pen. First use the pencil, set square and ruler to construct the necessary corner points and outlines for edges, and then complete them using a pen. If you follow this principle for using the outline editor, you will very quickly be in a position to create some quite complex outlines. For very simple outlines, it may not always be necessary to use guidelines. There are predefined outlines for squares and circles available for this purpose.

When creating edges based on guide elements, there is an extra tool, which automatically detects the type of object you are creating. For example, if you are creating a semicircle, the radius and the start and end points for the semicircle will be recognized, along with its intersection points with other Guidelines.

Ideally, you should spend some time experimenting with the various input options for guide elements and edges. Keep the principle of *sketch with pencil* (=guide lines) and complete using the pen (= tool) in mind.

Once a complete outline has been entered, the outline editor will automatically detect that the outline has been completed and will highlight the inside of the element in color. If you then click inside a closed edge, it will be highlighted in red and you can move it as a unit.

The same keyboard shortcuts as when using construction elements in ArCon can be used both when moving elements and when entering elements. Using **Ctrl+F** multiple times will use the various possible snapping points, and **Ctrl+W** moves the different corner points for the element being moved towards the mouse. This can be used to snap a corner point on a edge to two intersecting guidelines, for example.

3.12.1   *Select icon in the outline editor*

The icon is used for selecting different elements in the outline editor. The elements which can be selected include guide elements, surfaces created from closed outlines including holes, individual sections of an outline and individual outlines, for example, the hole on a surface.

An element is selected by first clicking the icon. Selected elements are highlighted in red.

Note: In order to distinguish selected outlines from selected surfaces, selected surfaces are displayed with red shading. This means that if only the outline of a surface is marked in red, the outline is selected on its own, but if the surface has red shading, the

entire surface (the outline and holes) is selected.

If during the selection process you click an area where there are several different selection options because the area under the mouse is an individual area and also part of an outline and therefore part of a surface, for example. Clicking it several times will run through the different options. The markings will indicate what's currently selected.

Regardless of what you have just selected, you can then delete the selected elements by clicking ✕ or by pressing the **Del** key, or you can move the elements by moving them with the mouse button held down once they have been selected.

Clicking an area where there are no elements or if you hold down the **Ctrl** key when clicking (which prevents the element from being moved when clicking a selected element) and then dragging out a rectangle with the mouse button held down, will select all the elements within that rectangle.

These elements can then be moved or deleted while holding down the **Shift** key.

3.12.2   *Rotating surfaces* ⊕

If you have selected a surface (displayed with red shading) and you click the surface once again, it will be displayed with a dotted rectangular frame. There will also be a rotation arrow at each of the end points of this rectangle. Click these rotation arrows to rotate the selected surface. In this process the point marked with ⊕ after the element has been selected will be used as the center point. This center point can also be moved just like a normal element.

As mentioned before, holes can also be rotated after they have been selected.

3.12.3   *Creating holes in surfaces*

If you create an outline, which is fully inside another outline, it will automatically be detected as a hole when complete.

However, if you have created an outline outside the first outline and you move it inside the first one, it will not automatically be detected as a hole. The inner outline can still be converted into a hole, after it has been selected. Conversely, selecting holes can be converted into surfaces using .

3.12.4 Intersecting outlines

If you have created two outlines and one of them is partially covering the other, these two edges will not be merged together automatically, but will be left as separate edges. In order to merge the two edges, you need to delete the relevant parts of the individual edges and insert new edge segments at the intersecting points as necessary.

3.12.5 Guide elements in the outline editor

Clicking the left icon ▾ of the two icons will display a list of possible guide elements.
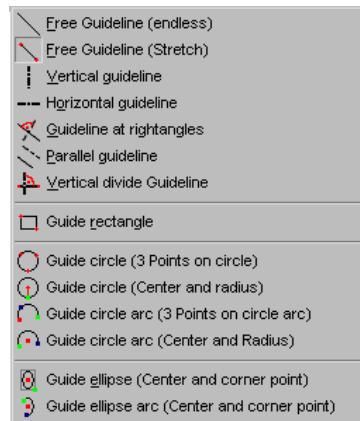
For guidelines in the outline editor there are very similar input methods as for guidelines in Construction mode. In addition to simple guidelines, there are guide squares, rectangles, circles and ellipses, as well as circle and ellipse segments which can be used especially for drawing outlines to represent parts with specific shapes.

Depending on the type, you may need to click multiple times when using these guide elements. The sequence of clicks is given by the symbols. The first element clicked is displayed in red, the second in green and the third in blue.

As explained in the introductory section, the guide elements can be used to construct the outline itself. The outline can then be completed using the edge tools described below.

ArCon

3.12.6   Edge tools

Clicking the right-hand icon ⚫ of the two icons will display a menu containing all the available edge tools.

When using edge tools you can snap to guide elements, to intersections for guide elements and to corner points for edges.

3.12.6.1   Edge tools ✏️ ╱

These two tools are used to complete edges. The ✏️ icon is used to complete existing guide elements and ╱ is used to create a free edge.

If you have selected and clicked ✏️ at the start of a guide element or on the intersection of two guide elements, that element, or one of the two elements can be completed. The outline editor will automatically detect the type of guide element and will complete it through to the next intersection point with another guide element or to the end of it.

If there is more than one possible option for completing the element, for example, because there are several guide elements intersecting at one point, the guide element closest to the mouse will always be selected. Therefore, moving the mouse in a certain way will affect which guide element is used.

3.12.6.2   Square and Circle Edge tools ▢ ◯ ◉

Unlike the tools described above, ▢, ◯ and ◉ are used to create complete edges (squares and circles). The only difference between ◯ and ◉ is the type of input.

3.12.6.3   Rounded corner Edge Tool ⌐

This tool ⌐ is used to round off corners on the edge after it has been created. To do this, move the mouse close to a corner you want to round off and then set the radius by moving the mouse. The dialog box, which appears after the final click allows you to change the set radius interactively, in the corresponding input box.

Note: If the **Ctrl** key is held down while clicking, the rounding will be carried out immediately without the dialog box being opened.

3.12.7   Zoom and Show all 🔍 🔍

These icons are the same as in Design and Construction mode, except that in this case they relate to the working area in the outline editor.

Note: The section can be enlarged, reduced in size and moved using the arrow keys and the keys on the numeric input box.

3.12.8   Grid and Guideline ▦ 📊

These two icons are used to switch the grid on and off and to show and hide the guides.

Note: If the guides are hidden and you use 🖊 to draw guides, they will automatically be displayed.

3.12.9   Outline editor context menu

Right-clicking anywhere in the working area of the outline editor will open the context menu.

Show grid	Ctrl-R
✓ Show guide elements	Ctrl-H
Guide elements...	Shift-H
Guide element construction	▶
Segment construction	▶
Adjust image section	F4
Load plan from flie...	Ctrl-O
Save plan to file...	Ctrl-S
Program setup...	
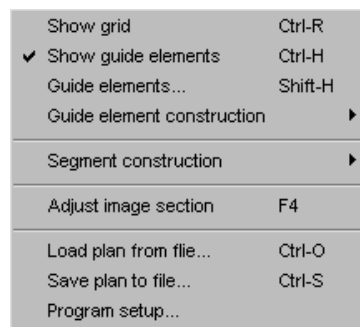
Note: The menu options **Transformation…** and **Delete selected elements** will only appear if an element is selected when the right mouse button is held down.

In theory, the context menu can be used to carry out the same actions as using the icons. For example, **Show grid** ▦ and **Show guide elements** 📊, **Guide elements construction** corresponds to the left of the two icons ▾, **Segments construction** to the right of the two icons ▾ and **Adjust image section** 🔍.

The other functions can only be accessed via the context menu. These are **Guide elements...**, **Load plan from file...**, **Save plan to file...**, **Program setup...** and, if an

element is selected, the options **Transformation...** and **Delete selected elements**.

3.12.9.1 Guide element dialog box
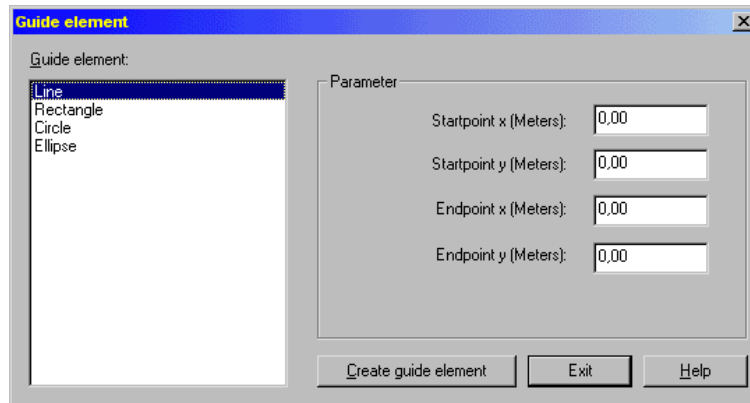
This dialog appears when you right-click in the outline editor working area and select the corresponding menu option in the context menu displayed. This dialog box can be used to construct different guide elements, where the corner points are not entered interactively but using the relevant input boxes.

The guide elements available are **Line**, **Rectangle**, **Circle** and **Ellipse**. Depending on what you select, the number of parameters possible for that guide element will be displayed in the **Parameter** section, and you can make the relevant settings there. The specifications here relate to the origin point in the outline editor. If required, clicking it and moving the mouse with the left button held down can move this point.

Once the settings have been made, click **Create guide element** to add the relevant guide element to the outline editor working area. This method can be used to create any number of guide elements using this dialog box without having to close it. After the last guide element, click **Exit** to close the dialog box.

3.12.9.2   Transformation dialog box
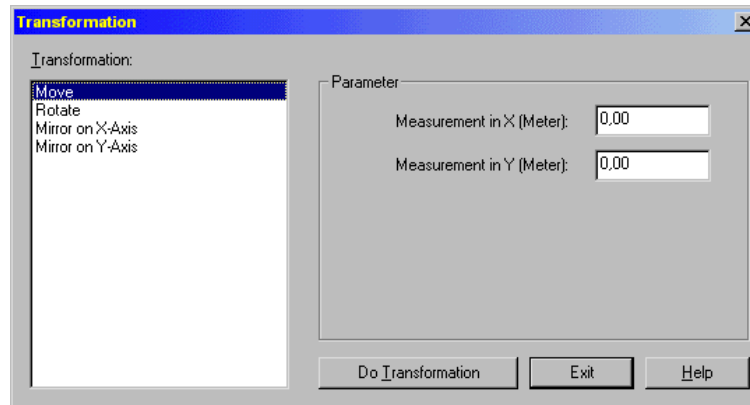
This dialog appears when you right-click in the outline editor working area, after an element has been selected, and selecting the corresponding menu option in the context menu displayed. This dialog can be used to change the position and orientation of the selected element or to create a mirror image of it.

The transformations available are **Move**, **Rotate**, **Mirror on x-axis** and **Mirror on y-axis**. The method for using this dialog box is the same as described in the previous section.

Note: When mirroring and rotating elements, the axis point ⊕ of the edge which is displayed when the dialog box is opened, is used as the reference point for edges. For guide elements, the relevant center point is used.

3.12.9.3   Load plan from file... and Save plan to file... menu

Right-click the outline editor working area and select one of the two menu options, which appear in the context menu displayed. Use the **Load plan from file...** option to load complete plans, previously saved, back into the editor.

Conversely, the **Save plan to file...** option can be used to save the current plan in the outline editor to a file, for example, to make it available to colleagues via a network. This means that plans created using the outline editor can be used completely differently in ArCon, for example, the outline for platforms in platforms.

3.12.9.4 Program setup menu
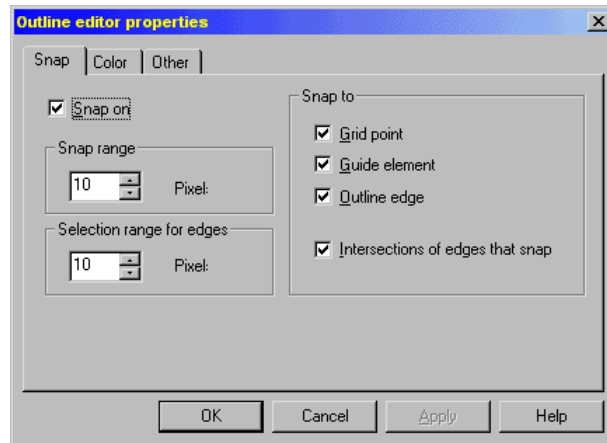
This dialog appears when you right-click in the outline editor working area and select the corresponding menu option in the context menu displayed. The dialog box consists of the three tabs **Snap**, **Color** and **Other**.

3.12.9.4.1 Snap tab

This tab is used to set how and to what an object is snapped. In order to be able to use the snapping function, the **Snap on** box needs to be selected. How close a snapping point needs to be approached by the mouse is set in the **Snap range** section. The **Selection range for edges** section is used to specify how close you need to get to an edge with the mouse in order to be able to select it. The optimum values for you should be set here according to the size and resolution of your screen.

In the **Snap to** section you can set what is actually being snapped to, including to **Grid point**, **Guide element**, **Outline edge** and **Intersections of edges that snap**.

3.12.9.4.2 Color tab

This tab can be used to select colors for the different elements in the outline editor.

3.12.9.4.3   Other tab
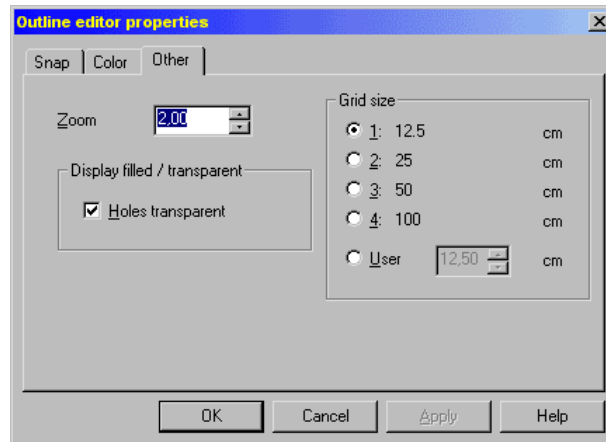
This tab includes the **Zoom** input box, which can be used to set the value by which the section of the plan is enlarged or reduced if you use the **+** and **−** buttons to enlarge or reduce the section using the keyboard.

In the **Display filled/transparent** section, the **Holes transparent** check box can be used to specify whether the inside of holes is displayed in color, or whether the background is visible.

The **Grid size** section is used to set the size of the horizontal and vertical spacing of the grid points. The grid is always laid out so that one point corresponds to the origin point. Moving this origin around part of a grid will also move the grid accordingly.

4 GENERAL PROCEDURES

4.1 OVERVIEW

Contrary to the other toolbars in ArCon, the uppermost horizontal toolbar does not change while you use the program. With this toolbar you can make project adjustments or access program functions which are available both in Construction mode (see page 88) and in Design mode (see page 90). These functions include creating a new project, loading and saving projects, printing, saving pictures, increasing and decreasing the view and switching the display of various details in your plan on and off. You can specify, for example, whether dimensions, the ruler, or the roof structure are visible or not. Additionally, there is a list box in the toolbar, where you can select the current floor.

Contrary to all of the icons in the uppermost horizontal toolbar, the floor selection list applies only to the current window. If you have opened more than one window, you can show the ground floor in one window, for example, and the first upper floor in another.

Certain views are only available under certain conditions. If these conditions are not met, the suitable icons are inactive and are shown in gray.

For most of the icons, you can configure them and switch between various options. You can do this by right-clicking the suitable icon. The dialog boxes that are opened this way are described in the appropriate section.

4.2 UNDO/REDO

The **Undo/Redo** icons in ArCon are similar to those in other Windows programs.

The amount of available memory (RAM) determines the number of undo/redo actions. Since each undo/redo step requires very little memory, and the memory reserved for undo/redo operations is relatively large, it is possible, even with longer ArCon sessions, to cancel all operations up to and including the first.

4.2.1 Undo/redo functions in detail

You can undo (cancel) an operation by clicking ⟲. If you would like to cancel several operations at the same time, select ▾ to the right of ⟲. In the list that opens you can undo/redo as many steps as you want to cancel.

If you have made no operations or changes in ArCon, they will appear in gray.

The icons for redo ⟳ and ▾ accordingly behave the same way. If you have not canceled any actions, you can't redo an action.

Note: ArCon tracks changes in Design and Construction mode and switches between each mode as necessary for undo/redo, depending on the mode where the action was made. If you go into Design mode and undo a wall insertion, for example, ArCon automatically goes back into Construction mode and reverses the action.

You can achieve the same by clicking ⟲ or using the keys **Ctrl+Z**.

A redo can be made with the keys **Ctrl+Y**.

4.3 OVERVIEW OF CONSTRUCTION MODE 🔲🔨

Construction mode is separate from Design mode in ArCon. In this mode you enter the architectural properties of your plan. All fixed elements of your building, apartment or house – those things which are structural or generally immovable – are designed and placed in Construction mode. In contrast, you complete your design in Design mode, where a multitude of furniture, furnishings and accessories are at your disposal. You can at any time switch between Construction and Design mode by clicking 🔲🔨 in the toolbar (see page 106). When you start a new project, you are automatically placed in Construction mode.

Depending upon the zoom level 🔍 (see page 127), you can only see certain sections or the entire plan. Besides the main work area, the display includes a horizontal toolbar at the top and two vertical toolbars at the left. The leftmost toolbar contains icons for elements you can include in your plan. Here you can select walls, windows, doors, stairs, etc.

With *multi-function icons* you can adjust the element icons to suit your needs. Variations appear when you hold the mouse pointer over a multi-function icon. The second vertical menu bar has, depending on the element selected, icons which specify how the element should be placed or drawn into your plan.

For example, if you would like to input a single wall without windows and doors, you

can draw an individual wall by clicking ✏ at the two desired end points. If you want to draw in multiple, connected walls, you can draw those walls consecutively with the 🔲 icon.

With fine control and many options over how elements are drawn and added to your plan, you can design your project very effectively.

4.3.1 Guidelines and ruler 📐 📏

A very important aid in construction is the guidelines. You can use these guidelines to complete certain constructional functions in your plan. You can use the guidelines as well as snapping (see page 165) to accurately position elements and sections of your plan. ArCon's guidelines simply make accurate design easy. You will find more details on guidelines on page 184**.**

Besides guidelines, a ruler is also available to aid you. This ruler looks and acts like a normal ruler. With some practice, you'll find that the ruler and guidelines together make editing in Construction mode easy and accurate. You'll find specifications on the ruler on page 167.

4.3.2 Working in Construction mode

In ArCon's Construction mode you can input walls, windows, doors, supports, chimneys, stairs, roofs, skylights, dormers, and floor slabs. You can subsequently insert cutouts in ceilings and walls, and vary the properties of walls, ceilings, and floors.

The individual design features involve not only the building, but also its surrounding environment. Thus, you can mark out properties and areas as well as define the height of the landscape, in order to achieve the most realistic view of the house and environment.

In ArCon+ you have the option to make as many horizontal, vertical, and diagonal sections and views as you like, and create different building sections as required for a building request.

You can also enter text and arbitrary dimensions.

ArCon will use default or predefined values for new walls so you can begin a design quickly. Also, you generally don't need to worry about a room receiving a ceiling or floor as ArCon automatically detects a room surrounded by walls, and draws in appropriate ceilings and floors. You can adjust some of these automatic functions with a

89

wide range of controls.

4.4   OVERVIEW OF DESIGN MODE

Design mode is separate from Construction mode. In it you arrange your apartment or house by filling it with furniture and other furnishings. It is also possible to shape and decorate the exterior as well as the surrounding area.

In Design mode you'll find the upper horizontal toolbar identical to that in Construction mode and another horizontal toolbar underneath it in which you control the view in the current window. These icons let you indicate the type of view as well as the position of the viewer. Furthermore there is a vertical toolbar at the left of the display. This toolbar contains icons that affect objects, for example, to organize, position, and group furniture. Additionally you can switch individual lights on or off from this toolbar.

In Design mode, you have the object and texture catalog. This window is central to Design mode and its uses. It serves as a catalog from which you can browse and add furnishings to your plan. Additionally you can add textures to your design by simply dragging with the mouse from the catalog window to the desired object in your plan. Because of the object and texture catalog's importance in Design mode, a separate section is devoted to it (see page 443).

4.4.1   Working in Design mode

The four main functions of Design mode are:
- Loading objects
- Deleting objects
- Positioning objects
- Changing objects in size and appearance

Additional functions let you put up wallpaper in your rooms, provide floors and ceilings with the desired materials, and select a material for the facade.

By specifying the latitude and longitude, the season, or the time of day, the sun can be positioned automatically and accurately. Thus, you can simulate the lighting conditions inside and outside your buildings realistically.

Finally you have the ability in Design mode to view or walk through your apartment or house from different positions and angles. Here ArCon+ can even record, save, and play back a walkthrough. Finally you can save and print the current view.

4.4.2   Loading objects

After you start in Construction mode (see page 88) in layout view, you'll place your walls, windows, doors, and other constructional elements. All that's left will be to complete the design by adding the appropriate furnishings. For loading objects (see page 413) or loading groups of objects (see page 426) you have two methods:

Loading by *drag and drop* from the object and texture catalog.

Loading from the menus **Objects – Load object** or **Objects – Load group**.

After loading an object or a group, the object(s) must be placed. How this is done depends on the type of view (see page 377).

4.4.3   Placing objects

ArCon has three different types of view in Design mode: Plan view, Plan view (color) and Perspective view. In ArCon, Plan views give you a view from above. But in ArCon+ you can view an apartment in Plan views from the left, right, front, back, or below the building. If you defined one or more sections in Construction mode (see page 362). ArCon+ offers you a section view for each of the three types of view.

Just as height is displayed differently in each of the three views, placing an object relative to height is also different in each of the three views.

In Plan view you cannot directly determine the height at all. If you place an object in this view, account for and specify only the horizontal and vertical position of the object, ArCon will determine the height for you.

In Plan view (color) and Perspective view you can control the height yourself. In contrast to Plan view where you see the mouse pointer as a cross hair when placing your object, a 3D mouse pointer appears in Plan view (color) and Perspective view when placing an object.

In Plan view (color) you see the 3D mouse pointer from above. Accordingly, in Perspective view the 3D mouse pointer has perspective.

The cross hair in Plan view as well as the 3D mouse pointer in Plan view (color) and Perspective views are substitute symbols for the object which you're placing. Only when you release the left mouse button to set the object does the actual object appear.

This can be used to judge the height of the object above the floor on the current floor more accurately.

Note: If the snap function in Design mode is activated, it will also be used when loading objects directly.

4.4.4   Setting the height

If you place an object by means of drag and drop into the current view, the behavior is relatively simple in Plan view. When you release the left mouse button, the object lands where the cross hair is. In Plan view (color) and Perspective view you can control the height with the help of the right mouse button, while keeping the left mouse button held down. In Plan view (color), moving the mouse up and down while holding down the right mouse button moves the object up and down (in height), toward the ceiling or floor. In Perspective view you can see for yourself what happens; if you click the right mouse button while moving the mouse, the object is either moved forward and back, forward and back with unchanged height, or up and down. You can configure this behavior to suit your preferences through the menu **Options – Program – General...** (see page 101).

Experiment with the different options in the dialog box, and remember you can see the absolute position of an object in the status bar at the bottom of the window.

4.4.5   Rise and fall of objects

After you have positioned an object by drag and drop, as described above, release the left mouse button. This is best viewed in Perspective view. Depending upon the object, it falls downward, rises upward, or remains exactly where you released it. Elements such as desks, chairs, and cups fall downward; ceiling-mounted lamps automatically *rise* upward, and elements that are normally mounted to a wall, for example, pictures, cabinets, etc. retain the position you set. This behavior is identical in all three types of view, even if you cannot see it in Plan view and only conditionally in Plan view (color).

Since it is impossible to determine the height in Plan view, ArCon determines the appropriate height according to the following rules:

Objects that fall, are placed in such a way that they will fall to the floor in the current floor when you release the mouse button. The object will fall onto whatever you see in your Plan view. If you load, for example, a cup and position it over a desk, it will land on the desk in Plan view.

Objects that rise are positioned to the ceiling on the current floor, or directly under any

object over them. If, for example, you place a ceiling lamp that fits under a desk, in a place where there is a desk visible in Plan view, the lamp will be placed under the desk.

Objects, which *float* are positioned halfway between the floor and ceiling of the current floor.

4.4.6 Move objects

Moving objects already loaded is just like moving objects as you're loading them. That is, by means of drag and drop. If you want to move an object click it and hold the left mouse button down. From here the object behaves in exactly the same as if you were loading it by dragging and dropping. The only difference is that you visually move the object, rather than a cross hair or 3D mouse pointer. Setting the object in the new position is exactly as described above.

4.4.7 Selecting objects

If you left-click an object, this object is selected. Selected objects are identified in Plan view by a rectangle around the object, and in Plan view (color) and Perspective view by a 3D frame around the object. In Plan view (color) you'll only see the top edges of this frame.
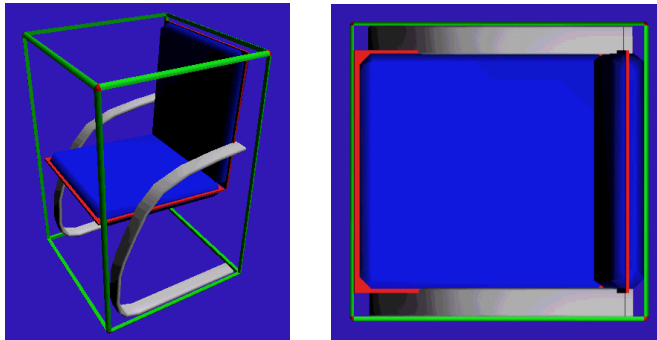
You can select more than one object by clicking additional objects while pressing the **Shift** key.

Once you've selected one or more objects, you can manipulate these selected objects.

You can rotate an object around any axis (see page 433). For this function you have the

toolbar icons
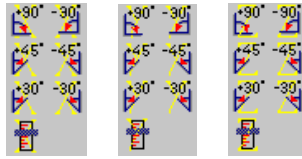
and . With (see page 432) or by pressing the **Delete** key you can delete an object.

If you have selected more than one object, you can align the selected objects to each other with the icons:
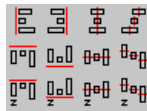
(see page 437) or combine them into a group with the icon (see page 431).

If at least one of the selected objects is a lamp, you can switch the lamp(s) on and off with the icon (see 438).

It is also possible to move more than one object simultaneously by selecting all objects as described, but when selecting the last object keep the mouse button held down. If you now move the mouse, all selected objects move simultaneously. When you release the left mouse button, all the objects go up or down in sequence.

4.4.8   *Different views in Design mode*

Each window of your project can be shown in Design mode as Plan view, Plan view (color) or Perspective view. You select or change a view type with the three icons , and (see page 377) which are to the left in the second horizontal toolbar.

For Plan view (color) and Perspective view you can also specify the level of quality in the display. This is set with the multi-function icon (see page 387). All six variations are only available in ArCon+.

The different types of view not only affect the display quality, but also the display rate. The variation is the simplest one, and so the fastest; the variation offers the best quality, but is the slowest.

Wireframe
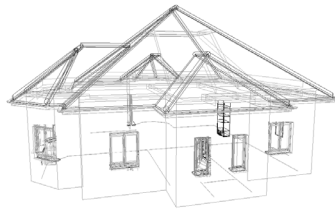
Colored without texture

Colored with texture (medium quality)

Colored with texture (high quality)

4.4.8.1 Additional views in ArCon+ 🖋

ArCon+ contains two additional types of view besides the four mentioned above. With the 🔲 icon you can display buildings **Wire frame with hidden surfaces** (see page 388). The 🔲 variation **Wire frame with hidden line removal** (see page 389) uses accurately calculated surfacing, which is why this method is more time-consuming.

Wire frame with hidden surfaces
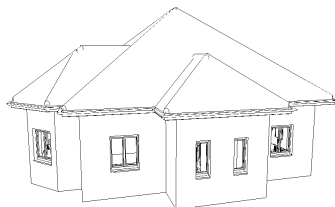
Wire frame with hidden line removal
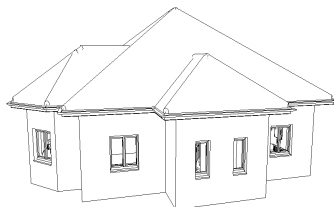
4.4.9 Walking through a plan and changing the viewpoint 🔳 🔘

If you are in a Perspective view, additional icons appear in the second horizontal toolbar 🔳 (see page 394). If you click these, you can walk through your design. After selecting

the icon, position the mouse in the view window and keep the left mouse button held down. As you move the mouse pointer around the window, you move through the apartment in that direction. Note that the pointer changes to indicate the specified direction.

In Plan view and Plan view (color) walking through an apartment is not possible. In these two views and also in Perspective view, you have the icon, which lets you change the viewpoint position, from which you view your project. Unlike all other icons in ArCon, it matters which part of the icon you click. If you click, for example, the left of it and you're in Plan view or Plan view (color), the view shifts from the right to the left accordingly. In Perspective view, however, you rotate about the left of the building. Appropriately, if you click the right side of the icon the view moves to the right in Plan view and Plan view (color), and rotates right in Perspective view. The up and down arrows at the top and bottom of the icon, behave the same way.

Note: With the icon you change the position of the viewer and not the position of the plan. If you rotate, for example, left around an element, the element seems to rotate to the right. Some users might be uncomfortable with this, so you can change the settings in the **Options – Program – General...** dialog box in the **Viewing buttons** section (check the switch **Swap left and right**).

If you have a viewpoint you'd like to return to later, you can store the viewpoint with the help of the icon. After clicking a dialog box appears in which you can enter a name for the viewer position. Subsequently, the list to the right of the icon contains a list of the saved positions. If you select a name from the list, that viewpoint is restored.
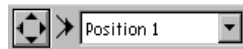
4.4.10   Elevator Up and Elevator Down

If you selected Plan view or Perspective view in Design mode, the icons and appear in the second horizontal toolbar. With these you can change the display from one floor to the next. In Perspective view, you can even animate the move from one floor to another. To animate this change in view, press and hold the **Ctrl** key while clicking or .

4.5   PROGRAM OPTIONS
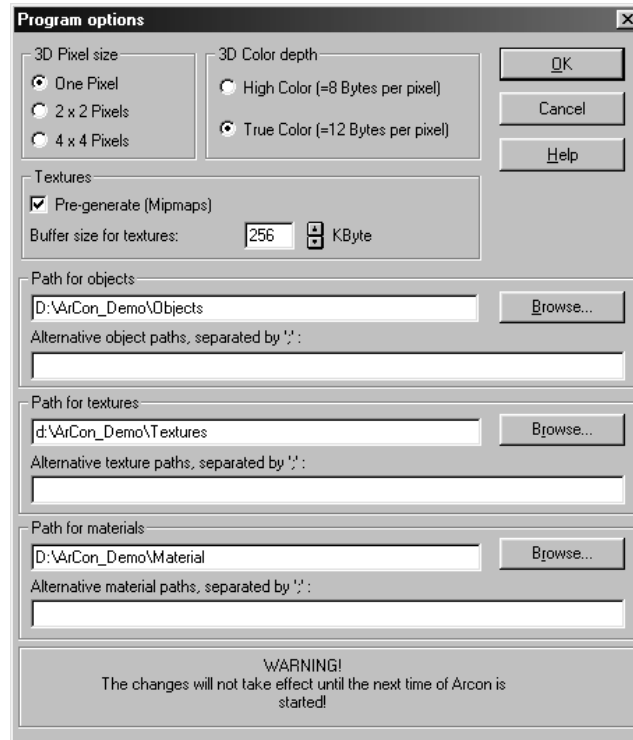
In the **Program options** dialog box, fundamental ArCon settings are set. These settings are established only when the program starts. The dialog is opened by selecting the menu **Options – Program options...** if no project is loaded, or by selecting the menu **Options – Program – Program options…** if a project has been loaded. Note that modifications made in this dialog box don't take effect until the next time you start the program. Also, you can press and hold the **Ctrl** key while the program is starting up and the **Program options** dialog will open automatically as the program is loading.

In order to calculate and display a 3D picture (as in Perspective view), a set of working conditions and requirements is needed for each screen pixel. This set includes the screen resolution, which you set in the Windows Control Panel and which ArCon uses, and color depth, or the number of colors a pixel can display.

Higher screen resolutions and color depths require much more memory. Since this can slow down the computer, especially the 3D display, you can change the following

settings in ArCon to minimize the memory needed and the demands put on your system.

4.5.1   3D pixel size

Here you can modify the size of a 3D pixel, in order to reduce memory consumption for a smooth program operation.

4.5.1.1   One pixel

If you selected this option, a 3D pixel in memory corresponds exactly to a pixel on your display. This gives you an optimal view, but has a relatively high memory requirement. This is the default selection and should be modified only if you're having performance problems when running ArCon.

4.5.1.2   2 x 2 pixels

With this selection a 3D pixel in memory corresponds to four pixels on screen, in a 2 x 2 array (so the pixel size is doubled in each direction). Not only does this free up some of your computer's memory and other resources (reduced by a factor of four), but it greatly speeds up rendering and display speeds because ArCon is drawing only a quarter of the pixels for the same size image. Of course, the display quality is reduced. This option is particularly useful for demonstrations and presentations because it will speed up the demonstration dramatically, and if you're using a projector or a screen some distance away, the degradation in image quality might be scarcely noticed.

4.5.1.3   4 x 4 pixels

With this option, a 3D pixel in memory corresponds to 16 screen pixels, decreasing the memory required by a factor of 16. The 3D display becomes rougher, and jagged, by the same factor.

4.5.2   3D color depth

Changing the color depth of a 3D pixel has a considerable effect on the required memory just like changing the pixel size. There are two options for color depth:

4.5.2.1   High color (8 bytes per pixel)

With this option, approximately 32,000 colors are available for display. Note that this requires the Windows Color Palette to be set to High color or True color in the Windows Control Panel.

If you have a computer with MMX capability (see page 673) the screen output is accelerated because ArCon supports MMX for display. Note that while MMX supports High color, it does not support True color.

4.5.2.2   True color (12 bytes per pixel)

With the True color option, there are approximately 16 million different colors available for display. You must also set the Windows Color Palette to True color in the Windows Control Panel. If you have not done this, ArCon will still accept your selection but it will have no effect.

It can be practical in only one situation to select the True color option although your screen display is lower – if you want to create high-quality pictures, which will be printed out or transferred to another computer. Even though the display won't display all the colors, they will be intact for your saved pictures and printouts. Remember that after such jobs you should switch ArCon back to High color mode since the True color setting is always slower. This applies in particular to computers with MMX (see page 673), since the display is accelerated in High color but not in True color.

With the screen resolution, which you specified in the Windows Control Panel, and color depth determined you can easily compute the memory requirements yourself. You should still consider that the menu and toolbars use approximately 20% of the display. For example, with a resolution of 1024x768 and True color mode the approximate storage requirement would be 7.4 MB, whereas in the High color mode only 5 MB would be necessary.

4.5.3   Textures

Within this section, definitions to the internal settings of the textures are carried out. In addition, the following describes the specifications, which should be adapted according to your hardware.

4.5.3.1   Pregenerate (mipmaps)

If you activate this switch, textures are stored in memory and rendered at various resolutions when they're loaded. This results in the highest-quality display of textures in 3D view. Contrary to the graphic enhancement, calculating different resolutions while loading the texture requires more time and increases the memory required by approximately 33%.

4.5.3.2   Buffer size for textures

All of the textures you load (including those attached to objects you load) are stored in a memory buffer regardless of whether or not they're actually in use in your project. When the buffer is full, textures not often used are removed from memory. This has the benefit that frequently used textures load quickly (because they're already stored in memory).
The value in this field, specified in KB, indicates the size of the texture buffer in memory, and should be adapted to the amount of memory installed in your computer.
The memory required for textures is approximately 90 KB per texture, with mipmaps (pregenerate) enabled. Without mipmaps, approximately 60 KB per texture is required.
You can see the textures that are in the memory buffer, even if they're not being used in your project, by opening the object and texture catalog and clicking the icon.

4.5.4   Path for objects

The path specified here identifies the directory (folder) from which ArCon reads all objects. This specification is made automatically by ArCon during the installation and does not normally have to be modified. If you do need to modify the path, you can edit the path directly in the input box using the keyboard or you can click the **Browse** button

100

to use a file selector dialog box to locate the folder containing your objects.

Besides the default object path, you can specify alternative object paths in the **Alternative objects paths, separated by** field, in which ArCon will look for objects that are not found in the standard path. You can enter multiple paths, but a semicolon must separate them.

4.5.5 Path for textures

This path specifies the location of textures used by ArCon. This path is automatically set up during the program installation. If you should have to modify the path, you can enter the path directly into the input box or click the **Browse** button to identify the folder using a standard file selector dialog box.

Just as with the object section, you can specify additional paths, separated by a semicolon.

4.5.6 Path for materials

This field is almost identical to those for objects and textures. ArCon includes a large number of different materials and their location is specified in this field.

The materials and their location are installed automatically during the program installation. If you modify the location you can specify it in this field.

All modifications can be acknowledged with **OK**.

4.6 GENERAL OPTIONS

This dialog is opened with the menu **Options – Program – General...** and the settings made here optimize the operating speed and handling of ArCon's 3D display.
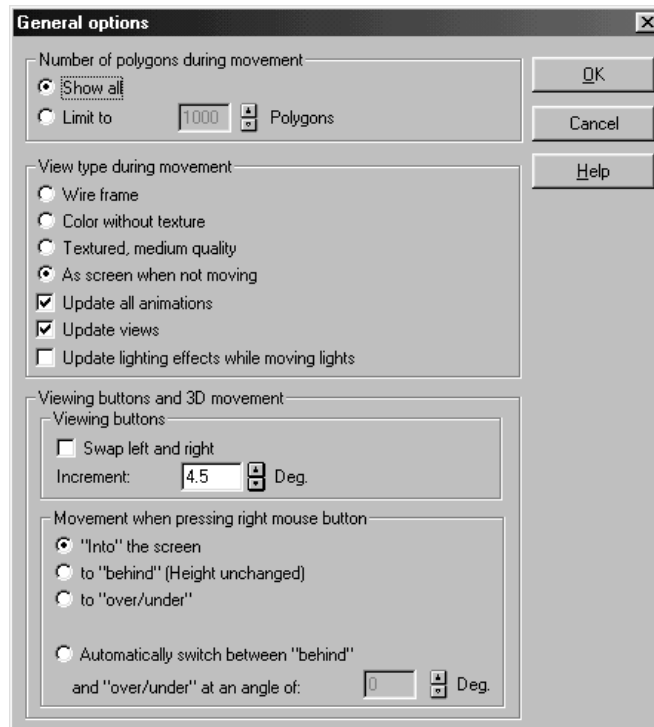
The specifications and details of this dialog and its options are detailed below.

4.6.1　　Number of polygons during movement

If you find your computer slowing down when you're walking through your design, you can reduce the number of displayed polygons. Depending on the project, ArCon may be processing hundreds of thousands of polygons. In order to accelerate the display you can limit the number of polygons by selecting **Limit to** and entering a number that suits your computer hardware and your working style. It entirely depends on your computer's configuration and the complexity of your project, but if it's moving too slowly you can start with a limit of 3000 polygons, for example.

4.6.2　　View type during movement

Moving around in a 3D view with the **Move viewer** icon as well as placing objects is

102

sometimes hard on your computer, and slow. With simple adjustments within this dialog you can accelerate the display.

4.6.2.1 Wire frame

During movement, walking through your design or moving the viewpoint, the project is displayed as a wire frame (see page 387).

4.6.2.2 Color without texture

During movement, walking through your design or moving the viewpoint, the project is shown without textures, but matching solid colors (see page 387).

4.6.2.3 Textured, medium quality

This option shows your project during movement with all the objects' assigned textures and colors, with reduced details in textures. This option is not suitable for computers without MMX (see page 673). For computers with MMX, this offers the optimal compromise between quality and frame rate (see page 387).

4.6.2.4 As screen when not moving

When you select this option, the type of view does not change at all during movement and uses whatever type of view you selected for your 3D display (Perspective view).

4.6.2.5 Update lighting effects while moving lights

Separate from the settings described above you have the option of deactivating lighting changes while you're moving lamps. If you move a lamp that is switched on, the program constantly updates the lighting of all objects and structural elements as you move a lamp across a room. So here you have the option of leaving the room lighting alone until you position the lamp (by releasing the left mouse button). If you deactivate this switch, the lamps are not switched off; only the effects of their light are put *on hold* until you place the lamp, when the lighting will be recalculated from the lamp's new

103

position.

4.6.3   Viewing buttons and 3D movement

Here you can adjust the function of the view icon in the toolbar and control the effect of the right mouse button in the 3D display (Perspective view). The following paragraphs explain the available options.

4.6.3.1   Viewing buttons

With the help of the **Move viewer** you can rotate the viewpoint around the building or rotate the building, depending on what you prefer. By activating the switch **Swap left and right** you can modify the operation. By default, the viewpoint rotates around the building, so clicking the left arrow appears to rotate the building right. If you activate this switch, the building will rotate left when you click the left arrow (the viewpoint will rotate right). You should adjust this function to suit your own requirements.
You can also specify the increment of rotation. This controls how far the viewpoint is rotated with each click of the ⬍ icon.
The increment is specified in degrees. To change the value, you can click the up and down arrows or click directly in the field and type in a value. Acceptable values are between 1 and 90.

4.6.3.2   Movement when pressing right mouse button

The following options describe how objects are moved and placed when you click the right mouse button. You can adjust this to optimize the operation of the program.

4.6.3.2.1   Into the screen

If you select this option, the object you're manipulating moves forward and back "into" the screen when the right mouse button is held down. This is independent of the view, regardless whether you're viewing from above or from the side.

4.6.3.2.2   To behind (height unchanged)

This option is likewise independent of the view and moves the selected object with a constant height over the floor of your building when the right mouse button is held down.

This option may seem confusing if, for example, you're viewing your house in Perspective view from above and move an object while holding down the right mouse button. If this should be the case, we recommend the option **Automatically switch between "behind" and "over/under" at an angle of:** (see below).

4.6.3.2.3   To over/under

The option: **To "behind" (height unchanged)** can lead to strange effects if you look at your project in Perspective view from almost directly above. If you move the mouse upwards the object does not follow your mouse movement but rather towards the floor. You must right-click the object to move upwards correctly.

If you now select the option **To "over/under"** the behavior is reversed, that is, if you move the mouse upwards without holding down the right mouse button, the object moves upwards on the display. Note that this is only the case if you look from almost directly above. If you hold down the right mouse button and move the mouse upwards, the object moves *into the display*.

In the long run both of these options are practical only in certain circumstances. Therefore the following option is available:

4.6.3.2.4   Automatically switch between behind and over/under at an angle of:

With this option you can combine "behind" and "over/under" by having the switched automatically between the two. You can specify the point where ArCon switches between the modes, in degrees.

4.7   FUNCTIONS OF THE HORIZONTAL TOOLBAR I

In this paragraph the icons of the horizontal toolbar and their functions are described. Some the icons illustrated here may not always be available, depending on the mode in which you're operating. Icon which are not available for use are shown in gray.

The left group of six icons (see page 108), (see page 112), (see page 115),

⊟ (see page 118), ⊞ (see page 120), and ⊞ (see page 125) deal with project management and views. If you installed eLines (see page 467), the ∠ icon appears between the icons ⊟ and ⊟. If you activate this, eLines is started in the current ArCon project.

By left-clicking the ▯ icon you create a new project. If you click this icon with the right mouse button, a dialog box opens where you can set the desired project options. Click ⊟ to open a standard file selector dialog box where you can open an existing project.
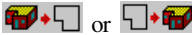
If you left-click the ⊟ icon you can save the current project. If you haven't yet saved or named the project, a standard file selector dialog box opens where you can give the project a name. Right-click this icon to open a dialog box where you can set options for saving. You will find details on these icons in the *Loading projects* section (see page 112) and *Saving projects* (see page 115).
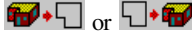
If you left-click the ⊟ icon in the current view of your project, it will be printed to your default printer (which is set up in Windows). Right-click this icon to open a dialog box where you can set options for printing. You will find information on these options in the *Printing* section (see page 118).

By clicking ⊞ you can save the current view as a bitmap picture or Windows metafile picture. By right-clicking this icon you open a dialog box where you can adjust the settings and options for saving pictures. Details on these settings can be found in the *Save view* section (see page 120).

If you left-click the ⊞ icon you'll open a new window with a new view. Right-click this icon to open a dialog box where you can set the relevant options for new views. Details on these options can be found in the *Creating new views* section (see page 125).

4.8   FUNCTIONS OF THE HORIZONTAL TOOLBAR II

The following icon ⊞ or ⊞ (see page 88 and 90) lets you switch between the two operating modes, Construction (see page 88) and Design mode (see page 90). Information on these two modes is found in the appropriate sections.

To the right of ⊞ or ⊞ are the icons ↶ ▾ ↷ ▾ (see page 87) with which you can cancel edits and changes (undo) or recreate edits and changes you've undone (Redo). The left button in each icon lets you undo and redo individual steps, while the right button of the icon lets you select a number of actions to undo or redo simultaneously.

4.9 FUNCTIONS OF THE HORIZONTAL TOOLBAR III

The next two icons, (see page 127) and (see page 127) involves the zoom level of the current view. The icon (see page 127) is the same as the menu **View – Show all** and the icon (see page 127) is the same as the menu **View – Zoom in** or **View – Zoom out**. If you right-click the icon you open a dialog box with default settings. You'll find details on these options and the zoom function in general in the *Zoom* section (see page 127).

4.10 FUNCTIONS OF THE HORIZONTAL TOOLBAR IV

The following section consists of the icons (see page 165), (see page 167), (see page 165), and (see page 184) and controls auxiliary functions helpful in constructing your project.

For example, the origin position (see page 165) in the grid or the origin and grid together can be set, depending on which variation of the icon you selected (see page 165). You can read details of this function in the *Place coordinate and grid origin* section (see page 165).

The ruler can by switched on and off by left-clicking it. If you right-click this icon, you'll open a dialog box with the ruler options. You'll find a description of the ruler and its settings in the *Ruler* section (see page 167).

The two icons and switch the grid or guidelines on and off in Construction mode.

Additionally, in ArCon+ there is another icon to the right of the icon, the icon (see page 181), with which you can switch the background transparencies on and off.

4.11 FUNCTIONS OF THE HORIZONTAL TOOLBAR V

The final seven icons (see page 341), (see page 209) , , (see page 284), (see page 284), (see page 351), and (see page 353) consists of icons which switch elements in the view window on and off. The icon (see page 341) switches the landscape features on and off in the view window. Right-click this icon to open a dialog box to limit the displayed landscape features. The icon switches wall shadings on and off, and switches the furnishing objects on and off. The icon switches the roof surface on and off, and (see page 284) switches the roof wood

construction on and off. The Abc icon switches the display of text on and off, and ¹·⁰ switches the dimensions on and off. The ⁕ icon is used to switch the **Collision control** on and off during a walkthrough. These icons affect all view windows.

In ArCon+ this group also contains the icon (see page 367) to switch sections on and off.

The next element in the toolbar is a list box in which you can select the current floor. Click this box with the left mouse button and a list will drop down with all available floors. From this list you can select the floor you want to view and work on by clicking it.

4.12 FUNCTIONS OF THE HORIZONTAL TOOLBAR VI

At the far right in the horizontal toolbar you have two icons – the **Help** icon (see page 37) as well as an icon for switching the catalog on and off (see page 443) which appears only in Design mode. If you click the **Help** icon with the left mouse button, the pointer changes into a question mark. You can then click any visible element in the ArCon display and receive context help on the use of the selected element.

If you click the **Catalog** icon , you can switch the display of the catalog on and off. Note that this icon is only available in Design mode (since only in Design mode can you load objects and textures).

4.13 CREATE A NEW PROJECT

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found at the beginning of page 109.

To create a new project, you can either select the menu **File - New** or click the icon. Under normal circumstances a dialog box appears when creating a new project, in which you must specify the first floor properties.
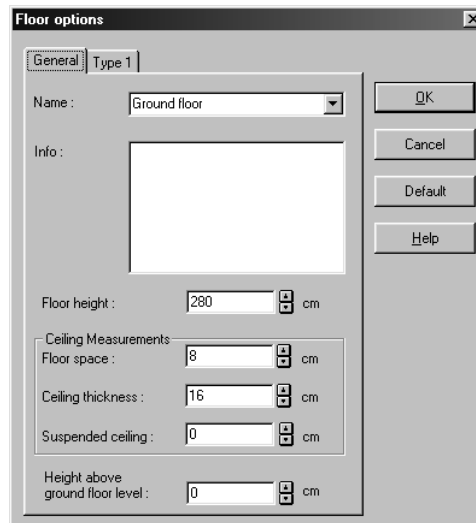
If you want to create a new project with the current project settings, you can exclude the display of this dialog box by clicking the ⬜ icon while pressing the **Ctrl** key.

All inputs and adjustments you can make on the **General** tab are detailed in the *Working with floors* section (on page 133).

4.13.1   Type 1

If you are using ArCon+, when creating a new project the dialog box for floor options also contains a tab Type 1. This is based on **DIN 277**.

All inputs, which you make here, are particularly useful for transferring information to the calculation according to TYPE 1. You'll find the tab described in detail in the *Calculation conforming to TYPE 1 and TYPE 2* section.

4.13.2   Project options dialog box
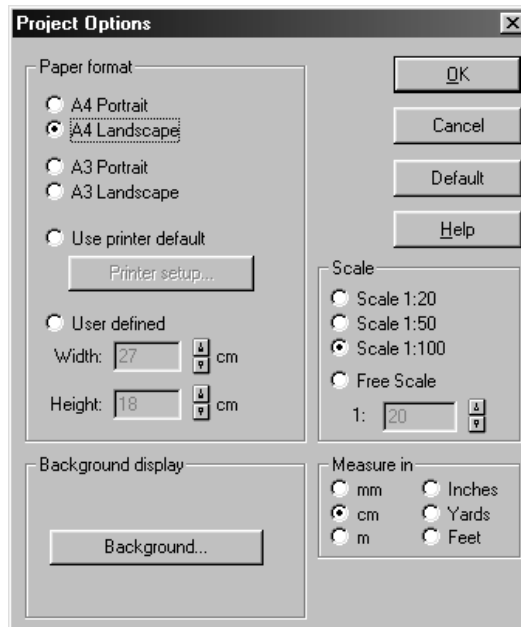
You can open the **Project options** dialog box by right-clicking the [] icon or selecting the menu **File – Project options**.

ArCon uses the settings here when creating a new project. You can change these settings later as you work on your project. The following descriptions are the available options and settings in this dialog box.

4.13.2.1   Paper format

Here you can select the paper format used for printouts of your project. In addition to the standard formats **A4 Portrait**, **A4 Landscape**, **A3 Portrait**, **A3 Landscape**, and **Use Printer default**, you can define any size. The printer default varies according to the type of printer you're using, but can be changed by clicking **Printer setup…**.

Besides the printout page format, having to match the actual paper size, the page format (and paper size) must be able to contain your entire project. You should therefore adapt the page format and the scale of your building project so the project fits on the printed

page. Subsequently you can, for example, reduce the page format from A3 to A4 and modify the scale of your project, and shift the page in the layout view so it all fits nicely.

Please note that when selecting a page format that exceeds the maximum paper size supported by your printer, the printout will be divided over multiple pages. Details can be found in the *Printout* section (see page 118).

4.13.2.2   Background

With this button you can open the dialog box for adjusting the time of day.
A detailed explanation of this function can be found on page 381.

4.13.2.3   Scale

The scale selected here is used for printing your project and also affects the maximum size of your project.

Beside the typical ratios used in the building industry, which can be selected by simply clicking the icons, you can click **Free scale** to set any ratio between 1:1 and 1:250 for your project.

4.13.2.4   Measure in
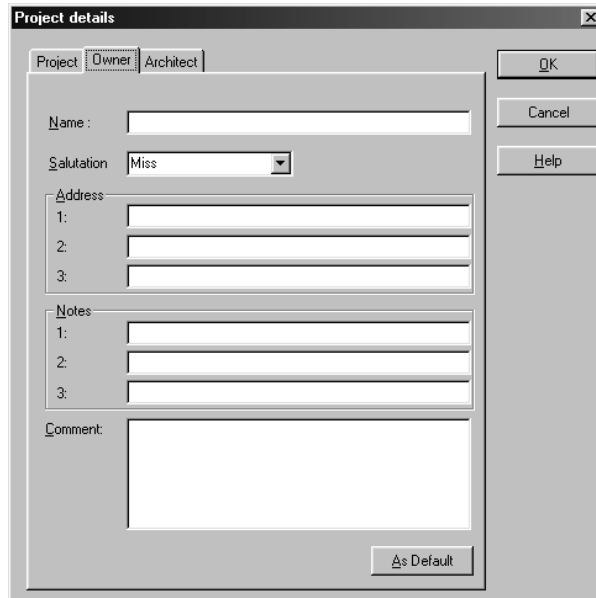
All dimensions in your ArCon project use the dimension system specified here. The options are **Millimeters (mm)**, **Centimeters (cm)**, **Meters (m)**, **Inches (")**, **Yards (yd)** and **Feet (ft)**.

Once you've established the settings you require, acknowledge them by clicking **OK**. By clicking the **As default** button the current settings will be used automatically for all new projects.

4.14 PROJECT INFORMATION

Apart from the geometrical specifications, which aid you during the process of creating your ArCon project, you can specify additional information, which is used in ArCon+ when you're editing room information and creating sections. To view or edit this

information, select the menu **File – Project information** and the Project data dialog box appears.

This dialog box consists of three tabs: **Project**, **Owner**, and **Architect**. The fields for the name, the address, and notes, as well as a field for any comments, is available on all three pages. Whatever you want to enter in these fields is up to you. Information entered here is used with the generated room information and sections in ArCon+.

Additionally, on the **Owner** and **Architect** tabs, you can select a title. You can select a predefined title from the pull-down list, or you may enter any title into the input box.

4.15 OPEN PROJECT 📂

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found at the beginning of page 150.

You can load projects with the standard Windows file selector dialog box. You can open this file selector by clicking 📂 or opening the menu **File – Open**. You can also use the keyboard shortcut **Ctrl+O**. The standard file extension for ArCon projects are *.**acp**, and the standard file extension for backup files is *.**bak**. When naming your projects remember that ArCon supports long file names, i.e. you can use up to 256

characters for the file name. When you open or save an ArCon project, using the standard Windows file selector dialog box, the last-used path is opened automatically.

During the loading procedure a progress display that lists the elements currently being loaded is visible in the status bar at the bottom of the ArCon window. This information can be useful, especially with larger projects since recalculating the textures used and interrupted by pressing the **Esc** key can extend the loading operation. If the loading operation is interrupted a dialog box will be displayed.

You can also open a project with the menu **File – New from template…** This works exactly like opening a project, except that you cannot save the loaded project under the existing name. This way you prevent overwriting the existing file, which is practical, for example, when basing a new project on an existing project. ArCon saves the paths for **Open** and **New from template** separately.

4.15.1 Aborting the loading of a project
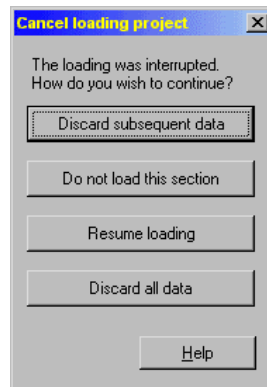
As you watch the status bar showing what parts of the project are being loaded, you can interrupt the loading by pressing the **Esc** key. A dialog box will appear and give you options on how you want the rest of the project to load.

4.15.1.1 Discard subsequent data button

The loading procedure will stop at this point. Nothing else in the project file will be loaded, and the elements already loaded will be displayed.

4.15.1.2   Do not load this section button

The part of the project being loaded when the **Esc** key was pressed (as indicated in the status bar) is skipped. All previous and following parts are loaded as usual and displayed.

4.15.1.3   Resume loading button

The interruption is ignored and ArCon continues loading the complete project.

4.15.1.4   Discard all data button

The loading operation is aborted and all loaded data is rejected. The program returns to its status before the project loading was initiated.

4.15.2   Search for objects

ArCon stores a project with references to the objects used in the project. If an object cannot be found upon loading a project (because a path specification was modified or the object was moved to another folder), the loading process is interrupted and the **Search for object** dialog box appears.
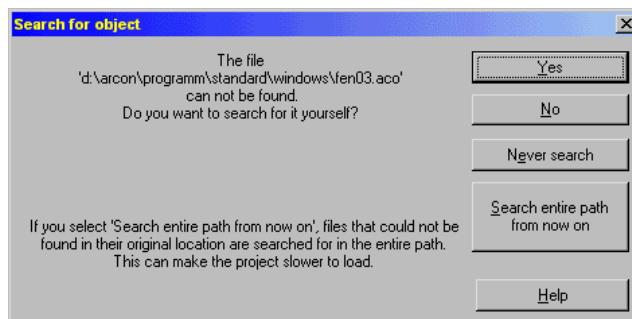
In this dialog box you can search for the missing object. If you choose **Yes** to search for the object yourself, the standard Windows file selector dialog box is opened.
If you select **No** the project is opened without the missing object.
If you click the **Never search** button, the project is loaded without the missing object,

and subsequent missing objects are automatically overlooked (and not loaded).

If you select **Search entire path from now on**, any files that are not at their original location may be found, since the program will search the entire object path and its subfolders. The object path is the path (folder hierarchy) which is automatically created when you installed ArCon, and the main folder for all objects, for example, C:\ARCON\OBJECTS. If you specified any alternative object paths in the **Program options** dialog box, ArCon will search them, too.

If objects are found in another folder (path), the next time you save the project ArCon will update the saved project with the current object path, so objects are loaded without interference.

4.16   SAVING PROJECTS 💾

You can save your project by clicking 💾 or selecting the menu **File – Save…**. This will automatically save your project under its existing name, in its existing folder on your hard drive. You can also save a project this way with the keyboard shortcut **Ctrl+S**. If you have not yet saved a new project, when you use these elements to save a project a dialog box will open where you can name your project. This is the same as selecting the menu **File – Save as…** which will always open the file selector for you to save your project with a name you specify, regardless of whether the file is new or not.

The standard file extension for ArCon projects is *.**acp**, and backup files have the extension *.**bak**. When entering a name for your project, remember that ArCon supports long file names, i.e. you can use up to 256 characters for the file name. After saving a project, the same folder you saved it in is opened when you attempt to load a project.

Additionally, ArCon saves all program and window options and settings in the project file, so the next time you load the project, all will be exactly as you left it.

4.16.1   Save options

You can open this dialog box by right-clicking the 💾 icon or by selecting the menu **Options – Program – Save...**

You would normally save your project by clicking the 💾 icon or by selecting the menus **File – Save** or **File – Save as...**. ArCon also gives you the option of automatically saving your project at fixed intervals.

When exiting program
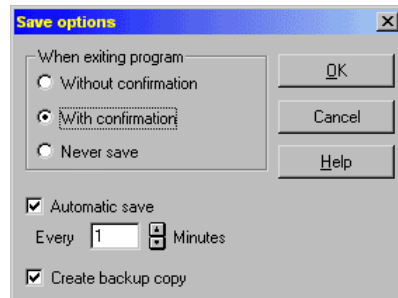
Here you can specify whether or not to save when exiting the program or closing a project (which happens automatically when you have a project open and you choose to create a new project or load an existing one).

4.16.1.1.1   Without confirmation

If you select this option ArCon will automatically save the current project each time you close a project, open another project, or exit ArCon.

4.16.1.1.2   With confirmation

If you select this option, when you close a project, open another project, or exit ArCon, you will be asked if you want to save the current project.

4.16.1.1.3   Never save

If you select this option, when you close a project, open another project, or exit ArCon, the current project will not be saved, and it will not ask you. This option should be treated with caution, since one could easily make a mistake and lose one's work.

4.16.1.1.4   Automatic save

You have the option of ArCon automatically saving a backup of your project at timed intervals. You can specify the interval. This backup copy is stored independently of your regular saves, and is deleted upon exiting the program.

We suggest that you activate this option since automatic saves are done quickly, they don't disturb your work, and you can work without any interruptions so that your project

data stays intact.

If ArCon is unexpectedly exited and the Automatic save option was active, the following dialog box appears when you next start the program. You are given the option to recreate your project based upon the automatically saved data.
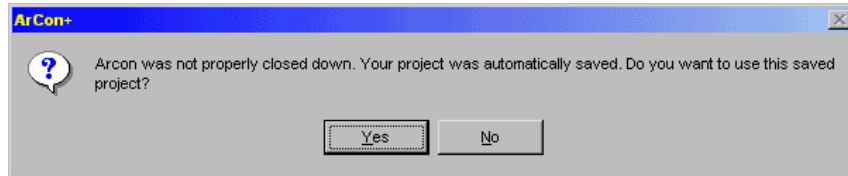
If you should see and acknowledge this dialog box when starting ArCon, you should promptly save the project under another name. The reasoning for this is if you do not save this project under a new name and ArCon is unexpectedly terminated, the saved backup is overwritten by the new automatic backup; this overwriting of the backup is not intended and can cause data corruption.

4.16.1.1.5 Create backup copy

If you activate this with a check, ArCon makes a copy of the previously saved project, under the same file name but with the file extension *.**bak**. This not only saves you time and trouble if you encounter data corruption (through a computer crash, for instance), but gives you a previous version of your project should you change your mind about the most recent changes. If you regret a recent change, you can simply load the *.**bak** file version of your project.

When you load a *.**bak** file and continue work on it, you should save it under a new name, otherwise you'd be overwriting the existing backup file with the same data as the project file, eliminating the benefits of having a separate backup file.

4.17 CLOSING PROJECTS

When you close a project by means of the menu **File – Close**, you may be asked if you want to save the project. Whether or not you're asked depends on the settings of the **Save options** dialog.

117

4.18 PRINTING 🖨

🖨 ArCon lets you print Plan views or Perspective views directly to a printer. Plan views are printed at a scale you specify, and Perspective views at an adjustable size. With the menu **File - Print...** you open the standard Windows print dialog, where you can select the printer, adjust print options according to the selected printer, select the number of copies, and so forth.

A special function of ArCon is that your printout can be any size, independent of the paper format or size. If the printout is larger than the paper size, ArCon will distribute the printout image over multiple pages that you can piece together to create a larger page. To facilitate this, the printed pages include overlapping regions with small section labels. Additionally all pages are numbered accordingly so you can easily identify which page goes where.

ArCon offers many options for printouts. You can even print a plan view to a plotter. To take the best advantage of ArCon's printing capabilities we recommend that you customize the printing options.

4.18.1   Print options
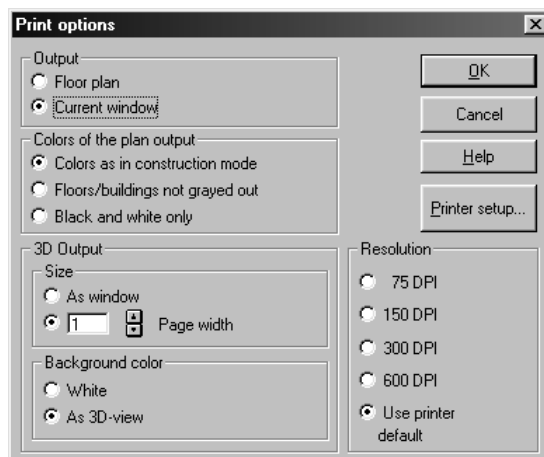
You can open this dialog box by right-clicking the 🖨 icon or by selecting the menu **Options – Program – Print….** You can specify here whether you want to print a Plan view or the contents of the current window. You can also specify the print resolution,

colors for plan printouts and 3D backgrounds, and the size of printouts of Perspective view.

Besides the three standard **OK**, **Cancel**, and **Help** buttons you have the **Printer setup…** button which takes you to the standard Windows dialog box for setting parameters for the selected printer.

4.18.1.1 Output

In this section you can specify what is to be printed. If you select the **Floor plan** option, you'll always get a printout of Plan view regardless of what view is on screen. The option **Current window** delivers a printout of the current, active window, and can be either a Plan or Perspective view.

If you're working with multiple windows, be careful that the active window is the one you want to print before you click 🖨.

4.18.1.2 Color options

Within this section you can specify the colors used in your printout. You can select to print colors as they are in Plan view (color), or only partially in color, or in black and white. The settings for shadings and colors in rooms can be set in the **Room info** dialog box.

4.18.1.3 3D output

The settings made here are only valid for printouts of Perspective view. The size of a plan printout is determined by the ratio specified.

4.18.1.4 3D output: Size

The option **As window** corresponds to the size of the active window. You can use the other option to adjust the printout to the paper size, with 1.00 fitting exactly on one page. Remember that you can print multiple pages, using crop marks to put the pages together. Please note that the height of the diagram is automatically adjusted, so it's possible that multiple pages will be printed.

119

4.18.1.5   3D output: Background color

With the **Background color** option you can select whether your printout contains the background color of the current view window or if it should simply be white. The option **White** may lower your printing costs and can improve output quality.

4.18.1.6   Resolution

Here you can adjust the printing resolution. By selecting a lower resolution than your printer's maximum, the printing time is reduced, but with reduced quality. Increased resolutions may look better on a printout, but will take longer to print. Also, you cannot select a resolution that is not supported by your printer; the resolution will automatically be reduced to the maximum supported by your printer.

The option **Printer default** will use your printer's default resolution, and will likely result in the best output quality.

4.19   SAVE VIEW

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 523.

ArCon lets you save a view, i.e. the contents of the current window, as a bitmap picture, or with Plan views, a Windows Metafile. Bitmap pictures can be optimized while saving by utilizing over sampling and an edge filter. You will achieve excellent results, which are suitable for presentation purposes, with the help of this function.

In order to take advantage of the options here, you should read the following paragraphs and understand and adjust these options before you save pictures. Once you've done this, you can simply left-click the icon to save the picture to your hard disk. You'll be presented with the standard Windows file selector dialog box where you can specify the folder where you want the picture saved, and the name of your picture.
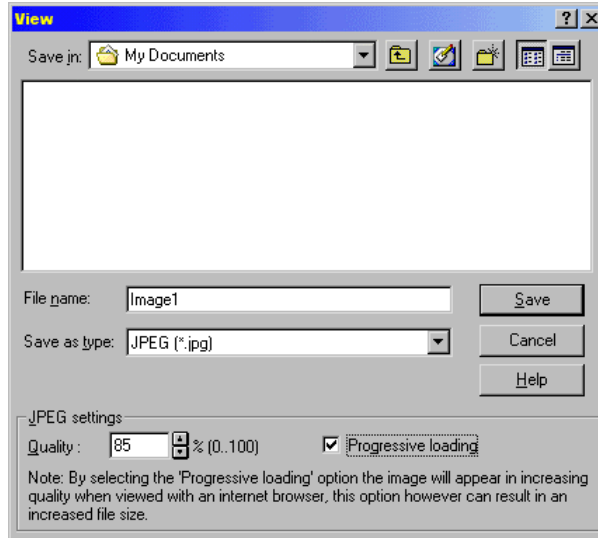
Besides the options described here, you can use the raytracer (see page 389) to render the saved picture. If the **Raytraced** option is selected, a raytraced picture will be saved on your hard disk. With this option you can save very high-definition pictures of a Perspective view.

4.19.1   Save picture
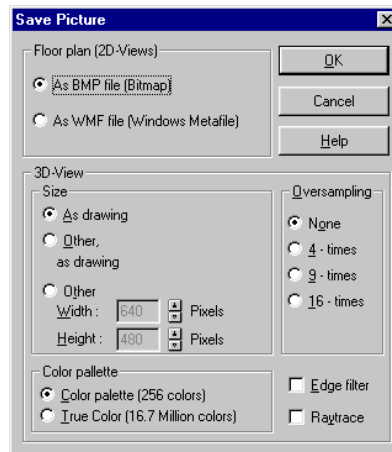
This function is extended in ArCon+. You will find Suitable information starting from page 523.

You can open this dialog box by right-clicking the icon or by selecting the menu **Options – Program – Save picture…**.

4.19.1.1   Floor plan (2D view)

Here you can select how to save a plan, either from Construction mode view or Plan view (see page 523) in Design mode. This selection applies only to Plan views, since 3D views can only be saved as bitmap pictures.

4.19.1.2   As BMP file (bitmap)

If you decide to save your picture as a bitmap, the saved file consists only of a pixel-based image of your view window, which you can subsequently edit or process with a pixel-based editing program. The benefit of this picture type is that almost any image editor can load the picture. However, these files are generally larger than Windows Metafiles and can't be enlarged without substantial degradation in image quality.

4.19.1.3   As WMF file (windows metafile)

If you save a Plan view as a Windows Metafile, the image saved is not pixel-based, but vector based. This means that the lines in your plan are not saved as pixels on the screen, but as descriptions of the points and lines, and so can be scaled up and down in size without any degradation in quality. Additionally, the file size is typically much lower than a bitmap of the same image.

4.19.1.4   3D views

The options selected within this section apply exclusively to Plan view (color) and Perspective views (see page 378). Before you can save a picture with these settings, the active window must be either a Plan view or Perspective view.

Here you can adjust the size and appearance of your saved pictures. Notably, you can adjust the settings to dramatically improve their quality.

4.19.1.5   Size

Within this section you can control the size of the 3D picture to be saved. The option **As drawing** uses the current size of the view window in generating the bitmap image. You can thus control the size by adjusting the view window. If you select the option **Other, as drawing**, you can adjust the size in width or height keeping the aspect ratio the same as the view window (if you adjust the width, the height changes accordingly). With this option, you can change the size of the picture and still get a saved picture that corresponds exactly to the on-screen view, whether the resolution is higher or lower. With the option **Other** you can freely adjust the width and height, without maintaining the aspect ratio. You are likely to encounter distortion of the image with this selection, but you can set it so the picture shows elements which are not otherwise visible with the aspect ratio intact, or in the view window.

4.19.1.6   Color palette

Within this section you can control the color depth of the saved bitmap, which defines how many colors are used in the saved picture. Two color options are available to you: Color palette (256 colors) and True color (16.7 million colors). The option you decide to use should depend upon what you intend to do with the saved picture. The option Color palette saves pictures that are easily converted to other image file formats, and that are suitable for publishing on the Internet. You should use the True color option if you have very high quality requirements for the picture to be saved, since among other things the storage space requirements are much higher with True color images.

When saving as Color palette the Optimum color function (see page 439) is executed automatically. This function forces ArCon to create a global palette of 256 colors, by examining the current view and optimizing the color palette for 256 colors, which it uses to build the saved image.

Note: If ArCon is set up to operate in High color mode (see **Options – Program – Program options…**) it can only create and save pictures with a High color palette (32,000 colors). When you save pictures as True color while in this mode, only 32,000 different colors can be used – even though the file saved is built on a True color (24-bit) model, resulting in an overly large file, with a limited color palette (the lower bits of the color model remain unused). Only if ArCon is operating in the True color mode can you use all available colors when saving pictures. If you want or need true color pictures,

you must run ArCon in True color mode, and don't forget that Windows and your video card must also be set to True color (see page 110).

4.19.1.7   Oversampling

You can improve the quality of your pictures with several aids. One way is to use over sampling. With this technique each pixel is internally measured against neighboring pixels, and the display and coloring is adapted accordingly. The result is that edges are smoothed and colors appear more realistic. The over sampling options are None, 4-times, 9-times and 16-times. The following two pictures illustrate the effects of over sampling:
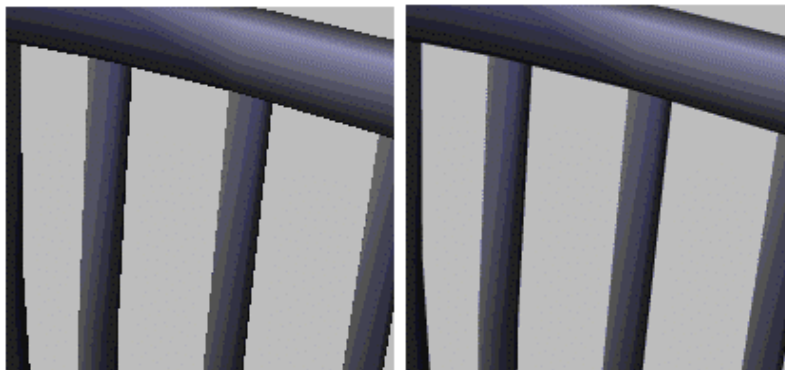
The left image is without oversampling and the right image is with oversampling.
We recommend that you use over sampling together with Edge filters (described below) for best results.

4.19.1.8   Edge filters

If you enable this switch, ArCon looks at all visible edges in the picture to be saved, and tries to smooth them out. Since this function takes up little computing time, it is recommended that you always activate this switch.
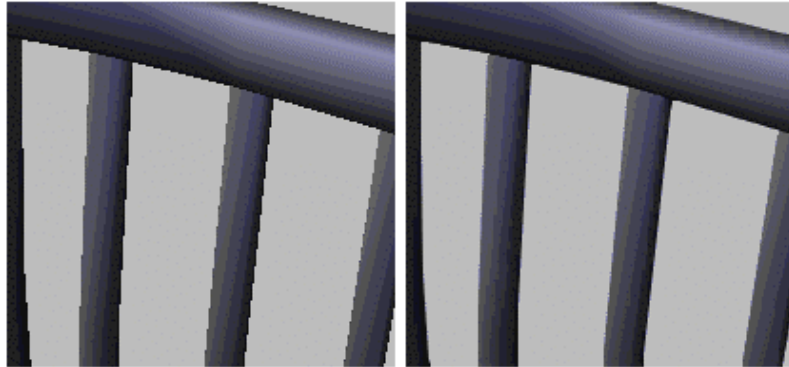
The left image is without edge filters abd the right image is with edge filters.
You'll get the best results by using both Edge filters and over sampling.

4.19.1.9   Raytrace

If you activate this option, the picture is processed with the Raytracer before it is saved. The current settings for the Raytracer (which you can set by right-clicking) are used. You'll find detailed information on the Raytracer and the relevant options on page 389). **Note:** If you activate the **Raytrace** option, the required computing time can increase tremendously, especially if you've set a high resolution and if you're using over sampling. Raytracing delivers a better picture, but there's a reason it is an option…

4.20   NEW VIEW

You can open a new window with a new view by left-clicking the icon. Alternatively, you can select the menu **Window – New view**. This view is created according to the settings described in the next few paragraphs, and displayed in a new window. If you want to work with multiple windows, you can arrange these windows next to each other with the menus **Window – Cascade** and **Window – Tile**.

4.20.1   New view

You can open the **New view** dialog box by right-clicking the icon or selecting the menu **Options – Program – New view**.
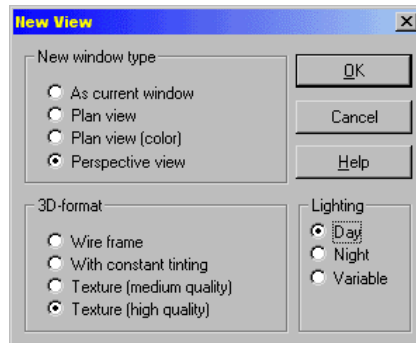
You can make the following adjustments in this dialog box, in order to control the parameters of the new view.

4.20.1.1   New window type

Here you can specify the display type to be shown in the new window. The option **As Current window** creates an identical copy of the currently active window. You can also specify a **Plan view**, a **Plan view (color)**, or a **Perspective view**. The type of view specified here will appear upon subsequent clicks on the **New view** icon (see above).

4.20.1.2   3D format

Select in this section the type of 3D view you require. The four options are **Wire frame**, **With constant tinting**, **Texture (medium quality)** and **Texture (high quality)**. Remember that you can change the view later (see page 387). If you consistently work with only one type of view, the settings you make here will always control the New view option.

4.20.1.3   Lighting

Within this section you can select whether the new view should be set in the daytime, nighttime, or a variable-time. To set these parameters you have the check boxes for **Day**, **Night** and **Variable**.
Of course you can later (and at any time) change the setting with the variable icon.

126

4.21 ZOOM

ArCon lets you adjust the current view of your project, by moving the viewpoint in and out of the project. To enlarge the display of a specific area, you can zoom in. You can do this by left-clicking the , which activates the zoom function. After zooming in or out, the zoom icon is automatically deactivated. You can also set the zoom level to show everything in your project by clicking the icon.

Once you've selected the zoom icon, you can increase the level of detail in the view windows with the left mouse button. You can zoom out, or display more of the project, by pressing the left mouse button while simultaneously pressing the **Ctrl** key. If you have entered a fixed zoom level, you need only click the left mouse button in the current view window. If you did not enter a fixed zoom level, you must define the area to display by pressing the left mouse button and drawing the area in the window.

After you have specified this area by drawing a rectangle in the view window the area you specified is displayed in the view window.

Note: In Perspective view, using the zoom can change the zoom depth, so that the focal point of the selected area is the new focus (centered in the view window).

Besides the zoom , you also have the numeric keypad on your keyboard to adjust zoom levels and move windows.

The following guide lists the key commands:

Key **0**	Show everything
Key **1**	Move the window downward and to the left
Key **2**	Move the window downward
Key **3**	Move the window downward and to the right
Key **4**	Move the window to the left
Key **6**	Move the window to the right
Key **7**	Move the window upward and to the left
Key **8**	Move the window upward
Key **9**	Move the window upward and to the right
Key **+**	View window is zoomed in, around the center
Key **-**	View window is zoomed out, around the center
Key *****	View window is zoomed in, centered around the mouse pointer
Key **/**	View window is zoomed out, centered around the mouse pointer

You can easily follow these key shortcuts by imagining arrows around the numerical keypad, with the key **5** being the center, and the keys around it moving the window in

the respective direction.

After getting used to these keys you will probably use them almost exclusively for navigating your ArCon project, since is more effective than using the mouse. In order to facilitate this for laptop users without a numeric keypad, ArCon uses the keys: + , - , * , / while pressing the **Ctrl** key (using the keys on the regular keyboard).

With the settings described in the following paragraphs you can adapt the zoom function to suit you.

4.21.1   Zoom

You can open this dialog box by right-clicking or by selecting the menu **Options – Program – Zoom…**

4.21.1.1   Zoom factor

Here you can adjust the mode of operation for zoom by selecting the desired option. The setting made here applies to both zooming in and zooming out.

4.21.1.2   Best fit (free)

With this option you can specify the area to be zoomed in on or out from by drawing a box in the window. After selecting the zoom icon, press and hold the left mouse button in the view window. As you move the mouse you can draw a box in the window around the contents you want to zoom in on. Release the mouse button to zoom in on the selected area.

4.21.1.3   Best fit (center)

This option is similar to the option **Best fit (free)** except you don't draw a box corner to corner. Instead, as you move the mouse a box is drawn out from a center point where you first held down the left mouse button. This has the benefit that you can first determine what you want to be the focal point, then start zooming from that part – the point where you start will be the focal point at the center of the screen. Whichever of the two options you use is left to your personal taste.

4.21.1.4   Zoom factors: 1.414, 2.0, and 4.0

Here you can specify a fixed zoom factor. You use this by clicking the zoom icon with the left mouse button then again in your current view window. The view is then zoomed in by the factor you specified. You can zoom out by pressing the **Ctrl** key while clicking in the view window.

4.21.1.5   Other

Here you can enter your own zoom factor. The only limitation is that this value must be between 1.00 and 20.00.

4.22   WORKING WITH FLOORS

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 141.

You can model not only floors of your house in ArCon, but you can design whole houses, from the foundation to the attic. To assist you with floors the menu **Floor** is available in both Construction mode and Design mode. ArCon always tells you exactly which floor you're working on (the current floor). The name of the current floor is displayed in the list box at the right in the upper horizontal toolbar (or with the menu **Floor… current floor**).

You can switch at any time to another floor (and make it the current floor) by selecting the desired floor from this list box.
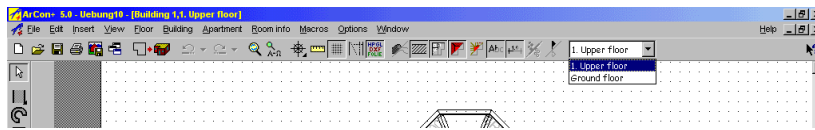
In Construction mode (see page 88) you design the structure of the current floor. Whether you place or move windows, doors or walls – the elements are always placed or moved within the current floor.

In Design mode, too, the current floor is always visible. However, you can display additional floors in Perspective view. Whenever you select Perspective view, the current floor is displayed.

4.22.1   Assigning inputs and objects to floors

ArCon assigns all of your inputs to a certain floor. These design changes are usually made in Construction mode for the current floor. Remember: in Construction mode your inputs and changes are always for the current floor. These inputs also include text, guidelines, and dimensions. With objects, which you place in Design mode, the assignment to individual floors is as follows: Objects that you place within a closed room are attached to the relevant floor. For an object to be *within* a closed room, the focal point of the object must be clearly inside the room concerned. Objects that are not assigned to a room are not assigned to a floor, and therefore remain if you change or delete floors.

4.22.2   Defining the first floor in a new project

If you are in ArCon and click the ☐ icon (see page 108) or select the menu **File – New** to create a new project, a dialog box opens where you can define the properties of your first floor. In principle, these inputs correspond to the plan's specifications, and will also apply to the construction of additional floors. These properties are explained in the sections on **Floor – New top floor**, **Floor – New floor above current…** and **Floor – New bottom floor…** menus.

If you are adding a new floor, you can transfer the properties from an existing floor to the new floor. You can control this in the **Transfer** tab in the **Floors** dialog box.

You can also define the level of the floor here. If you want to start, for example, with the basement, you can specify a value of 3m, for example. As a result of this

130

specification and the **Ceiling height** specification, the levels of the floors, current and those added later, are defined.

4.22.3   Dependencies between floors

If you operate in ArCon with multiple floors, the floor levels of the various floors are determined in such a way that all floors *merge* into one another seamlessly. If, for example, you define a ground floor with a floor height of 2.80 meters, and the upper edge of the floor of this ground floor has an absolute height of 0.0 meters, the upper edge of the floor above (the first upper floor) will be situated at 2.80 meters. You cannot modify this directly; you would modify either the floor height of the ground floor or its zero level.

This seamless merging of floors affects the input of zero levels (the level of the floor's upper edge) and floor heights. If you define only one floor, you can specify the zero level – the level of the upper edge – of the finished floor and the floor height independently. Accordingly, both inputs are available in the **Floors** dialog box.

If you define at least one floor and you then add a floor below all others, you can specify the floor height for this lowest floor and in addition, the level of the upper edge of the finished floor. Both values depend on each other; if you change the level of the upper edge (the zero level), the floor height will necessarily change, and vice versa. For all floors – down to the lowest in your building – the level cannot be specified. It is computed based on the other information you enter, and cannot be directly modified.

To best understand these dependencies between floors, we recommend that you create a simple building with several floors in order to experiment with the various floor properties inputs.

4.22.4   Visible floors

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 141.

If you select the menu **Floor – Visible floors…**, the following dialog box appears:

The contents of the list within this dialog box naturally change depending on how many floors your building has, and their types or names. Our example project has five floors.

In this dialog box you specify which floors should be visible, in addition to the current floor. In Construction mode display, the current floor is displayed normally and all other visible floors are shown in gray. You can snap on elements in the gray-colored floors. In Design mode, the view depends on the type of view in the window. In Plan view, the view is similar to the view in Construction mode – i.e., all visible floors are displayed in gray, and the furnishings of the current floor are shown in black. In Plan view (color), the view is independent of the settings in the **Visible floors** dialog box; only the current floor is shown (otherwise you would always see only the topmost floor). In Perspective view, all floors are displayed. Particularly with this type of view, you can achieve special effects using the dialog box.

If you select **Current floor**, you can show your house as *layers*, by changing the current floor with the floor list in the horizontal toolbar.

Note: You can also use the arrow keys (up and down) on your keyboard to select floors, but you must click first in the floor selection list.

Note: In Construction mode, the **Always show stairs to the floor beneath** option in the **View** – **Architectural representation** menu can be used to select whether or not stairs on floors underneath the current floor are visible when the floor on which the stairs are located is not visible.

132

If in the dialog box you select **All floors**, you can view your entire house in Perspective view. The final alternative **Current floor and the following selected floors** is useful if you want to show only some floors of your house.

4.22.5   *New floor above current*

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 137.

If you would like to add an additional floor to your project, select one of the three menus. You can add your new floor either above the current floor, above the highest floor or below the lowest floor. After selecting a menu the following dialog box appears.
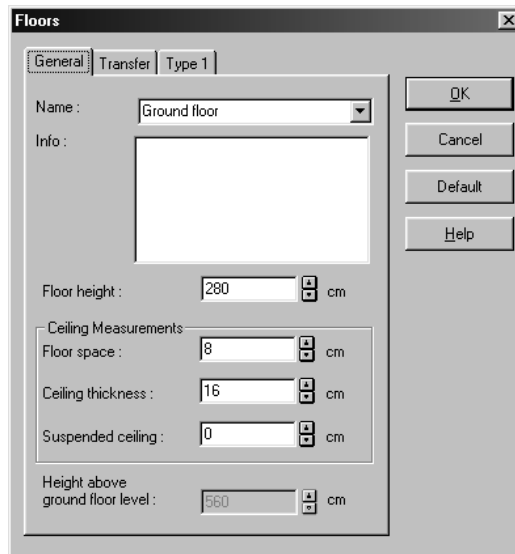
The dialog box consists of three tabs, **General** , **Transfer** and **Type 1**. In the **General** tab you specify your desired floor data. In the **Transfer** tab you can copy elements from existing floors to the new floor.

4.22.5.1   General tab

In the **Name** box you can enter a name for the floor, or select a predefined name from the drop-down list. This name will be used to identify the floor. You can select this floor as the current floor by selecting its name from the floor list in the upper horizontal toolbar.

Note: If you should assign a name already being used, ArCon will automatically add an ordinal number in order to differentiate between the floors.

In the **Info** box you can enter any comments about this floor.

In the **Floor height** field you can specify the floor height of the floor. This can be changed later at any time. In the **Ceiling measurements** section you can specify the height of each section of the ceiling.

Note: In ArCon the ceiling and the underlying room belong to a floor. A floor always goes from the upper edge of the finished floor up through the ceiling to the upper edge of the finished floor above it.

134

4.22.5.1.1   Floor height

Since in ArCon the ceiling belongs to a floor, you must define not only the height of the floor, but also the height of the different layers of the ceiling. The following illustrates this idea.
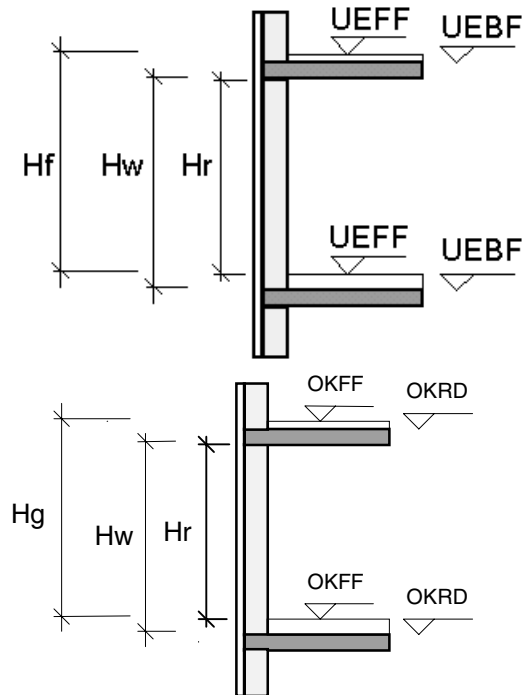
Hs =   floor height
Hw   =   wall height
Hr =   room height
UEFF =   upper edge of finished floor
UEBF =   upper edge of bare floor (subfloor)
Note: The room height is equal to the floor height minus the height of the ceiling layers.

4.22.5.1.2   Height above ground floor level

Generally the value in this box cannot be changed, since it is computed automatically

135

from the other values in this dialog box, and the total heights of the underlying floors.

If you define only one floor, you can specify the level of the upper edge of the finished floor and the ceiling height independently. Only in this case can you generally enter a value directly into this field.

4.22.5.2   Transfer tab

Usually superimposed floors are similar in Plan view, as they have shared walls and so forth. In order to avoid having to now input a completely new plan for each new floor (redrawing walls, etc.), you can transfer a plan and other elements from an existing floor to the new floor. Before you do so, you must specify the source floor from which to transfer the plan and other elements. You can select the source floor in the **Source** list box.

With the buttons you can select what you want transferred to the new floor. The options include **None**, **Complete floor**, **Floor plan only** and **Floor plan with**. If you select this last option, you can select which elements from the source floor you want transferred. You can select **Doors**, **Windows**, **Supports**, **Chimneys**, **Stairs**, **Ceiling**, **Upper/lower beam**, **Text**, **Wall cutouts**, **Suspended ceiling**, **Dimensions**, **Guidelines**, **Furnish**

objects and **Platforms**. In ArCon+ you can also transfer **Virtual walls**. After you have made your selection, acknowledge the dialog box with **OK** and ArCon will create the new floor.

4.22.5.3   Type 1 tab

If you are using ArCon+, you'll find an additional tool when creating a new floor. In the **Floors** dialog box there is an extra tab for **TYPE 1**.

All inputs that you make here are used for calculating a project according to TYPE 1. You'll find detailed information about this page in the *Calculation conforming to TYPE 1 and TYPE 2* section.

4.22.6   Edit current floor

If you would like to modify an existing floor's height or name, select this menu from the Floor menu. You can modify the name of the floor, just as you originally named it. You can also change the floor height as well as the height of each ceiling area.

In principle this dialog box is identical to the **General** page in the **Floors** dialog box which you use each time you create a floor. If you acknowledge your changes with **OK**, the new values are immediately used.

If you change the floor height, you must understand what happens to this floor as well as the floors above and under the current floor. This is discussed in the next few paragraphs.
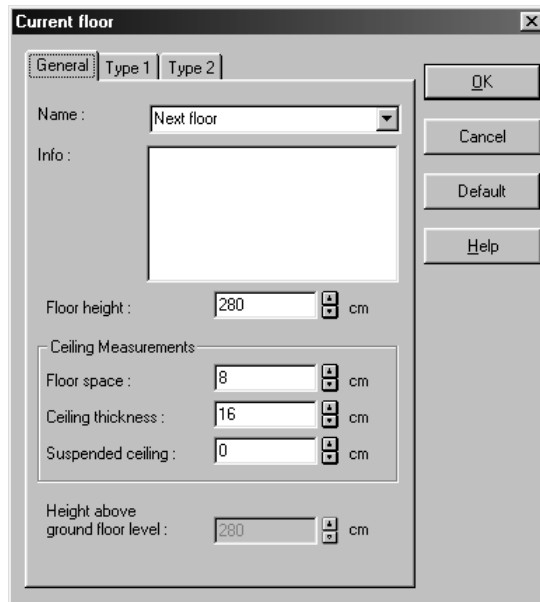
Select in the dialog box the element you wish to change, and make your modifications. Acknowledge your changes to the current floor and close this dialog box with **OK**. If you change your mind you can click **Cancel** to close the dialog box without making any changes to your floor.

Note: If you change the floor height, ArCon automatically makes some modifications to this floor. These are:

- Stairs in the current floor are adjusted to match the new floor height.
- Objects which have the characteristic to *rise upwards* to the ceiling (like certain lamps) are moved the same amount upward as the ceiling of the floor is shifted upward.
- All objects which fall to the floor or *float* are moved downward when the ceiling of the floor immediately below is moved downward, to keep those objects either on the floor, or midway between the floor and ceiling.
- If the ceiling of the underlying floor is moved, the windows in the current floor are shifted likewise so that their sill height remains constant.
- Doors are shifted similarly to windows.
- If the height of the current floor is reduced, you may have windows and doors that no longer fit. ArCon will ask you if you want these windows and doors deleted, or if you want to keep them. If you choose to keep

138

them, you must manually adjust their height so they fit properly.

- If, due to the modifications in the current floor, other floors must change their height or position, ArCon will ask you how they should be handled and proceed accordingly.

Note: Modifying the level of the lowest floor will modify the levels of all upper floors. This way the level of the entire building is easily changed.

4.22.7 Delete current floor

Besides adding new floors to your project, you can delete existing floors. After selecting the menu **Floor – Delete current floor**, the following dialog box appears:
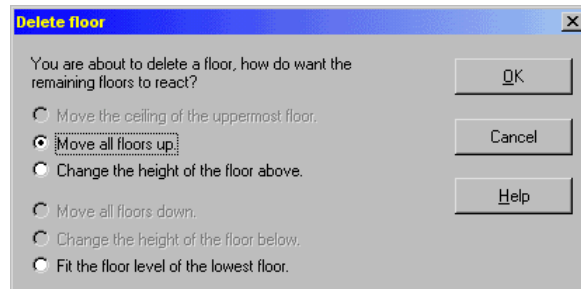
Here you can adjust how ArCon should process the remaining floors. If you acknowledge this dialog box with **OK**, the floor and all design details (walls, doors, windows, furnishings, as well as text, guidelines, etc.) are deleted.

In order to prevent accidental deletion, ArCon will warn you before letting you delete a floor. When presented with the warning, you can cancel the operation, or continue and delete the floor.

5 BUILDINGS, APARTMENTS AND ROOMS

5.1 OVERVIEW

A project in ArCon is assembled from different elements, one above the other in a hierarchy. You first have floors, and each floor consists of multiple rooms. In ArCon+ this hierarchy is extended: besides the levels **Rooms** and **Floors**, ArCon+ supports the levels **Buildings** and **Apartments**.

Buildings: Buildings in ArCon+ includes the whole set of floors, which are placed above each other. ArCon works the same way with buildings, but ArCon+ adds the option of multiple buildings.

Apartments: Apartments do not necessarily have a shared space, but help you identify and control additional information about each room. You can assign the same apartment to different rooms. These rooms can be situated on different floors, or even in different buildings. In this sense *apartment* corresponds to a group of rooms, connected only by the shared term, *apartment*.

These two hierarchic levels are used on one hand for room information, and on the other-hand for organizing and planning your project.

Additionally, ArCon+ lets you load and save buildings independently of a project to, for example, join separate projects into an overall project. Apartments are particularly useful in Design mode of ArCon+: it is possible to show only the current *apartment*, with all other apartments shown with transparent walls and without furnishings.

5.2   BUILDINGS

A building in ArCon+ is a group of floors each situated above another. Multiple buildings can be placed next to each other so you can define different buildings with different floor heights and different zero levels. Additionally, entire buildings can be loaded and saved, as well as moved with the mouse in the display.

5.2.1   *Working with buildings*

For editing buildings you have the **Building** menu with the following elements:
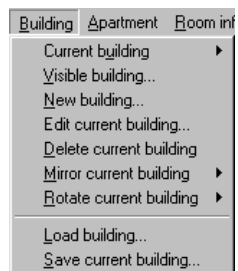
Before these menus are described in detail, consider these general notes about buildings. ArCon+ always uses a single building for each view. If you work with several views, each view can each have a different current building. You can identify the current building you're working with in any view by the label at the top of the window. In Construction mode your edits always affect only the current building and the current floor (which you can specify in Construction mode). In Design mode, the current floor

142

of the current building is always visible. You can choose to display additional buildings, and control the displayed floors in these buildings. An exception is that in Plan view (color), the current floor of the current building is displayed.

5.2.2 Edits and inputs in a building

In ArCon+, your inputs and edits affect the current floor of the current building.

5.2.3 Defining the first building in a new project

When you define a new project in ArCon+ by clicking the ▢ icon or by selecting the **File – New…** menu a dialog box appears where you must define the specification of the first floor of your project. A building is created and is named **Building 1**. You can later edit this name and the building's specifications.

5.2.4 Dependencies between buildings

Buildings are completely independent of each other in ArCon+. That means, for example, the walls of a building *are not merged* with walls of another building, but only with the walls of the same building – as with ArCon – with walls of the same floor.

5.2.5 Visible buildings

If you select this menu the following dialog box appears:
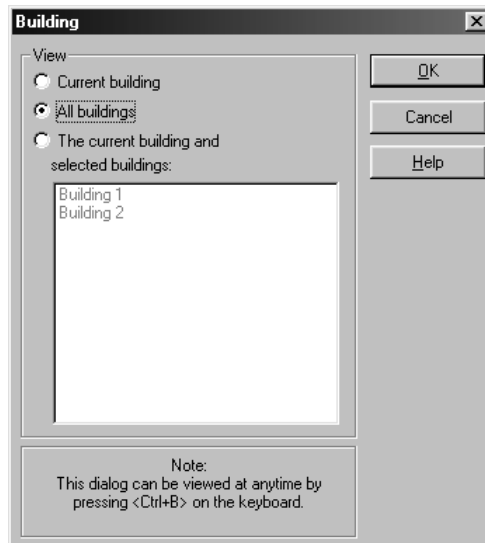
This is almost identical to the dialog box that appears when you select the menu **Visible floors**; also their function is nearly identical. But instead of visible floors you specify visible buildings.

Contrary to floors, which are displayed in the list box in the upper horizontal toolbar, easily changing between different buildings is not accomplished through a list box, but only through this dialog box. However, in order to switch from one building to another, keyboard shortcuts are available. This applies, by the way, not only to buildings, but also to floors and apartments (see page 153). Here follows the keyboard shortcuts:

>   Floors: Ctrl+G
>   Building: Ctrl+B
>   Apartments: Ctrl+U

When you press one of these three key combinations together in either Construction mode or Design mode, you move between the three options of the dialog box, for example, with buildings, between the **Current building**, **All buildings**, and **The current building and selected buildings**. The function works the same for floors and apartments.

5.2.6   *New building*

If you would like to add an additional building to your project, select this menu. After

144

selecting it the following dialog box appears:

You can specify the name of the building in this dialog box, as well as any comments. You can use both later in the **Room info**. If you acknowledge the dialog box with **OK**, the floor characteristic dialog box appears next where you can specify the first floor parameters, just as if you created a new project (since these parameters must be set for each new building, and a project begins by specifying the first floor of the building). If necessary, existing buildings are shown in gray depending upon their visibility settings, or hidden completely.

5.2.7   *Edit current building*

By selecting this menu, you open the **Building data** dialog box. You can also open this dialog box by double-clicking the building, if it is selected. You can select a building, like all other objects in ArCon+, by simply clicking it. A building is the *largest* element in Construction mode. Accordingly, in order to select it, it may be necessary to click a number of times consecutively, before the building (and not a wall, a room or a roof) is selected.

The dialog box that appears consists of the fields **Name** and **Comment**. In the **Statistics** section some details of the building are displayed: **Number of floors**, **Number of apartments**, **Number of rooms**, **Floor area** and **Volume**. These values are also used for the room information.

5.2.8   Delete current building

Just as you can add buildings to your project, you can delete both new buildings and existing buildings. After selecting this menu a dialog box appears. This dialog box appears to warn you that you're deleting elements besides the building, which could have fatal consequences. When a building is deleted, all constructional elements as well as all furnishings assigned to this building are deleted.

Note: The last building in a project cannot be deleted, since your project would otherwise be void. If you want to delete all buildings, create a new project.

5.2.9   Mirror current building

In order to mirror a building select from the **Building** menu **Mirror current building…**

A submenu appears to the right of the menu where you can select between predefined axes and an arbitrary axis over which to mirror the building.

Basically, buildings can be mirrored independently. You can, for example, mirror a loaded building within a project and refit it into a new position.

5.2.9.1   Mirror in X- or Y-axis

In order to mirror the current building in a defined axis, simply click the desired axis in the submenu.

This operation mirrors a building in the X or Y-axis at the current origin (see page 165).

5.2.9.2   Mirror free axis

If you select this option, you can draw a line that will represent the axis in which the building is mirrored. After selecting this option, you must click twice in the plan window in order to define the mirror axis (the status line displays information while you're doing this). After the first click, an outline of the mirrored building is displayed, indicating the mirrored building's position. Click a second time to confirm the mirrored building in the specified axis.

5.2.9.3　　Mirror buildings setup

You open this dialog box by selecting **Setup…** in the **Building** – **Mirror current building** submenu or by selecting the **Options** – **Program** – **Mirror buildings** menu.
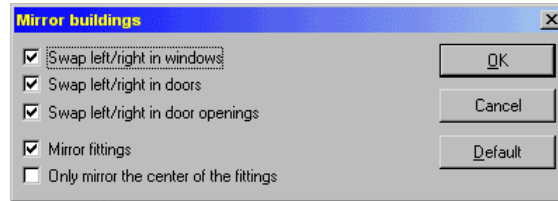
In this dialog box you can specify how individual elements in the building will react when mirroring a building. If **Mirror fittings** is checked, the furnishings are mirrored with the building, ending up in their appropriate positions. The furnishings are also mirrored, so, for example, a chair in front of and facing a window remains facing the same window. If **Only mirror the center of the fittings** is checked then the furnishings are mirrored, but they are not rotated or otherwise adjusted in position, for example, the chair mentioned above will still be in front of the window, but it will be facing its original direction.

5.2.10　Rotate current building

In order to rotate a building within a project select the **Building – Rotate current building** menu.
A submenu appears to the right, where you can select between predefined angles of rotation as well as free rotation.
Basically, buildings can be rotated independently. You can, for example, rotate a loaded building within a project and refit it into a new position.

5.2.10.1　　Rotation by fixed angles

To rotate the current building through a predefined angle around its center, select the desired angle.
The predefined angles let you rotate a building by 90°, -90°, 45°, -45°, 30°, and -30°.

147

5.2.10.2   Free rotation

Besides rotating a building by a fixed angle, ArCon also lets you specify any arbitrary angle by which to rotate a building around its center. If you select this menu, the following dialog box appears:
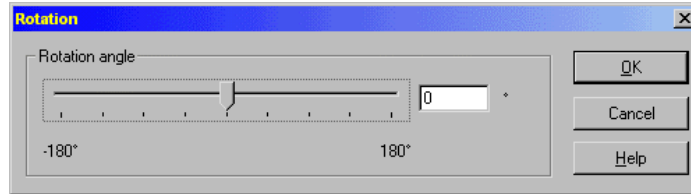
Using the slider control you can adjust the angle of rotation freely. The current value for the angle of rotation is displayed in the box to the right of the slider. You can also directly enter a value into this box. As you move the slider, or enter values into the numeric field, the display gives you a preview of the building rotated by the angle specified. To accept the angle of rotation, acknowledge the dialog box with **OK**.

5.2.10.3   Working with rotated buildings

Independently of whether you select a fixed angle of rotation or a free angle of rotation, the building is moved around the origin ⊕ (see 165) together with not only all of the floors, rooms, and furnishings, but text, dimensions, etc. – even the grid.
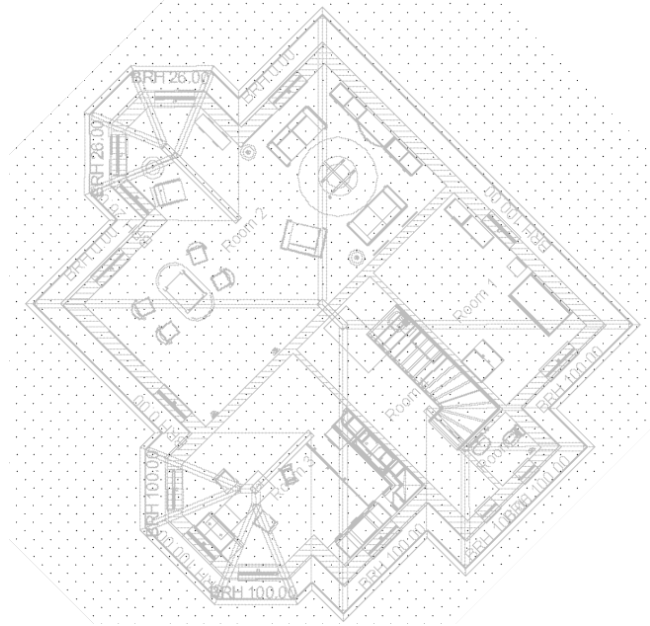
After the rotation the grid is oriented as the building itself. Only the compass remains unaffected by the rotation. This means: All inputs you make now are relative to the rotation of the current building. In other words, they refer to the coordinate system rotated with the building. Move, for example, a horizontal guideline, which is horizontal only for the building, and it will be moved diagonally on the page. Also, when drawing in walls, the status line display calculates everything relative to the rotated building.

If you adjust another current building, its adjustments are relevant to the existing grid.

5.2.10.4   Excluding elements from rotation

You have the option of excluding room text as well as normal text from the rotation if you uncheck the box **Rotate with building** in the **Room info** dialog box or in the **Text** dialog box.

Also, the sill height for windows, as well as the stair dimension and appearance, can be excluded from the rotation by opening the **Display the sill height** or the **Stair details** dialog boxes, and uncheck the **Relative to window rotation** or **Relative to stairway rotation** boxes.

149

5.2.11   Load building

With this menu you can add to your current project existing projects or buildings from other existing projects. If you select this menu, the following dialog box appears:
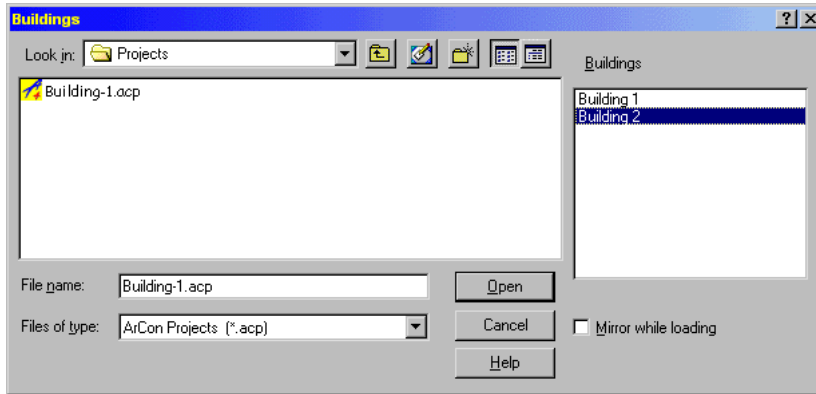
The dialog box is a standard Windows dialog box for opening files, but with an additional list box and the option **Mirror while loading**. You can select any ArCon project files (*.**acp**). For any selected project the names of all defined buildings in the project are listed in the list box. You can use the mouse and the **Ctrl** or **Shift** key to select one or more buildings of the selected project. This selection process is the same as other such processes in Windows (if necessary, consult your Windows documentation). The selected buildings are loaded by clicking **OK** with the selected project still named in the **File name** field of the dialog box.

The selected buildings, including all information (objects, dimensions, text, etc.) are loaded, and the first selected building is designated the current building. If you are in Construction mode, this building is automatically selected, so you can move it immediately. If you loaded multiple buildings simultaneously and want to move the others, you must select and move them manually.

When you load buildings in this manner, the project information associated with these buildings is discarded (the current project information is used). This information includes page format, scale, architect and owner information, etc.

If you select **Mirror while loading**, the building is automatically mirrored during the loading over the Y-axis. Here the origin and direction of the project, from which the building is being loaded, is used.

Note: With this function, you can add a building onto itself as mirrored, by saving the

150

current building as a project then loading the building back in.

5.2.12   Save current building

Just as you can load buildings into your projects, you can save selected buildings of the current project as a separate project. If you select **Save current building…**, a Windows file selector dialog box opens where you can save the selected (visible) buildings as a project, with the file extension *.**acp**. Saving this way is like saving the entire project, and includes all project data, but only visible buildings are saved in the project.

5.2.13   Current building

Selecting the current building is somewhat different from selecting the current floor (which you can do from the list box in the upper horizontal toolbar). The list of all available buildings, from which you can select a building to make it the current building, are in a submenu. You open this submenu by selecting the menu **Building – Current building**. All buildings are listed here, with the current building identified with a check next to its name. Simply click another building's name to designate it as the current building.

5.3   APARTMENTS

Similar to buildings in ArCon+ apartments are used to organize your project in a hierarchy. Unlike buildings, apartments do not have a direct effect in your model, but are useful in **Room info** and in Design mode display.

In the **Room info** dialog you can assign rooms to apartments, and sort them accordingly. In Design mode you can choose to display only certain apartments, to emphasize individual sections graphically.

5.3.1   Working with apartments

Options and controls for apartments are accessed from the **Apartment** menu. Before these entries are described in detail, consider these general notes about apartments. ArCon+ always uses a single apartment for each view. If you work with several views,

151

each view can each have a different current apartment. You can identify the current apartment you're working with in any view by the caption at the top of the window.

5.3.2   *Edits and inputs in a apartment*

In order to define which rooms belong to an apartment; you open a dialog box with this specification for each room. You can open this dialog box by double-clicking in a room, in Construction mode. The apartment fields, where you assign a room to an apartment, are described in the **Room info** section (see page 155) dialog box.

Because you allocate rooms to a apartment, objects are automatically allocated to apartments, since objects are located in rooms that belong to a apartment. This information is also available in the **Room info** dialog box.

5.3.3   *Defining the first apartment in a new project*

Unlike buildings, apartments are not automatically created or assigned by ArCon+. Instead all rooms are initially assigned to no apartment. Accordingly, the field for the apartment name displays **<not assigned>**. Rooms, which are not assigned to an apartment, can be subsequently assigned to an apartment.

5.3.4 Visible apartments 🔷

If you select this menu, the following dialog box appears:
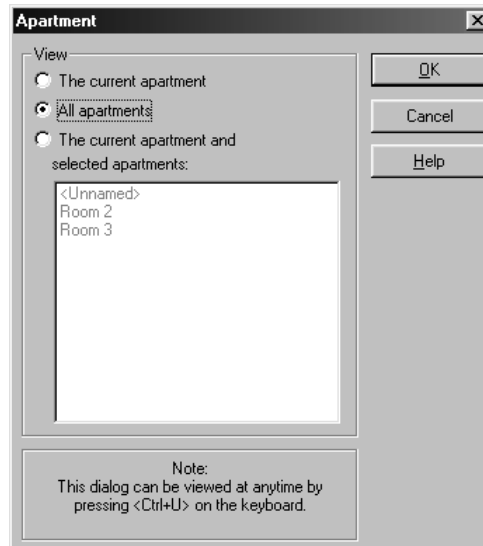
It is almost identical to the dialog box for visible floors; the function is similar. Rather than specifying visible floors, you specify visible apartments.

Unlike floors, which can be selected from the list box in the horizontal toolbar, easily changing between different apartments is not done with a list box but through this dialog box. You can switch between the three options in this dialog box with keyboard shortcuts, as you can with floors and buildings (see page 143). The keyboard shortcuts are as follows:

Floors:	Ctrl+G
Building:	Ctrl+B
Apartments:	Ctrl+U

When you press one of these three key combinations, whether in Construction mode or in Design mode, you switch between the three options of the dialog box – between **The current apartment**, **All apartments**, and **The current apartment and selected apartments**. The same applies to floors and buildings, respectively.

153

5.3.5   New apartment 🔺

If you would like to add an apartment to your project, select this menu. After selecting it, the following dialog box appears:

You can specify the name of the apartment in this dialog box, as well as any comments. You can edit both in the **Room info** dialog box. This new apartment is then available after double-clicking in a room to open the dialog box (see page 155) for you to assign rooms to it. Additionally, the new apartment automatically becomes the current apartment, so that new rooms are automatically assigned to it.

5.3.6   Edit current apartment 🔺

This dialog box is accessed from the menu **Apartment – Edit current apartment…**. It consists of the fields **Name** and **Comment**, which you are already familiar with from the dialog box for a new building. In the **Statistics** section some values for the apartment are displayed: **Floor area**, **Living space (TYPE 2)**, **Volume**, **Rooms** and **Floors**. These values are also displayed in the **Room info** dialog box.

5.3.7   Delete current apartment 🔺

Unlike deleting buildings, deleting apartments does not actually delete architectural elements or objects, but the apartment name is removed from the project. All rooms

154

assigned to a deleted apartment are then assigned to no apartment; the apartment field will display **<not assigned>**.

5.4 ROOMS

5.4.1 *Rooms dialog box*

As in ArCon, ArCon+ defines rooms by closed walls. This occurs automatically when placing and moving walls. The behavior when you double-click in a room using ArCon+ is different from that in ArCon. In ArCon the dialog box for adjusting floor and ceiling properties is opened, in ArCon+ the following dialog box is opened:

155
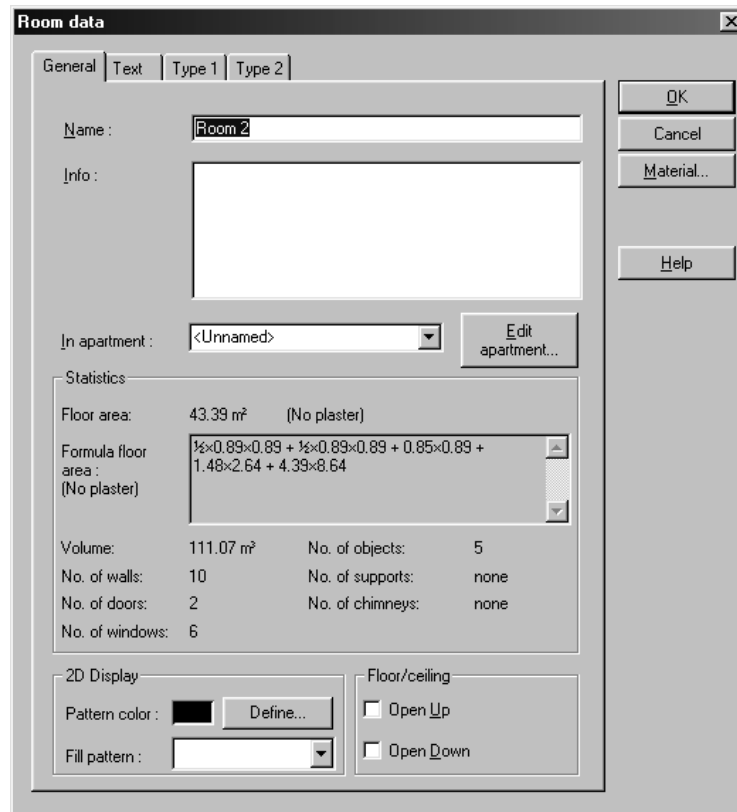
The dialog box for defining floor and ceiling materials is now available by clicking the **Material…** button.

Note: You'll find that you frequently make room inputs and adjustments in this dialog box, since these are required for the complete definition of a room. For this reason you can open the dialog box by double-clicking in a room or by pressing the F11 key. A prerequisite for using the keyboard, however, is that in Construction mode the mouse pointer must be within the room. When you press the F11 key the room is selected and the **Room info** dialog box is opened.

5.4.1.1 General tab

The **General** page is divided into two parts. At the top you can enter general information about the room, for example, its name. The lower section is reserved for statistics, which are calculated directly from your project.

All specifications and changes you make in this page, and those which ArCon+ calculates automatically, can be used in both the **Room info** and in the calculation according to TYPE 1 or conforming to TYPE 2. This is independent of whether or not these specifications are visible or not in your project. If you deactivate, for example, the comment in the plan, this does not mean that the comment is not used in the **Room info** or the calculation according to TYPE 1/ TYPE 2.

5.4.1.1.1 Name

Here you can name the selected room. ArCon+ automatically names rooms by numbering them consecutively as you create them. You can subsequently modify a room's name.

5.4.1.1.2 Info

Here you can enter any text you want. For example, you can record notes about the room.

5.4.1.1.3 In apartment

In this field you can specify which apartment the room belongs to. If you click the arrow to the right of the field, all existing apartments are listed and you can select the desired apartment. Another option is to enter an apartment name directly into the field. This

156

creates a new apartment with the given name and will subsequently appear in the list of apartments. Thus, entering a apartment name in this field is a sort of *shortcut* to create a new apartment.

However, note that in contrast to defining an apartment with the menu **Apartment – New apartment...**, creating a apartment this way does not automatically make the new apartment the current apartment.

5.4.1.1.4   Edit apartment

To the right of the **In apartment** field is the button **Edit apartment…**. This opens the **Apartment** dialog box (see page 151) for the selected apartment. You can then edit the apartment name and comment directly. The **Edit apartment…** button is a shortcut to the dialog box for editing an apartment's specifications.

5.4.1.1.5   Statistics

In this section you'll find calculated values for your room, including **Floor area** and the formula that was used to calculate the floor space, as well as various other specifications. These include the **Volume** of the room as well as the number of constructional elements such as walls, doors, windows, objects, supports and chimneys.
Note: In ArCon+ the data for rooms which are topped by a roof includes consideration of the additional space.

5.4.1.1.6   2D display

Within this section you can specify how the room is shown in Construction mode. You can define the color and fill pattern.
Tip: If you select solid black as the fill pattern and any color besides white as the line color, the room is displayed in multiple solid colors, rather than cross-hatched.

5.4.1.1.7   Floor/ceiling

Within this section you can specify whether the room has a floor and/or ceiling. If you check **Open up**, no ceiling is created for the room; if you check **Open down**, no floor is created.
Note that these inputs affect the characteristic of a room, whether it is partly enclosed by virtual walls, or confined according to TYPE 1.

5.4.1.1.8   Text

On this page you can indicate what is to be displayed in the room text in your plan. The page is divided into three parts: In the **General** section you can select elements that you entered in the **General** tab of the **Room info** dialog box, or that ArCon automatically computes from your project (which are also shown on the **General** tab). The elements in the **TYPE 1** section are specified or determined in the TYPE 1 tab. The elements in the check box in the **TYPE 2** section on the **TYPE 2** tab are specified or calculated accordingly.

You can specify on the **Text** page whether each element is to be displayed as text in the plan. This means that if you activate, for example, the box **Name**, the name of the room is visible both in the normal view and in the layout view. This text can be edited in your project like normal text. You can also move the text or rotate it by right-clicking it. The

only difference between this text and normal text is that when you double-click normal text you open the text characteristic dialog box, but when you double-click text you open the **Room info** dialog box.

If you rotate a building in ArCon+ (see page 149) you can specify by checking **Rotate with building** whether the room text should be rotated with the building. If the box is checked, the room text is rotated and aligned with the rotated building. If the box is not checked, the room text is not rotated with a rotated building, but it is moved to stay with the room it describes.

If you click the **Font…** button, a standard Windows dialog box is opened where you can select a typeface (font) for the text. The selected font applies to all text in the selected room.

With the **Apply font** button you can use the selected font in all text in visible rooms. Here, visible rooms include those in the current floor (shown in black) and in the visible (but not current) floors (shown in gray).

If you click the **As default** button all adjustments made on this page are saved and used for all other rooms and selected automatically.

5.4.1.2   The Type 1 and Type 2 area calculation tabs

All inputs you make in this page are intended for the requirements of TYPE 1 and TYPE 2 particularly for calculations according to TYPE 1. Values shown in the **Statistics** section are calculated by ArCon. These cannot be modified, since they result directly from your project.

6 CONSTRUCTION MODE

Construction mode is separate from Design mode in ArCon. In Construction mode you enter the architectural properties of your project. All fixed elements of your apartment or house – the architectural things that are generally immovable – are designed in Construction mode.

In the following sections you'll find detailed explanations about Construction mode and its available tools.

6.1 SNAP

ArCon helps you arrange elements using various aids in Plan view within Construction and Design mode. One such aid is called Snapping. This function helps you place elements by snapping to, or *snapping onto*, certain existing elements in your project. The mouse pointer will snap onto elements when it's within a predefined distance: the *snap radius*. For example, with snapping switched off, you can begin drawing a new wall very close to an existing wall, without the two connecting. With snapping switched on, the pointer will snap onto the existing wall so the two walls connect perfectly at their edges.

Besides selectable elements, you can snap onto the grid, the ruler and guidelines. The selectable elements include wall axis, wall edges, cutouts, and floor slabs as well as cuts and ends. Generally you can only snap onto visible elements or aids. For example, if you switch all guidelines off with the icon, you won't be able to snap on these – even if you activated the guideline option in the **Snap and select** dialog box.

If you want to place a point freely without snapping, you can switch snapping off for all elements by pressing the F3 key, then set the point. Note that this disables snapping only for setting a single point, then snapping is switched back on again. So if you want to place several points freely, it is best to switch off snapping completely in the **Snap and select** dialog box, rather than pressing **F3** before setting each point.

If several snap points are situated tightly together, you can switch between them by pressing the key combination **Ctrl+F** before finally placing the point or object.

6.1.1 Snap and select

You open this dialog box by right-clicking the ![cursor icon] icon or by selecting the menu **Options – Program – Snap and select…**

The dialog box consists of two pages: **Snap** and **Selectable elements**. In the **Snap** page you can adjust the snap radius and which elements to snap only while editing. In the **Selectable elements** tab, you can select which elements can be selected with ![cursor icon] in the work area.

6.1.1.1   Snap tab
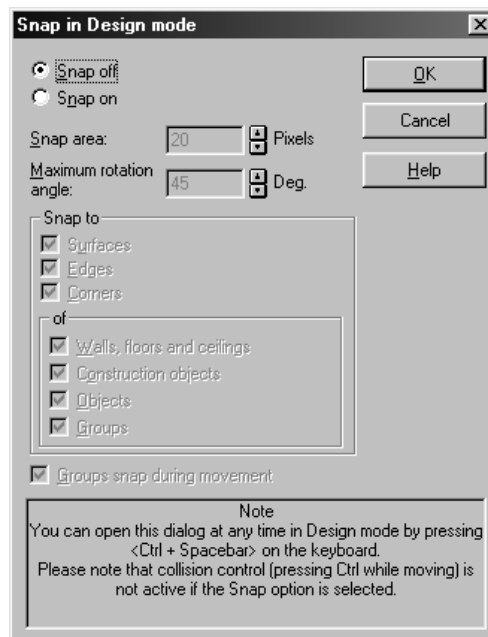
6.1.1.1.1   Snap on / Snap off

You can deactivate snapping with the option **Snap off**. If this is selected no further input is possible in the dialog box and you can place objects and elements freely on your page. If you activate the option **Snap on**, you can adjust snapping to your needs with the following options and adjustments.

162

Note: The options **Virtual walls**, **Roofs** and **Transparency** are only available in the ArCon+ version.

In ArCon+ you can snap on transparencies. If you selected the architectural representation (see page 199) display, you can snap on roofs (during replacement) – on the roof edges, the one and two-meter lines as well as the zero line. Interaction of roof edges and roof lines with other elements, for example, guidelines or walls is not supported when snapping.

6.1.1.1.2 Range

Here you specify the snap radius. Within this radius ArCon will try to find a point on which to snap. It can be a point of the grid, the ruler or a point on a specified element.

Since it can often happen that within the snap radius there are multiple points on which to snap, you can press **Ctrl+F** to switch between these points and select the desired point on which to snap.

The snap radius you set depends largely on the elegance with which you use the mouse, and should be set at whatever level you're most comfortable with. If the snap radius is too high, inputting different elements and switching between snap points can become tedious because you never snap onto the point you want – which defeats the purpose of the tool. If the snap radius is too small, you may find that you're not snapping onto the point you want because you're not positioning the mouse in exactly the right spot. You'll get best results if you experiment with different settings.

6.1.1.1.3 Snap to

By simply checking the boxes for different elements, you can select which elements to snap onto. You can select **Guidelines**, **Wall axis**, **Wall edges**, **Images**, **Cutouts/ceiling tiles** and **Roofs**. Additionally you have the option of snapping on **Cuts and ends of** the indicated elements.

If the elements selected here are not visible in your plan, you cannot snap on them, even if the appropriate option is active.

If you operate with multiple floors (starting from page 129) you can also snap on all elements of the visible floors, separately from the current floor (see 137). You can use this function to place elements on top of each other, for example, accurately placing walls between different floors.

163

6.1.1.2   Selectable elements tab
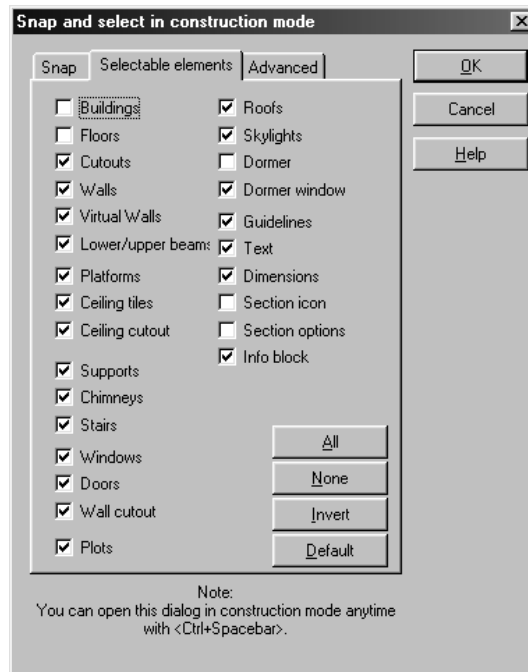
This page consists of a set of control fields, which lets you control which elements in your project can be selected.

All options are selected by clicking the **All** button; all options are deselected by clicking **None**. **Invert** reverses the status of all elements, checking those that were previously unchecked, and so forth. **Default** checks those elements, which are typically set under *normal* operating conditions.

You can use the options in this page to be able to quickly and easily select elements in your project, especially if several elements are situated one over another. That can be the case, for example, if you move a roof. Normally the roof options are not selectable because this one element lies over everything else and would prevent selecting anything underneath it. If you want to edit or move a roof, you'll want to change some of the options here, including **Roofs**, **Roof areas**, **Skylights**, and **Dormers**.

To quickly change the selectable elements, you can use the keyboard shortcut **Ctrl+Spacebar**. This is generally faster than right-clicking or using the menu.

6.1.1.3 Advanced tab
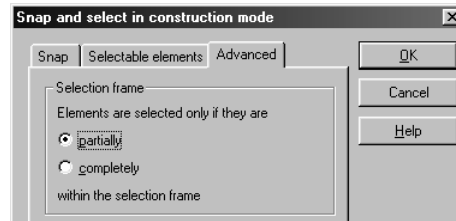
The **Advanced** tab consists of only one section called **Selection frame**. This section is used to specify how elements behave in Construction mode when they are only partially positioned inside the frame when using a frame to select elements (dragging out a frame).

If the **Partially** option is selected, elements that are only partially inside the frame are also selected. Selecting **Completely** will only select elements, which are completely within the frame.

6.2 COORDINATE AND GRID ORIGIN SET

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 176.

Beside guidelines and the ruler, the grid is probably the most important aid in Construction mode. It can be switched on and off with (see page 166). The grid properties can be adjusted by right-clicking the icon in the toolbar. When placing objects and drawing elements the mouse pointer snaps on the grid, if it is visible. You'll find a description of snapping in the preceding paragraph.

Closely associated with the grid is the origin, because all coordinates identified in the status bar are calculated from it. The origin will therefore be very important when you're designing and creating a project. With the variable image icon you can set, depending on your selection, the origin, the grid origin, or both the origin and grid origin.

While the origin sets the coordinates for the grid, the grid origin sets the position of the dots of the grid. Since you'll probably make use of snapping on the grid, you may want to adjust the grid so a grid point is exactly at the desired place. To do this, move the grid by setting a new grid origin with or and position the grid on the desired

165

point. All pixels will then shift + / - a half grid line width or height according to your input.

6.2.1 Grid ▦
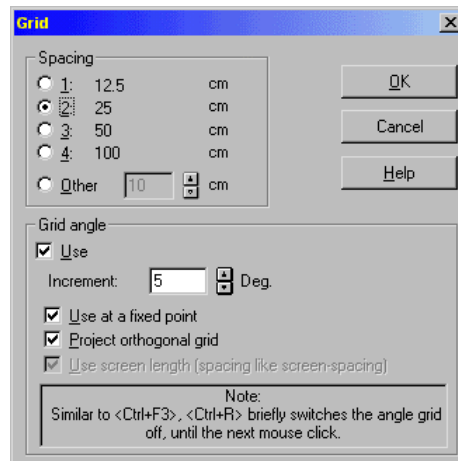
You open this dialog box by right-clicking ▦ or by selecting the menu **Options – Program – Grid…**.

6.2.1.1 Spacing

You have five different options for defining the grid spacing, or the distance between grid points. This distance applies to both X and Y- values, as the grid is always square. The first four options offer predefined distances. These are common building standards and are multiples of 12.5 cm.

The fifth option lets you define a non-standard (arbitrary) grid spacing, with values between from 1 cm to 10m. You can enter the desired value in the input box with the keyboard or by clicking the up and down arrows, which increase or decrease the value incrementally. All distances use the dimension system that you specified in the **Project options** (see page 110).

Note: The grid may not be visible depending on the zoom level. It's possible to zoom so far in that the entire view is between grid points. You can also zoom so far out that the grid points would be so close together as to make a mess of the display, so ArCon

166

switches the grid off until you zoom in to a *viewable* level.

6.2.1.2   Grid angle

Here you can decide whether you want to work with an angle grid. This function is particularly helpful when designing a house plan, because you can define a fixed angle for support of your project. If, for example, you specify an angle of 90 degrees, all walls are automatically positioned at right angles, regardless of whether or not you set the point precisely with the mouse.

If you activate the use of angle grid, you must enter a value between 1 and 90 degrees, as you require.

If you check the **Use at fixed point**, during input the lengths of elements is determined by points caught on which, the angle of the input elements assumes only multiples of the angle grids size.

If you check **Project orthogonal grid**, the angle grid determines the angle of an element. If during input the element is in the snap range of a pixel, the length of the element is determined in such a way that the element is perpendicular through this pixel. This is most simply explained with an example of drawing in walls: If you move a wall, one point of the top of the wall will be on a pixel, which defines the wall's angle based on the angle grid.

If you check **Use screen length** (spacing like screen spacing), you can input elements only at discrete angles and lengths (those of the normal grid). Note that, with snapping, elements snap on the normal grid before the angle grid. **Use screen length** is also useful if you checked **Project orthogonal grid**. The reason is that with projection the length is determined by the projection, and discrete length is no longer possible.

Note: In contrast to the *normal* grid, the angle grid remains active even if the view of the grid ▦ is switched off. Particularly with the option **Use screen length**, you should switch off the normal grid, since it has priority over the angle grid in the switched on status; otherwise the expected results are not achieved.

Similar to **Ctrl+F3**, **Ctrl+R** briefly switches the angle grid off, until the next mouse click.

6.3   RULER

In Construction mode (see page 88) you have the option of making your adjustments

with the help of a ruler. The ruler is only displayed if the ▦ icon is selected.

```
-0.8  -0.7  -0.6  -0.5  -0.4  -0.3  -0.2  -0.1   0   0.1   0.2   0.3   0.4   0.5   0.6   0.7
```
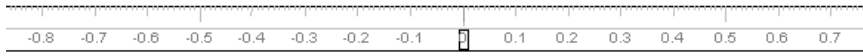
You can use the ruler for not only measuring, but for designing. If the ruler is visible, a small bar (the ruler bar) appears in the lower left side of the window. You can use the ruler bar to control the ruler and make inputs.

Before going on with the functions of the ruler bar, please note the basic operation of the ruler: The ruler functions, in principle, just like a normal ruler. You can move and rotate the ruler on the page, or lift the ruler, so that you go past with the pencil (the mouse) at the edge of the ruler. In connection with snapping (see page 165) and the definable tab stops, the ruler is a descriptive but nonetheless powerful tool in ArCon.

6.3.1   Basic use of the ruler

The ruler consists of two parts: The top part with the lines marking the scale of the ruler, and the bottom part with the text of the scale. Both areas behave differently when you click them. The text area behaves as a *handle* for the ruler. With the selectable element ▱ activated, you can move the ruler by clicking in this area and, keeping the mouse button held down and moving the mouse. Note that when moving the ruler, it snaps on to other elements in your project, just like any other element. Also, moving the ruler this way, you can only move it straight up and down, the origin (zero position) of the ruler does not change.

You can move the origin of the ruler by clicking the icon at the origin or by pressing the **Shift** key while moving the mouse. So, you can move the ruler up and down, and adjust the origin position at the same time.

A third way to move the ruler is to rotate the ruler. You can rotate the ruler by clicking in the ruler's text area, and pressing the **Ctrl** key while moving the mouse. You will rotate the ruler freely around its origin.

6.3.2   Ruler tabs

A standard wooden ruler has notches in it, used to measure and mark columns. The

equivalent in ArCon, are the tabs of the ruler. These tabs are marked in color within the ruler. There are three different types of tabs: The green tabs are periodic tabs – they repeat, with a fixed distance, always starting at the origin. You can change the distance between each of the tabs, or switch them off entirely. You make these settings in the **Ruler options** dialog box, which you open by right-clicking the ruler or by right-clicking the ruler icon in the horizontal toolbar. More detailed explanations of this dialog box can be found in the following paragraphs.

Besides the periodic tabs, you can set arbitrary tabs. You set arbitrary tabs by clicking the ruler, in the lined scale area. A dialog box then appears where you can enter the position of the tab numerically (which is much more accurate than using the mouse). These arbitrary tabs are shown in red. You can move arbitrary tabs by clicking them and, keeping the mouse button held down, move them left or right along the ruler. If you move it off an end of the ruler, the tab is deleted. Also, after moving a tab the dialog box appears again so you can accurately position it.

Tip: If you want to prevent the dialog box from opening after creating or moving a tab, press the **Ctrl** key while you click the ruler. The tab will snap on the scale lines of the ruler.

6.3.3 Ruler options

If you right-click the ruler, the following dialog box appears:
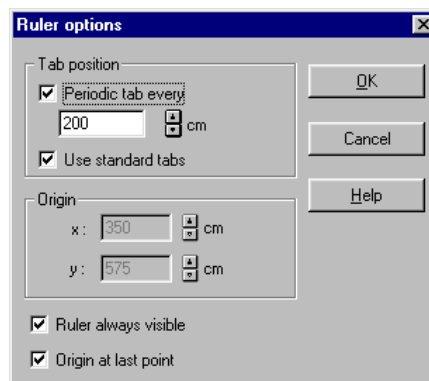
With the **Ruler options** dialog box, you can specify which tabs are used, the position of the origin of the ruler, and other ruler settings.

Any adjustments you make to the ruler settings apply only to the current window. If you

169

have several windows open, you can have different ruler settings for each view.

6.3.3.1   Tab position

Tabs of the ruler serve as snapping points when you're designing. You can set periodic tabs, which repeat over a predetermined distance, for example, snapping points every 10 cm. Periodic tabs (snapping points) appear on the ruler in green.
The following options are available:

6.3.3.1.1   Periodic tab every

If you check this option, you can enter the distance between the periodic tabs in the input box.

6.3.3.1.2   Use standard tabs

Select this option to use the standard tab. The standard tab is shown in blue.

6.3.3.2   Origin

If the option **Origin at last point** is not selected, you can enter the ruler's origin position here. If you exit the dialog box with **OK**, the ruler is set at the position relative to the origin of the plan (see page 165).
Note: The option **Ruler always visible** when changing the origin. If the ruler would not be visible after your inputs (outside the view window), the adjustments are changed, rather than the view, to keep the ruler visible.

6.3.3.3   Ruler always visible

In order to prevent the ruler from disappearing when you're scrolling a view window, you can check this option to have the ruler automatically moved so it is always in view.

6.3.3.4   Origin at last point

If this box is checked, the origin of the ruler is always moved to the point where you last

clicked the mouse button in positioning walls, windows, doors, etc.

6.3.4   Ruler bar

In the ruler bar, which is always displayed in the current window if you are in Construction mode and you click , you can make certain inputs directly with the keyboard. Besides the fields for numeric inputs, there are six icons with which you can control the ruler: , , , , and .

With the icon you can *lift* the ruler. This has the effect that you can move the mouse pointer or input elements unhindered while drawing in walls etc. across the ruler. This is not the case if the icon is above. In this case you can cross the ruler unhindered only from below; when crossing the ruler from above the input element moves along the ruler's edge.

The function of is to swap the sides of the ruler, and reverse the conditions of the previous icon. Normally, the edge of the ruler is on top; if you click this icon, the ruler's edge is on the bottom and changes its appearance to . This procedure is quite similar to using a genuine ruler, where you are situated partly above the pencil and partly below.

The icon moves the ruler a fixed distance, keeping it parallel in orientation. When you click it the orientation of the ruler is retained, but the edge is moved a predetermined value. This value is specified in the first number field in the ruler bar. For example, if the distance specified is 1 meter and you click the icon, the ruler is moved one meter upward. Note that negative values in the input box move the ruler downward.

The icon rotates the ruler by a fixed degree (angle of rotation). The center of rotation is the ruler's origin. You specify the degree of rotation in the second input box in the ruler bar. The value is in degrees, where positive values rotate the ruler counterclockwise, and negative values rotate the ruler clockwise.

The icon rotates the ruler 90 degrees. If your ruler is, for example, perfectly horizontal and you click this icon, it is then perfectly vertical. Clicking this icon again rotates the ruler back so it is again horizontal.

The last icon positions the ruler perfectly horizontal. Regardless of the ruler's angle and orientation, clicking this icon brings the ruler back to its initial, horizontal position at 0 degrees.

171

6.3.4.1 Input boxes of the ruler bar

The first two input boxes were described in the previous paragraph. The first specifies how far the ruler is moved when you click the ▲ icon for parallel movement. The second specifies the degree of rotation when you click the ↻ icon, relative to the current angle. For example, if you entered a value of 15 degrees, you can rotate the ruler 45 degrees by clicking the ↻ icon three times.

The third input box defines the standard tab (see page 169). The position of this fixed tab can be changed at any time, without opening and closing a dialog box – just change the value in this input box.

In the last input box you can enter an absolute angle of rotation. If you enter here, for example, 45 degrees, the ruler is accordingly rotated 45 degrees. Additionally this box shows the current angle of rotation after rotating the ruler manually by pressing the **Ctrl** key (see above). So, this field always shows the current angle of rotation.

6.3.5 *Keyboard control of the ruler bar*

The six icons in the ruler bar can be selected with the keyboard. For this, use the function keys F5 - F10. F5 corresponds to the first icon, the lifting key, and F10 the last icon, which returns the ruler to 0 degrees. Once you have learned and practiced using these keyboard shortcuts, you can use the ruler very effectively during your construction. For example, try drawing a twenty-sided plan with the help of the ruler.

Note: Use the standard tab, and rotate the ruler each time through a fixed angle of 18 degrees.

6.4 NUMERIC INPUT

6.4.1 *General information*

Although in ArCon numeric inputs are possible with the help of the icon, for example, the inputs available there are limited to positioning with the mouse. In ArCon+ is this different? All elements that can be entered in Construction mode can be entered with the mouse and the keyboard. Especially for accurately positioned elements,

this input is sometimes most practical when done with the keyboard.

In order to use numeric input simply and effectively – to offer it as a tool without disturbing normal procedures – a special solution was created for ArCon+. In the long run you should be able to use numeric input when you want, and work comfortably without it when you don't.

This means, in detail:

- For each tool of the toolbar you can press the **F2** key to specify whether the input should be made with the mouse or the keyboard.
- For input using the keyboard, the number of necessary inputs is minimized.
- You can change between numeric input and input with the mouse at any time, even between individual steps of an input, with the **F4** key.
- During multi-stage inputs you can select which inputs you want to enter with the mouse, and which you want to enter with the keyboard.

Please note: If you want to move existing windows or doors with numeric input, you can find the appropriate information in the **Doors** section.

6.4.1.1 Arithmetic calculations in input boxes

In any ArCon+ input box, it is possible to use arithmetic. For example, instead of entering 1.23 you can enter 1.0 + 0.23. ArCon+ replaces the formula with the calculated value. Besides the four basic arithmetic operations, ArCon+ additionally supports exponentiation, for example, $2^3 = 8.00$, trigonometric functions, for example, sin (45) = 0.71.

6.4.2 Numeric input

ArCon possesses two vertical toolbars at the left side of Construction mode screen. The *what* bar contains elements you can create and the *how* bar has icons that control how to create it. ArCon+ permits you to switch between numeric input and mouse input for each icon of the *how* bar.

In Construction mode mouse or keyboard input can be specified for each icon of the *how* bar, and for each element of the *what* bar. The **F2** key switches between the modes for each icon. The icons of the *how* bar remember their status i.e. whether they use mouse input or numeric input. Icons with numeric input enabled are marked with a yellow border. Icons without a yellow border are configured for mouse input.

173

If you click an icon in the *how* bar, which is marked with a yellow border, or if you press the F2 key during mouse input, (which switches the icon to numeric input and marks the icon in yellow), a special dialog box appears at the bottom of the work area where numeric input is made. Depending on the icon (and hence, function) selected, this dialog box has different forms. Here are three examples:
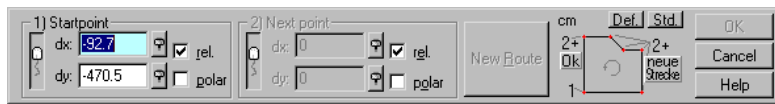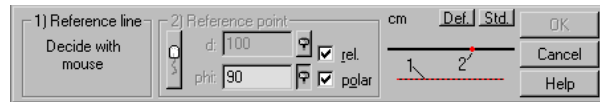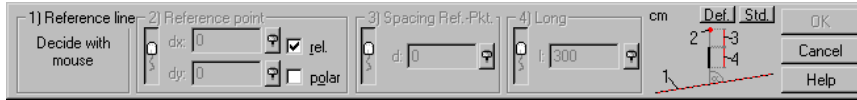
All numeric input dialog boxes have three buttons to the right of the dialog box, with which you can acknowledge a numeric input, terminate the input operation by aborting, or open the appropriate help text. To the left of the **OK**, **Cancel**, and **Help** buttons you'll see a diagram representing the input. With this diagram you can understand the operation without having to read the complete ArCon+ manual.

Inputs (which you make in the dialog's input boxes) correspond to emphasized elements in the plan. Each section in the left part of the dialog box corresponds to a point or a line. Both the points and lines in the plan and icons are consecutively numbered to suggest which field corresponds to which point or line in the plan. Additionally, you'll find above the plan two small icons with the labels **Def.** and **Std.**, which will be described in detail later in this chapter.

Finally, to the left and above the plan the current dimension system is identified. For example, if you're working in meters, there will be a small **m** in this corner. This tells you that all inputs within this dialog are measured in meters (except of course for angles in degrees). To the left of the plan are the required input boxes, in order of their use. For example, if you're placing a wall, there are fields for the point of origin and termination point.

174
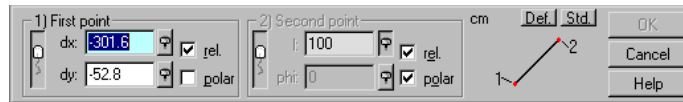
Besides the actual enter fields, where you enter the actual values for points (or lines and lengths), this section contains various icons and shadings. The icons tell you whether you can use mouse input for a field. The shadings indicate which input boxes are active, and as you go through each step the view will change to reflect the completed fields.

Within each section as points (or lengths or lines) are entered, you can use the control fields **rel.** and **polar** to specify whether the coordinates are relative (or absolute), and polar (or Cartesian).

6.4.3   User-controlled behavior

You can control the behavior of an input box itself with the mouse (the oblong icon left of an input box). If the mouse icon is depressed, the respective value can be entered with either the keyboard or the mouse. If you want to specify the first point with the mouse and the second point with the keyboard, click the mouse icon next to the first input box so it's depressed, and leave the second mouse icon.

Instead of clicking the mouse icon in the input section, you can also change this switch with the **F4** key. The status of the icon changes each time you press the F4 key.

The icon to the right of an input box gives you even more control over the input box. If you click this icon so it is held down, the field cannot be changed. The value in this field is used without further input. If all input boxes in a section are completed, this icon and its function are skipped, since you've finished the section and are on to the next step. This mechanism simply serves to reduce unnecessary work during numeric input.

6.4.3.1   Input using the mouse with partially completed data entry

If the mouse icon (the oblong icon to the left of the input boxes) in a section is clicked and one of the two input boxes is locked by means of the icon, you can modify the second input with the mouse only. This is especially so depending on the interaction with the control fields **rel.** and **polar** respectively.

Example: You want to position long walls (3 meters long) in different parts of your project, then you want to determine the point of origin and the orientation of the wall using the mouse. For this you use the icon and adjust the numeric input dialog box as follows:

175

In the first section, press the mouse icon down; in the second section switch to relative and polar coordinates, and locate the length input box. After locating it, input the length of 3 meters there. The input of values in input boxes, which are not even active, is possible only in located boxes. You can identify these boxes by the fact that the icons to their right are depressed and the fields are gray.

After you've entered the length, in the second input box, hold the ⊞ button down, since you want to input the angle with the mouse. Next, you can start to input the walls. You must click twice for each wall, i.e. first, in order to set the beginning of the wall and, after you selected the angle by moving the mouse, a second time to locate the wall. If you would like, instead of setting the angle with the mouse, which inputs angles with the numeric input box, you don't have to press the ⊞ button down in the second input box.

This example should make clear the function of the ⊞ button, with the help of the mouse icon and when inputting values over a wide range.

It can be quite practical *to locate all values* of all input boxes. For input function only the **OK** button is available. If this is selected, all located values are used.

Example: You would like to move 10 supports horizontally a distance of 3 meters. Proceed as follows: Select the element for round supports and next switch off the numeric input, if is not already switched off. Next, position the first support. Subsequently, activate the numeric input by pressing **F2** and adjust the switches in the numeric input dialog box as shown in the following figure.
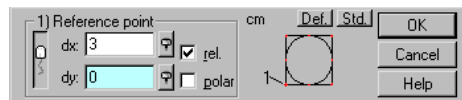
Now simply press the **Return** key or click the **OK** button nine times.

6.4.3.2 Input of points: Relative/absolute and polar/Cartesian

In input boxes where you define points, you can specify for each point whether its coordinates should be absolute or relative (related to the origin), and whether you want to input its Cartesian or Polar coordinates. The input of absolute coordinates is simplest to understand, but presumably will rarely be used.

176

If neither **rel.** nor **polar**, input the absolute x-coordinate in the upper input box, and the absolute y-coordinate in the lower input box. 0.0 corresponds to the origin, which is marked by the cross hair.

Note: You can adjust the position of the origin with the help of the multi-function icon image, even during numeric input.

The second possibility for input is polar coordinates of an absolute position. For this, uncheck the control field **rel.** and check the control field **polar**. Instead of entering the x and y-coordinates relative to the origin, you enter distance and angle; the distance refers to the origin. The angle is measured relative to the X-axis in degrees (in a few special cases this can be different).

The other two possibilities, i.e. the relative input in Cartesian and polar coordinates, refer not to the origin, but to *a point of reference.*

This point of reference is new to ArCon+ and will be described in detail later. The point is basically the point of reference – where you clicked the final mark or which was the result of a numeric input. So you already have a point as a point of reference, for example, for the second input section of a numeric input dialog box, which you input in the first input section. The point of reference is marked by a small red cross hair.

Since the point of reference is the result of the previous input, you can determine the size of an element by using the relative input method, which starts from the second input box. It is now separate for X- and Y- as the difference in X- and Y-directions or when selecting **polar** by length and angle. Note that when using polar coordinates the length refers to the point of reference, generally with an absolute angle. 0 corresponds to the right (in X-direction) and to 90 upward (in Y-direction). Angles are left *turned* around. The exception of this zero-direction is the subject of the following paragraph.

6.4.3.3 Zero direction during input with polar coordinates

If you use polar coordinates when entering values (with **polar** checked) in an input box, you must specify a length and a direction. In contrast to the length itself, whether **rel.** or not, the point of reference or the origin always refers to the general angle to the X-axis. That is, an input of angle 0 corresponds to the direction to the right.

To this there is, independent of whether relative or absolute polar coordinates are input, an exception: Whenever you do not intend to input a reference line, for example, when using the tools , , and , , using the X-axis, the perpendicular is used for this reference line. You can detect this by the fact that, when selecting, a small

directional marker appears vertical to this reference line with the mouse at the reference line. If this reference line is a wall edge, this arrow always points away from the wall. If you use a guideline as a reference line, you can determine, after the mouse has caught on the guideline, by simply moving the mouse whether the direction vector shows *to the left* or *to the right*.

The sense of this – apparently random – handling of zero-directions is as follows: anytime a step of the input refers to a reference line, generally the specification of this step is given relative to the reference line. If you would like to input, for example, a wall parallel to another, you will want to generally input the distance of this wall from the reference wall, along the perpendicular. This is possible only if you can refer to this perpendicular. For inputs that do not refer to reference lines, this relative input makes little sense and is therefore not implemented.

6.4.3.4 Adjusting the point of reference

As mentioned above, the point of reference is always the point last entered. If you would like to use a point of reference besides this last point, you can complete this with the help of the fourth version of the multi-function icon image. This version is in ArCon+ and is used just like the first version, which adjusts the origin. You can also adjust the point of reference during numeric input.

6.4.4 Moving between the input boxes

Like Windows in general, you change between the different input boxes with the **Tab** key or with the **Return** key. The tab key moves back and forth between the input boxes; the **Return** key does the same, but accepts the input value when it leaves one field for another. If you enter a value in the lower input box of a section, the values of this section are used and the next section becomes active. If the field was in the last section, the respective element is moved or placed and the first section becomes active again for a second element.

6.4.5 The def. and std. buttons

With the function described, you have many possibilities of optimally using numeric

178

input to suit your purposes. If you want to use an adjustment again and again, press the **Std** button. It stores the inputs you've made as standard inputs, so you can use them again and again in new projects. The values are stored for each section whether the inputs are to be relative or absolute, or entered as polar or cartesian. Additionally, the status of the buttons within the different sections (whether the mouse icon ⬚ is depressed, and whether the icons are clicked) is saved with the input boxes. Selecting the **Std** button means quasi-permanent saving of the dialog box.

The **Def.** button serves as an escape hatch: With the many adjustment possibilities you can very easily achieve an adjustment which simply doesn't work well. So you could then select **Def.**, and all buttons and input boxes are restored to their default status. This default is stored and was selected to start with not necessarily a perfectly clean, empty dialog box but one that is as practical as possible. If you should accidentally define a very messy input as standard, you can simply click **Def.** and then click **Std.** to make the default values again the standard. These are the default settings upon a new installation of ArCon+.

If you have trouble with the different possibilities of the numeric input dialog boxes, clicking the **Def.** button always helps; you'll return to a certain base function, which is generally sufficient. Only with special – and rare – constructional functions must you make the kind of modifications described in the previous paragraph. Just the same, once you learn the **Numeric input** dialog box, you'll have a very powerful tool at your disposal, and you'll be able to effectively manage almost any input function.

6.4.6 *Polygonal wall input* 🖋 🔲

If you use numeric input (see page 172) while using the polygonal wall 🔲 you'll access extended functions. Since this deviates from the functions of numeric input described above, it is described here in detail.

When entering polygonal walls and numeric input is switched on, the following dialog box appears:
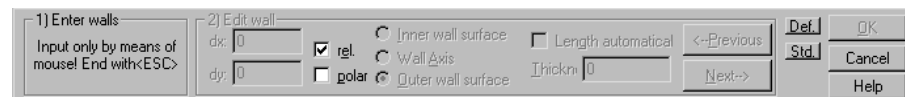
As you can see from this dialog box, the input of the polygonal wall chutes, with numeric input switched on, is divided into two sections: The first wall must be entered with the mouse. It does not have to have accurate lengths and angles, since these are

179

input in the second step. You can nevertheless use **Ctrl+Q,W,E** to accurately start the wall, but remember the second input will adjust this wall.

After the polygonal draft, which was input as completely as possible without numeric input, press the **Esc** key or click the **Cancel** button and the numeric input dialog becomes active in the second step, *Work on walls.* Here you can specify the lengths of the individual walls in sequence. You have the options **Left wall surface**, the **Wall axis**, and **Right wall surface** for selecting the wall part to use when entering values.

The two input boxes at left in the second section indicate the coordinates of the end point of the wall area or the wall axis. Just as with all numeric inputs, you can choose between relative or absolute coordinate placement, and polar or cartesian coordinate specification by checking the boxes **rel.** and **polar** (see page 176). If you checked **polar**, the angle is always assumed between the previous and the current wall. You can detect this by the directional marker at the point of reference.

Note: For the first wall of the polygonal draft, the x-direction is always assumed, since there is no previous wall to use for the first wall.

Note that the specification for the ending point is adapted automatically if you switch between left wall surface area, wall axis, and right wall surface, for example, if the next wall and the current wall form an angle of 90 degrees, and the next wall has a thickness of 25 cm, after switching the current wall from the left surface area to the right surface area the specification for the length is automatically increased automatically by 25 cm.

With the **Previous** and **Next** buttons you can make the previous wall or the next wall the current wall. With these, you'll also start over at the end of the polygonal draft. If you are on the final wall, and click **Next**, you'll move to the first wall. Finally you have the option to adjust the thickness for each wall. The standard thickness for the current type of wall can be changed by right-clicking the multi-function icon ▊▙.

The check box **Auto length** has multiple uses. It can be assigned to a polygonal wall section of up to two walls. If it is assigned to no wall, you can specify the position of the ending point for all walls. If it is assigned to two walls, the lengths of these two walls are automatically calculated in such a way that the walls are equivalent.

Example: You draw in a rectangular room, by starting at the lower left and drawing in sequence all four walls around the left. Now select **Auto length** for the top and left walls. If you now change the length for the bottom or right walls, the lengths of the top and left are automatically adjusted so the room always remains closed.

If **Auto length** is selected for only one wall of the polygonal draft, ArCon+ proceeds as follows: The length of this wall is adjusted in such a way that the last wall of the

180

polygonal draft is aimed at, or oriented towards, the origin point of the first wall.

Note that the **Auto length** check box is automatically set for a wall if two walls of the polygonal draft are already set to **Auto length**. If an additional wall is selected for **Auto length**, one of the walls previously so selected must be deselected. Note that with walls selected with **Auto length**, changing one of the two input boxes has the consequence of automatically changing the value in the other input box.

Tip: Instead of using the **Previous** and **Next** buttons as well as the options **Left wall area**, **Wall axis**, and **Right wall area**, you can specify with the mouse which wall and wall area you would like to use for inputs. To do so, simply click the desired wall area.

After you have made your inputs for all walls, acknowledge the settings by clicking **OK**. Subsequently, the polygonal wall section is moved and set in your project, and merged with existing walls.

6.5   TRANSPARENCIES

If you would like to create a project based on work from another program, ArCon+ supports so-called transparencies. These transparencies can be loaded and be used like guidelines, so you can snap, for example, on walls. Supported file formats for transparencies include HPGL plotter files (with the file extension HPG and PLT) and AutoCAD or DXF/DWG files.

To load a background transparency, select the menu **File – Insert transparency**. The following dialog box appears:
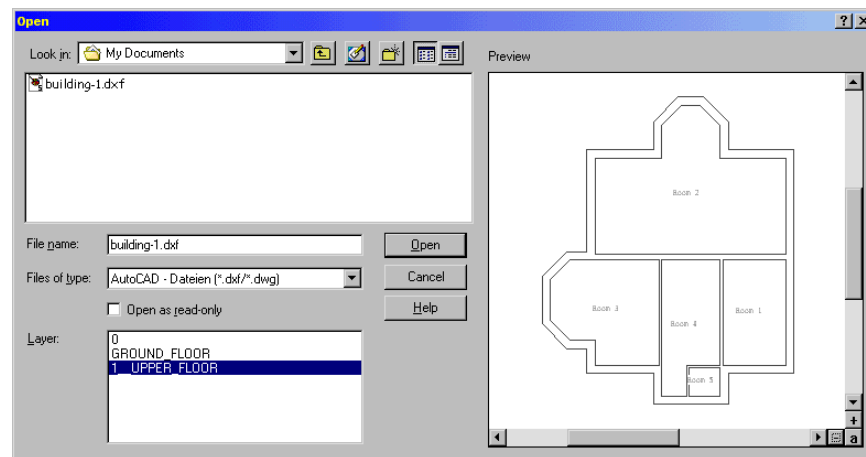
This is a standard Windows file selector dialog box with two additional windows. In the window **Layer** you'll find a list of layers when loading DXF files. You can select one or more layers here (with the mouse and **Ctrl** and **Shift** keys). The first selected layer is displayed in the preview window, below the Layer window. The preview does not show any text contained in the layer. The film can be zoomed within the preview window while holding down the right mouse button. This function equates to the zoom function in the 3D preview window which is opened when selecting objects, for example.

If you acknowledge the selected file by clicking the **Open** button, the selected layer is loaded as a transparency and displayed in Construction mode. You can import transparencies only in Construction mode.

Like guidelines, transparencies are assigned to the floor of the current building when loaded. You'll only see these loaded transparencies if the assigned floor is visible. Also, you can edit it only if this floor is the current floor of the current building.

6.5.1 *Working with transparencies*

When you load a transparency, you can work with this transparency similar to the way you work with guidelines, as you can only move or delete all information. Loaded transparencies essentially act as *background pictures* for visual aid and for snapping to in Construction mode.

Just as the display of guidelines can be switched on and off, the display of transparencies can be switched on and off in Construction mode. For this ArCon+ contains an additional icon which is directly to the right of the icon, which switches the display of guidelines on and off.

You can select and move a loaded transparency, edit it, and delete it. To edit a transparency, double-click it. The following dialog box appears:
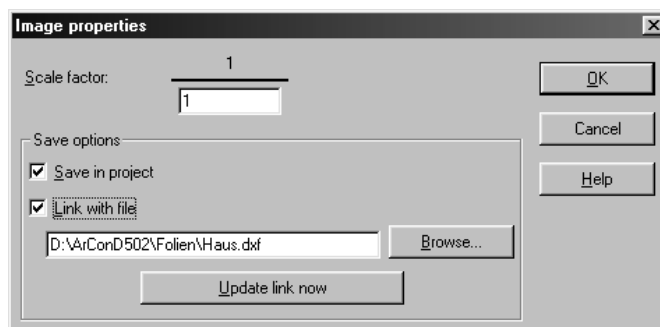
In this dialog you have among other things the option of changing the size of a transparency numerically. This may be necessary if you load a file, which does not fit correctly in your project.

When you select a transparency with the mouse, it is marked in red (like any selected object), and small square boxes appear at the corners of the transparency's surrounding rectangular marker. You can click these square boxes to scale the transparency interactively with the mouse. Furthermore, you can move the selected transparency by moving the mouse (while pressing the left mouse button).

6.5.1.1   Save options

In this section you specify how the loaded transparency and the current ArCon project should be linked. There are two options: **Save in the project** and **Link with file**. The latter option shows the filename and path of the linked file, which can be changed and updated.

6.5.1.2   Save in project

If you check this switch ArCon saves the loaded transparency in the ArCon project file; so even if you later delete the transparency file, you can continue to work with it in ArCon since the transparency file's information is saved in the ArCon project. Subsequently the transparency file is no longer needed and will not be accessed the next time you load this project. Accordingly, the file will not be displayed in the display window.

6.5.1.3   Link with file

This box is always checked automatically if you do not check **Save in the project**, since in this case only by linking to the transparency file can it be accessed. If **Save in project** is checked you can select whether the current transparency should also be linked to a certain file or not. Generally this file will be the original transparency file; its path and filename is displayed in the input box under the switch. If you would like to use another transparency, you can enter another filename directly into the input box or select the **Browse** button to look for a file using the standard Windows file selector.

183

Note that this link is only checked and verified if you click the **Update link now** button. Clicking this button corresponds in principle to reloading the transparency, whereby the current version of the transparency on your hard disk is used.

Note that when loading a project, linked transparencies are automatically updated, since the current version of the file is always loaded.

6.6   GUIDELINES

For quickly and easily inputting and editing your plan, ArCon offers guidelines that you can quickly draw in the display. With the **Guidelines** dialog box you can define the appearance of guidelines, and with the **Numeric input** dialog box you can finely control the positions, lengths, and angles of guidelines. You can also save these values as the default for all guidelines.

By clicking [icon] you can switch the display of guidelines on and off.

6.6.1   Selecting a guideline

In the vertical toolbar you'll find the icon for the guideline function. It is a multi-function icon, characterized by small black triangle in the lower right corner. By clicking the left mouse button and moving the mouse away from the icon, the two icons for guideline types are displayed. Information on the respective icon is displayed at the bottom left of the display. Move the pointer while holding down the left mouse button onto the desired type and release the mouse button to select it. The selected type now appears in the toolbar.

6.6.1.1   Guideline icons

With the first option [icon] straight guidelines are shown crossing the entire work area; in the second case [icon] they have a fixed length that you determine. For these variable-length guidelines you set the start and end points of the line.

When you select a type of guideline, ArCon adds a second vertical toolbar (*how* bar) which controls how the guidelines will be added to the project. By right-clicking these icons a dialog box appears (this dialog box is the same for all icons in this toolbar). Here you can specify the following values by clicking in the input box and entering the

value with the keyboard.

The input box **Angle to reference line** indicates the defined angle to the reference line for the input box **Separation**.

You enter the points of the guideline in the display by clicking the left mouse button. If you want to abort a drawing or moving process, press the **Esc** key.

In the following paragraphs straight guidelines and variable-length guidelines will be described simultaneously. The term *guideline* covers both types.

6.6.2 Placing guidelines

6.6.2.1 Vertical guideline

Place the straight vertical guideline by clicking at any horizontal point in the work area. The line crosses the entire work area vertically.

With variable-length guidelines, the first mouse click sets the point of origin, and the second click sets the end point of the guideline, and in setting this end point you set the length of the guideline. If you press the **Shift** key while setting the first point, ArCon notes the horizontal position of the vertical line. Then you specify with the second and third mouse clicks the beginning and end of the guideline.

With this extended function you can have more accurate control over the placement of the guideline.

6.6.2.2 Horizontal guideline

Placing straight horizontal guidelines is done identically to placing straight vertical guidelines.

6.6.2.3 Arbitrary guideline

After clicking to set the first point, you can rotate the guideline freely around this fixed point. With the second click you set the angle of the line, and for variable-length guidelines, the end point.

The **Shift** key has no effect.

6.6.2.4 Guideline perpendicular to a reference line

Straight guideline: Click the mouse pointer on the desired reference line (wall edge, etc.). From the reference line you draw straight guidelines, perpendicular to the reference line. Click the left mouse button at the desired point to set the guideline. If you press the **Shift** key at the same time you click to set the first point, ArCon notes the angle of the straight guidelines. The position can still be moved, even beyond the selected reference line.

Variable-length guidelines: With the first mouse click you select the reference line. This is also the point of origin of the guideline. The second point specifies the length of the guideline that is perpendicular to the reference line. If you press the **Shift** key at the same time you set the first point, ArCon notes the angle of the variable-length guideline. The position for the length can be adjusted. Specify with the second and third mouse clicks along this line, the start and end points of the line.

6.6.2.5 Guideline at a fixed angle to a reference line

With this function you can set a guideline with a fixed angle.

Setting straight guidelines and variable-length guidelines with or without the **Shift** key is done similarly to setting guidelines perpendicularly to a reference line. The only difference is that the guideline is not set at a right angle, but from any angle. You can set the value for this angle, by right-clicking the icon in the *how* bar and setting the appropriate value in the dialog box that appears.

6.6.2.6 Guideline parallel to a reference line

Click the desired line to which the guideline should be parallel. With the second mouse click you specify the distance between the two parallel lines.

For variable-length guidelines, the first click identifies the reference line. The second click specifies distance between the two lines, sets the start point for the variable-length guideline. The third click sets the end point. The **Shift** key has no effect.

6.6.2.7 Guideline parallel to a reference line (numeric distance)

Click the reference line and then to the left or right of the reference line (whichever side you want the guideline to be). A dialog box opens where you can specify the guideline's distance from the reference line, numerically.
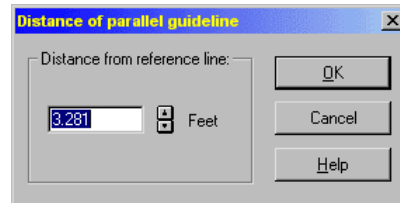
The values you input in this dialog box are saved for future use. If you set multiple guidelines with this input method, you need only input the values once.

You can suppress this dialog box, by pressing the **Ctrl** key at the same time you set the second point.

When setting the guideline ArCon uses the parallel position of the second point for the guideline's point of origin, relative to the reference line. With the third point you set the end of the guideline. Between the second and third points (mouse clicks) a dialog box appears in which you enter the distance from the reference line. You can also suppress this dialog box by pressing the **Ctrl** key. In this case, the previous value is used.

6.6.2.8 Guideline central between two points

The point of origin is set between the two points that you enter . This can be centered between the two points (50%) or set at any arbitrary division ratio. You can open the dialog box for entering the division ratio by right-clicking the desired icon in the *how* bar for guidelines. The straight guideline's axis is set between these two points, as dictated by the division ratio value.

With variable-length guidelines the point of origin is placed at the indicated division ratio between the two specified points. A third point (mouse click) determines the direction (to the left or right of the reference line you drew) and also the length of the variable-length guideline. When simultaneously pressing the **Shift** key when setting the first two points (the reference line), you can set the guideline away from the reference line, making two more clicks to set the start and end points of the line.

6.6.3 Deleting guidelines

You can select the desired guideline by clicking ![cursor](see page 189) with the left mouse button and then clicking the guideline. The selected guideline is shown in red. By pressing the **Delete** key the guideline is deleted. If you want to delete all guidelines, select the menu **Edit – Delete all – Guidelines**.

6.6.4 Guidelines dialog box
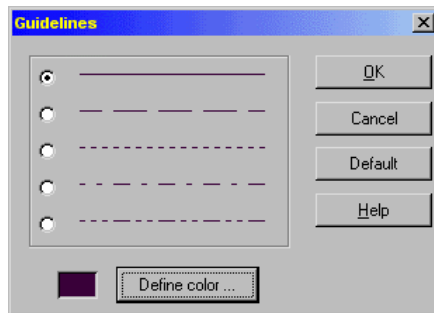
This dialog box is opened by right-clicking one of the ![icons] icons or by selecting the menu **Options – Program – Guidelines**...

6.6.4.1   Line type

You can select one of five different line types.

6.6.4.2   Define color

If you want to use a specific color, which is different from the colors already used in your guidelines, you can click the **Define color** button. A color palette is displayed in which you can select a predefined color, or define a color yourself.

6.6.4.3   Default

By selecting the **Default** button you can save the values set in this dialog box for future

188

use. All guidelines subsequently set will use these values.

6.7   SELECT ELEMENT IN CONSTRUCTION MODE

If you are working in Construction mode (see page 161) of ArCon, at the top of the leftmost vertical toolbar is the icon. This icon has a special function. It serves not to place elements, but to select elements. When this icon is selected, you can then select elements in your project to move or delete them, and to change their properties. To select an element, first select the icon then click the desired element. The element is marked in red. If you click in an area with several elements, one above another, the smallest element is selected first. If you click again, the next largest element is selected, and so forth. Selectable elements include walls, windows, doors, text, floors, ceilings (including the area inside a room), floor slabs, cutouts, stairs, roofs, and more. If you click, for example, in a room and a roof is situated above this room, the floor and room area is first selected, then upon the next mouse click the roof is selected.

For selected elements you can make the following changes:

You can delete a selected element by pressing the **Delete** key.

You can move a selected element by clicking again on the element and, keeping the mouse button held down, moving the mouse.

Note: Not all elements in Construction mode can be moved. You cannot, for example, move stairs. In such a case you must delete the element and place it again. Some elements are movable but with certain limitations. For example, windows can be moved only within a wall.

You can change an element's properties. You can double-click an element to open a dialog box where you can change that element's properties.

Note that the icon is automatically selected when you switch from Design mode into Construction mode.

6.7.1   Multiple select in Construction mode

Multiple elements can be selected simultaneously in Construction mode. These elements can then be deleted all in one go. There are two options for doing this:

You select an element and then select additional elements by holding down the **Shift** key while clicking the other elements.

Drag a frame around the area where the elements to be selected are positioned.

189

The **Snap and select** dialog box can be set either to select all elements completely within this frame, or to also select elements which are only partially within the area.

When more than one element has been selected, the elements can be deleted by pressing the **Del** key.

6.7.2   *Multiple copy for elements and objects*

Multiple copies of a selected element or object can be created both in Construction mode and in Design mode. To do this, the icon is displayed in the How bar in Construction mode when the icon is depressed. If an element is selected, will not be gray.

In Design mode (where there is no How bar in any case), is the second icon on the multi-function icon. To create multiple copies in Design mode, use the icon and select the object to be copied. Clicking after selecting an element or object – either in Construct or in Design mode – will display one of the following four dialog boxes.

In Construction mode:
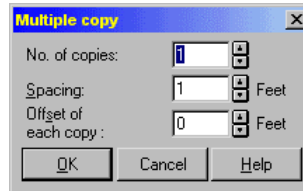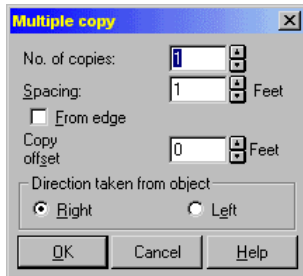
In Design mode:

Which one of the dialog boxes is displayed depends on the type of element to be copied. In Design mode, option 4 will be displayed; in Construction mode, the other three options are used.

6.7.2.1 Multiple copy dialog box - type 1

This dialog box is opened in Construction mode if you select an element and then press .

This dialog box is displayed for elements which have positions not based around the orientation of other elements, for example, for walls which can be freely rotated in the space, but not for windows because they will always have the same orientation as the walls in which they are positioned. In the dialog box, enter the **No. of copies** of the element or the object to be created and the **Spacing** for those elements/objects. If you select a value other than 0 in the **Spacing** input box, the distance is increased accordingly from copy to copy (and decreased with negative values). The **Copy offset** input box can also be used to set by how much a copy is rotated relative to the previous copy.

In the **Direction** section you can specify where the first copy is positioned relative to the original: either **Right**, **Left**, **Above** or **Below**. The fifth alternative available is to specify an **Angle**. An angle of 0 degrees here corresponds to the *right* direction. The angle is measured counter clockwise.

Do remember that a preview of the copies to be created will be displayed in the working area in ArCon while you are entering the settings into this dialog box. This allows you to check the effect of the different input boxes for the dialog box very precisely.

The following diagrams show the effects of the parameters on the example of three copies of a chair in Design mode (color view from above).
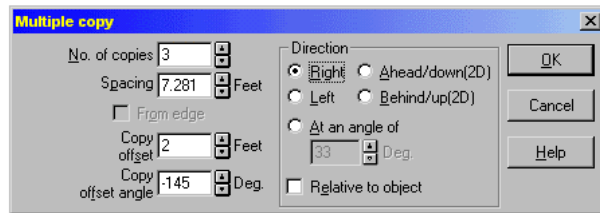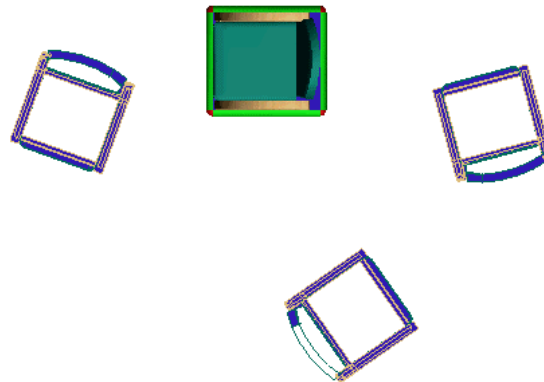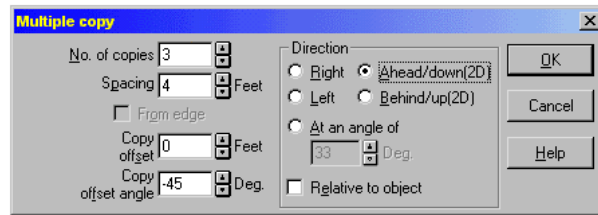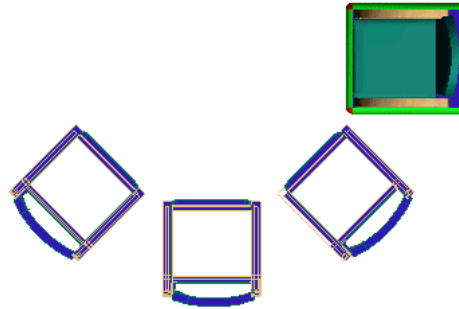
6.7.2.2   Multiple copy dialog box - type 2

Unlike option 1, this dialog box is opened when you want to create multiple copies of elements in Construction mode, where the orientation of those elements is specified by other elements. This includes windows and doors in particular, where the wall in which they are positioned as well as dormer windows, skylights and photovoltaic elements define the orientation. The orientation of these elements is given by the direction of the eaves selvage on the roof side where they are positioned. This dialog box is virtually identical to the dialog for option 1, except that the **Direction** section gives you the option of positioning the copies to the right or left of the selected element. The **Internal dimension** check box also included in this dialog box allows you to specify whether the **Spacing** you have entered in the corresponding input box is measured from one element to the next or between two elements. For example, if a window with a width of one meter is copied, and you use a spacing of two meters, the distance from the relevant, for example, left-hand edge of the windows will be two meters in each case, if **Internal dimension** is not selected. If **Internal dimension** is selected, the distance of the right-hand edge of a window to the left-hand edge of the window to the right of it will be two meters.

6.7.2.3   Multiple copy dialog box - type 3

This dialog box appears when you create a multiple copy of guidelines or guide sections. The function is basically identical to the two previous options, but it is not possible to specify a direction. The plus or minus sign in the Spacing input box can be used to specify the side of the elements to be copied on which the guidelines or surfaces are positioned.

6.7.2.4   Multiple copy dialog box in Design mode

Just as in Construction mode, multiple copies of a selected object can also be created in Design mode. The dialog box displayed after clicking is identical to option 1 in Construction mode, except for the additions of the **Internal dimension** and **Relative to object** check boxes. The **Internal dimension** feature here has the same function as the corresponding feature for option 2 in Construction mode (see above). If you select **Relative to object**, the copies of the object will be positioned in *object direction*, not in

true direction (to the left or right and up and down in the top view). The *true* and the *object* directions will differ if the object to be copied has been rotated.

6.8   COMPASS

Both ArCon and ArCon+ have a compass. It is visible in both Construction mode and Design mode. The size and position of the compass can be specified only in Construction mode.
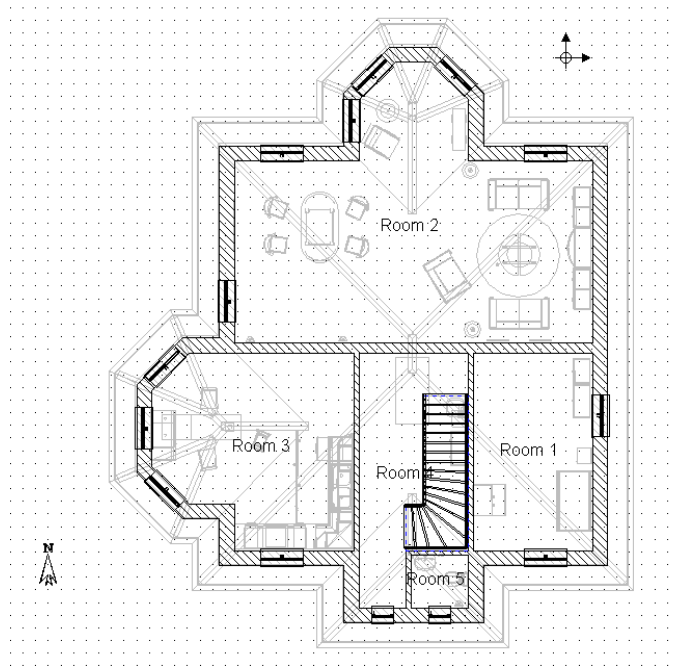
The compass does more than indicate the north direction. It also affects the variable time of day view, since the definition of the north direction dictates the sun's position and calculation. In the variable time of day views, the compass is queried to determine the exact position of the sun.

The compass can be moved in Construction mode by clicking (and holding) the mouse button on it, and moving the mouse. If you double-click the compass, you can rotate its orientation (change its direction). This is done through the **Compass** dialog box.

6.8.1   *Compass dialog box*
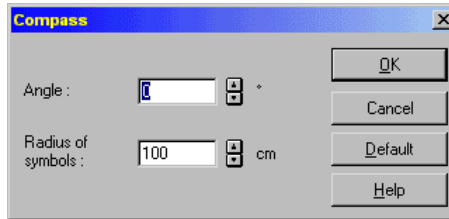
Enter the angle by which the arrow should rotate. With positive values the arrow rotates to the left; with negative values it rotates to the right.

With the field **Radius of symbols** you can set the size of the compass. The arrow symbol is drawn outward from a central point, so the radius is used to set its size.

Save your settings by clicking the **Default** button. In all new projects, the compass will be positioned and displayed according to your default settings.

6.9   INFO BLOCK

In Construction mode an **Info block** can be displayed in the lower right corner. This box contains basic information about the project.

These specifications are automatically created by ArCon and cannot be changed.

6.9.1   *Extended info block*

In ArCon+ you can select one of several different types of **Info blocks**. These have varying levels of complexity and detail.

You can select an **Info block** type, and configure its display, through the dialog box, which opens when you double-click the **Info block**.

6.9.2 Displaying the info block

You can switch the **Info block** display on an off by selecting the menu **View – Info block**. If the menu has a check, it is activated and the **Info block** is displayed.
Likewise you can specify in the dialog box that the **Info block** is not to be shown.
Note that a signature field must be visible for you to edit it.

6.9.3 Project details dialog box

You can open the **Project details** dialog box by double-clicking the **Info block** in Construction mode. Note that you can only edit the **Info block** if it is visible; that is, you must have enabled its display in the **View** menu.
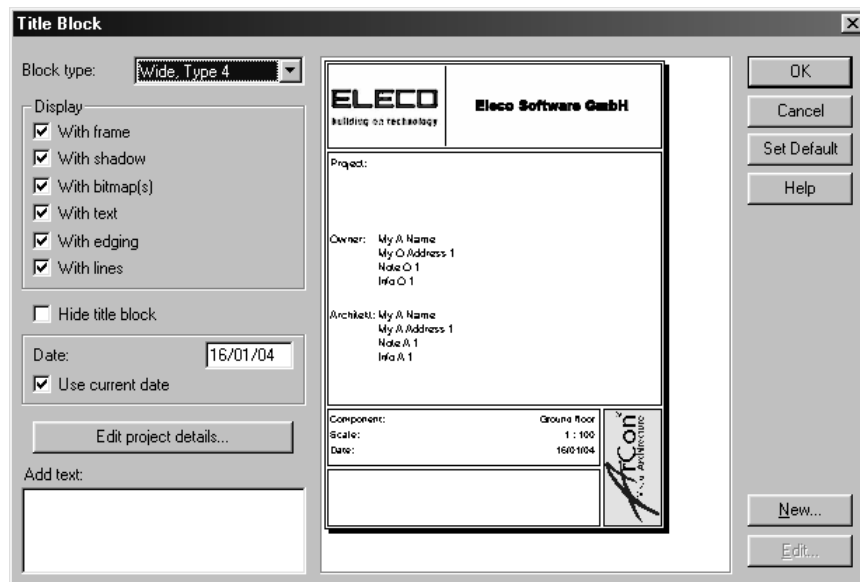
6.9.3.1 Info block type

In this box you can select a predefined **Info block** type. Besides the standard type, there are four additional types of varying complexity and detail.
The logos used in the individual **Info block** types are bitmap files installed during the

196

installation of ArCon, and are stored in the folder STANDARD\LOGOS. Here, logos and **Info block** types correspond to each other. For example, the logo for label 1 is linked to LOGO1.BMP.

The following table gives you an overview of the **Info block** types and their related logos:

The type of signature field...	... uses the following logo:
Standard	LOGO.BMP
Type 1	LOGO1.BMP
Type 2	LOGO2.BMP
Type 3	LOGO3a.BMP
Type 3	LOGO3b.BMP
Type 4	LOGO4a.BMP
Type 4	LOGO4b.BMP

If you would like to add your own logo into an **Info block**, you must store the desired bitmap file under the appropriate name in the LOGOS folder. Do not forget to rename the existing bitmap file first, so you can always go back to it.

Note: when you're creating your own logos, the aspect ratio of the bitmap must correspond to the original in order to avoid distortion.

6.9.3.2 Display

In this section you specify which elements of the **Info block** are to be displayed. In detail, you can decide whether your **Info block** includes frames, shadows, bitmaps, text, edging, and lines.

Note: If an **Info block** has multiple logos, you can only switch them on and off together; you may not switch them on and off individually.

6.9.3.3 Hide project details

If you activate this control box, the **Info block** is not displayed. To show it again, you

must activate the menu **View – Info block**.

6.9.3.4   Date

If you activate this control box, the current date (as given by your computer) is included in the **Info block**. If this is not active, you can enter any date yourself, by typing it directly into the Date input box. The date is not updated automatically.

6.9.3.5   Edit project details

By clicking this button you can edit the project options, which ArCon+ transfers to the **Info block**. The **Project details** dialog box lets you enter, for example, the owner and architect.

As soon as you click the button, the **Project details** dialog box is opened. You can also open the **Project details** dialog box (see page 111) by selecting the menu **File – Project information**.

6.9.3.6   Add text

Here you can enter any additional text or notes for your project.

Note: You can change the *Architect* entry in the signature field. To do this, open the file ArCon.INI (\ArCon\Program\ArCon.INI) in a text editor, for example, *Notepad* and look for the line *Architect=Architect*:

```
[info block]
Architect=Architect
Fieldtype=0
with frame=1
```

Replace in this line after the = character the desired name, for example, *Architect=Planner*, and save the file. After the next restart of ArCon the entered name will appear in the **Info block**.

6.10   ELEMENTS IN CONSTRUCTION MODE

The following sections describe how to work with elements (walls, windows, doors,

etc.) in Construction mode. The elements are described in order as you'll find them in the left vertical toolbar. The element descriptions are basically divided into the following structure:

- General description of the element
- Input methods for the element
- Options for the element

In the descriptions of input methods for elements you'll find precise explanations of the icons in the *how* bar for each element.

Options for an element can be accessed in several basic ways:

- You can change an existing element by double-clicking it.
- By right-clicking, for example, the icon, you can specify the default properties of the element. You can of course change such elements individually as explained in the previous paragraph.
- The method explained in the previous paragraph affects only the current project. In addition, you can make default adjustments for all future projects. When you change the element properties by right-clicking the element icon, making changes, then closing the dialog with **OK**, the changes remain until you either change them or exit the program. But, if in the dialog you select the **As default** button the settings are saved, and even if you change them, they'll be restored the next time you start ArCon.

Note: With this function you have the possibility of adapting ArCon to a wide range of non-standard uses. After installing ArCon, standard settings are set as default, which may not correspond to your requirements. After becoming familiar with ArCon we suggest you adjust the defaults to suit you.

6.10.1   *Architectural representation view*

ArCon+ offers the option of an architectural representation view of dimension lines (see page 361) as well as an alternate view of walls, doors, windows, stairs and roofs. In the architectural representation view the design features are displayed in the typical format for architects.

You switch into the architectural representation view by selecting the menu **View – Architectural representation**. This menu affects all design features in Construction

199

mode; you cannot display some elements in the normal view and some in the architectural representation (alternate) view.

6.10.1.1 Alternate view of walls

The alternate view of walls differs from the normal view with thicker lines of the individual wall edges.
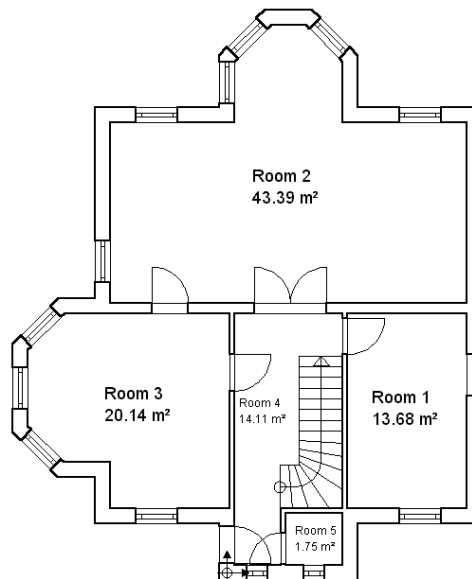
6.10.1.2 Alternate view of windows and doors

The special features of the alternate view of window and doors are best explained visually with the following figure:

| Normal view | Alternate view |
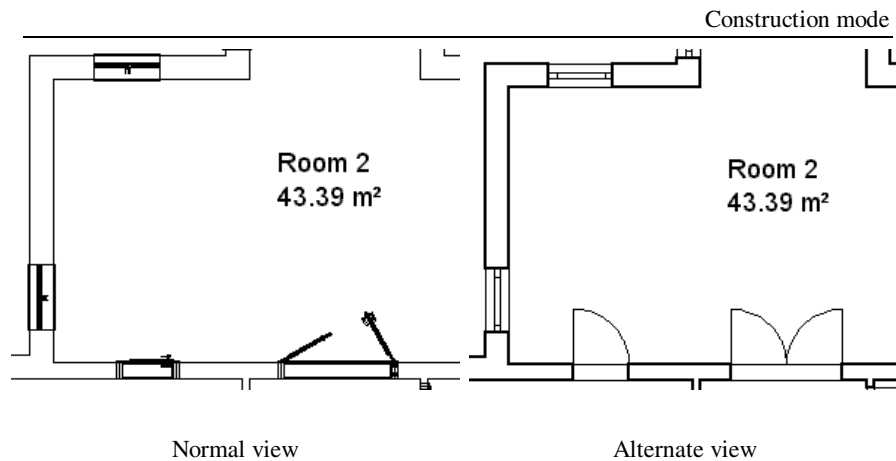
6.10.1.2.1 *View window hinges* ✒

In version 5.0 and later, ArCon+ can be used to display both the hinge side and the opening side in the substitute display for windows. To do this, select the **View window hinge** menu option from the **View** menu in the **Architectural representation** submenu. **Note:** This menu option will be gray and inactive if the architect view is not active. So in order to select this option, you first need to select the **Use** menu option (**View – Architectural representation**) to use the architect display.

6.10.1.3 Alternate view of stairs ✒

The alternate view of stairs is essentially distinguished from the normal view by the fact that the direction of travel is indicated.

Unlike the alternate views of walls, windows, doors and roofs, with stairs you can select from between four different alternate views. You can select the view in the **Stairs** dialog box, in the *Plan view* section (see page 263).

The following shows four different views:
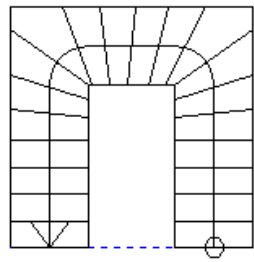
not sectioned   section with underlying run
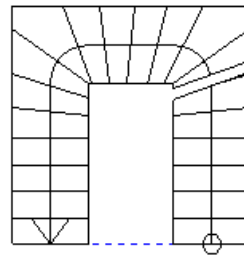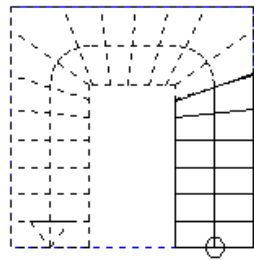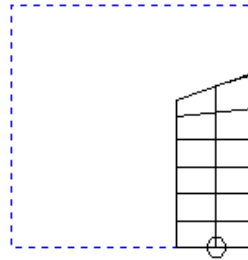
section with top shown   section without top shown

6.10.1.4   Alternate view of roofs

The alternate view of roofs is distinguished by the fact that only the individual roof edges are displayed, and those edges are displayed as lines. The wood construction, regardless of whether or not you enabled its display, is not displayed. Furthermore, fewer details are shown, for example, gutters are not displayed.

Another feature of this view is lines running to the roofs outside edges, which marks the one- or two-meter plane, measured from the upper edge of the finished floor, are parallel. This means: At the two-meter line the room has headroom of two meters.

If you set a roof over several floors, the one and two-meter lines for the current floor are colored differently than those of the other floors under the roof.

In floors that are within the roof, besides the one and two-meter lines yet another zero-line is shown. This indicates the size of the surface area of the respective floor. It is meant as a guideline for assistance while inputting walls in floors that are limited by the roof.
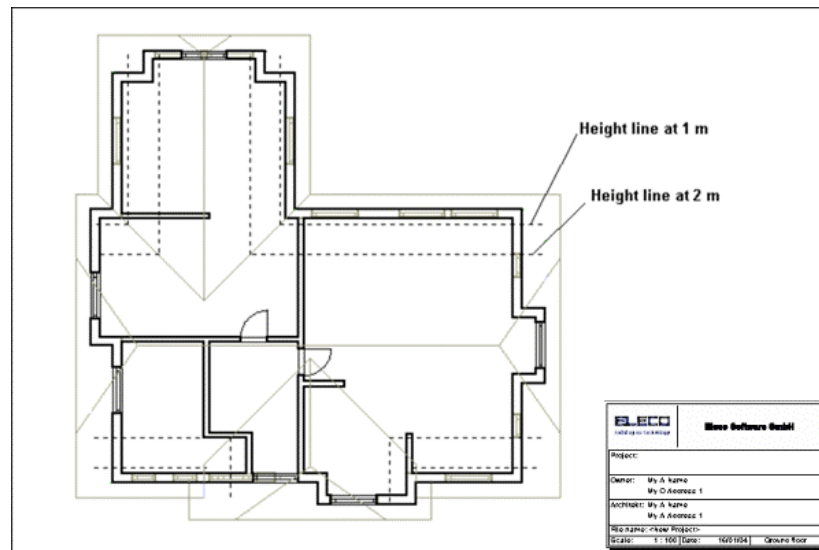
Attic in Plan view

Note: you can snap in the alternate view on the lines of the roof structure (the two meter lines as well as the roof edges including the cross beams), if you have checked the **Roofs** box (in the alternate view) in the **Snap and select** dialog box.

6.10.2 Walls

With the wall function you can quickly and easily design and input your plan. You can change the wall options such as dimensions and texture according to your requirements with the help of a dialog box. Additionally different types of walls can be input as the standard type. With the different input modes for walls and the use of the grid, guidelines, and the ruler you can quickly create precise plans. *Remember to ensure that the snap grid is switched on.*

Note: While you set a wall, you can see the precise length and direction (angle) in the status bar at the bottom of the display. Even if you select an existing wall edge, the exact length and angle are displayed in the status bar. If you rotate an object by the same angle (see page 435) you can precisely align the object at the wall.

203

6.10.2.1   Wall type

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 204.

In the vertical menu bar you'll find the ▐ icon which accesses the wall function. The icon is a multi-function icon, characterized by the black triangle in the lower right corner. By clicking the icon and moving the mouse (with the mouse button held down) a selection of wall types appears. Information about the respective type is displayed in the status bar at the bottom of the display. Move the pointer while holding down the left mouse button onto the desired wall type and release the mouse button to select it. The selected wall type now appears in the toolbar. To open the dialog box for modifying wall values and parameters, right-click ▐ or open the menu **Options – Walls**. In the dialog box you can check **Default** to save the parameters so they are always used as the standard. If you modify the values for a selected wall type, without saving it as the default, these values remain valid only for the current construction process (input). Also, you can later modify the respective wall by selecting it then double-clicking it to open a dialog box with its properties.

Once you've selected a wall type, ArCon opens a second vertical toolbar (*how* bar) which determines how the wall will be placed into the project plan. By right-clicking these icons you open a dialog box, where you can enter numeric values which are required for some input modes. These are similar to the options for guidelines, where you specify the angle to the reference line with the selection of ⬛ as well as the division ratio with the selection ⬛.

The distance to the parallel reference line ⬛, which is entered through a dialog box during the wall placement.

If you want to abort an installation process, press the **Esc** key.

6.10.2.2   Virtual walls ⬛

ArCon automatically detects whether an area is completely enclosed by walls, and if so, defines this area as a room.

It is necessary under certain circumstances to define rooms that are not completely enclosed by walls. Particularly for the calculations according to TYPE 1 such specification is necessary. With things like balconies and passages, for example, ArCon helps you create special rooms which otherwise are not completely enclosed by walls –

it does this through the use of virtual walls. The principle is simple: You place a virtual wall like a normal wall. The difference is that in Construction mode the wall does not have a thickness; it is shown as a line. In Design mode you won't see the virtual wall at all. You place a virtual wall by selecting the last multi-function icon, which is marked in red. Then place the wall like you would any *normal* wall.

Only exception with this option you cannot use numeric input (see 172).

6.10.2.2.1   Virtual wall options

If you right-click in Construction mode on the **Virtual wall** icon (you must have already selected the virtual wall type in the multi-function icon) or select and double-click an existing virtual wall, the following dialog box opens.
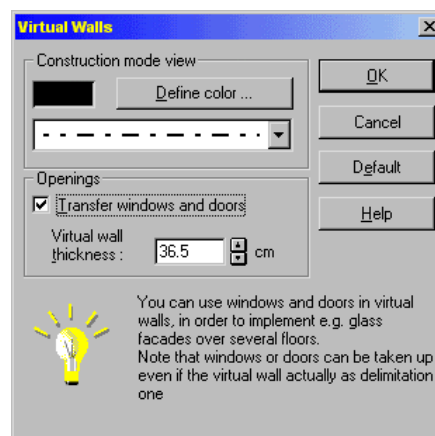
In this dialog box you can select the line style for the display in Construction mode. You can also select whether or not doors and windows can be placed in this virtual wall. The specification *virtual wall thickness* is necessary for the calculation of window sills and door frames – the wall still has no actual thickness.

6.10.2.2.2   Virtual walls and rooms

If an unclosed area results from shifting virtual walls (if necessary in combination with real walls), ArCon+ detects this automatically and the following dialog box appears:

205
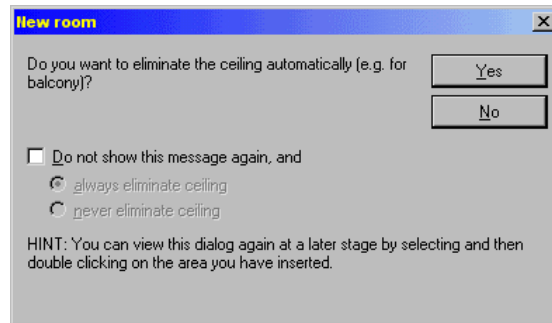
You now have the possibility to decide whether the resulting *room* is to have a ceiling or not. Particularly for balconies, here you should select **No**.

If you would like to later modify the characteristic of whether or not this *room* has a ceiling, you can do so by double-clicking in the room to open the **Room info** dialog box (see page 155) and adjusting the floor/ceiling.

6.10.2.2.3   *Tips on using virtual walls*

Since virtual walls, quasi- cut open real walls, floors, and ceilings it is now possible to use other materials for these cut-open areas. So you can mark out and use different textures for a part of a floor or room. The same applies to walls.

Note that the drag-and-drop of textures onto floors and ceilings normally causes the complete room – also areas, which are marked out by virtual walls – to share the texture.

If you would like to texture an area separately, proceed exactly the same as with walls. Double-click a room and select in the **Room info** dialog box (see page 155) the **Material** button. In the dialog box that appears you can separately change the material for the floor and the ceiling.

Besides marking out areas for materials, you can simulate shifted floors with virtual walls and split-level floors.

Example: You would like to model a house whose floor level for the left half is different from the right half. To accomplish this, model the left half of the house as a building and the right half as a second building, where you adjust the floor levels to match the levels in the desired room. At the point where the two buildings meet, which is also where the level changes, use a virtual wall. This has the effect that the rooms that meet at the intersection are closed, and that one can look (quasi) from one room to the other.

If an actual wall is to be at the intersection, define for one building a wall, and for the other building a virtual wall (in the same spot).

Tip: The texturing of individual edges of upper beams is done exactly as with walls: In Construction mode, select the appropriate upper beam edge, rather than using drag-and-drop in Design mode.
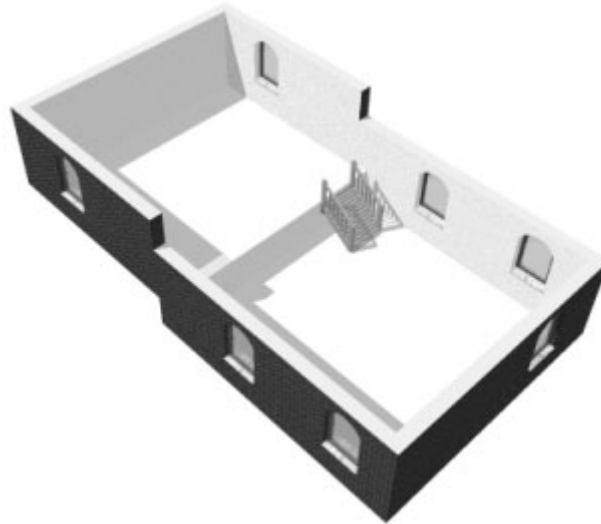
6.10.2.3   Placing walls

This function is extended in ArCon+. Appropriate information can be found at the beginning of page 179.

6.10.2.3.1   Modifying the base of a wall

After a wall's point of origin is set, a colored cross marks the current base of the wall. You can adjust this base to meet either the wall axis or one of the wall's two sides by simultaneously pressing **Ctrl+W**: the whole wall is shifted between the three variables. If only the points of the wall's face are to be shifted, press **Ctrl+Q** for the start side and **Ctrl+E** for the end side.

6.10.2.3.2 Draw several walls

With this icon/function you enter walls as a polygonal draft. That is, the first point you click is the point of origin of the first wall section; the second point you click is the terminating point of the first wall section and at the same time the point of origin of the second wall section, and so forth. Press the **Esc** key to stop drawing walls when you're done.

6.10.2.3.3 Draw individual wall

For each individual wall simply set the beginning and ending points.

6.10.2.3.4 Draw wall perpendicular to a reference line

If you click a wall or a guideline, this specifies the reference line and sets the point of origin. Click a second time to set the ending point.

If you press the **Shift** key at the same time you click the reference line, you can move up and down the reference line before setting the point of origin. You can then click a second time to set the point of origin (the starting point). The third click sets the end point.

Likewise, if you input the second point while pressing the **Shift** key, the perpendicular vector will be set and you can move along it to set the start and end points of the wall, no longer linked to the reference line. The third and fourth clicks set the beginning and ending points of the wall.

6.10.2.3.5 Draw wall at an angle to a reference line

With this icon you can create a wall with any angle from the reference line you select. The desired angle can be entered in the **Wall input** dialog box.

You can use the **Shift** key during this operation, exactly as described in the previous section.

6.10.2.3.6 Draw wall parallel to a reference line

Left-click a wall or guideline. An auxiliary line appears parallel to the reference line where you can set the distance from the reference line. The second and third mouse clicks along the auxiliary line set the beginning and ending points of the wall.

You can press the **Shift** key when you make the second mouse click to set the distance

without setting the wall's point of origin. Then the third and fourth mouse clicks set the wall's starting and ending points.

6.10.2.3.7 Draw wall parallel to a reference line (numeric distance)

With this function you can create a wall parallel to a reference line that you select. Upon the second mouse click (which normally would set the point of origin) a dialog box opens where you can specify the distance from the reference line numerically. The **Shift** key functions as described in the previous section.

6.10.2.3.8 Draw wall centrally between two points

With this input method, you click two points to draw a line between them, and along this line the wall will be placed centrally between the two points. The wall does not have to be exactly in the middle between these two points – it depends on the division ratio. You can specify the division ratio in the **Wall input** dialog box. If you click the second point while pressing the **Shift** key, the point of origin of the wall will be situated between these two points. Your third mouse click sets the length and angle of the wall.

If you do not press the **Shift** key when setting the second point, an auxiliary line is drawn vertically between the two points, along which you can set the position and length of the wall with the third and fourth inputs. These final two inputs don't have to be along the auxiliary line, but can be anywhere in the plan. ArCon sets the points along the auxiliary line regardless, which you can see by the small crosses on the line which indicate the starting and ending points.

6.10.2.4 Wall hatching

By clicking this icon you can switch the display of wall hatching on and off. When switched off, there is no fill pattern in the walls.

In the **Walls** dialog box there is a **2D view** section where you can select the desired color and fill pattern for wall shading.

6.10.2.5 Moving walls

To move a wall, either the entire wall or only an end, you must first select the desired

209

wall or wall end. Activating ⬚ (see page 189) and then clicking the wall does this. If you select a wall the whole wall is marked in red. If you select a wall edge, the edge is marked with a heavy red line. If you then double-click, the **Wall** dialog box is opened where you can change the properties of the selected wall or wall edge.

To move a whole wall, first select the wall, then move the mouse while pressing the left mouse button. The wall will follow the mouse pointer. When the wall is in the desired location, release the mouse button to set the wall. For shifting wall ends (extending or shortening the wall) press the **Shift** key while clicking the wall end. While pressing the mouse button you can now extend or shorten the wall. Release the mouse button to set the new end position.

If you move a wall and snapping (see page 165) is switched on, the snap point is the corner point which is nearest to where you clicked the mouse. If you click, for example, near the upper left corner of the wall, you'll move the entire wall and can then position it by snapping at the upper left corner. If you would like to use another of the wall's four corner points as the snapping point, you can switch the snap point by simultaneously pressing the **Ctrl** key. The snap point rotates through the wall's other corner points in sequence. The corner point that is the snap point is marked with a small red cross.

If you hold down the **Ctrl** key when starting to move a wall, the behavior changes (from the regular wall movement without **Ctrl** held down). If you click near the top of a *free* wall, you can shift this top; i.e. you can change the length of the wall. Here, *free* top means that the top is not attached to another wall. If a wall between two other walls is moved (like the centerline in the letter H), you can move the wall within the two other walls. It does not matter whether these two walls are parallel. If they are not parallel, the length of the wall that is moved is automatically adjusted (like shifting the centerline in the letter A). Finally, you can rotate one end of a wall, with the other end being the center of rotation. The wall cannot be connected to other walls. To do this, press the **Ctrl** key while you right-click at the *free* top of the wall. You can then turn the wall while keeping its length fixed. If you want to simultaneously turn the wall and change its length, press the left mouse button while you're pressing the right mouse button. (If this seems complicated – pressing the **Ctrl** key while pressing both the left and the right mouse buttons – you may choose to simply delete the wall and draw in a new one.)

6.10.2.6   Deleting walls

To delete a wall, you must first select the desired wall, by activating the select mode by clicking ![cursor] see page 189 and then clicking the wall. The selected wall is marked in red. Simply press the **Delete** key to delete the selected wall. If you want to delete all walls, select the menu **Edit – Delete all – Walls**.

6.10.2.7   Wall options

You open the **Wall** dialog box (like all dialog boxes for elements in Construction mode) either by double-clicking a wall, by right-clicking the wall ![icon] icon, or by selecting the menu **Options – Walls...**. This dialog box lets you set the properties for all areas of a wall.

If you've opened the **Wall** dialog box for a wall already placed in the plan, the function of the dialog box is modified since it concerns an existing wall. When double-clicking you can select not only a wall but also a wall edge. This wall edge is marked in thick red.

This way you can customize each of the wall's sides.

The following figure shows the **Wall** dialog box with the **2D view** section, which is only available in the ArCon+ version. In this section you can specify the appearance of selected walls in the plan: the edge color, the shading color, and the shading fill pattern.
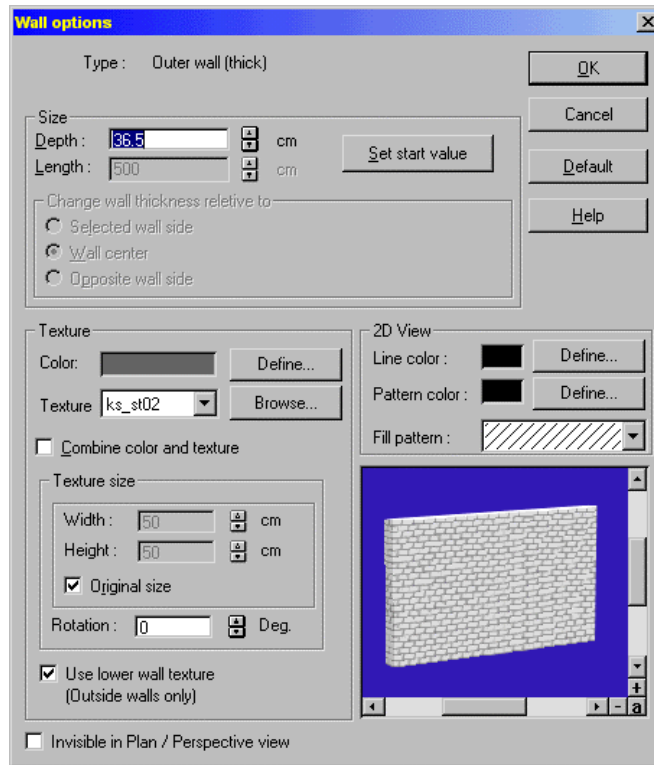
6.10.2.7.1 Wall type

Here the name of the type of wall, as you selected, is displayed. If you're modifying an existing wall, the icon for the current wall type is also displayed, as a multi-function icon. In this case you can change the wall type by clicking the icon, and keeping the mouse button down. The different wall type icons will appear where you can select a new wall type.

6.10.2.7.2 Dimensions section

6.10.2.7.2.1 Depth

In this section the wall thickness is displayed, and can be changed.

6.10.2.7.2.2 Length

You cannot input a wall length before drawing in a wall, so in this case the field is grayed out. The length of a wall can be changed only for an existing wall with at least one free wall end. An individual wall, connected to no other walls, extends or contracts in both directions, whereas a wall connected at one side is changed at the free end.

The **Set start value** button restores the wall thickness and length settings back to their originally defined values.

6.10.2.7.2.3 Changing thickness

If you changed the wall's thickness in the **Thickness** field, you can select in this section which part of the wall should remain unaffected by the thickness adjustment i.e. in either wall side (edge) or in the wall axis.

If you select **Selected wall side**, the wall side (edge) you selected (and is marked in red) will remain unchanged. If you select **Wall center**, both wall sides are shifted, relative to the wall axis; each side is moved in or out half of the thickness modification. If you select **Opposite wall side**, the wall side not selected (marked in red in the view) is retained.

6.10.2.7.3 Texture section

6.10.2.7.3.1 Color

If you want to select a color click the **Define...** button. A color palette is displayed in which you can select a predefined color, or you can create a custom color.

When you allocate a color in Design mode, you can no longer modify the texture. However, the wall texture can be changed repeatedly in Construction mode.

6.10.2.7.3.2 Texture

The wall is assigned the texture, which is indicated in the list box. If you want to select another texture, click **Browse...** to open a standard dialog box where you can select a texture.

6.10.2.7.3.3 Combine color and texture

Under the **Texture** list box is a check box labeled **Combine color and texture**. If you click this, the color and texture are combined. If you select, for example, black stripes

213

on a white background and mix it with a blue color, you'll get black stripes on a blue background.

6.10.2.7.3.4 Texture size

For most textures, the standard size is specified in the texture catalog. The **Original size** check box is grayed out if the texture size cannot be determined. The default value for a texture's size is 100x100 cm. This also defines how many times the texture is repeated over a surface, so you can control this repetition and thus the appearance of the texture on the wall by adjusting this size. If you click the **Original size** check box the original texture size is restored.

In the **Rotation** input box you can specify an angle of rotation with which the texture is displayed.

With the **Use lower wall texture** check box, you can transfer wall properties of lower walls to new walls (floors).

With the last **Invisible in plan/perspective view** check box you can control the visibility of a wall or wall side in Design mode. This characteristic is useful with walking through buildings. It can also be useful in the regular Perspective view because the walls are not blocking your views of the interior. However, it may require more computation and slow down your computer.

6.10.2.7.3.5 2D view

In this section you specify the color of the wall lines as well as the fill color and pattern for the selected wall. In this way you can differentiate the walls in your project, for example, individual walls can be colored differently. You specify which of the four wall lines are to be adjusted by selecting the desired wall side and double-clicking it. The fill color and fill pattern affect the entire wall.

Note: If you select an edge color in the dialog box, and you opened the dialog box by right-clicking the icon in the vertical toolbar (or through the menu **Options – Walls**) the setting applies to all new walls

6.10.3   Round wall

In ArCon version 5.0 and later, you can also generate arc-shaped walls. In this process, an arc-shape or even a full circle is created from individual straight walls, which, when viewed together, give the impression of being a rounded wall.

214

Once arc-shaped walls have been positioned, the segments created can be edited, just as if you had entered them as individual walls.

You will normally use ⟳ after you have finished entering the details for the wall, for example, to round room corners or even to add arc-shaped bulges to your plan, for example, for a staircase or a bay window. Clicking ⟳ will display the possible input methods for arc-shaped walls in the How bar. In addition to the option for entering arcs, the ⊙ and ◯ icons can be used to generate round rooms.

6.10.3.1   Entering arc walls

When you enter an arc wall, ArCon detects whether you have entered the start or end point of an arc inside or at the end of existing walls for the input options and . In other parts of your plan, it is not possible to do this, at least not using the two icons and .

For the start of the arc wall, the direction in which the wall starts is automatically used to determine the exit angle for the arc-shape. The arc-shaped wall comes *straight* out of the wall. In addition, both the thickness and the type of wall are transferred. For the input method , the same applies for the direction at the end of the arc relative to the second wall as for the start point relative to the first wall.

According to the radius of the arc, the walls where the arc starts or finishes may be shortened or extended in some circumstances in order to achieve the required radius for the arc.

For example, if you enter an arc in an existing corner of a room by first clicking inside one wall of the corner and then inside the other wall, both walls are shortened and the arc will be inserted between the ends of the walls, which will now be shifted.

Note: If there are any doors or windows in the parts of the walls being deleted due to the shortening process, these will be automatically deleted.

Because the start and end directions for the arc are also calculated from the walls to which it is *attached*, this procedure cannot be used to round walls, which are at right angles to one another.

Note: The relevant dialog box for arc walls (see page 218) can be used to set that the *exit angle* for the arc coming out of the wall is not 0. In other words, that the arc is seamlessly modified for the wall. Otherwise, you can set other angles here, for example, 90°. This allows you to create arc-shaped bulges in room corners, for example.

6.10.3.2   Options for arc-shaped walls

Clicking ![icon] will display the different input options for arc-shaped walls in Construction modes How bar. These include ![icon], ![icon], ![icon] and ![icon] for circle segments, ![icon] and ![icon] for full circles.

The input options can therefore be varied to a significant degree together with the options dialog box for arc walls (see page 218).

Note: If you hold down the **Ctrl** key with the last click for the various input types for arc walls, the dialog box for changing the numeric values subsequently, and the inputs carried out interactively will be transferred direct.

6.10.3.2.1   Curved wall between two walls ![icon]

This input method should be used if you want to drag an arc wall between two existing walls (see also page 215).

After clicking ![icon], you will need to click a further three times in your plan; the first click is for the start of the arc inside or at the end of an existing wall, and the second click is for the end of the arc inside or at the end of another wall. After the first click, the outline for the arc will appear as a preview. Moving the mouse after the second click means that you can change the radius of the arc. The third click transfers this radius into a dialog box where you can also enter this radius using figures in the relevant input box.

Note: If you want to enter an arc wall starting on only one existing wall, and you want that wall to end inside a *free space*, use the input method ![icon]. If neither the start nor the end of the arc is inside a wall, use ![icon] or ![icon].

Note: After the second click you can use the key combination **Ctrl+W** to specify whether you want to use the input for the axis of the arc or the interior or even the exterior side.

6.10.3.2.2   Curved wall between two walls with free angle ![icon]

This option is very similar to ![icon]. Unlike that method, however, the end angle for the arc is specified interactively. To do this you will need to click once more during the input process. The first click determines the start point for the arc and needs to be inside or at the end of an existing wall. The second click defines the end of the arc. After the second click you can use the mouse to set the direction at the end of the arc. A

third click fixes this direction and subsequent movements of the mouse change the radius of the arc. After this final click, both the radius and the exit angle for the angle are transferred into a dialog box and you can enter both values there as numbers using the relevant input boxes.

Note: If the arc does not reach the end point (second click during the input process) because its radius is too small, it is automatically extended using a straight piece of wall.

Note: After the first click you can use the key combination **Ctrl+W** to specify whether you want to use the input for the axis of the arc or the interior or even the exterior side.

6.10.3.2.3   Non-connected curved wall

and are used when you want to create arc walls which do not connect with existing walls. There is no automatic detection of the wall type and thickness for these input methods. However, the dialog box for arc walls (see page 218) can be used to set default values as well as change the options after they have been positioned, using the associated dialog box.

For both input methods you need to click three times before this dialog box appears. With both input methods, the first click determines the start of the arc, and the second click specifies the end. Unlike , where the third click specifies a point through which the arc is drawn, is used to determine the radius of the arc after the second click, by moving the mouse.

After the third click, a dialog box appears where you can change the radius, type and thickness of the wall in the relevant input boxes.

Note: With the first click you can use the key combination **Ctrl+W** to specify whether you want to use the input for the axis of the arc or the interior or even the exterior side.

6.10.3.2.4   Round wall options

In contrast to the other four input types, and are used to create not arcs but full circles, i.e. round rooms. In this process, is used to set the middle point with the first click and the radius with the second click, and to create a circle, which runs through three points. After the final click, a dialog box appears where you can change the type and thickness of the wall in the relevant input boxes. For , it is also possible to specify the radius.

Note: For on the second click, and for on all three clicks you can use the key

217

combination **Ctrl+W** to specify whether you want to use the input for the axis of the arc or the interior or even the exterior side.

6.10.3.2.5   Properties for creating round walls dialog box
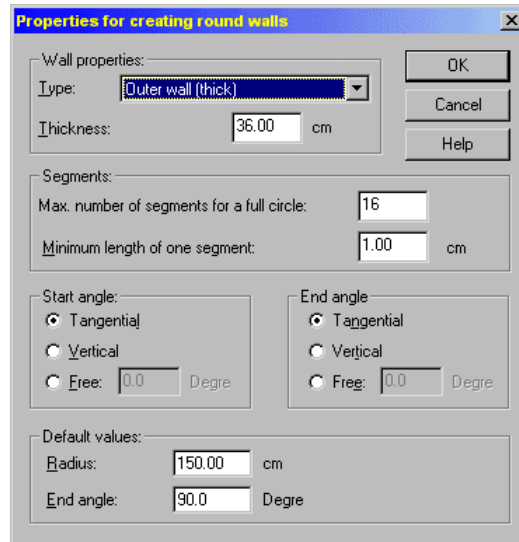
The properties dialog will appear after right clicking on any of the following icons:
.

6.10.3.2.5.1   Wall properties section

This subsection is used to specify the **Type** and **Thickness** of the walls which are used to create the arc using the input methods , , and .

Note: Both these values can be changed later on in the dialog box which appears once the inputs have been made using these methods. With both and the thickness of the first wall you click will always be used.

6.10.3.2.5.2   Segments section

This section is used to specify the degree of fineness for the arc segmentation. In the **Max. number of segments for a full circle** input box you can define how many individual walls are used to make up a full circle.

For example, entering 32 here and creating an arc spanning 90° will generate this arc

218

from eight individual walls. Depending on the radius of the arc, segmentation into 32 walls may be far too high for a full circle. For example, if the radius is only 1 m, an arc of 90° would be approximated using walls which are around 10 cm long. For this reason, the **Minimum length of one segment** input box allows you to restrict this length using a lower limit. If the segment length would be shorter than the value entered, due to the arc radii being too small, fewer segments will be created than entered in the first box.

The settings made in the **Segments** section apply to all six input options.

6.10.3.2.5.3   Start angle and end angle sections

This section is used to specify the angle at which an arc comes out of the first wall or goes into an existing wall. In normal circumstances you will select the alternative **Tangential** in both sections. However, if you select **Vertical** for the start and end, for example, and create an arc-shaped wall in a corner of a room, the arc will span an angle of 270° and will *dent* the corner of the room.

The **Free** option allows you to use angles other than 0° and 90°.

The settings made in the **Start angle** and **End angle** apply for the input methods and , where the inputs made for in the **End angle** section, relate to the direction entered after the second click.

6.10.3.2.5.4   Default values section

This section is used to set the values, which are used when inputs for , , , , and are made using the **Ctrl** key. In addition to the **Radius**, the input box for the **End angle** is used to set the angle, which spans the arc.

6.10.4   Upper/lower beams

With this function upper beams and lower beams can be input into your plan. Upper beams and lower beams are design features that behave similarly to walls. These are beams (girders) that are placed under the ceiling or above the floor. Lower beams are situated on the soil or base; upper beams hang visibly under the ceiling. Upper beams are used, for example, with wide ceilings as static elements.

In the vertical toolbar you'll find the icon, with which you select the type. By right-clicking the icon after selecting a type, you'll open a dialog box where you can make basic adjustments and optionally save them as the default settings. If you double-

219

click a upper beam or lower beam already placed in the plan, you'll open the same dialog box for the selected element.

6.10.4.1   Placing upper beams and lower beams

Once you've selected the desired type with the multi-function icon, ArCon opens the *how* bar where you can decide how to install the girder into your project. These input options are the same as the input options for walls. Specifically, upper beams and lower beams are placed the same way as walls (see page 207). In contrast to placing walls, however, the height can be controlled for an upper beam or lower beam.

You can place an individual upper beam or lower beam, or draw in multiple upper beams or lower beams consecutively. Furthermore, upper beams and lower beams can be inserted as a **Multiple upper beam**, **Single upper beam**, **Upper beam at right angle**, **Angled upper beam**, **Upper beam parallel**, **Upper beam midway** and **Upper beam parallel at distance**.

Upper beams and lower beams are not merged with or connected to walls. If you draw in multiple upper beams or lower beams consecutively with the icon, these are connected amongst each other. This way you can input an upper beam, for example, in the form of a U shape. After placing the upper beams they can be selected individually and by double-clicking an individual upper beam you'll open the dialog box to edit it.

Since upper beams and lower beams are not connected to walls, ArCon lets you adjust the edges to be aligned with walls. If you select a lower beam, the four corner points are highlighted within the selection frame. You can then click one of the corner points and move it to a wall edge, so it's it accurately aligned to the wall. The snap function is supported during this procedure. Specifically, you can snap a corner point when moving along the wall's edge.

6.10.4.2   Upper beam/lower beam dialog

The **Upper/lower beams** dialog box is opened by either double-clicking a selected upper beam or lower beam or by right-clicking the icon in the vertical toolbar.

The following figure shows the **Upper/lower beams** dialog box with the **2D view** section, which is available only in the ArCon+ version. In this section you specify the line color as well as the fill color and pattern for the selected upper beam.
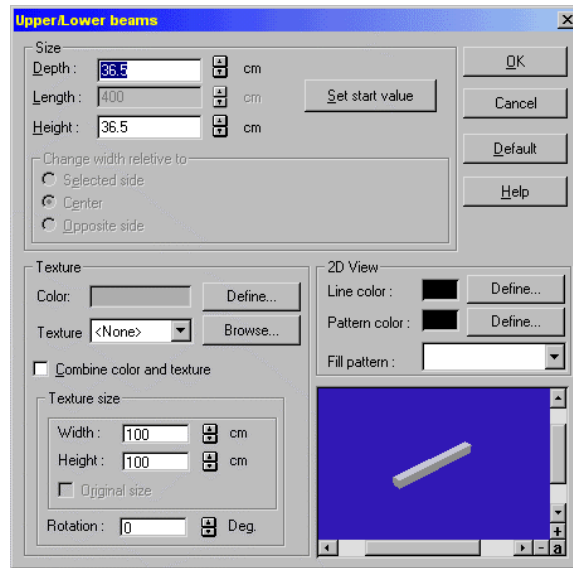
This dialog box is just like the dialog box for walls. You'll find the appropriate explanations in the *Wall dialog* section (see page 211).

Unlike the **Walls** dialog box, though, you can't choose a different type of beam. However, you can alter the height in the **Size** section.

6.10.5 *Doors*

The door function lets you insert different types of doors into the walls in your project. ArCon lets you choose from a multitude of different types of doors, and you can change the size, style, and textures in the **Door** dialog box. You find information on the dialog boxes in the following paragraphs. With the different input methods, described below, you can add doors easily and precisely. Additionally you can fine-tune door inputs with the grid, guidelines, and the ruler functions.

6.10.5.1 Choosing a door type

In the vertical toolbar you'll find the icon for the door function. The multi-function icon , which you activate by left-clicking the mouse button and dragging out to open the various door icons/functions. To adjust the door properties you can right-click the

221

icon or select the menu **Options – Doors**. If you modify the values for an existing door, the settings apply only to this door. You can modify an existing door by selecting it then double-clicking it to open its dialog box.

When you select the door function, ArCon opens the *how* bar in the second vertical toolbar, which lets you choose a method of inputting the door in your plan. If you right-click these icons, a dialog box appears. Here you can enter the numeric values required for the different input modes, including the distance from reference point reference as well as the separation ratio.

If you want to abort an entry adjustment, press the **Esc** key.

6.10.5.2 Placing Doors

6.10.5.2.1 Modifying the base of a door

A door has three bases, which can be identified by small red crosses. You can change the base by pressing **Ctrl+W**. This moves the base between the corner points of the door (left or right) or the center of the door frame.

6.10.5.2.2 Place door freely

If you select this input method, you can place the door directly with its base in the desired position. Place the pointer in the desired position and click the left mouse button to place the door. The door can be built only into a wall, where the base can be snapped on points or guidelines.

6.10.5.2.3 Place door from point of reference

You define a point of reference by clicking in the view window. This point of reference does not necessarily need to be in a wall. After setting the point of reference you can place the door with the base an approximate fixed distance from the point of reference. You then enter the distance (numerically) between the reference point and the base in the dialog box that is automatically opened for you after placing the door. If you set the point of reference not on a wall, but, for example, on a grid point or a guideline, the starting point for the door is projected perpendicularly onto the selected wall. If you press the **Ctrl** key while clicking the second time to set the door, the distance dialog box is suppressed. The default distance value is automatically used. The default

222

distance is set by right-clicking the *how* icon.

If you want to move existing doors with numeric input and/or set a new point of reference, you'll find the relevant information in the *Moving doors* section (see page 225).

6.10.5.2.4   *Place door centrally between two points*

With this input type you click twice to set two points along a wall, between which the door is installed according to the specified division ratio. If the first two points of input are not situated on a wall, then a third point is necessary to identify the desired wall. In this case the two points of input are projected perpendicularly onto the wall. The specified separation ratio is always used (you are not asked); you can set this ratio by right-clicking the icon in the *how* bar.

6.10.5.3   Door options

Like all elements you open the dialog box for doors by double-clicking an existing door, right-clicking the door icon, or by selecting the menu **Options – Doors...**
Regardless of the type of door (whose options you want to change), you always receive the same dialog box.
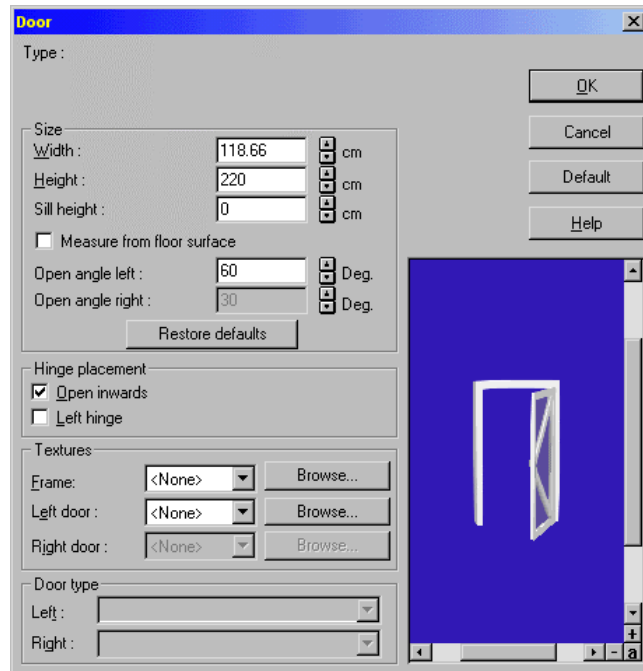
6.10.5.4   Sections of the door dialog box

In the **Size** section you can adjust the width, height and sill height of the door, as well as the angle of the opening (with double swing doors you can set the angle for each door separately). In the **Hinge placement** section you can indicate whether the door opens inward or outward, and whether it is fastened on the left or on the right. Within the **Textures** section you can change the textures used for the trim, the left door, and, for double swing doors, the right door. Finally in the **Door type** section you can identify and change the type of door. You modify the type of door by selecting a new type from the selection list. All modifications for opening width and door wings are updated immediately in the preview window. If you click the **Default** button your adjustments are saved and used for all newly added doors.

6.10.5.4.1   Sill height for doors

In ArCon version 5.0 and later, you can also enter a **Sill height**. This is especially useful for split-level floors, for example, if a door is positioned at the height of a staircase platform.

In the **Size** section, select the **Measure from floor surface** check box to measure the **Sill height** box starting not from the final floor surface but from the substructure. Changing the option selected here will therefore change the value in the input box by the thickness of the floor covering for that floor.

6.10.5.5   Moving doors

You first select the door by left-clicking (see page 189) and then clicking the desired door, which will be marked in red after you have selected it. You can move the door by holding down the mouse button on the door and moving it along the wall.

If you want to position the door accurately by entering a position numerically, you can use numeric input. Click the icon in the *how* bar with the left mouse button and the following dialog box appears:
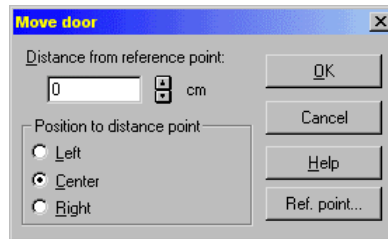
First click the **Ref. point** and set the reference point by clicking in the view window with the left mouse button. Appropriate information is displayed in the status bar at the bottom left of the display window. Next decide whether you want the base of the door to be at its left, center, or right. If you now manually enter the value for the distance from the point of reference in the upper field, the door moves according to your entered value. The new position of the door is also displayed in the plan, with the door displayed as an outline. When you're satisfied with the new position, acknowledge it by clicking **OK**, and the door is placed in its new position.

6.10.5.6   Overlapping doors and windows

If you set windows or doors in a place where a door or window already exists, the following dialog box appears:
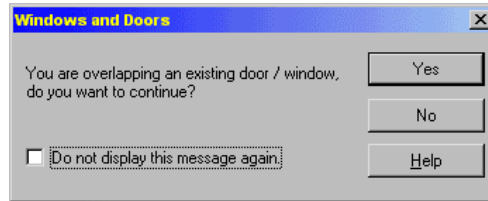
If you check the box **Do not display this message again** you will not be warned again of overlapping doors or windows. It's possible that in the plan, doors and windows may appear to overlap but actually do not, due to different sill heights. In this case the warning dialog is not opened. This warning only appears when window or door cutouts overlap. A similar dialog box appears if you set a roof on a floor that already contains windows and doors. In this case, the automatic merging with the walls cuts into windows and doors. In this dialog box you can choose whether these windows or doors should be automatically removed, or whether you want to keep them and subsequently delete them manually, or adjust them.

6.10.5.7   Deleting doors

You first select the door by left-clicking (see page 189) then clicking the desired door, which will be marked in red, to show that it is selected. By pressing the **Delete** key on the keyboard or selecting the menu **Edit – Delete** the selected door is deleted. If you want to delete all doors, select the menu **Edit – Delete all – Doors**.

6.10.6   Windows

ArCon offers you an extensive number of different types of windows for use in your project. First, you have three very basic window types, which you can use to freely design your own windows. These are calculated for each unique application (like, for example, with stairs (see page 239). You can also save these non-standard, defined windows with the macro *freely-designed windows* (see page 239) for future use, where they will be integrated into the object catalog.

226

You can also use one of the many predefined windows, for which you can subsequently change the dimensions and certain surface features. The geometry of these window types cannot be changed.

In principle, windows in your project are no different to other objects, for which you can make similar modifications. The advantage of using the predefined windows is that they are very detailed, for example, with stucco. A disadvantage, however, is that these windows are relatively inflexible in their use and handling.

Clicking the windows multi-function icon opens all available window types.

The first three windows in the list are freely definable basic windows, while the rest are the predefined windows for the current ArCon version. You can see this because the icons are different for the two different types.

Note: Through a special ability of the ArCon software, it is possible to extend the function and range of windows. Therefore, you can add and use additional types of freely defined windows. This is of particular interest to window manufacturers wishing to be able to add their designs to ArCon's existing window library. International users may also have a need for a local window design, not normally available. Ask your software supplier for information on these extension modules.

6.10.6.1　Choosing a window type

In the vertical toolbar you'll find the ▯ icon for the window functions. This icon is a multi-function icon, characterized by the black triangle in the lower right corner.

By moving the mouse while pressing the left mouse button a selection window opens to the right listing all the possible types of window. Information about each type is displayed in the status bar as you move the mouse over the icons.

To open the **Window** dialog box to modify the values, right-click the ▯ icon or select the menu **Options – Windows…**. By selecting the **As default** button in the dialog box you can save the current values so they'll automatically be used for new windows. If you

modify the values for a selected type of window, without saving them as default, these values affect only the installed window you're modifying. You can modify the values for an installed window by selecting it then double-clicking it to open the dialog box for it. Once you've selected a window type, ArCon displays the various input methods in the second vertical toolbar, the *how* bar. When you right-click these icons you open a dialog box (which is the same for all three icons). In this dialog box you can input the required value for the separation ratio used for some types of mounting (see page 229).

If you want to abort a selection, press the **Esc** key.

6.10.6.2   Placing windows

You set windows by selecting a window type from the window icon then placing it within an existing wall in the plan. Simply move the mouse to the desired location and click the left mouse button to set the window. ArCon automatically replaces the selected wall area with the window and determines the required cutout. How exactly you place the windows in the view window depends the input type you selected in the *how* bar.

Like doors, windows are placed depending on its base. The base can be the left side, right side, or the center of the window. The base is marked as a small red cross, and can be switched between these while you're placing the window. Switch the base by pressing **Ctrl+W** on the keyboard.

For the three freely defined window types you can define a miter on the left and right sides. This is automatically created when moving a window, as soon as you move the window to the corner of a wall. This way, corner windows can be installed and moved in ArCon.

6.10.6.2.1   Modifying the base of a window

A window has three bases that are displayed as red crosses. You can change the base by pressing **Ctrl+W** while you're placing the window. The base is the left, right or center of the window.

6.10.6.2.2   Place window freely

If you select this function, you can place the window directly into the desired location. Place the pointer in the suitable position and set the window by clicking the left mouse button.

228

Please remember that windows can only be built into walls, and that the base can snap on walls, as well as other snap points (including grid points and guidelines).

6.10.6.2.3 Place window from point of reference

Determine the point of reference by clicking a wall or other spot in the view window. Define with the second click the approximate position of the window in the desired wall. A dialog box appears where you can input (numerically) the window's distance from the point of reference (the distance is measured from the base of the window). Note that this procedure is identical to placing doors this way.

If your point of reference is situated not on a wall, but on a grid point or guideline, for example, the starting point is projected perpendicularly onto the selected wall. If you press the **Ctrl** key at the same time you set the second point of input, the dialog box is suppressed and does not open. In this case the default distance is used. Note that you can set the default distance by right-clicking the icon for placing windows from point of reference.

If you want to move existing windows with numeric input or set a new point of reference, you'll find detailed information in the *Moving windows* section (see page 238).

6.10.6.2.4 Place window centrally between two points

With this input type you click twice to set two points along a wall, between which the window is installed according to the specified separation ratio. If the first two points of input are not situated on a wall, then a third point is necessary to identify the desired wall. In this case the two points of input are projected perpendicularly onto the wall. The specified separation ratio is always used (you are not asked); you can set this ratio by right-clicking the icon in the *how* bar.

6.10.6.3 Window sill height

For all windows you place in ArCon+, the sill height is determined automatically, based on the value in the dialog box for the appropriate window type. The sill height is the distance from the bottom edge of the window to the floor.

SH 1.0
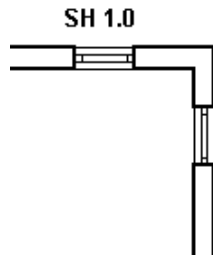
The sill height text, displayed next to windows, behaves like normal text, which you create with the **Text** icon Abc (see page 351) Specifically, you can move or rotate (by clicking with the right mouse button) the text just like regular text. By double-clicking the text you open the **Display the sill height** dialog box where you select the font type, among other things.

Unlike normal text you cannot change the content of the text, since this is derived directly from the project.

Note: You can switch the display of sill heights next to windows on and off with the menu **View – Architectural Representation – View window sill height**. If you want to switch off the sill height display for only a single window, you must hide it by moving the text under the signature field, where it will be hidden, or by changing the font properties, for example, changing the font color to white.

6.10.6.3.1   Display the sill height 🖌

You open the **Display the sill height** dialog box by selecting the text then double-clicking it.
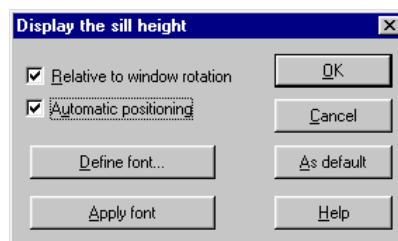
Editing the display parameters for the sill height is done similarly to editing the display of the dimension specification for stairs. You'll find detailed information about this dialog box in the *Stair details* section (see page 246).

6.10.6.4 Point from which the sill height is measured in the plan output

During the output of the sill height for windows in your plan, you can specify whether or not the windows are measured from the substructure or from the final floor surface. To do this, select **View – Architectural Representation – Sill height from bare floor.** This setting does not affect the specifications for the sill heights in the dialog boxes for windows and doors. It only affects the output in the plan.

6.10.6.5 Window options

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 237.

Like all elements you open this dialog box by double-clicking an existing window, right-clicking the window icon, or by selecting the menu **Options – Windows**. Depending on the type of window, up to four different dialog boxes are opened: a different version for each of the freely defined windows as well as a dialog box which applies to all predefined windows.

6.10.6.5.1   Windows options (type 1)
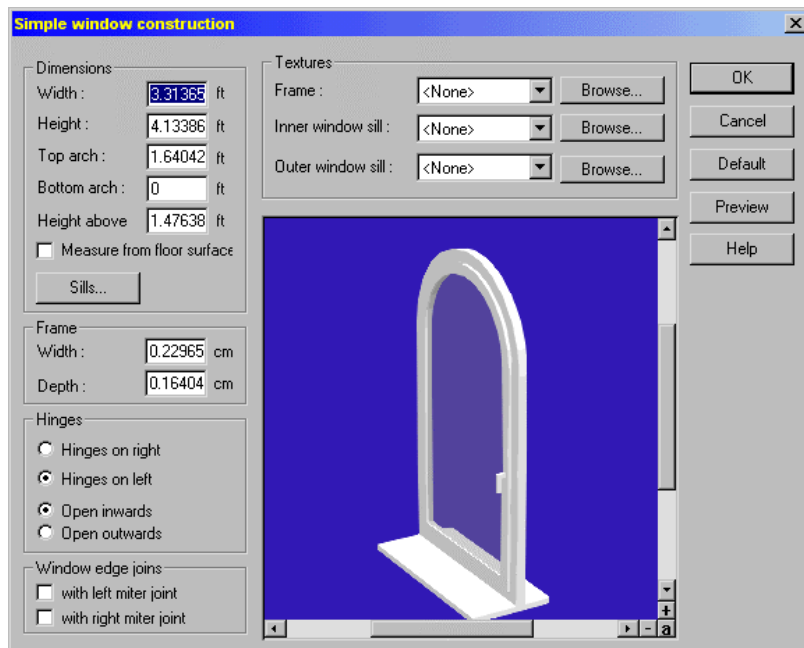
6.10.6.5.2   Dimensions

You can set the window **Width** and **Height**. If you specify any value other than zero for **Bottom arch**, this window will not have a window sill.

Note: If you enter zero for the height and the same value for **Top arch** and **Bottom arch** i.e. half the width) you can create a round window.

Select the **Measure from floor surface** check box to measure the inputs in the **Height above** starting not from the final floor surface but from the substructure. Changing the option selected here will change the value in the input box by the thickness of the floor for that floor.

6.10.6.5.3   Hinges

In the **Hinges** section you can specify whether the window is fastened on the left or on the right, and whether it opens inwards or outwards.

Note: ArCon automatically detects the *outside* of a wall.

6.10.6.5.4 Window edge joins

In this section you can decide, with the check boxes, whether the window will miter left and/or miter right when connecting with corner windows.

The miter is created only when placing the window where it will meet a corner, not within the normal wall area. Specifically, if you move the window during the input strictly within the wall area, it keeps its normal shape. If you arrive at a right wall corner, the window is cut diagonally, where the edge connects with the other corner window.

The prerequisite for automatically creating a miter cut is that you must position the window in a corner.

Note: In general, you'll know before inputting the window whether or not it will be in a corner, and so you can determine beforehand whether or not it should be mitered, and if so, on which side. You can of course create the miter subsequently by activating the appropriate check boxes and moving the window into the desired corner.

6.10.6.5.5 Textures

In the **Textures** section you can select textures for **Frame** and for the inside and outside **Window sills**. If you select **None**, the window is shown without textures.

ArCon does not necessarily update the preview window after some modifications. You may have to select the **Preview** button.

233

6.10.6.5.6 Windows options (type 2)

For this type window the following dialog box appears:
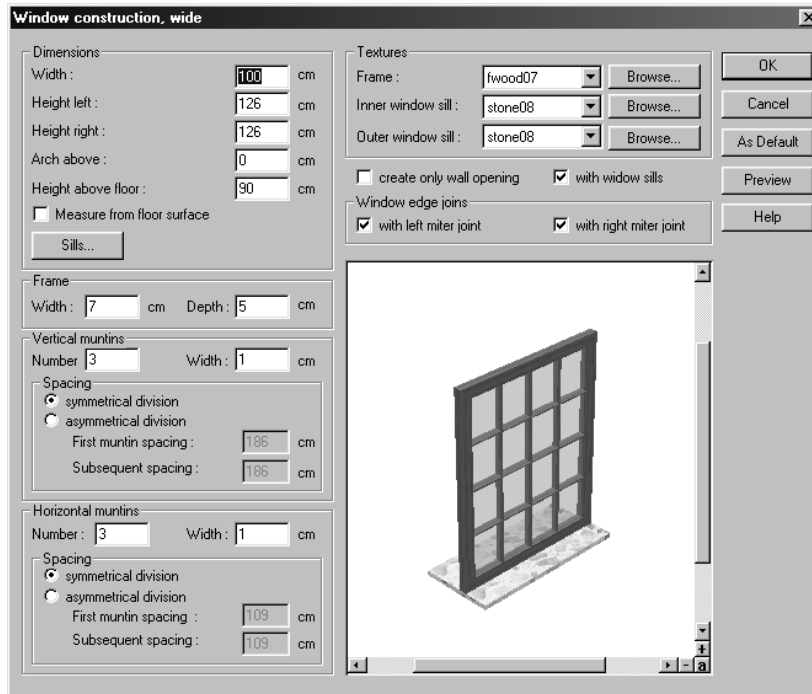
Here you can change not only the window form (within a wide range), but the interior of the window space with vertical and horizontal bars. Like all other windows, you can select textures to use on the frame and the two window sills. Finally you can specify the dimensions of the cross section of the frame.

A special feature of this window type is activated with the **Create only wall opening** check box. If you activate this option, a cutout is created in the wall area, but no window is inserted. This way you can create, for example, an entry space between two interior rooms. Since the wall cutouts take the same form as windows, you can customize the wall opening with **Arch above** inputs. You can also place wall cutouts one above another for decorative effect.

The input boxes in this dialog box should be self-explanatory. You can get some help from the following examples. With the preview window it is easy to learn your way around this dialog box, simply by adjusting entries and options and examining the effect

in the preview window. You can also learn about the basic input boxes from the description above on version 1 of the freely defined windows.
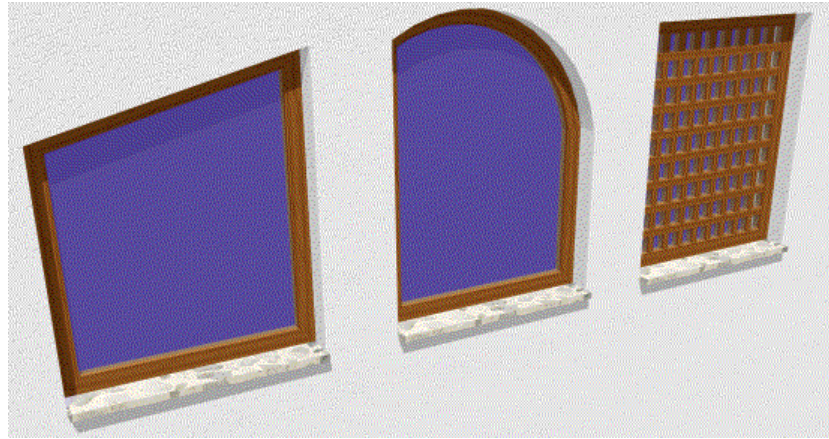
6.10.6.5.7   Windows options (type 3)

For this type of window the following dialog box appears:
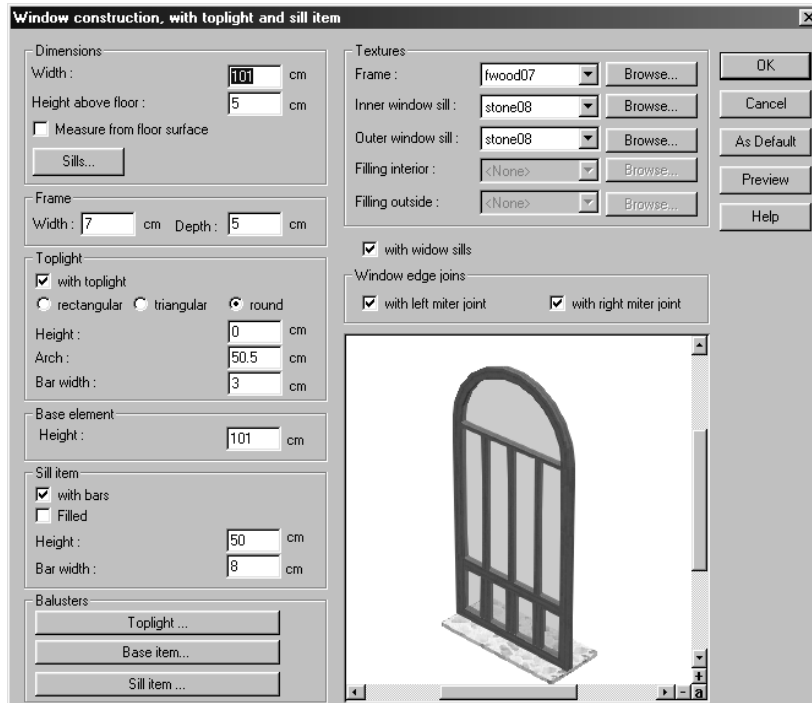
With this version you can plan a window with toplight sill element, which is assembled from three optional sections. You can design it with or without the skylight and sill element. Like the other two freely definable windows, you can edit the opening, the frame, the dimensions, the miters, and textures. In the toplight section you can select between rectangular, triangular and round toplights, which can vary in height, the arch above, and the horizontal bar width. The same input options are available for the sill element. A special feature of this freely definable window type is the option to designate both horizontal and vertical bars to all three parts of the window. If you select a window with the left mouse button within the **Rungs** section, the **Rungs** dialog box for that section opens, and you can define settings for the rung cross section.

6.10.6.5.8   Window sills in freely-designed windows

If you're using ArCon+, the **Dimensions** section includes, for all three freely defined window types, a button labeled **Sills…**. If you click this button the following dialog box appears:
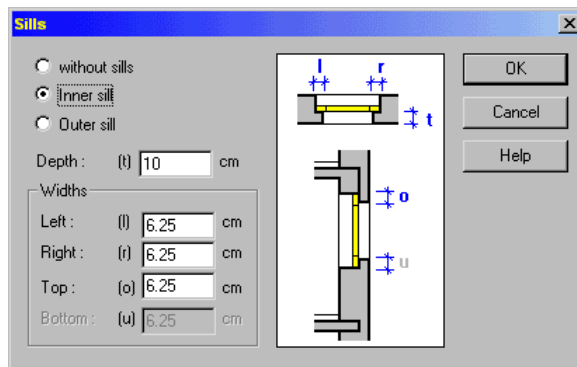
In this dialog you can adjust the window sills' width and depth. Note that the width specification is only available you're using window sills (**Inner sills** or **Outer sills)** and that you can only specify the **Bottom sill width** if you did not check the box **With window sill** in the dialog box (a sill precludes having a bottom sill).

Note: The **With window sill** check box is only available for the freely defined window types 2 and 3.

6.10.6.5.9   Predefined window options

By selecting then double-clicking a placed window, you can adjust the options for a predefined window, as shown in the following dialog box.
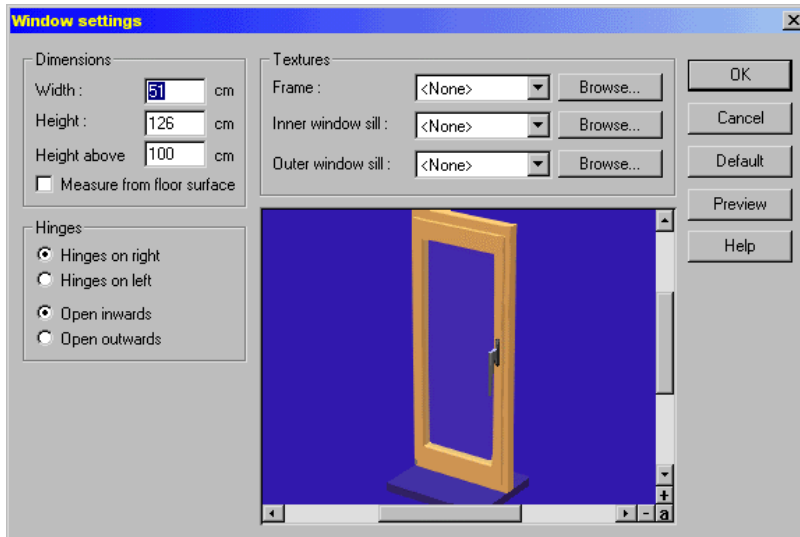
This dialog box is basically a subset of the input options for freely definable windows. However, the frame width for predefined windows changes if you modify the width of the entire window. Since the input boxes and options available in this dialog box have already been explained above in the sections on freely definable windows, we won't bother wasting your time with repetition. However, if you need help with this dialog box, please consult the sections on freely definable windows where you'll find the relevant information.

6.10.6.6   Moving windows and doors

To move a window, you first have to select it. Activate the selection mode by clicking ![icon] (see page 189). Next click the desired window in the plan, and the selected window will be marked in red. If you now move the mouse while pressing the left mouse button, the window will follow your movements within the wall. If you want to set the window at a precise point, specified numerically, you can use numeric input by selecting the ![icon] icon in the *how* bar.
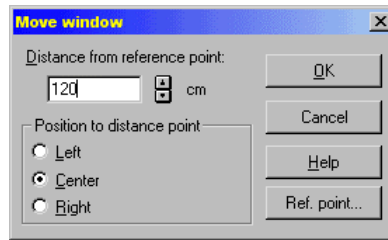
238

The following dialog box appears:

First click the **Ref. point** and set the reference point by clicking in the view window with the left mouse button. Appropriate information is displayed in the status bar at the bottom left of the display window. Next decide whether you want the base of the window to be at its left, center, or right. If you now manually enter the value for the distance from the point of reference in the upper field, the window moves according to your entered value. The new position of the window is also displayed in the plan, with the window displayed as an outline. When you're satisfied with the new position, acknowledge it by clicking **OK**, and the window is placed in its new position. If you receive a preview in light blue, you'll still find your window in its original position.

If you move a window with the mouse, you can press **Ctrl+W** while you're moving it to change the base between the left side, center, and right side. With the help of snapping (see page 165) you'll be able to precisely control the positioning of the window.

6.10.6.7   Deleting windows

Select the window to be deleted by first activating the selection mode by clicking (see page 189). Next, click the window. The selected object is marked in red. Press the **Delete** key to delete the window. You can also delete the window by selecting the menu **Edit – Delete**. If you want to delete all windows in your project, select the menu **Edit – Delete all – Windows**.

6.10.7   Stairs

In ArCon the following stair constructions are available: straight stairs, L-shaped stairs with a landing, U-shaped stairs with a landing, L-shaped spiral stairs, U-shaped spiral stairs, curved stairs, and a spiral staircase. In ArCon+ You can also build a ramp and a free-form multi-section polygonal staircase. All can be constructed of either wood or

239

concrete. After you've selected a stair type and entered the necessary points in the plan, a dialog box opens where you can make the relevant adjustments.

6.10.7.1   Selecting a stair type

In the vertical toolbar you'll find the multi-function icon ▦ which opens the stair function. This icon is a multi-function icon, characterized by the black triangle in the lower right corner.

After selecting a stair type and positioning the mouse in the plan window, the pointer displays a stair outline, the size of which indicates the approximate stair size. After positioning the stairs (with three mouse clicks) ArCon automatically opens the dialog box where you can input the stair values.

To position the stairs you must specify three points, with three mouse clicks. The first determines the starting position; the second sets the direction and length of the first segment; the third sets the direction and length of the perpendicular segment. The stairs are calculated based on these input points, and displayed.

6.10.7.1.1   Straight stairway

Input the points according to the following figure. In the dialog box the values can be adjusted or corrected. Any correction causes the input points noted below to move.
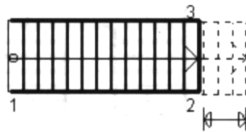
When extending or shortening the **Tread width** (the horizontal distance between steps), the end point is shifted. Point 1 remains unchanged. If you modify the **Riser height** (the vertical distance between each step), the third point is shifted.

6.10.7.1.2   L shaped stairway (wood)

Input the points according to the following figure. In the dialog box the values can be adjusted or corrected. Any correction causes the input points noted below to move.

240
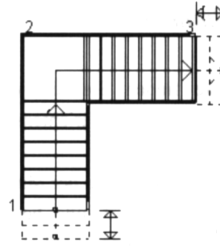
If you change the number of steps or the tread width, the end point is shifted. The landing point (point 2) remains unchanged. If you modify the stair depth, point 3 is shifted.

6.10.7.1.3   U shaped stairway (wood)

Input the points according to the following figure. In the dialog box the values can be adjusted or corrected. Any correction causes the input points noted below to move.
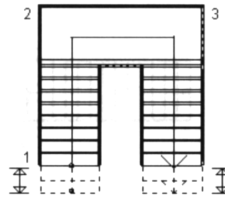
The landing depth is equated with the width of the stairs. If you change the stair width, the landing depth and width are automatically modified. These shifts affect points 1 and 3. Point 2 (the rear side of the landing) is unchanged. The number of stairs (steps) is arbitrarily adjustable. You can change the landing width independently of the stair depth.

6.10.7.1.4   L shaped winding stairway (wood)

Input the points according to the following figure. In the dialog box the values can be adjusted or corrected. Any correction causes the input points noted below to move.
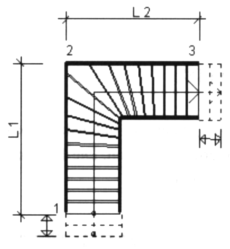
The corner point (point 2) is fixed; if you adjust the length of the first section (L1) point 1 is moved, rather than point 2. The same applies to the length of the second section – if you change it, point 3 is moved.

6.10.7.1.5   Curved stairway (wood)

Input the points according to the following figure. In the dialog box the values can be adjusted or corrected. Any correction causes the input points noted below to move.
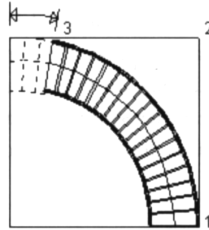
Starting point 1 is the only unchangeable point. Otherwise you have various possibilities of modification with the curved stairs. The stair width is narrowed if you modify the outside radius. You can specify the rotation angle, which defines the direction and location of the end point. You can enter values up to 360 degrees.

6.10.7.1.6   U shaped winding stairway (wood)

Input the points according to the following figure. In the dialog box the values can be adjusted or corrected. Any correction causes the input points noted below to move.
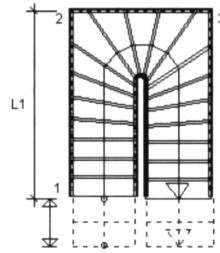
The length of the first section (L1) can vary. A number of step adjustments can cause the starting point (point 1) to be shifted. The points of input are shifted as follows: The length of the first section is modified by moving point 1, adjusting the width at point 2, and the length of the second section as set by point 3.

6.10.7.1.7   Spiral stairs

Enter the input points according to the following figure. Note that points 1 and 2 determine the focal point (the center), which in turn determines the diameter and the twist of the stairs.

Tip: Simply place the first point and watch how the stair pointer behaves when you move the mouse.
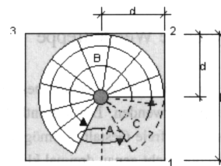
A corresponds to the start angle; B corresponds to the pitch around the staircase; C corresponds to the opening angle, and d corresponds to the distance from the center of the stairs to the outside edge (= ½L1).

After placing the stairs a dialog box appears in which you can make corrections and perfect the stairs installation. With the start angle you specify the angle at the beginning of the stairs. With the specifications for tread width, number of steps, and the degree of rotation around the center, you determine the stair's end point. By modifying the stair depth and the outside radius you influence the overall diameter of the stairs.

Note: When the stairs are shifted this way, the focal point is preserved. With the **Start angle** you determine the beginning opening in the floor.

243

6.10.7.1.8   Ramp

The ramp is a special *stair form*. A ramp is entered in exactly the same way as the other stair types. In the **Ramp geometry** section you specify the geometry of the actual ramp. In the **Walls** section you can set walls on each side of the ramp to fit into the surrounding architecture, for example.

Note that the walls of the ramp are not like other walls in ArCon; i.e. you cannot install windows or doors in these walls. Just like the *regular* stairs you can set the angle at the beginning and end, but of course for a ramp these values must be identical. The ramp will always fill the form of a rectangle or parallelogram.

6.10.7.1.9   Polygonal spiral stairway (wood)

In ArCon+ you can use besides the stairs described above, a polygonal spiral staircase. The substantial difference between this stair type and the other stairs is that the polygonal staircase can be freely designed. This has the consequence that when inputting the stairs, you must click not exactly three times, but a number that depends on the form you arbitrarily design.

Inputting the polygonal spiral stairs is similar to inputting walls with the input method . While you're setting the points in the view window, you'll see the form of the sides of the stairs. Exactly as with walls, you can, during the input, press the key combination **Ctrl+W** to adjust the base of the stair section, between the left side, center, and right side.

Once you've input all the sections of the stairs, end the input by pressing the **Esc** key. The dialog box for setting the stairs parameter appears. The inputs and adjustments available to you here are principally the same as with the other stair types.

6.10.7.1.10   Tip for using polygonal spiral stairs

With the polygonal spiral stair, which is available only in the ArCon+ version, you can simulate the other ArCon stair types, for example, the U-spiral stair, because you have more control over the base points. Thus, you can make a *tweaked* version of, for example, the U-spiral stair.

The following illustration shows a U-spiral stair and a polygonal spiral stair. Both differ essentially in the form of the outside edges. The polygonal spiral stair was placed with the base at the outside edge (by moving the base with **Ctrl+W**). The overlaps of the interior edges, which resulted during the placing, automatically corrected.

244
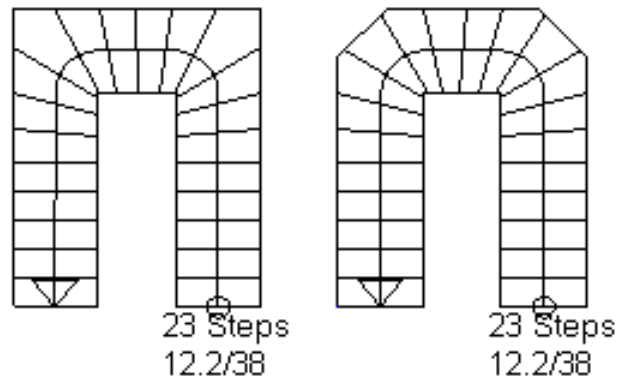
6.10.7.1.11   Stair text

All stairs that you place in ArCon+ automatically receive text with different dimension specifications. These specifications are calculated from the values in the **Stairs** dialog box.

21 Steps
13.3/37.2
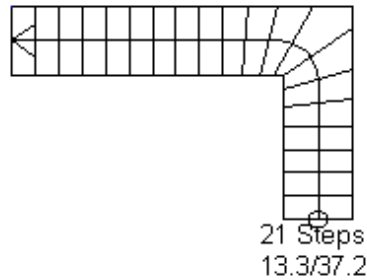
The upper number indicates how many steps are in the staircase. With two-stage staircases, the number in the first length and the number in the second length are both provided. Underneath this number, there are two other numbers. The number on the right indicates the **Tread width** and the number on the left indicates the **Riser height** of each stair step (the vertical distance from one step to the next).

The stair text behaves like normal text, which you can enter with the **Text** icon (see page 351). This means that you can move or, by right-clicking the text, rotate the text. By double-clicking the text you'll open the **Stair details** dialog box where you can select the font type and customize the display.

Unlike normal text you cannot change the contents of the text, since this is derived directly from your project.

Note: With the menu **View – Show rise and appearance of stairways** you can switch the text display on and off in the plan window.

6.10.7.2   Stair details

You open the **Stair details** dialog box by selecting the text and double-clicking it.
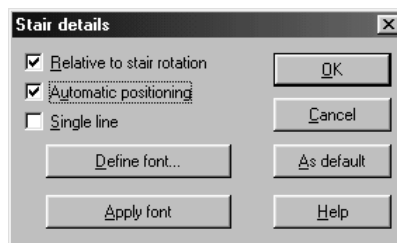
If the **Relative to stair rotation** check box is checked, the text maintains its orientation to the stairs through any rotation. If, for example, the stairs are rotated diagonally, or

they are situated diagonally after rotation of the building (see page 147), the text is aligned diagonally as well. If you deactivate the check box, the text moves with the stairs but is not rotated to maintain its orientation towards the stairs.

When moving stairs, the text is automatically positioned at the end of the stairs. If you move the text, the **Automatic positioning** check box is deactivated in the dialog box. If you do not activate it, the text is moved to its designated position at the end of the appropriate stairs.

If you check the **Single line** box, the text of the text is displayed in a single line, rather than spread over two lines.

If you click the **Define font** button, a standard Windows font selector opens where you can select the desired font for the text display. Any changes you make here apply only to the selected text.

With the **Apply font** button you can transfer the defined font properties to all visible stair text. Here, *visible* means the text in the current floor (shown in black) and in the visible (but not current) floors, shown in gray. If you want to apply the font settings to new stair text, you must save the settings as the default.

6.10.7.3   Deleting stairs

First you first must select the desired staircase by activating the icon (see page 189) and then clicking the desired staircase. The selected stairs are marked in red. Press the **Delete** key to delete the selected set of stairs. You can also delete the selected stairs by selecting the menu **Edit – Delete**.

When placing stairs in a project, corresponding cutouts in the ceiling of the current floor are automatically made. When you select a set of stairs, generally only the cutout is selected. If you click again, the stairs are selected instead of the cutout. You can delete cutouts and stairs independently.

If you want to delete all stairs in a project, select the menu **Edit – Delete all – Stairs**.

6.10.7.4   Automatically-generated ceiling cutout

When you place stairs, ArCon automatically generates a cutout over the stairs in the ceiling of the current floor. You can subsequently edit this cutout, by treating it as a newly created cutout, created with the icon (see page 270).

247

6.10.7.5   Stairs dialog box

Since stairs types are very individual and have different parameters, the dialog boxes for the available stair types are displayed in the following paragraphs, before adjustable properties and parameters are described. The following dialog boxes show the versions for wood stairs, but the dialog boxes for concrete stairs have the same options and settings.

6.10.7.5.1   Straight stairs
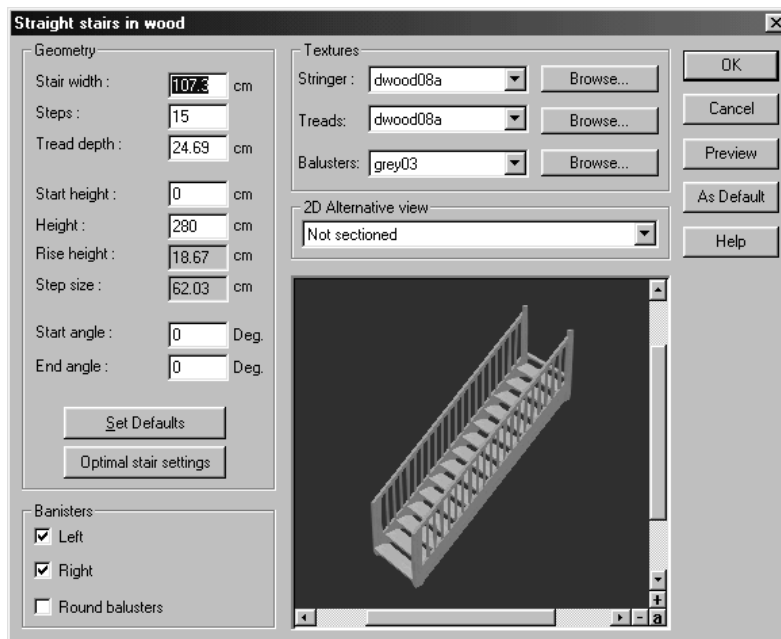
6.10.7.5.2   *L shaped stairs*
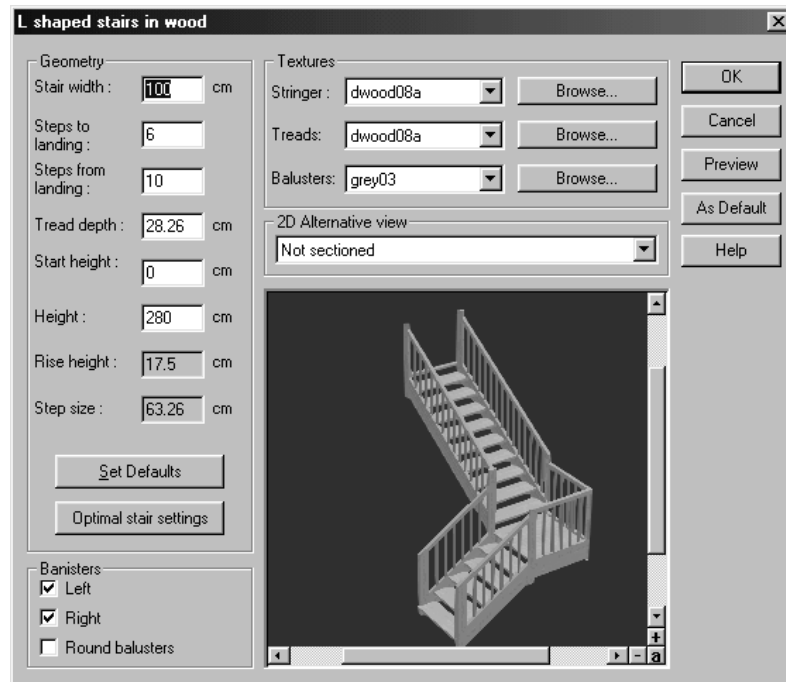
6.10.7.5.3   U shaped stairs
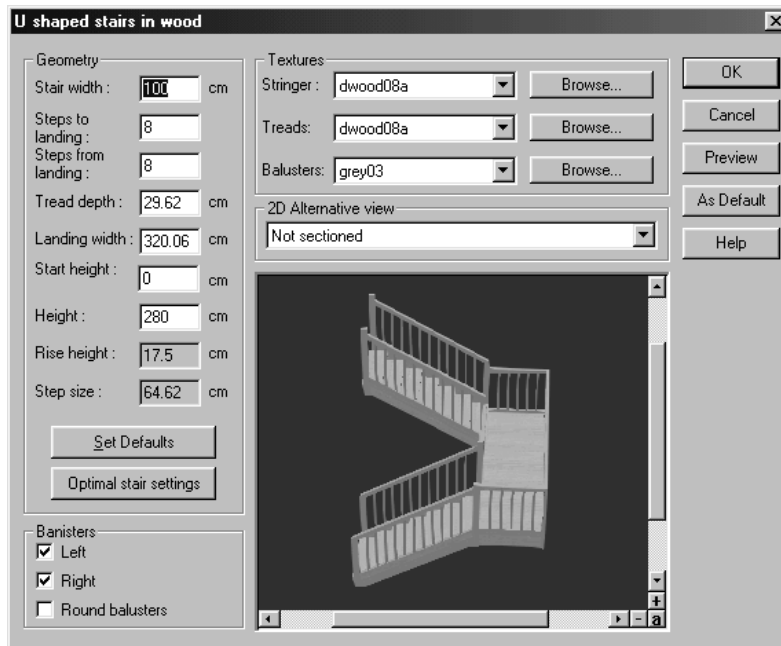
6.10.7.5.4   L shaped winding stairs
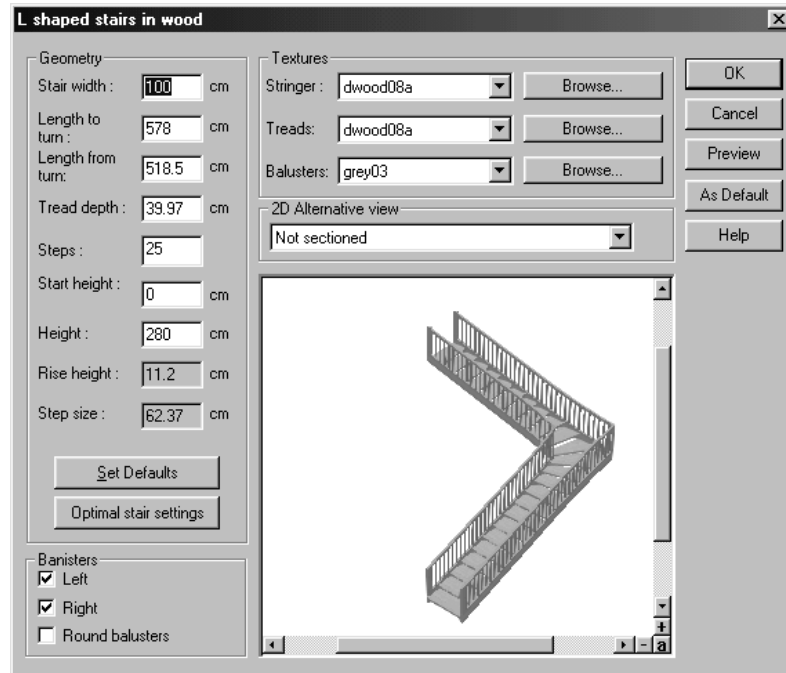
6.10.7.5.5   Curved stairs
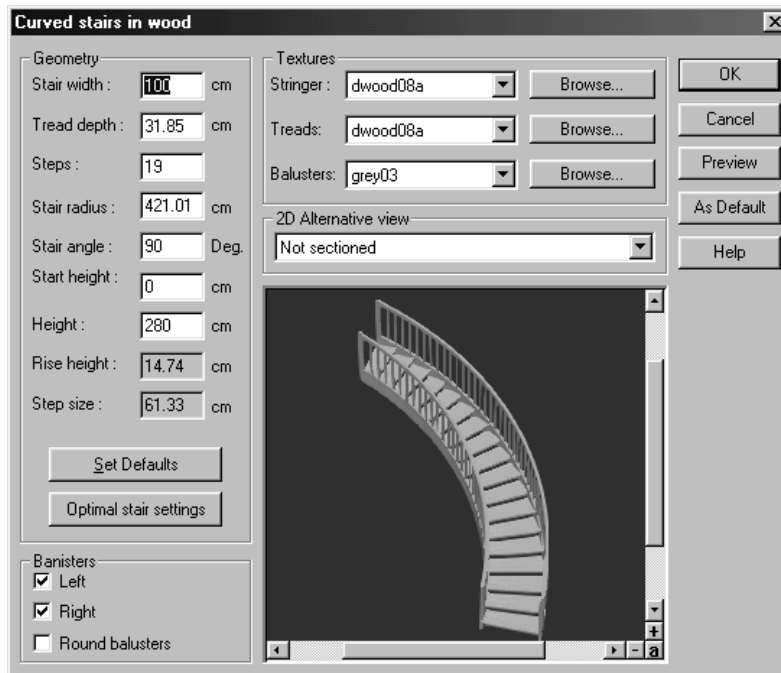
6.10.7.5.6   U shaped winding stairs
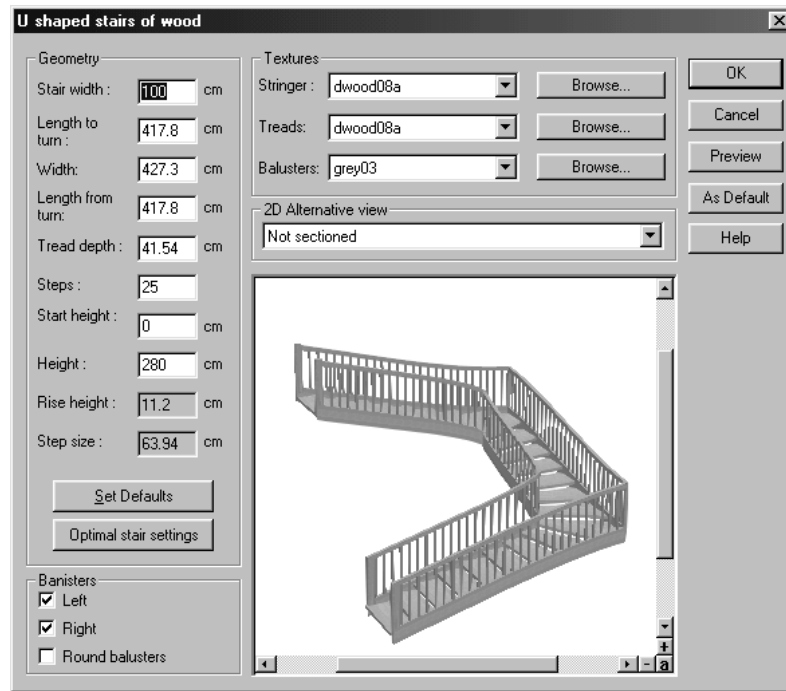
6.10.7.5.7   Spiral stairs
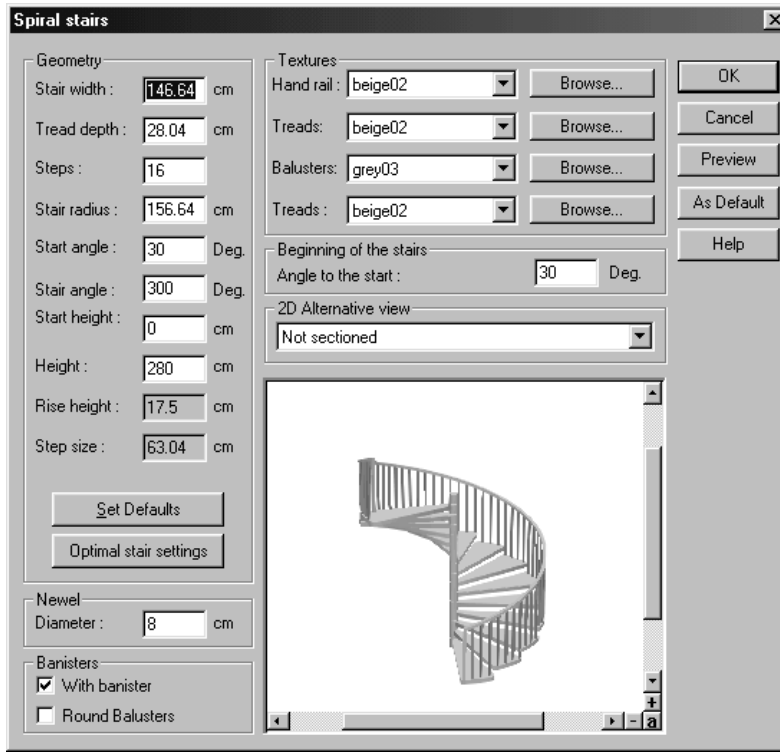
6.10.7.5.8   Ramp
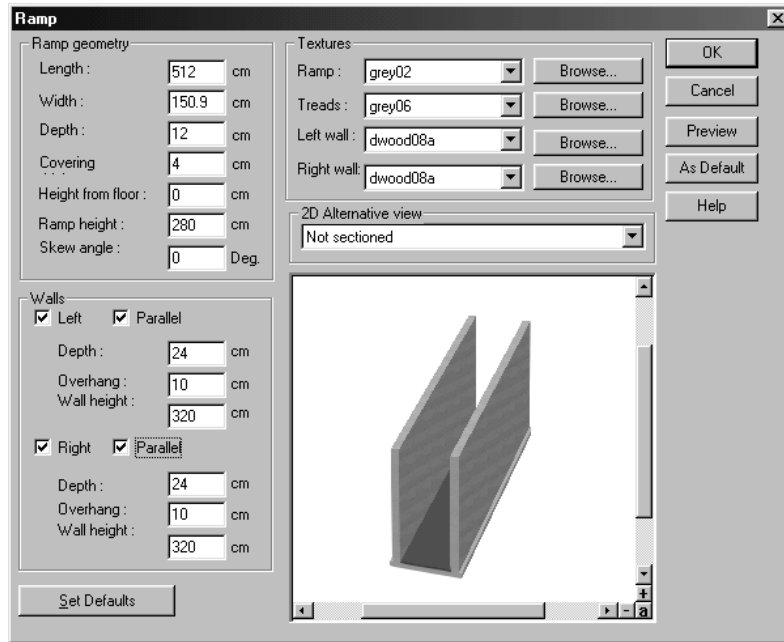
6.10.7.5.9   Polygonal spiral stairs
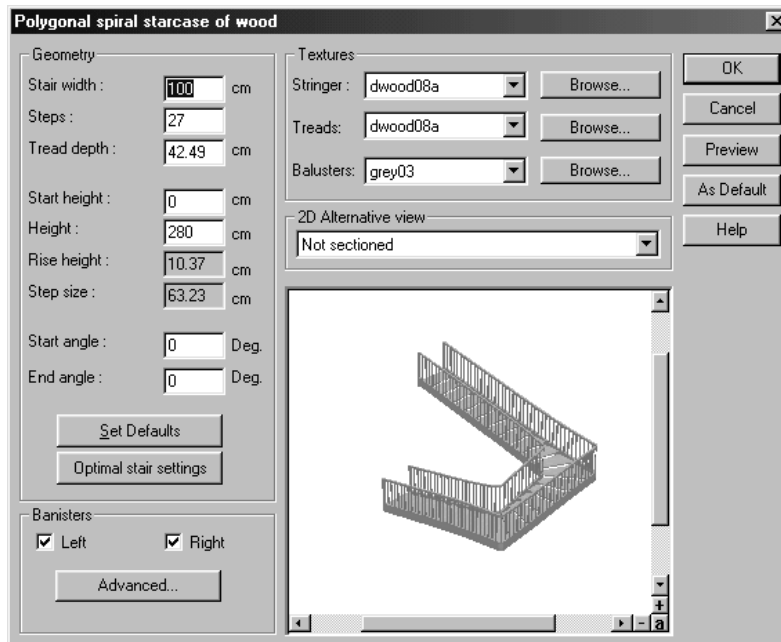
6.10.7.5.10   Description of the stairs dialog box

All stair dialog boxes are opened automatically after you input the three points for the installation of the stairs. The values, which were determined by the points of input, can be modified in the dialog window. You can modify predefined stairs by selecting the stairs and then double-clicking them with the left mouse button.

6.10.7.5.11   Geometry

The Geometry section will vary depending upon the stair type but can include the following options:

6.10.7.5.11.1 Stair width

With straight stairs, the third input point determines the stair width. With the other four

256

types of stairs, a default value for the stair width is used initially. You may enter the required stair width into the input box in the dialog box.
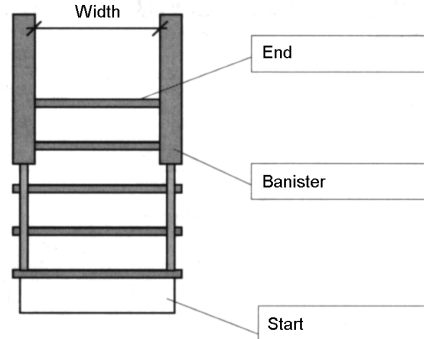
6.10.7.5.11.2 Steps

Here the desired number of steps is entered, or with multi-length stairs the number of steps in the first and second lengths.
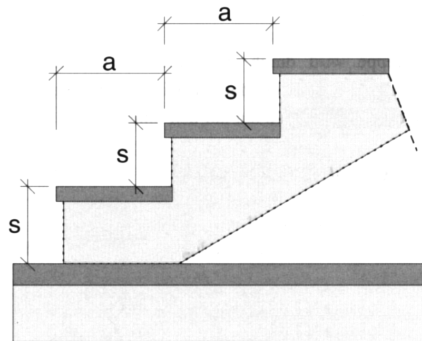
a= Step depth (29cm)
s= Step height (17 cm)
Step size = a+2 x s (=63)

6.10.7.5.11.3 Tread depth

Enter here the desired tread depth of the levels. The modification of the appearance width entails varying the length of the stairs (see *Plans of the description of type of*

257

stair on page 256).

6.10.7.5.11.4 Landing width

With multi-level stairs the landing width corresponds to the standard stair width. With the U-landing the value can be changed subsequently in the dialog box.

6.10.7.5.11.5 Outside radius

The outside radius of the curved stairs is calculated by the position of the three input points. It can subsequently be freely modified. The modification of the stair width does not affect the outside radius, but only the inside radius.

6.10.7.5.11.6 Degree of stair bend

This determines the angle between the start and end of the stairs.
The following three values are grayed-out in the dialog box, since they are calculated from the upper dimensions.

6.10.7.5.11.7 Level at the start

Here you determine, for all stair types, the level where the stairs are to begin, measured from the upper edge of the floor. With a level of zero, the stairs start at the floor.
Usually, you'll modify this setting only if stairs start on a level of *half height*, which is not equal to zero, for various reasons. A typical example is the stairway to a basement. The following illustrates the situation:
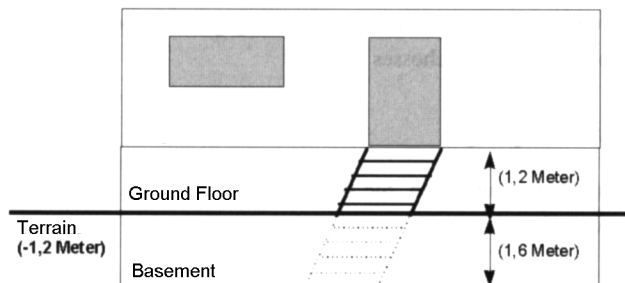
Note: in order to insert the stair, you must adjust the starting level by 1.60 meters, to the height, where an imaginary stair breaks through the base and becomes a real stair.

258

6.10.7.5.11.8 Height

In this field you can modify the height of the stairs. When you're first placing the stairs, the height of the stairs automatically corresponds to the height of the room. More specifically, the floor height is the total height between the finished floor of a floor and the finished floor of the floor above it. ArCon matches the staircase height to match the floor height. In general, if you later change the height of the floor (story), the stairs will not land perfectly at the floor above.

In ArCon, with a subsequent modification of the floor height the stair height is automatically adjusted. A prerequisite for this automatic adjustment is that the stairs end exactly at the upper edge of the upper floor. For example, if you have defined a floor height of 2.8 meters, when placing the stairs the staircase height will automatically be set at 2.8 meters. If you later increase the floor height to 3 meters, the staircase height is automatically adjusted. That applies even if you set a non-standard height for the stairs, but they stop exactly at the upper edge of the floor above.

Note: The stair height is not automatically adjusted if you input a value deviating from the default value for the stair height, so the stairs do not end anymore at the upper edge of the floor above.

6.10.7.5.11.9 Riser height

Here the riser height is specified. It is to be understood as a quotient from the floor height and the number of levels.

6.10.7.5.11.10 Step size

With the step size the gradient ratio of stairs is limited. The step size for stairs is in the range 59 to 65 cm. It should be understood as the distance of about 2 riser heights and their tread depth.

6.10.7.5.11.11 Start angle

In both the type of stairs **Curved stairway (wood)** and **Curved stairway (concrete)** you can specify the **Start angle**.

259
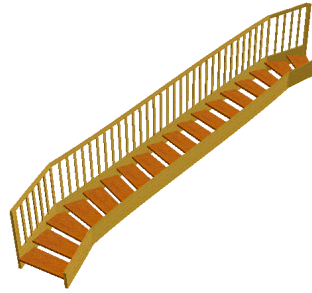
By adjusting the start and end angles you can adapt the stairs to the room.

6.10.7.5.11.12 Optimal stair settings

Since the stairs are inserted precisely into the given dimensions, it can be that the staircase is very flat or very steep. When desired, the stairs can again be calculated automatically with the **Optimal stair settings** button. The stair depth as well as minimum and maximum values for riser height and tread width are calculated. The length of the stairs is also calculated again due to the optimal desired step measure, whereby the dimensions can change depending upon the type of stair (see page 256).

6.10.7.5.12   Banisters

With the first two check boxes, you can select whether to have a banister at the **Right** side, **Left** side, or **Both** sides (enabled by selecting both switches). The default banister uses rectangular balusters unless you activate the switch **Round balusters** and ArCon will use round balusters instead.

6.10.7.5.13   Textures

This section consists of three or four individual list boxes, which display the name of the texture used for the relative part of the staircase. If you want to select another texture for an element, click **Browse…** to open a dialog box where you can select a new texture.

The texture inputs for **Wood stairs** consist of specification for **Stringers**, **Treads** and **Balusters**, where the texture of the side is also used for the banister.

With **Concrete stairs** you can make different texture inputs for **Handrails**, **Treads** and **Banisters**, where the texture chosen for the banister is also used for the banister's newels.

6.10.7.5.14   Advanced banisters input 🏃

The **Advanced** button is used to open the **Advanced banister options** dialog. This dialog provides numerous options for modifying the banisters for stairs, but these options can only be used with a polygonal, newel staircase. All settings made in this dialog can be checked directly in the preview window in the stairs dialog after pressing the **OK** button.
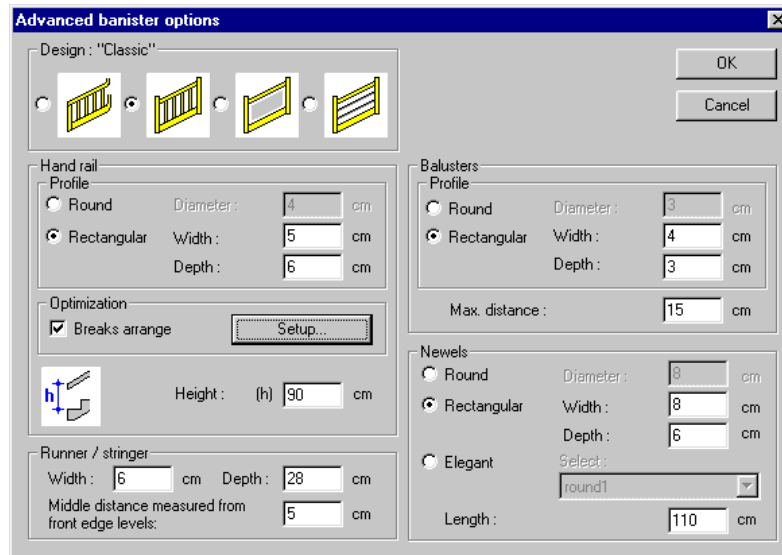
6.10.7.5.14.1 Design section

This section provides a selection of four basic banister shapes as options with the designs **With wreath, Classic, With in-fill** and **Modern**. Depending on the design you have chosen, various different sections of the dialog will be deactivated. For example, the **Balusters** section is inactive for the **With in-fill** design.

6.10.7.5.14.2 Handrail section

This section can be used to change the diameter if the **Round** option has been selected, and to change the width and thickness of the handrail if a square shape has been chosen.

261

6.10.7.5.14.3 Optimization

For the *Classic, With In-fill* and *Modern* designs, bends can be automatically added to the sides of the stairs in ArCon. The criteria for these bends can be defined in the dialog box opened by clicking the **Setup…** button.
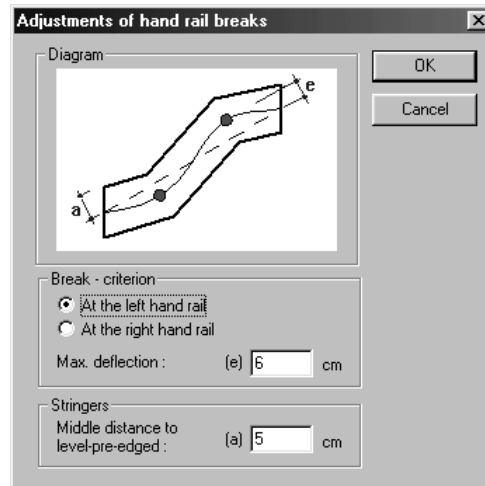
This dialog allows you to specify the maximum deflection for the left or right handrail and the central distance to the front edge of the step in cm for the strings. The diagram for this function illustrates the dimensions in question.

You can immediately check whether or not each optimization process has been successful in the preview window in the dialog box for polygonal, newel stairs.

6.10.7.5.14.4 Runner/stringer section

The width and thickness input boxes are used to change the dimensions of the stringers. The center distance measured from the front edge of the stair give dimensions, shown in the following diagram.
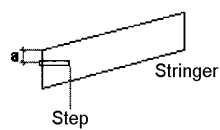
6.10.7.5.14.5 Balusters section

Both the cross-section of the balusters and the relevant dimensions such as the diameter or width and thickness can be entered here. A maximum distance can be entered to modify the distribution and the number of balusters. The larger the maximum distance selected, the fewer the number of balusters positioned at equal distances in ArCon.

6.10.7.5.14.6 Newels section

The relevant dimensions such as the diameter or width and thickness can be entered here for the cross-section selected for the newels. When the **Elegant** option is checked, ArCon provides you with a list box where you can select one of five different support types. For all support types, the length can be changed in the relevant input box.

6.10.7.5.15   2D Alternative view

With this list box you can select how the stairs are displayed in Plan view (see page 201). The **Not sectioned** option is suitable for the normal stair view. For the architectural representation view, you might prefer **Section with underlying run**, **Section with top shown**, or **Section without top shown**.
Note: The stairs are displayed in the architectural representation view type only if you have activated the menu **View – Architectural representation** view.

6.10.7.6   KENNGOTT stairs

Note: Kengott is a German manufacturer of stairs and gives a good example of how expandable ArCon is to allow the creation of additional modules.
Selecting the KENNGOTT staircase icon from the stairs multi-function icon and then right-clicking the icon will open the following dialog box:
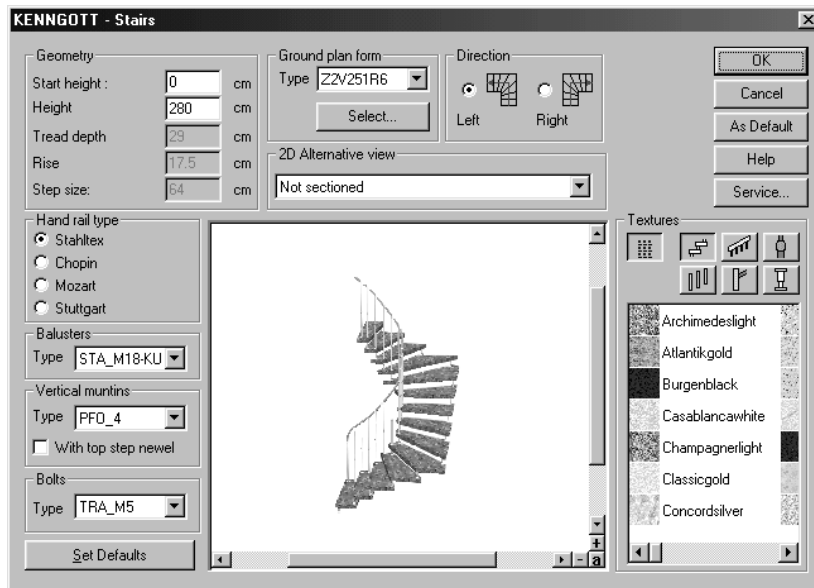
6.10.7.7   Geometry section

The staircases integrated here are standard types with fixed geometry, which can only be varied in terms of their height. Further information on this and on special designs is available from the KENNGOTT Company. The mailing address and telephone number of this company is displayed by pressing the **Service…** button.

6.10.7.8   Outline shape section

The list box called **Type** is used to select another outline shape directly, assuming you are familiar with the name for the type of KENNGOTT staircase you want. More details on the type can be found using the Select plan outline shape dialog, which is opened using the **Select** button.

6.10.7.8.1   Select plan outline shape dialog
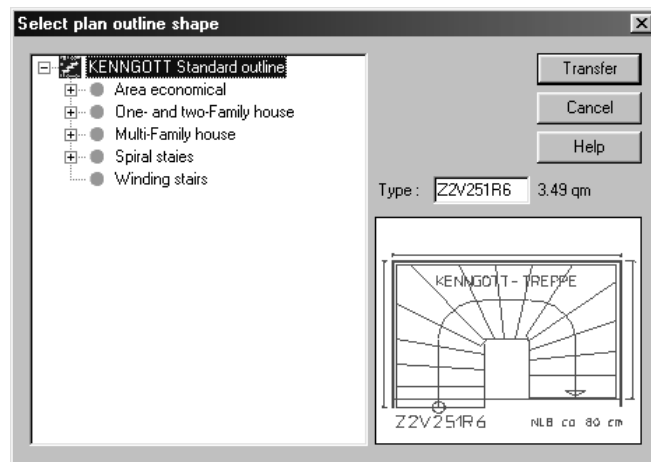
The left-hand window provides you with a hierarchical list of over 45 outline shapes, arranged in different main groups.

For example:

- Space saving
- One family and two family houses
- Multiple family houses
- Spiral staircases

As you will be familiar with from other Windows applications, the next information level in this view is displayed by clicking the icon. If there are no more icons, this means you have reached the lowest level. The dimensions for the stairs are displayed here. The exact name of this type of staircase is displayed along with the necessary surface for this type directly above the preview window. In the preview window itself, DXF films are displayed for the selected type. Closing the dialog box using the **Transfer** button will display the selected staircase type with all its specifications and the 3D preview in the KENNGOTT dialog.

6.10.7.8.2   Handrails, balusters, newels and bolts section

These setting options can be used to change the appearance of the staircase type in question quite significantly. This does also depend on the availability of newels, balusters and bolts from the manufacturer. The decisive factor here is the handrail you

choose, i.e. when you select a different handrail, a selection of balusters, newels and bolts available to you will be specifically matched to that handrail. A support at the top step needs to be specially activated using the relevant button. All changes can be checked immediately in the 3D view.

6.10.7.8.3   Textures

The function of this section is similar to the ArCon Explorer. The ⊞ icon can be used to switch from the standard view to the detailed view for displaying textures. No information such as the filename, manufacturer or size is given here, however. The detailed view simply contains more textures displayed in one go. The following list can be used to find out which part of the construction can be activated for texturing, and which button, i.e. the texture is only placed on the component, which you have just selected. All other areas of the staircase remain untouched. For the different components, only selected materials are specifically available from the KENNGOTT Company.

Newels

Balusters

Steps

Handrails

Bolts

Decorative finishes

6.10.8   Floors and ceilings

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 155

6.10.8.1   Floor and ceiling options
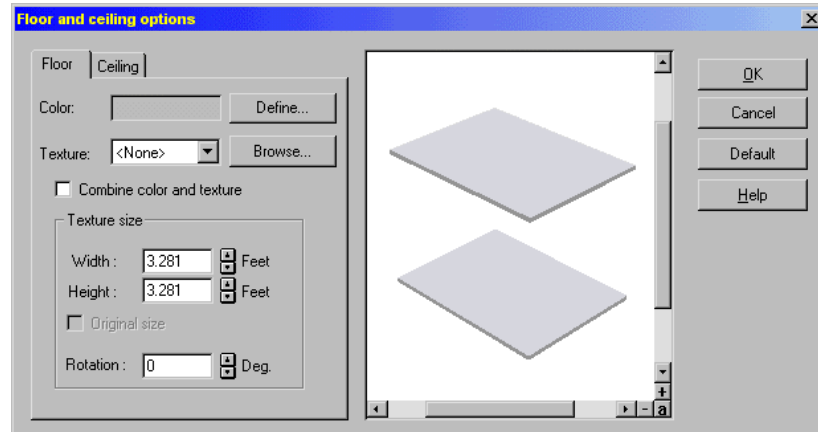
You can open this dialog box by selecting the menu **Options – Floor/ceiling…**. You can open this dialog to adjust an existing room by first selecting the room, then double-clicking it. The dialog box is similar to the dialog box for adjusting floor slabs. They differ only in the number of pages. **Floor** and **Ceiling** correspond to the bottom, top and edges (see page 272.).

6.10.8.1.1   Surface properties

6.10.8.1.1.1   Color

If you want to assign your ceiling a simple color, press the **Define...** button and a color palette is displayed where you can select either a predefined color, or by selecting **Define custom colors**, a color you mix yourself.

6.10.8.1.1.2   Texture

This field specifies the texture, which is identified in the list box. If no suitable texture is listed in the list box, click the **Browse…** button to open a standard dialog box where you can select a suitable texture file.

6.10.8.1.1.3   Combine color and texture

Select this check box to combine the color and texture you've selected. If you select, for

example, black stripes on a white background and mix this with a blue color, you'll receive black stripes on a blue background.

6.10.8.1.1.4 Texture size

For most textures (pictures, *.bmp files) the original size is already specified in the texture catalog. If this is not the case, the option **Original size** is shown in gray. The default value for a texture is 100x100 cm. If you put this texture on an area that is larger, it will be tiled over the surface of the area. If the texture should appear only once on this area, you'll have to adjust the width and height of the texture. If you click the **Original size** check box, the texture's original size is restored.

In the **Rotation** input box you can enter an angle of rotation by which the texture is displayed. With the help of this rotation, you have, for example, the possibility to shift the floor tiles in your bathroom diagonally.

6.10.8.2   Defining textures for floors and ceilings

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found starting on page 154.

You can change the material for floors and ceilings, as well as floor slabs, with the following dialog box:
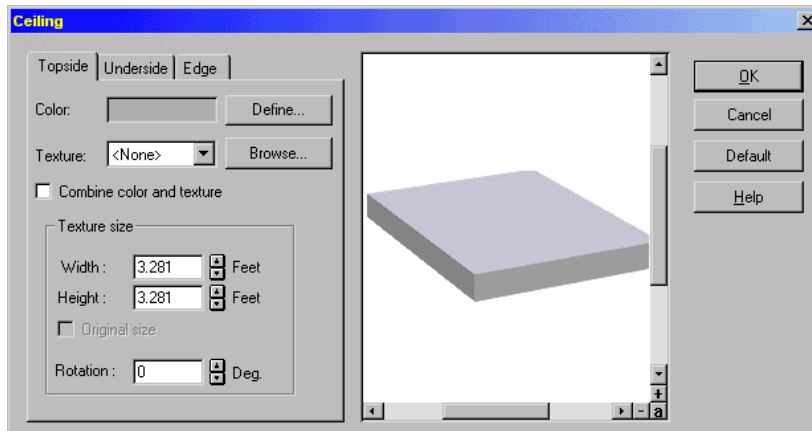
The dialog box for floors and ceilings is nearly identical, but instead of three tabs for Top side, Underside side, and Edges there are only two tabs: Floor and ceiling. With the

help of these three (or two) pages, you can select the desired color and texture. Each of the pages has entries for color and texture, a **Combine color and texture** check box, as well as an **Texture size** section. If you click the **Define…** button you can select a predefined color or create a new color. This color is wholly used only if you do not use a texture and do not activate **Combine color and texture**.

If you do not select a texture, the color is used as it is defined. If you select a texture, and activate **Combine color and texture**, the result is a mixture of the color and the selected texture. The texture appears as if you were looking at it through colored glass, where the selected color corresponds to the color of the glass. If you do not select **Combine color and texture** the selected color is ignored in favor of the texture.

In the **Texture size** section you can specify the size of the texture, as it is projected onto the floor, ceiling, or floor slab. If you activate the **Original size** check box the original size of the texture, as defined in the texture catalog, is restored and used.

Note: With textures you create and/or add yourself, it can occur that there is no specified *original size*. If the original size cannot be determined, the control field **Original size** is grayed-out. In this case you must specify a size in the fields **Width** and **Height** to use. If you load a bitmap picture file to use as a texture, there is no way to determine it's original size (because, for example, a scanner cannot determine the intended resolution or size) so you must enter the desired width and height, as it corresponds to your bitmap picture.

Finally, you can rotate the texture through the option **Rotate**. Here you can specify the angle of rotation. The texture image will be rotated and tiled across the surface area, if necessary.

If you would like to save the settings made in this dialog box for future floors, ceilings, and floor slabs, click the **Default** button. The settings will be automatically assigned to new floors, ceilings, and floor slabs

6.10.9   Ceiling and wall cutouts

With this function ceiling and wall cutouts can be inserted into your plan. You can access this from the vertical toolbar, where you'll find the multi-function icon .

For ceiling cutouts there is no dialog box. You therefore cannot make any adjustments. For a wall cutout you can make adjustments through a dialog box and optionally save them as the default values. If you double-click a placed wall cutout, this dialog box is opened for the selected cutout.

269

6.10.9.1   Ceiling cutouts

In order to cut into ceilings and floors that are automatically created for rooms, ArCon has the ⬜🔲 icon. Note that such cutouts are created automatically when you set stairs into the current floor. After placing stairs, the automatically created cutout is identical to a cutout you'd create with this icon. Unlike all other elements in Construction mode, you cannot adjust the properties of a ceiling cutout. For the lining of the cutout, ArCon uses the texture of the ceiling.

There are two different ways to enter a ceiling cutout. You can enter it as a rectangle using 🔲 or as a freely defined polygon using 🔳. The two input types are identical to the input types for roofs. If the ceiling cutout is to be changed, you must select it with the 🔍 icon and you can then modify it using click and drag to edit it's shape.

6.10.9.2   Wall cutouts 🔲

With the 🔲 icon you can input wall cutouts, by creating outlines of the cutouts and providing them with linings. Wall cutouts are input similarly as windows and have essentially the same properties.

Note: Wall cutouts can also be created with the window function for freely definable windows. Here you can use the outlines that are created when you place a window for the wall cutout.

6.10.9.2.1   Placing a wall cutout

Once you've selected the wall cutout icon, ArCon shows you the various installation types in the second vertical toolbar (*how* bar). The three input methods are the same as those used to input windows (see page 228). You can place a wall cutout freely, at a fixed distance to a reference point, or centrally between two points.

6.10.9.2.2   Modifying a wall cutout

Like windows, wall cutouts can also be modified after you've placed them in your project. You adjust a wall cutout through a dialog box, which you can open by selecting the cutout and double-clicking it.

6.10.9.2.3   Wall cutout dialog box

You open this dialog box by double-clicking a selected wall cutout or by right-clicking the ⬚ icon in the vertical toolbar.
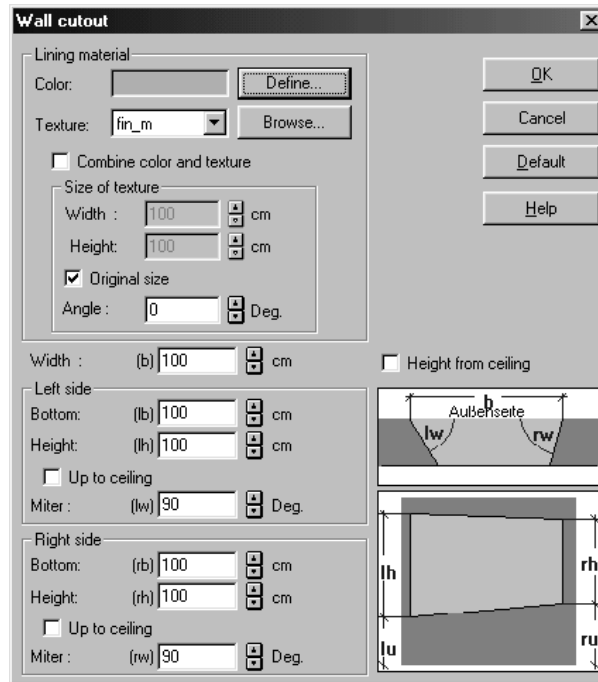
6.10.9.2.3.1   Lining material

In this section you can set the details of the lining of the wall cutout. Like other dialog boxes, you can select a color and texture, as well as its size and other options.

6.10.9.2.3.2   Width

Here you specify the width of the wall cutout. If you place the wall cutout with the fourth input method, by defining the points on the wall sides, the width specified here is ignored in favor of the placement setting.

6.10.9.2.3.3   Left and right sides

In this section you specify the height above the floor (between the floor and the bottom

of the cutout) for both the right and left sides of the cutout. You also specify the height of the cutout itself.

Because you can enter different values for the right and left sides, the lower edge of the cutout can be diagonal. In principle, you can make a wall cutout of any size and shape. The only limitation is that the left and right sides of the cutout must be perfectly vertical.

If you check the **Up to ceiling** box, the wall cutout is automatically stretched up to the ceiling. The **Height** input box then has no effect and is grayed out.

Like freely definable windows, you can miter the cutout (see page 233) by adjusting the **Miter** value.

6.10.9.2.3.4   The preview window

In the preview window the wall cutout is showed as a diagram, with both plan (from above) and front views. With these diagrams you can see and control the setting to be adjusted.

If you click the mouse button in an input box of the dialog box, the appropriate dimension identifier is marked in red in the plan. For example, if you modify the width, the **w** is marked in red. This linking goes both ways, so you can also click a dimension identifier in the plan to select that input box in the dialog box.

6.10.10   *Floor slabs*

Normally, you do not need to worry about placing ceilings and floors (floor slabs) yourself, because ArCon automatically detects when a room is closed and draws in the ceiling as necessary. You nevertheless have the ability to draw in floor slabs, for example, to attach a terrace. To do this you'll want to select the icon.

The floor slab to be placed is always placed at the height of the existing ceilings *in the current floor*. To input a floor slab, proceed as follows:

First select the floor slab icon . Next, select one of the two input modes from the *how* bar, or . With the icon you can draw in rectangular floor slabs; this input method is similar to inputting rectangular roofs.

With the icon you input floor slabs with an outline, drawing in any polygonal shape. The input method is the same as defining roof polygons.

272

6.10.10.1   Floor slab options

Like all elements in Construction mode, there are two ways to open the dialog box to adjust the settings for floor slabs: You can right-click the ⬚ icon or by selecting a floor slab already placed with the ⬚ icon (see page 189) and double-clicking the floor slab. The dialog box for floor slabs is nearly identical to the dialog box for floors and ceilings, which is described in another section (see 267).

6.10.11 Platform designer ⬚ ⬚

As well as the option to add supports, superstructures and substructures and other similar construction elements into your plan, ArCon version 5.0 and later allows you to create raised platforms. These platforms are basically boards for which you can set both the shape and the appearance using textures and material properties.

The ⬚ icon is used to create platforms. The actual process for adding the platform depends on the option you select in the How bar.

There are 3 options in the How bar: ⬚ ⬚ ⬚

6.10.11.1   Standard platforms ⬚

With this input option only one click is needed to position a platform. All other information required for this platform (outline, but also materials or height above floor) are set using the **Options** dialog box for platforms (see page 274) – which is opened by right-clicking the platform icon ⬚. The settings made here are then used for each new platform to be added.

Once the platform with its outline displayed in the plan during positioning has been positioned with a left-click, the dialog box where the default values can be changed will be displayed. This dialog box is identical to the **Platform** dialog box.

6.10.11.2   Square platforms option ⬚

The input option ⬚ is different to the previous option mainly because it is used to enter square platforms. After clicking ⬚, you will need to click twice in your plan to drag out a square. After the second click, the dialog box described for the first input

273

option will be displayed, but this time the outline used for the platform will be a square with the proportions you have specified when clicking. These proportions, and other parts of the outline, can still be changed afterwards in the dialog box, which is displayed.

6.10.11.3   Define platform option

This input option can be used to enter any square directly when adding the platform and therefore to change the shape of the platform significantly at the same time as you are defining it. When you conclude your inputs using the **Esc** key as for other square inputs in ArCon, the **Options** dialog box for platforms (see page 274) will appear, as for the other input options, which means you can change the properties of the platform.

6.10.11.4   Platform dialog box

This dialog box is opened by right-clicking to make the settings required for the different input methods for platforms, or after a platform has been entered using the input option , or .

Note: A very similar dialog box is also opened when creating blocks in Design mode.

The dialog box comprises the three tabs **General**, **Surface** and **Outline**.

The **General** tab is used to enter general properties of the platform such as the height above the floor or the height of platform itself.

In the **Surface** tab you can specify which materials and textures are used for the platform. On this tab you can make separate settings for the top and base surfaces of the platform, and for the side surfaces.

Finally on the **Outline** tab is a special tool which can be used to edit the outlines of polygons in numerous ways. The *program within a program* which appears in the **Outline** tab is used in exactly the same way as for boards in Design mode. The Outline Editor will also be useful as an input medium in future versions of ArCon for limited 2D structures. It may therefore be a good idea to familiarize yourself with this tool, even if you do not need any platforms or boards in Composer in Design mode at the moment.

6.10.11.4.1   General tab

In addition to the preview box, which is standard in ArCon, the tab also comprises the

274

Heights, **Sides** and **2D Display** sections. A special **Catalog** section in the lower part of the dialog box can be used to save complete settings made in this dialog box in a catalog and therefore save a number of guide platforms.
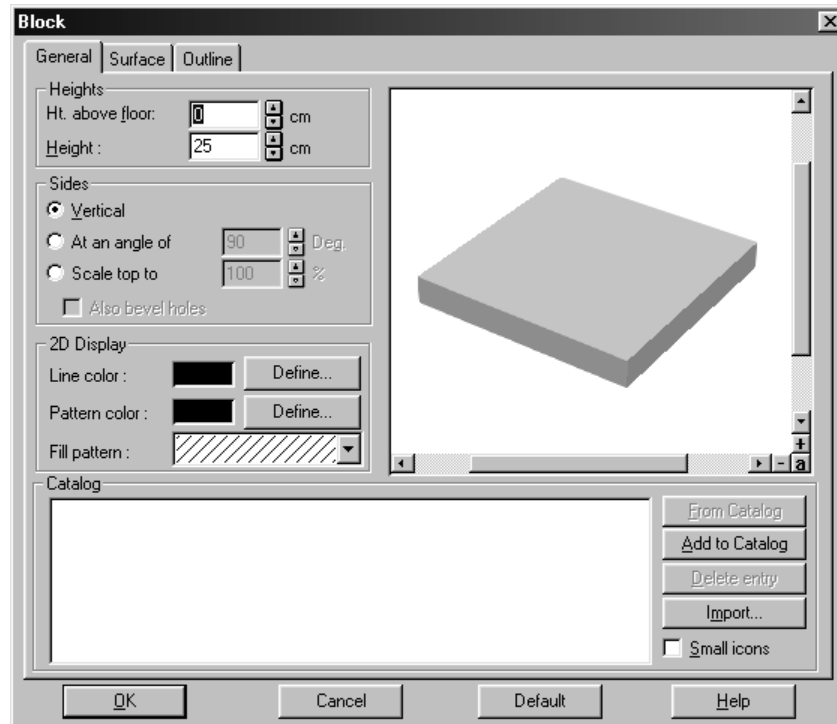
6.10.11.5   Heights section

The two input boxes **Height above floor** and **Height** are used to specify the height of the platform's position above the floor and the height of the platform itself. In this case the distance between the base edge of the platform and the top edge of the floor surface is used as the **Height above floor**.

6.10.11.6   Sides section

This subsection is used to specify how the sides of the platform are designed. When

275

Vertical is selected, the sides of the platform will always be aligned vertically to the platform surfaces and accordingly also to the floor surfaces. If you select **At an angle of**, pyramid-shaped platforms can be created, where the side surfaces are not vertical to floor and ceiling surfaces, and instead use the angle specified. Lastly, the **Scale top to** option can be used to specify the size of the platform surface based on the platform base shape.

For example, if you have selected a circle with a diameter of 1 meter as an outline shape, and you set **Scale top to** at 50%, the surface of the platform will be a circle with a diameter of 50cm. The platform sides will therefore be at an angle.

Note: With more complex outlines for the platform, the following procedure should be followed when creating the top surface based on the platform base shape: the *center point* of the base is determined first of all, based on the center of the box surrounding it. The platform base is then moved by the height of the platform and then the distances of the individual corner points for the platform are moved by the factor specified, relative to the center point just outlined.

6.10.11.7   Also bevel holes

If the outline to be used for the platform is an outline with the options **At an angle of** and **Scale top to**, then the option Also bevel holes will determine whether the same process is applied to holes within the platform.

6.10.11.8   2D Display section

This section is used to specify how the platform is displayed in your plan in Construction mode. The input options here are basically the same as those used for walls, for example, but also supports similar construction elements. Values can be defined both for the line color and the pattern color. It is also possible to specify a fill pattern to create different hatching for the surface or even to display the platform surfaces as completely filled in.

Note: The outline for the lower edge of the platform is always used in the 2D view in Construction mode. In some circumstances, this may be different to the top edge, particularly if you are using inclinations for the sides that are not 90 degrees.

6.10.11.9 Catalog section

As there are virtually unlimited ways for creating platforms due to the diverse setting options on the **General**, **Surface** and especially the **Outline** tabs, ArCon provides ready-made settings - in other words, complete platforms - on the **General** tab and in the **Catalog** subsection, for saving platforms in a catalog. The four buttons **From catalog**, **Add to catalog**, **Delete entry** and **Import...** in the **Catalog** section can be used to transfer values from the catalog into the remainder of the dialog box (for all three tabs) and even to save them in the catalog. Lastly, a block can be removed from the catalog by selecting a platform located in the catalog and clicking **Delete entry**, because you no longer need that platform, for example.

Select **Import...** to add catalogs from other places to the defined platforms. ArCon saves all platforms and boards in Design mode in a file `ArConShapes.KTL` in the program directory for ArCon. If you want to add platforms (or even boards) from a different directory, for example, via the Intranet from another computer, select **Import...**. An **Open file** dialog box will then be displayed where you can select the relevant file.

Note: Although both platforms and boards are saved in a file, the import process is carried out separately. In other words, importing the platforms from a file does not mean that the boards have also been automatically imported from that file. This is carried out using the **Import** button in the dialog box for boards (see page 440).

The remaining section displays a list of the platforms defined up to that point. If the **Small icons** check box is selected, these will only be displayed as small preview images. If not, they will be displayed in the size also used for the preview images in the ArCon catalog, for example.

6.10.11.9.1 Surface tab

The **Surface** tab is used to specify which textures and materials in the platform are used in Design mode. The specifications for color and texture can be entered separately for **Base**, **Exterior**, **Interior** and the **Top** for the platform. Each of these sections comprises an input box for the color and an input box for the texture.
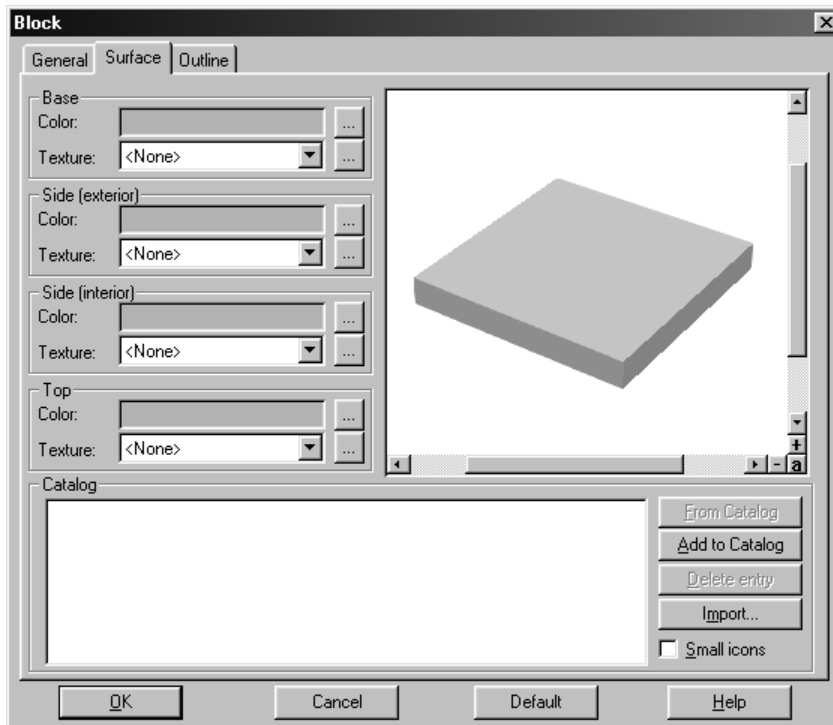
In addition to these input boxes, you will find the **Catalog** section at the bottom of the **Surface** tab, which is identical to that section on the **General** tab.

To the right of the boxes for colors and textures is an icon for each box. Clicking the ··· icon will display a standard color selection dialog box for colors, and for textures the following special menu is displayed.
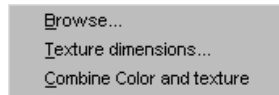
If you click **Browse...** in this menu, the texture required can be selected in an **Open file** dialog box. After selecting **Texture dimensions...** a special dialog box is displayed which is described in the next section. Lastly, selecting or deselecting **Combine color and texture** means that the color set can be mixed with the texture, also possible for walls, for example.

6.10.11.9.1.1 Texture dimensions dialog box

The **Texture dimensions** dialog box is opened using the **Texture dimensions...** option in the **...** menu for textures on blocks on the **Surface** tab in the dialog boxes for platforms (see page 274) and boards (see page 440).
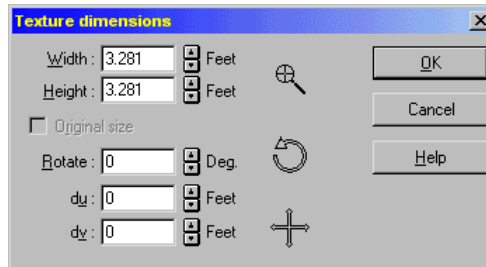
This dialog box can be used to enter the size, position and rotation angle for the texture using either numeric input or interactive icons. For the numeric input, use the input boxes for **Width, Height, Rotate**, du and dv. If the **Original Size** box is checked, the dimensions saved in the texture are used for the width and height.

Note: If there are no dimensions saved in the texture, the **Original size** box will be gray and inactive.

For inputing values using the interactive icons, proceed as follows:

Even before you open the dialog box, the position of the object in the preview in the higher level dialog box should be set so that you have a clear view of the surfaces with the texture for which you want to change the dimensions.

If you then click inside the three image boxes in the dialog box and move the mouse while holding down the left mouse button, the specifications in the input boxes will change and the set values will be displayed directly in the 3D preview. The best thing to do is to experiment using this dialog box.

6.10.11.9.2 Outline tab

This tab can be used to change the outline of your platform. This tab is effectively a *program within a program* which can be used to create general outlines consisting either of straight lines or circular or elliptic arcs.

Whether you right-click the icon or double-click the platform after it has been inserted, the **Outline** tab in the **Platform** dialog box displays the plan as a white background.

When entering the outlines for the platform you can snap to elements in the plan, while

279

you are viewing your plan, using the same snapping options as when working normally in ArCon. The other input options and working modes for this Outline editor are described in a separate chapter of this manual.
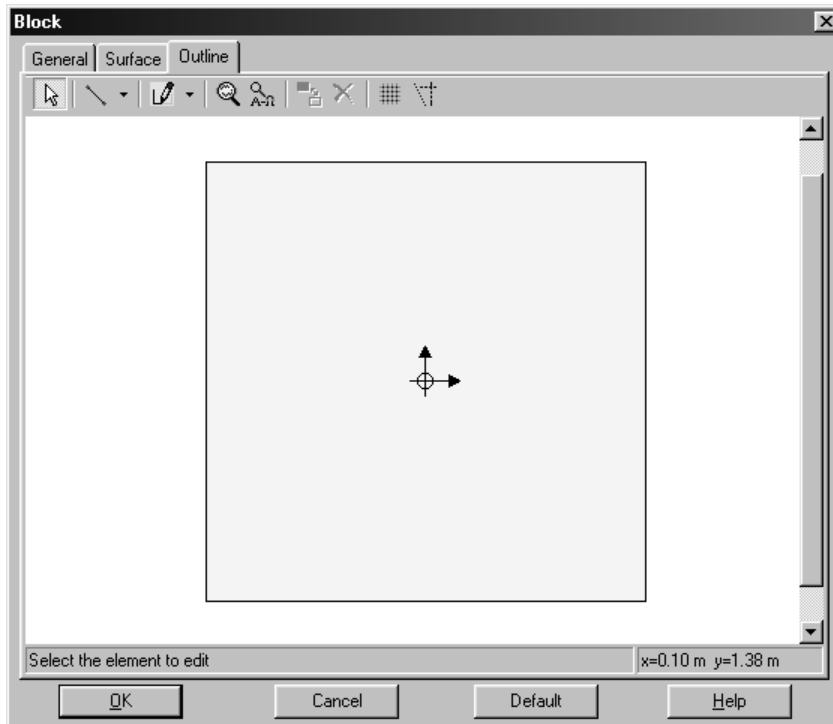
6.10.12 *Chimneys and supports*

With the help of the chimney and supports functions you can quickly and easily insert chimneys and supports into your plan. By opening the dialog box for these two elements you can change their dimensions and textures. Additionally you can save your settings for these two elements as defaults, so they apply to all newly added chimneys or supports. By using constructional aids such as the grid, guidelines, and the ruler you can quickly insert your elements into the precise location you desire.

6.10.12.1 Settings for chimneys and supports

In the vertical toolbar you'll find the ▢ ▣ ▦ ▥ icon or for the chimney or support functions. ArCon offers via the multi-function icon chimneys both with and without additional ventilation sections. With the supports you have the option of square or round supports. To open the dialog box for adjusting the preset values, right-click the ▢ ▣ ▦ ▥ icon or or select the menus **Options – Chimneys…** or **Options – Supports…** The description of the dialog boxes can be found in the following paragraphs. By clicking the **Default** button you can save your settings to be used as the default for future chimneys and supports.

If you modify the values without saving them as default, these values remain valid only for the current element. Also, you can subsequently modify existing elements by selecting them and double-clicking them. This will open the dialog box where you can change the settings for the selected element.

6.10.12.2 Placing chimneys and supports

After clicking the appropriate ▢ ▣ ▦ ▥ icon in the vertical toolbar you can place your chimney or support in the plan. Remember that you can take advantage of the grid, the guidelines, and the ruler. Pressing **Ctrl+W** while you're placing it can change the base of the chimney. The base can be one of the four corners, or the center of the chimney. The base is marked with a red cross in the display.

6.10.12.3 Moving chimneys and supports

To move the desired element you must first select it. Clicking the element with (see page 189) does this. The element is marked in red in the view window.

To move an element, click it and, keeping the mouse button held down, move the mouse. When you've set the element in the desired position, release the mouse button to set it. Remember that you can adjust the base while moving by pressing **Ctrl+W**.

6.10.12.4 Deleting chimneys and supports

With you must first select the element with the left mouse button. The selected

element is marked in red. You can delete the selected element by pressing the **Delete** key or by selecting the menu **Edit – Delete**. If you want to delete all chimneys or supports, select the menu **Edit – Delete all – Chimneys** or **Edit – Delete all – Supports**.

6.10.12.5   Chimney and support options
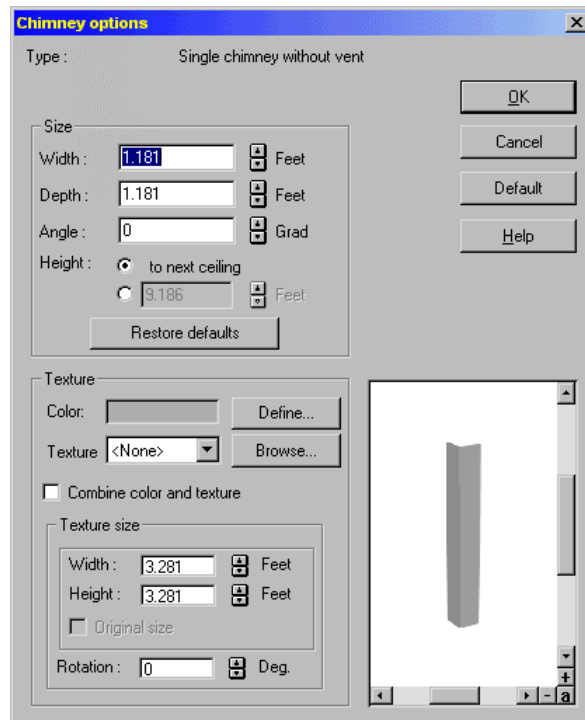
These dialog boxes are opened when you right-click the ⬚ ⬚ ⬚ ⬚ icons or 🯀 🯀 . You can also open these dialog boxes by selecting the menus **Options – Chimneys** or **Options – Supports**. You can modify an existing chimney or support by selecting it then double-clicking it.

6.10.12.5.1   Type of chimney/support

Here the type of chimney or support is displayed at the top of the dialog box. If you

modify an existing element through this dialog box, you will have an icon identifying the type. In this case, you can click the icon to change the type. This works just like the multi-function icons in the vertical toolbar.

6.10.12.5.2   Dimensions

6.10.12.5.2.1 Width, depth, and angle

In this section you can specify the width and depth of the element. Since supports are symmetrical, only the thickness can be modified.
In the **Angle** input box you can specify the rotation of the element relative to the current coordinate system.

6.10.12.5.2.2 Height

In this field you can specify the height of the chimney or support. By selecting the **to next ceiling** check box the height is automatically adjusted to meet your designated ceiling height.

6.10.12.5.3   Surface

6.10.12.5.3.1 Color

If you want to select a color click the **Define…** button. A color palette is displayed in which you can select a predefined color, or you can create a custom color.

6.10.12.5.3.2 Texture

The element is assigned the texture that is indicated in the list box. If you want to select another texture, click **Browse…** to open a standard dialog box where you can select a texture.

6.10.12.5.3.3 Combine color and texture

Under the **Texture** list box is a check box labeled **Combine color and texture**. If you click this, the color and texture are combined. If you select, for example, black stripes on a white background and mix it with a blue color, you'll get black stripes on a blue background.

6.10.12.5.3.4 Texture size

For most textures, the standard size is specified in the texture catalog. The **Original size** check box is grayed out if the texture size cannot be determined. The default value for a texture's size is 100x100 cm. This also defines how many times the texture is repeated over a surface, so you can control this repetition and thus the appearance of the texture on the wall by adjusting this size. If you click the **Original size** check box the original texture size is restored.

In the input box **Rotation** you can specify an angle of rotation with which the texture is displayed.

6.10.13 Roofs

This function lets you create a variety of roofs and insert them into your project.

In order to create a roof in your plan, you should first create an attic (see 133). If you create your roof in an existing floor, ArCon places the roof at the same level as the walls of the current floor.

With the **Roof settings** dialog box (see page 292) you can make basic adjustments and save them as the default values. Three different input methods are available to you.

6.10.13.1   Accessing the roof function

If you click the icon in the horizontal toolbar, the roof view is hidden in Construction mode and Design mode. If no roof exists, this icon is grayed out.

In the vertical toolbar you'll find the icon to access the roof function. To open the dialog box for modifying the roof values, right-click the icon (for a description of the **Roof settings** dialog box see page 292).

By clicking the **As default** button in the dialog box, you can save the current values as the default for future roofs and projects. These values will then be used as standard when you draw in a roof, but can of course be changed in the dialog box for each roof.

6.10.13.2   Show/hide the roof structure

To the right of the icon is the icon, which you can show or hide the wood construction of the roof structure. This icon's effect is independent of i.e. you show

and hide the wood construction and roof areas separately.

If you look at the roof from above, you'll first see no modifications. Only if you view the roof from below will you see the rafters. Note that in Construction mode, you cannot edit the roof unless at least one of the two icons ▉ or ▉ is pressed. So this is a prerequisite to edit a roof or place a skylight in the roof ▉ (see page 334).

6.10.13.3   Defining the roof type

The vertical toolbar contains the ▉ icon. This is a multi-function button, which is identified as such by the black corner triangle at the bottom right. Clicking and moving the mouse into the view window while holding down the left mouse button, will display a selection of roof types. The roof types available include:

▉ Free roof shape

▉ Pent roof

▉ Gable roof

▉ Hip roof

▉ Partially hipped roof

▉ Mansard roof with gable

▉ Mansard hipped roof

▉ Barrel roof

Moving the mouse onto one of these options for the multi-function button, in other words, selecting that option, means that the corresponding roof type will be assigned to the button in the toolbar. Right-clicking the button will open a dialog box for the roof shape required. There is a difference between the free roof shape and the square shapes, in that the **Roof settings** dialog box will be opened instead of a dialog specific to the roof type.

6.10.13.4   Roof over all buildings check box ▉

In all dialog boxes for defining the roof, when you right-click the various buttons for the roof types and the dialog opens, there is the check box **Roof over all buildings** at the far bottom left.

Selecting this box will not only cover the walls, floors and ceilings of the building of which the roof is part, but also the walls, floors and ceilings of all other buildings,

285

under the same roof.

This is particularly useful if you are constructing several buildings with split-level floors and you want to enter the roof for one building to use that roof for another building as well. So if you are using a general roof, you will not normally want to define the roof shape using the input method , but using the input method .

Once the roof for both buildings has been entered, and the relevant settings have been made in the remainder of the dialog box for this common roof, select this box. After confirming with **OK**, all the walls, floors and ceilings of both buildings will be covered using this roof, just as if it were part of the other building (which might not actually even be a building as you may have only constructed it in order to simulate split-level floors).

6.10.13.5 Roof dialog box options

Given below are displays for the various dialog boxes for the various roof shapes.

 Pent roof options
 Gable roof options
 Hip roof options
 Partially hipped roof options
 Mansard roof with gable options
 Mansard hipped roof options
 Barrel roof options

6.10.13.5.1   Pent roof options
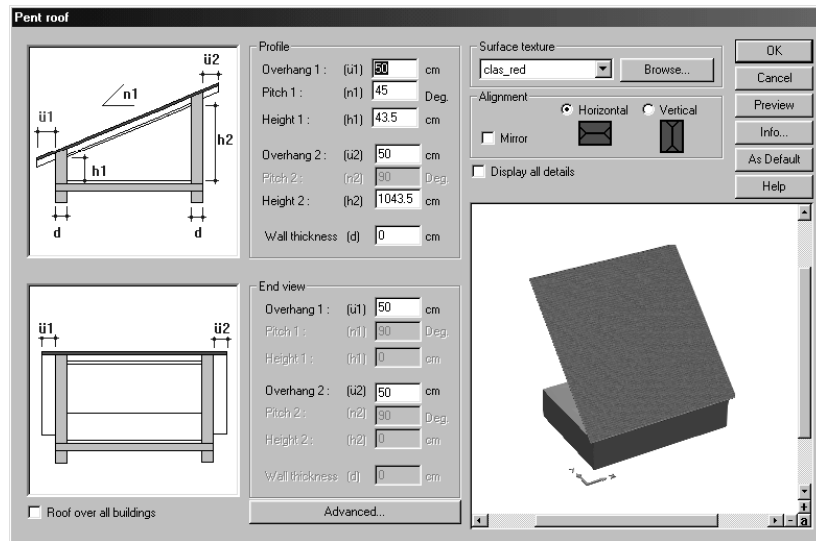
6.10.13.5.2   Gable roof options
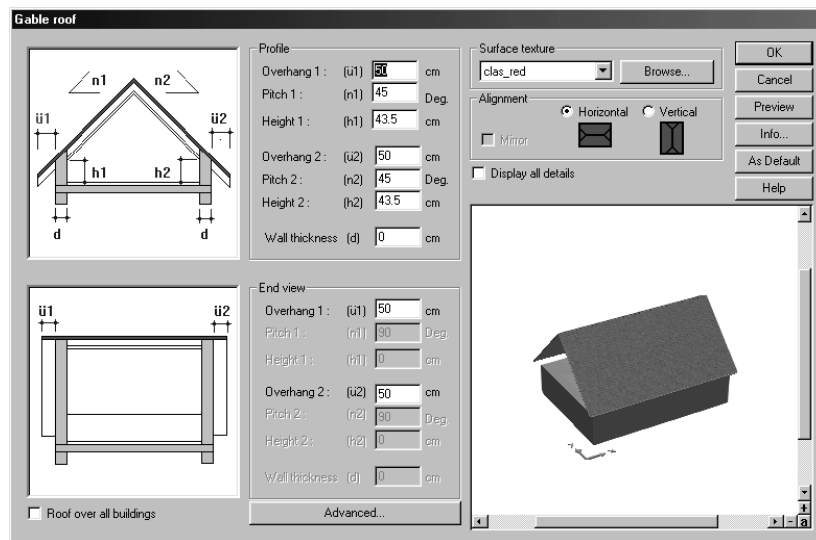
6.10.13.5.3 Hip roof options
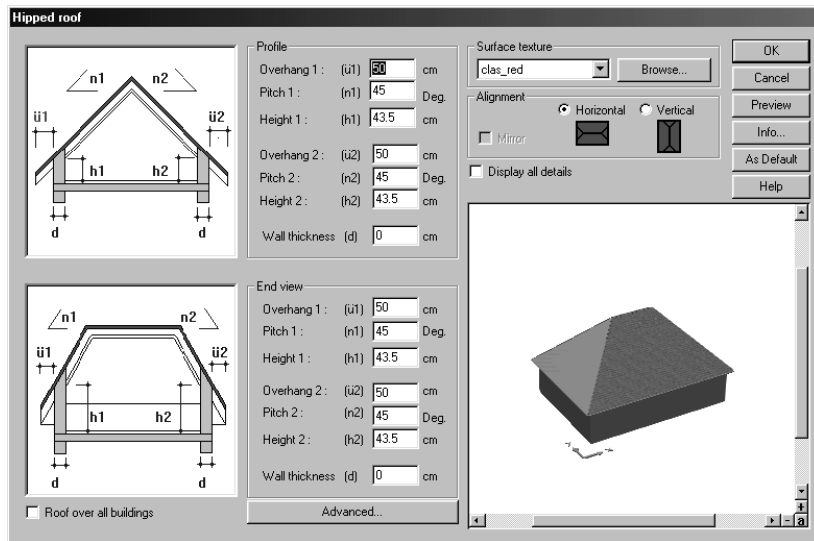
6.10.13.5.4 Partially hipped roof options
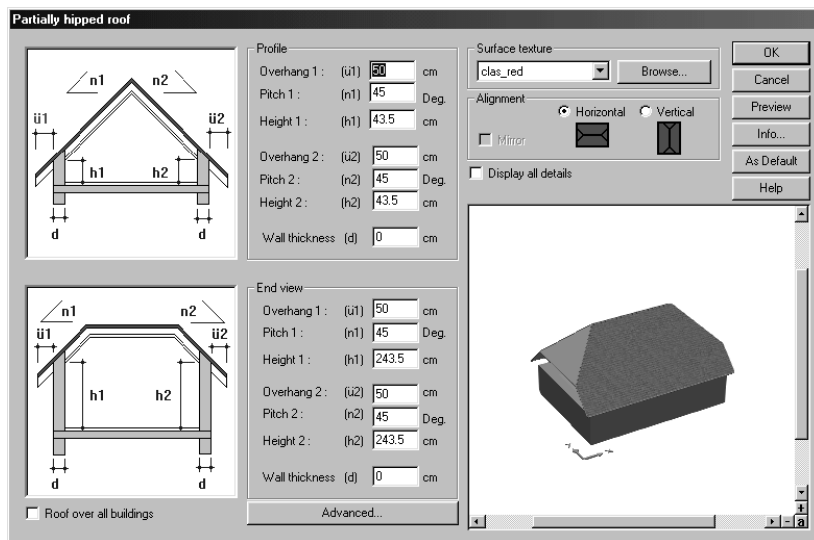
6.10.13.5.5   Mansard roof with gable options
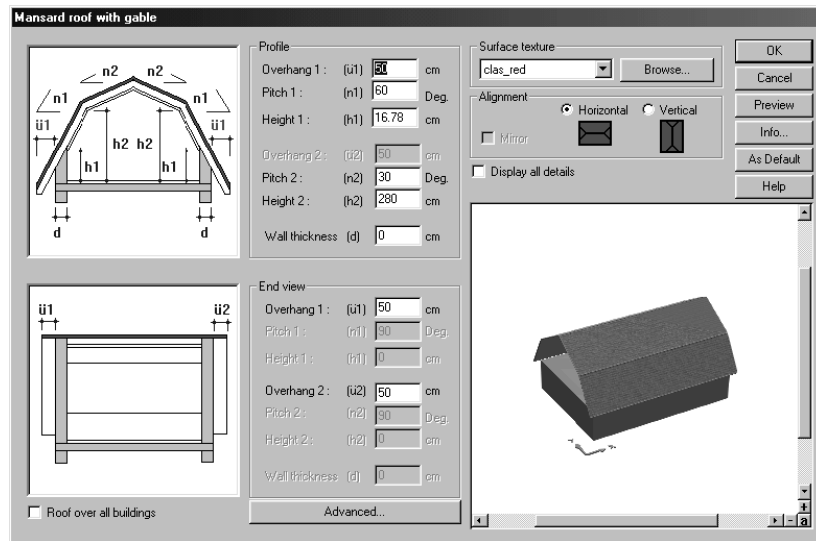
6.10.13.5.6   Mansard hipped roof options
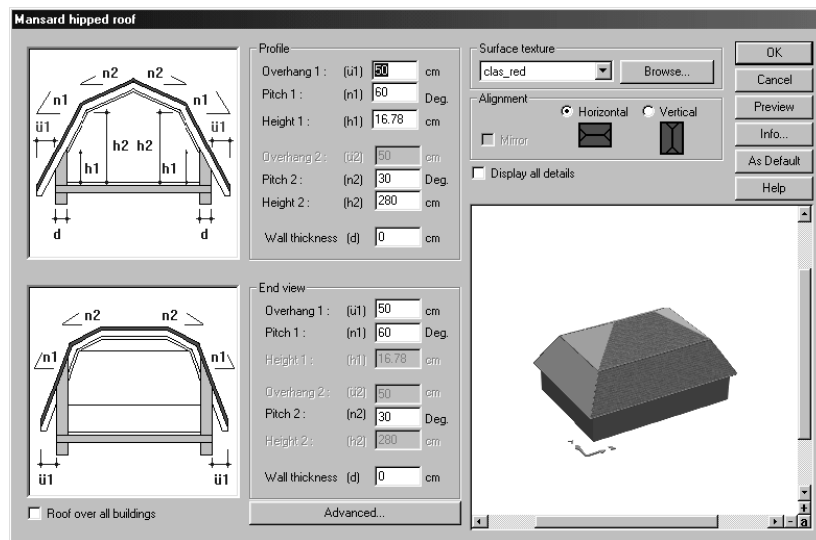
6.10.13.5.7 Barrel roof options
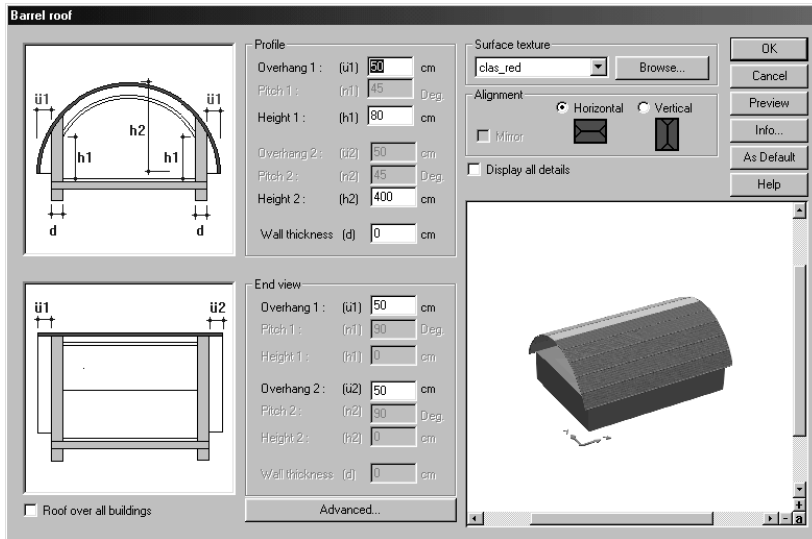
The dialogs for the square roof shapes are divided into four sections. **Profile**, **End view**, **Surface texture** and **Alignment**. There are diagrams available for the profile and end view sections, which allow you to determine the dimensions used. When you move into an input box, the corresponding dimension in the diagram will be shown in red. Left-clicking within the diagram on a different dimension selected in red will automatically switch to the relevant input box in the dialog.

Double-clicking the relevant dimension within the diagram will open up a dialog box, which allows you to enter the value directly.
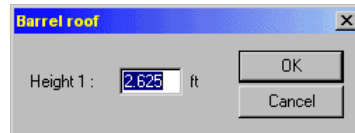
Only the necessary or possible dimensions for inputs are provided for any of the roofs. All boxes where the values cannot be used sensibly for the current type are shown in gray in the dialog, i.e. displayed as inactive.

Selecting the **Display all details** check box means that ArCon will include the textures for all roof surfaces in the preview window, and will also display the relevant guttering, eaves box, ridges, moldings and hips, according to your inputs.

290

All other settings for roofs or their details can be made using a function in the **Roof settings** dialog box, which is opened by clicking the **Advanced…** button. **Details** on the dialog box displayed are provided in the section entitled **Roof settings** dialog box. This dialog is different to the opened dialog only because it has an additional **Surfaces** tab, which includes selection options for textures and some boxes where you can input specifications already included in this dialog box.

The **Info** button takes you directly to the **Roof info** dialog box.

A description of the **Roof over all buildings** check box can be found on a separate help page 285.

6.10.13.6 Select roof input method

After you have clicked the icon in the left-hand vertical toolbar, ArCon will display a selection of options for adding the roof in a second vertical toolbar (How bar).

Note: Square/rectangular roofs only can be created using all the predefined roof shapes. Even if the red line follows the basic outline when entering the roof automatically (see below), the result will always be a square roof.

6.10.13.6.1 Entering a rectangular roof shape

This option for adding a roof can be used to enter a roof with a rectangular basic surface, regardless of the geometry of the basic outline. There are two points to be placed on the screen. These describe the diagonals. The basic surface of the roof is displayed using a *rubber band* after the first point on the screen has been defined. After the second click, the **Roof editor** dialog box is displayed for the free roof shape, or the relevant dialog box for the predefined roof construction.

6.10.13.6.2 Entering the roof automatically

The procedure for adding a roof automatically is as follows: After clicking the relevant icon, point the pointer at the outer wall edge you want to use as the roof surface outline. The outline shape of the roof is displayed on the screen as a dotted red line and when you click the left mouse button will display the **Roof editor** dialog box for the free roof shape or the relevant dialog box for the predefined roof construction.

6.10.13.6.3   Entering the roof shape as a polygon

 (Only applies to the free roof shape) The polygon shape to be entered allows you to create any shape of roof, in other words, a shape different to the existing outline of the wall. This input method is required if the shapes of the line for the eaves and the basic outline are different, for example, for bay windows, overhanging roof surfaces, for dormer windows, above terraces, etc.

To input the polygon, click the required corner points in sequence. You can close the input by pressing the **Esc** key or by clicking the starting point of the polygon again.

If a roof with the same shape already exists, ArCon will indicate this using a message and you can cancel the procedure.

6.10.13.7   Deleting roofs

You first select the roof by clicking (see page 189) with the left mouse button and then clicking the roof. The selected roof is marked in red in the display. By pressing the **Delete** key or selecting the menu **Edit – Delete** the roof will be deleted. You can delete all roofs with the menu **Edit – Delete all – Roofs**.

ArCon always selects the element under the mouse pointer and when multiple elements are under the mouse pointer, the smallest element is selected first. So you may find that instead of the roof, the room's entire floor is selected. You can continue to click in the same space as ArCon selects different elements under the mouse, until the roof is selected. You can then edit or delete the roof.

6.10.13.8   Roof options

Right-clicking the icon opens the **Roof settings** dialog box. The dialog box consists of five tabs, in which general values for the roof framing are set. You have the option of saving the current settings in this dialog box by clicking the **As default** button. The values will then be used for all new roofs.
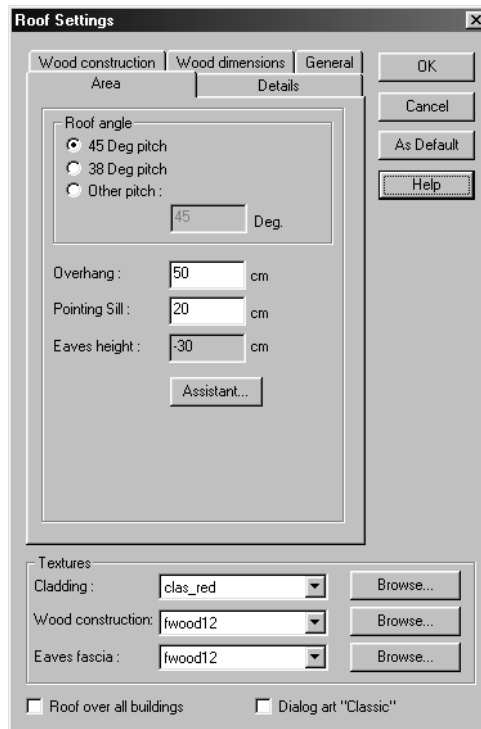
Different values for individual roofs are entered in the **Roof editor** dialog box (see page 307). You receive this dialog box when you place a roof or subsequently double-click a selected roof.

A description of the **Roof over all buildings** check box can be found on a separate help page 285.

6.10.13.9   Dialog art classic check box

If you activate this check box in the **Roof settings** dialog box, the dialog adapts to the appearance of older ArCon versions such as 4.1. Familiarize yourself with this selection, by referring to the original documentation if you have this earlier version.

6.10.13.10   Textures

This section is at the bottom of the dialog box, for all five pages. It consists of several

list boxes. If you want to select another texture for the roofing, the interior, the eaves, or the wood construction, click **Browse…** to open a dialog box where you can select a texture.

You can also change these textures in the **Roof editor**. The textures for the roofing and interior are can be changed in the **Surfaces** page. The textures for the eaves and the wood construction can be changed in the **General** page.

6.10.13.10.1 Cladding

Here you can select a texture for the top surface of the roof.

6.10.13.10.2 Wood construction

This is for selecting a texture for the wood construction, visible when the Roof surface is removed and the Wood construction is enabled.

6.10.13.10.3 Eaves fascia

The eaves in your project will be shown with the texture selected here.

6.10.13.10.4 Area tab
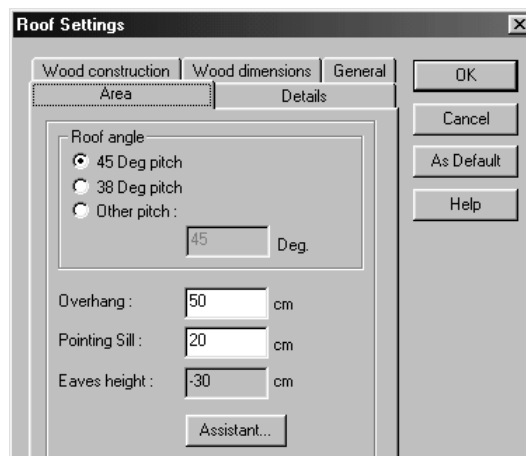
In this tab you define the values for **roof angle**, the **overhang** and the **Pointing sill**. The

Eaves height is calculated from the other specifications and is therefore grayed out.

In the **Roof angle** section you have three options for setting the roof pitch: **45 deg pitch**, **38 deg pitch** and **Other pitch**. With the option **Other pitch**, an input box below it opens, where you can specify the required inclination (between 1-179 degrees).

If you would like to define the **Gutter height** with additional support, you can use the **Assistant**. If you click the **Assistant** button, the following dialog box opens: The values for the height of the eaves are then automatically calculated by ArCon, but can be changed later on. The following dialog will be displayed if necessary.
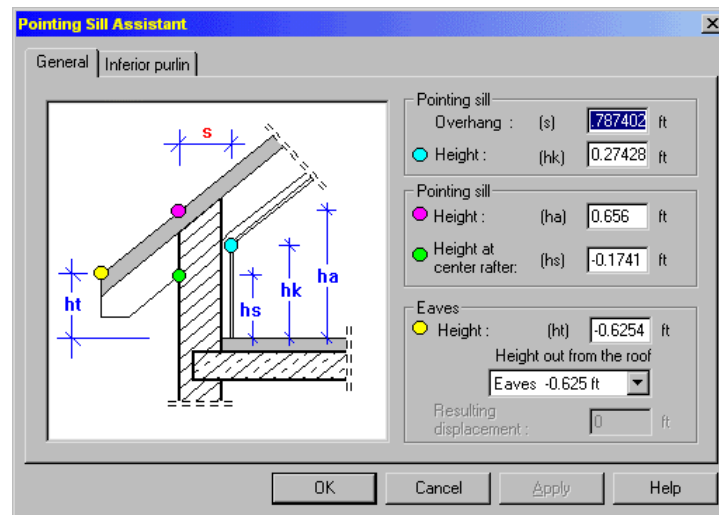
Confirming these inputs using **OK** will close the Sill Wizard and you can continue making other settings for your roof construction.

It is normally possible to use the **Area** tab in the dialog box for the **Roof editor**. Here you can set the plate height as well as your specifications for the gutter height with the aid of the plan. ArCon automatically calculates the values for the gutter height based on the linked fields. Acknowledge these values with **OK**. This dialog is then closed and you can continue to make further adjustments to your roof structure.

You can also change these settings in the **Area** tab in the **Roof editor** dialog box (see page 307) – the pitch of individual sides of the roof, the overhang, and gutter height can deviate from the default settings made here. You can also access the Threshold assistant from the **Surface** tab to make adjustments there.

6.10.13.10.5 Details page
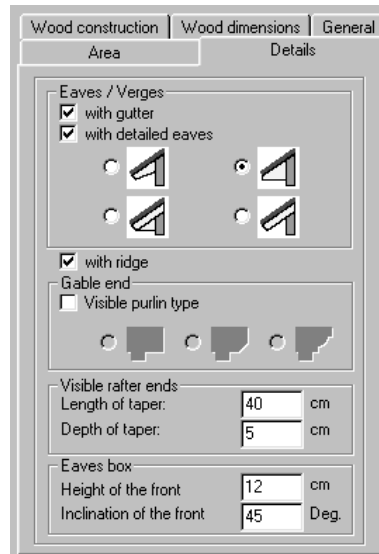
In this tab you specify additional details of the roof structure.

6.10.13.10.5.1 Gutters and eaves

With the **With gutter** check box you specify whether the roof will have gutters.

If you activate the **With detailed eaves** check box, you can display the roof edges in varying levels of detail, for example, with cornices. ArCon has four options for detailing the roof edges.

6.10.13.10.5.1.1 Standard view of the eaves

According to the standard view of the roof structure at the edges, the rafters are cut off vertically:
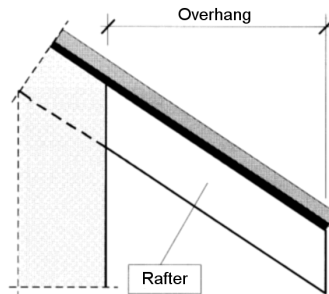
Frequently the roof edges, for formative or constructional reasons, are provided, for example, with soffits. For these detailed formations of the roof edges, the following options are available.

6.10.13.10.5.1.2 Detailed views of the eaves

Here the exposed rafters are tapered in the roof eaves.
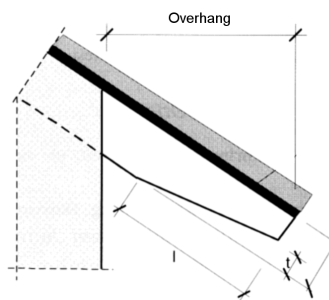
h defines the height of the rafter; **l** the length of the taper, and **t** the depth of the taper. The length and depth of the taper can be specified in the **Visible rafter ends** section (see page 300).

Standard cornice with vertically cut face and horizontal soffit perpendicular to the external wall.

Overhang
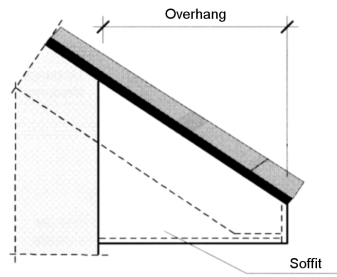
Soffit

Window box with diagonally cut face and horizontal soffit perpendicular to the external wall.

Overhang

Rafter

Gable wall
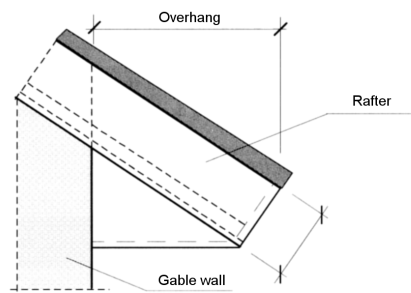
The diagonal cut of the rafters and matching soffit results in a roughly symmetrical roof edge around the roof.

The last option is like the previous in that the rafter is cut diagonally, but rather than the soffit running horizontally to the wall it runs parallel to the roof, to the external wall.

Overhang

Rafter

Gable wall
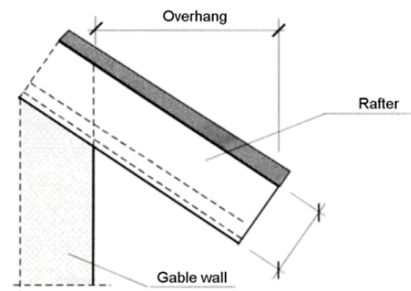
Note: For the last three designs the roof outline should run along the external walls

298

without varying in distance to the walls. The input method **Automatic roof** method is particularly well suited for this type of roof design. If it's not possible for your roof outline to link directly to the external walls, for example, with terraces, gaps between the lower base and the external wall result. These gaps can be closed, for example, with 3D objects.

Note that in the **Eaves box** section (see page 301) you can adjust the angle of inclination of the fascia (front surface) and the height.

6.10.13.10.5.2 Roof ridges

This section can be used to specify whether the ridges and hips are displayed. . To do this, select or deselect the **with ridge** check box.

This setting can be changed at any time on the **Details** tab of the **Roof editor** dialog box.

6.10.13.10.5.3 Visible purlins
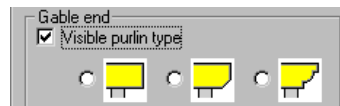
According to whether or not you activated the visible purlin switch, ArCon uses one of the following two versions regarding the roof structure:

In the first version (with the check box deactivated), the first rafter inside of the wall and the crossbeam sit up to the wall (Plan view).
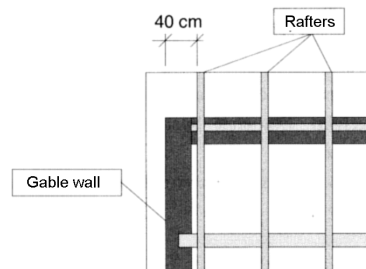
In the second version the first rafter sits at a distance from the edge and is situated freely outside of the wall (a so-called *free rafter*). The purlins are also led beyond the

299

edge of the wall. These are in most cases visible from the outside (*visible purlins*)
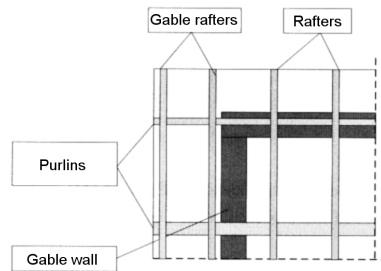
The criterion for switching between the first and second version is as follows: With roof eaves of more than 50cm a basic construction is required to accommodate the loads of the roof. Therefore, in this case the second version is automatically used.

If the roof eaves are equal to or less than 50cm in distance and the switch **Visible purlin type** is inactive, the first version is executed. The first rafter is set at a distance of 40 cm from the wall's exterior.

6.10.13.10.5.4 Tapered rafters

In this section you can enter into the input boxes the length and depth of a taper for exposed rafters in the eaves.
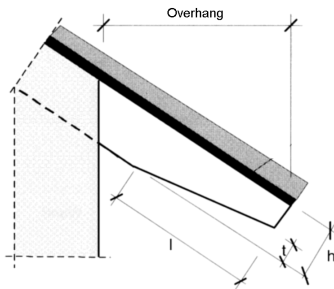
In this figure, the measure **I** defines the length of the taper and **T** defines the depth of the taper.

If you select the appropriate button for **With detailed eaves** (see page 296) you can see the effect in the preview.

6.10.13.10.5.5 Eaves box

In this section you can enter into the input boxes the specifications of the Eaves box. In the following figure, **h** is the **Height of the front** and **n** is the **Inclination of the front**.
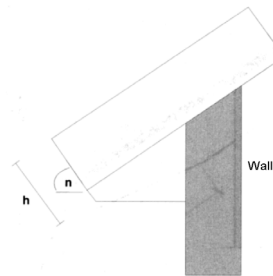
If you select the relevant view in **With detailed eaves** (of four eaves versions) (see page 296), you can see the effect in the preview.

6.10.13.10.6 Wood construction

The **Wood construction** page consists of two sections: In the upper section you can specify details of what should be used for the wood construction. In the lower section you can set certain distances to override the values defined by ArCon during the automatic generation of the roof.

6.10.13.10.6.1 Wood construction details

In this section of the page you set controls on the wood construction, including the details you'd like to use as default values for the wood construction. The following figures show the details in a roof structure with their names.
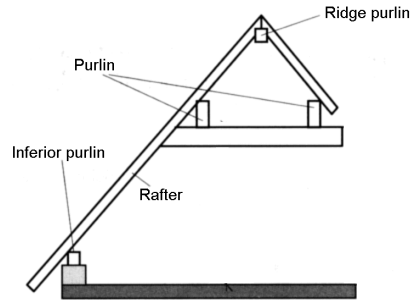
For the roof structure, rafters and plates are created. These form the wood construction typical in a roof structure. Individual plates and rafters carry special names which are explained in the following two figures.
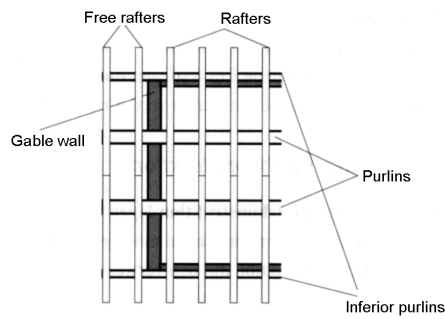
If you activate the check boxes for different constructional elements in this section, those elements will be visible in your roof structure.
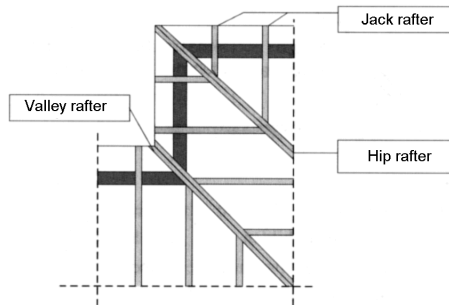
303

6.10.13.10.6.2 Spacing

The **Max. Rafter spacing** indicates the maximum distance between individual rafters.

In the field **Spacing to the first rafter** you can specify where the first rafter sits.

Finally, you can define the **Maximum overhang for the roof cladding**. The upper perlins are automatically lengthened in order to increase the roof's eaves. If the eaves are larger than the entered value, additional rafters are automatically added (for structural reasons).

6.10.13.10.7 Wood dimensions

On this tab you can specify the size of the individual elements ArCon uses in automatically generating the roof structure. You can modify the standard values according to your needs.

You have here the option to indicate for each type element used in the roof structure,

the width and thickness. The individual element types are shown in the following plan:
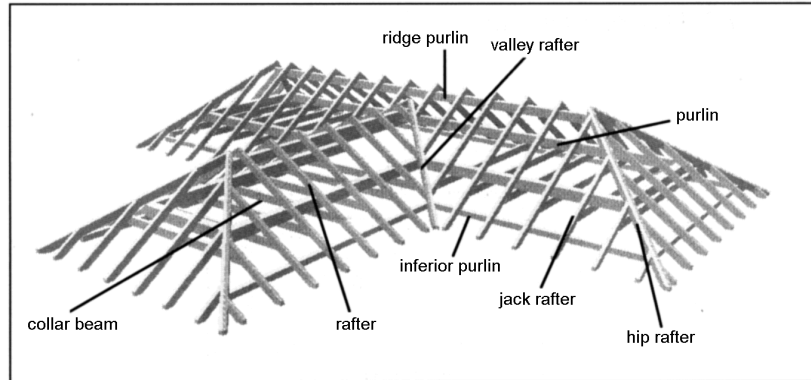
Note that when specifying values for these different elements, only approximate values are used, with your specific inputs being adjusted to keep the dimensions and representation practical.

The goal here is to aid you with a practical representation of the wood construction in the roof framing with the most accurate general impression possible.

6.10.13.10.8 General tab

6.10.13.10.9 Structure heights

In the **Construction** of the roof system, there are the constructional elements, for example, rafters as well as the roof's subconstruction, for example, slats, lining.

The **Cladding** includes everything that is appropriate or necessary for framework, insulation, slats, and roof pans over the entire roof structure. In the **Roof editor** dialog box (see page 307) on the **General** tab, you can change these values later.
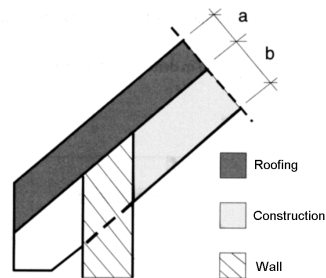
a = Roofing (framework, insulation, roof pan)

b = Construction (rafter thickness, framework, gypsum wallboard)

6.10.13.10.10   Roof gutter

Here you can assign a default value for the gutter diameter. You can modify this value later on the **General** page of the **Roof editor** dialog box (see page 307).

6.10.13.10.11   Transparent interior cladding

Here you can set the roof to be partially transparent, for example, glass roofs for conservatories or greenhouses can be created. With the help of the textures you specify the color and the degree of the hue. This adjustment can be modified later in the **General** page in the **Roof editor** dialog box (see page 307).

If you want to apply the transparent textures using the mouse and the texture catalog, you must press the **Ctrl** key when selecting the roof so that the transparent areas are also considered with the texturing.

6.10.13.10.12   Restrict roof height

This check box limits the total height of the roof. If you select the switch, ArCon cuts

the roof off above a certain height. You can define this height in the input box **Restrict to**. It can be modified later in the **General** page of the **Roof editor** dialog box (see page 307).

The following figure shows exactly what you should enter into the **Restrict to** input box.

h=height
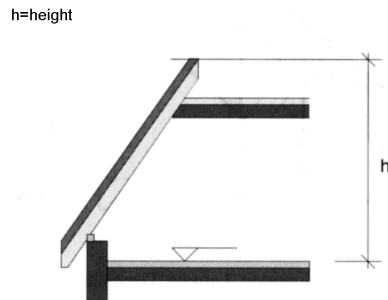
You can use this function of ArCon+ to model roofs with flat roof termination, for example, for roof gardens, roofs with domes etc. You can also achieve some special effects by adding a second roof on top of a cut-off roof.

6.10.13.11 Roof editor

You open the **Roof editor** dialog box after you input the final point when you're placing a new roof (see page 284) or if you select the � icon (see page 284) or ▶ and double-click a selected roof (both apply only to the free roof shape).
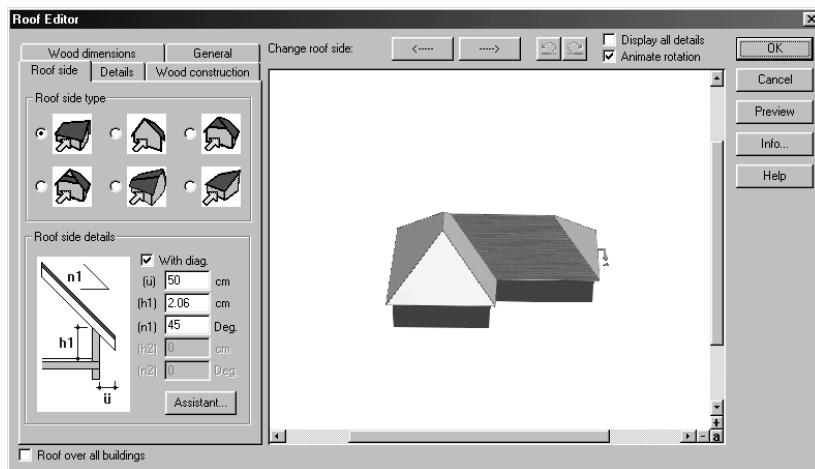
This dialog box includes five tabs at the top left: **Roof side type**, **Details**, **Wood construction**, **Wood dimensions** and **General**. These tabs (with the exception of the **Roof side type** tab) are largely identical to the tabs of the same name in the **Roof settings** dialog box, which is opened by right-clicking the ▉ icon.

To switch between the tabs, click the tab name at the top of the display. That page's contents come to the front in the dialog box. With the help of the **Roof editor**, the complete roof structure can be modified (when placing a roof, or anytime after). To adjust a roof, enter the desired values for an individual roof area, deviating from the default roof settings.

If you click the **Preview** button, the effects of your changes can be seen immediately in the preview window. Even if you have placed dormers, they are included and displayed in the preview window. Also note that some details are not shown by default, to keep the preview window from becoming slow. You can switch on the display of all elements by clicking the **Display all details** check box.

The **Undo/Redo** function can be used to undo or restore all the changes made in the Roof Editor. This provides you with *risk-free* working and also allows you to simply try out all the settings.

A description of the **Roof over all buildings** check box can be found on a separate help page 285.

6.10.13.11.1 Roof info

Clicking the **Info...** button in the **Roof editor** dialog box or in the dialog boxes for

predefined roof shapes will open an **Info** dialog box. If you are in the **Roof editor** dialog box you can click the **Info** button to open the **Roof info** dialog box. This dialog displays all area and length dimensions of the wood construction of the current roof, broken down separately into the main roof and the dormers. Using these values, ArCon can estimate the costs of the roof.

This dialog only shows calculated values. Inputs are not possible in the **Roof info** dialog box.

You can find calculations in this dialog, and use them to derive additional details.

6.10.13.11.1.1 Timber list (approximate)

In ArCon+ you can output a rough list of timber used in the roof, both as an on-screen dialog box and as a text file, saved on your hard disk. From the **Roof info** dialog box, click the **Timber list** button and a dialog box appears listing all timber used in the roof and their specifications.

309

Pos.	Name	Number	Width	Depth	Separate len...	Combined len...	Surface area	Volume		OK
1	Rafter/Jack rafter	20	8.0 cm	18.0 cm	7.45 m	149.00 m	78.056 m2	2.146 m3		
2	Rafter/Jack rafter	1	8.0 cm	18.0 cm	7.25 m	7.25 m	3.799 m2	0.104 m3		Save...
3	Rafter/Jack rafter	2	8.0 cm	18.0 cm	6.95 m	13.90 m	7.286 m2	0.200 m3		
4	Rafter/Jack rafter	2	8.0 cm	18.0 cm	6.85 m	13.70 m	7.182 m2	0.197 m3		Cancel
5	Rafter/Jack rafter	2	8.0 cm	18.0 cm	6.80 m	13.60 m	7.130 m2	0.196 m3		
6	Rafter/Jack rafter	1	8.0 cm	18.0 cm	6.35 m	6.35 m	3.331 m2	0.091 m3		Help
7	Rafter/Jack rafter	1	8.0 cm	18.0 cm	6.10 m	6.10 m	3.201 m2	0.088 m3		
8	Rafter/Jack rafter	2	8.0 cm	18.0 cm	5.80 m	11.60 m	6.090 m2	0.167 m3		
9	Rafter/Jack rafter	3	8.0 cm	18.0 cm	5.70 m	17.10 m	8.978 m2	0.246 m3		
10	Rafter/Jack rafter	1	8.0 cm	18.0 cm	5.65 m	5.65 m	2.967 m2	0.081 m3		
11	Rafter/Jack rafter	1	8.0 cm	18.0 cm	5.20 m	5.20 m	2.733 m2	0.075 m3		
12	Rafter/Jack rafter	1	8.0 cm	18.0 cm	5.00 m	5.00 m	2.629 m2	0.072 m3		
13	Rafter/Jack rafter	2	8.0 cm	18.0 cm	4.65 m	9.30 m	4.894 m2	0.134 m3		
14	Rafter/Jack rafter	2	8.0 cm	18.0 cm	4.60 m	9.20 m	4.842 m2	0.132 m3		
15	Rafter/Jack rafter	2	8.0 cm	18.0 cm	4.55 m	9.10 m	4.790 m2	0.131 m3		
16	Rafter/Jack rafter	1	8.0 cm	18.0 cm	4.10 m	4.10 m	2.161 m2	0.059 m3		
17	Rafter/Jack rafter	1	8.0 cm	18.0 cm	3.85 m	3.85 m	2.031 m2	0.055 m3		
18	Rafter/Jack rafter	1	8.0 cm	18.0 cm	3.55 m	3.55 m	1.875 m2	0.051 m3		
19	Rafter/Jack rafter	1	8.0 cm	18.0 cm	3.50 m	3.50 m	1.849 m2	0.050 m3		
20	Rafter/Jack rafter	3	8.0 cm	18.0 cm	3.45 m	10.35 m	5.468 m2	0.149 m3		
21	Rafter/Jack rafter	1	8.0 cm	18.0 cm	3.40 m	3.40 m	1.797 m2	0.049 m3		
22	Rafter/Jack rafter	1	8.0 cm	18.0 cm	2.95 m	2.95 m	1.563 m2	0.042 m3		
23	Rafter/Jack rafter	1	8.0 cm	18.0 cm	2.75 m	2.75 m	1.459 m2	0.040 m3		
24	Rafter/Jack rafter	1	8.0 cm	18.0 cm	2.40 m	2.40 m	1.277 m2	0.035 m3		
25	Rafter/Jack rafter	3	8.0 cm	18.0 cm	2.35 m	7.05 m	3.752 m2	0.102 m3		
26	Rafter/Jack rafter	2	8.0 cm	18.0 cm	2.30 m	4.60 m	2.450 m2	0.066 m3		
27	Rafter/Jack rafter	1	8.0 cm	18.0 cm	1.80 m	1.80 m	0.965 m2	0.026 m3		

ArCon+ processes the calculation of the timber list as follows:

All length dimensions are rounded to 5 cm increments.

Timber of the same types that, after rounding, have the same lengths are summarized.

In the Timber list, the timber are separated according to type, with their lengths, widths and thickness, as well as surface areas and cubic dimensions are displayed both individually and subtotaled.

By clicking the individual table headings in the timber list, you can sort the table. This sorting is done in each case for groups of homogeneous timber. If you click **Save...** a standard Windows dialog box appears where you can specify a filename and location to save this information in a text file.

The contents of the saved text file are in principle identical to the contents of the list as shown on screen.

6.10.13.11.2 Editing individual roof areas

In order to process an individual area of the roof, you must first select the desired area. To do this, locate the **Change roof side** section at the top of the **Roof editor** dialog box (over the preview window). This section also has two arrow buttons.

With these arrows you can rotate the roof left or right (depending on which arrow you click), which in turn rotates the roof in the preview window and switches the active side.

310

If you activate the **Animate rotation** check box, the arrow buttons cause an independent rotation of the roof by 90 degrees in the respective direction.

If you uncheck **Display all details**, you can detect the current roof area by the fact that in the preview window it is colored green and the appropriate roof area has texture. If you activate the **Display all details** check box, ArCon shows textures on all roof areas in the preview window, as well as gutters, roof ridges, rafters, and other elements you input, accordingly.

6.10.13.11.3 Roof side tab
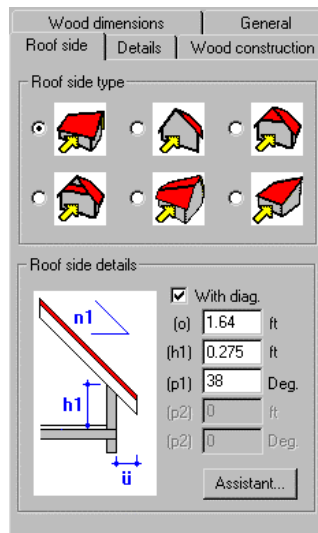
This page can be used to modify the settings for the selected roof, which have been specified as general settings for all new roofs from the **Surfaces** page in the **Roof settings** dialog box.

6.10.13.11.3.1 Roof side types section

In this section, ArCon suggests - unlike with the default settings - six option boxes with roof side types, which can be selected simply by clicking the mouse.

6.10.13.11.3.2 Simple roof side section

This input box can be used to change the values required for the roof side type you have selected. If you wish you can use a diagram to help you in assigning the dimensions.

311

6.10.13.11.4 Details/wood construction/wood dimensions

In the pages **Details**, **Wood construction**, and **Wood dimensions** you can make the same adjustments you made in the pages of the same names in the **Roof settings** dialog box. The explanation for these pages can be found on page 292.

6.10.13.11.5 General

In this page you can enter the same specifications for the selected roof as the defaults you set in the **General** page in the **Roof settings** dialog box. The explanations for this page can be found on page 292.

There is an additional function on this **General** page, however. You can move the entire roof up or down by a specified measure.

6.10.13.11.6 Raise roof from building

Enter into this field the amount you'd like the roof raised. When you click the **Apply** button the roof is raised by the given number, and the preview display is updated.

When you raise a roof by a value larger than zero, the gutters are raised the same distance as well. The height deviation in the attic starts, for example, not at the edge of the floor, but higher up. With values less than zero, the gutter is dropped accordingly. Here it can be that the roof already begins in the lower floor, which already indicates

312

that rooms in this floor deviate in their height.

The following figure shows in sequence: the roof in the starting situation, the roof raised with a value > 0, and the roof shifted with a value < 0.
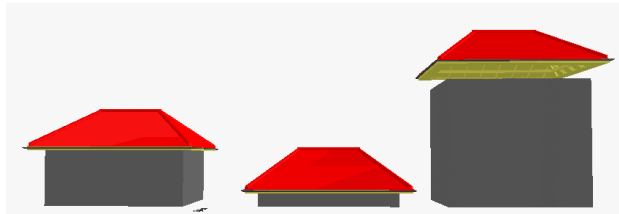
6.10.13.11.7 Textures

In these list boxes the textures for the **Eaves** and the **Cladding** can be entered. With views that are not switched on, the appropriate list box is grayed out. The selection of textures is done the same way as on the **Surfaces** page, which is described above.

6.10.13.12   Interior roof texture

If you're in Construction mode and **Roof surface on/off** is activated, you can edit the interior roof texture by selecting an area then double-clicking it. Note that the roof display must be switched on with (see page 284) for you to be able to select it.
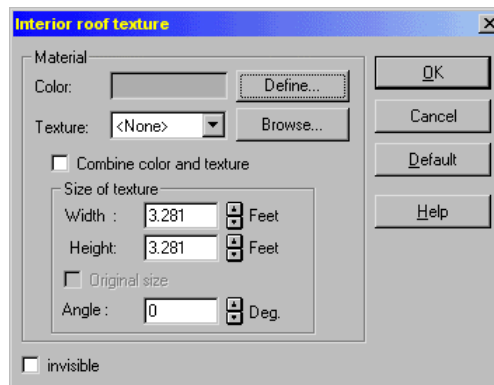
The dialog box that appears consists of the **Material** section where you can change the color and texture of this area. You can also check the **Invisible** box, with which you can specify whether the roof lining is to be shown at all. In the external area of large roof

313

plans, setting the lining to invisible makes special sense since you can then see the wood construction of the roof.

6.10.14 Dormers

The dormer function lets you build different types of dormers into existing roofs. Dormers are distinguished by the fact that their walls and sides are completely integrated into the roof. Dormers differ from, for example, oriels.

In ArCon, you can create a flat dormer, a pitched dormer and a triangular dormer. In ArCon+, you have an additional five types of dormer available to you.

When placing a dormer, both its walls and the dormer roof are created automatically. The wood construction of the roof changes as necessary: where the dormer is placed the roof rafters are removed. But the rafters for the dormer are added in automatically.
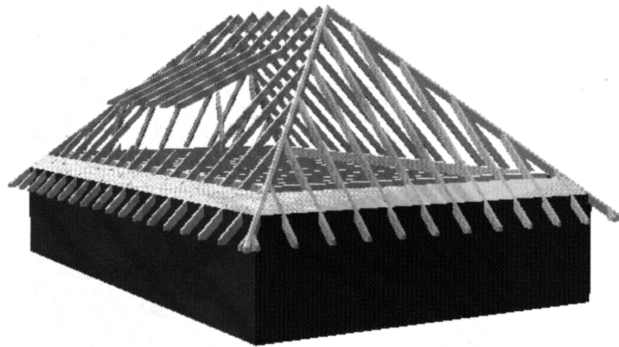
A dormer is always built into a floor. You can determine whether the dormer is to go up to the ceiling of the floor or not. In the first case the wood construction of the dormer is established in such a way that it is put at the height of the ceiling on the wood construction of the roof.
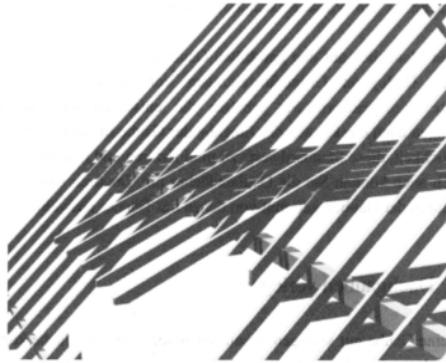
In the second case the dormer is drawn lower in the roof so the dormer changes into the normal roof area of the roof.
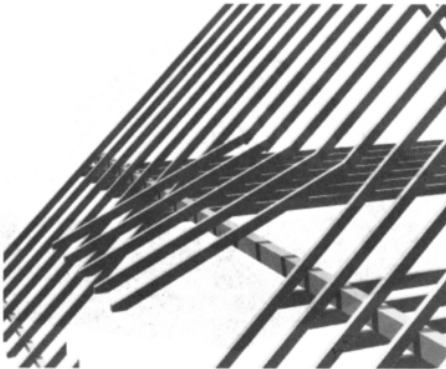
6.10.14.1   Selecting a type of dormer

In the vertical toolbar you'll find the �icon for the dormer function. This icon is a multi-function icon.

Right-clicking the dormer icon will open a dialog box where you can make adjustments to your dormer and optionally save them as the default setting for future dormers. You'll also get this dialog box after setting a dormer into a roof. In this case, you have the option to modify and adapt these default values.

Finally, you can assign textures to the dormer roof. These textures can be different from the textures used in the roof.

315

6.10.14.2   Placing dormers

You can place a dormer into your project only if you've already designed a roof. Roofs and dormers are related in this way to each other. Specifically: When placing a dormer one must always detect which area in the roof is available and how the orientation of the dormer affects this area. When placing the dormer it is automatically guaranteed that the front edge of the dormer is always positioned parallel to the edges of the roof.

All dormers input with the *free input* method, where you can use guidelines or walls, in order to snap the dormer on them. Changing the input mode with the second vertical toolbar (*how* bar) is not possible as there is only one input method.

6.10.14.2.1   The placement

Dormers are positioned – similar to stairs – with two or three mouse clicks (depending upon the type of dormer). The pointer is shown in the display with an outline of the selected dormer type. Relevant sizes during the input of dormers are the width and the depth. With your first mouse click you determine the position of the dormer with the second click you set of the dormer's front edge. The depth is calculated automatically.
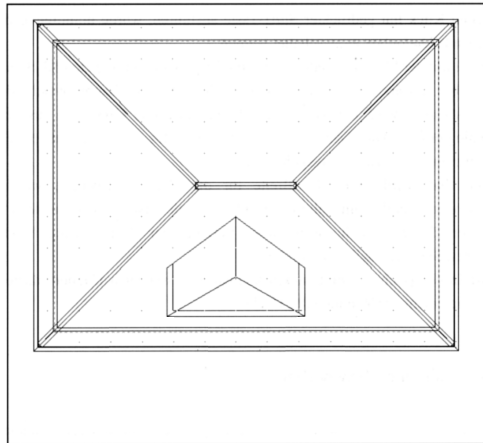
If the dormer does not fit in the roof, a broken outline of the dormer is displayed. This is simply a reminder that you must adapt the size of the dormer to the roof. ArCon permits you to place an extra large dormer in a small roof space but in practice this makes little sense.

After your second (or third) mouse click, the dialog box for the selected dormer opens.

This contains both the default values and the values derived from your direct input, for example, the width.

You can now modify the default values if you so choose. As a rule, you'll probably want to change the height (h) as well as the angle of inclination according to the width and placement. All other values of the dormer, for example, the depth result directly from the specifications in this dialog box. They are automatically calculated and displayed.

6.10.14.2.2 Tips for inputting dormers

Like with other elements in ArCon, you have the ability when placing dormers of accelerating the input.

If you click the mouse button while pressing the **Shift** key, the next click is not required. Specifically, with a dormer, which is placed with three mouse-clicks, by pressing the **Shift** key at the same time you make your second click, the default values are used instead of requiring a third click, and the dialog box to adjust the settings opens immediately.

If you click the mouse button while pressing the **Ctrl** key, the dialog box is suppressed. That is, if you're setting a dormer that is placed with two mouse clicks, and you press the **Ctrl** key while clicking the mouse button for the second time, the dialog box does not appear. The dormer will be inserted using the defined default values for this type of dormer.

In this case the default width for the dormer is used as it was defined in the dialog box. If you make all mouse clicks you'll set the width yourself in the process. If you cut the input short and rely on default values, you can at any time open the dialog box and adjust the width.

Note: Dormer windows can still be used with the **Barrel roof** type, but they will not follow the rounded shape of the roof.

6.10.14.3 Editing dormers

You can always modify the values of a dormer after you've inserted it into a roof. To do this, first select the dormer then double-click it. The **Dormer** dialog box for the selected type is displayed (it's the same dialog you open when you first place a dormer, or when you right-click the dormer icon in the vertical toolbar).

Here in this dialog box you can change the values. If you flatten, for example, the inclination of the dormer, the depth of the dormer is accordingly made shorter.

317

During all subsequent dormer modifications, ArCon calculates the entire roof again.

6.10.14.4   Deleting dormers

To delete a dormer, you must first select it by clicking the selection icon ![cursor] (see page 189) and then left-click the desired dormer. The selected dormer is marked in red in the display.

Note that if you switched off the roof area display with the ![icon] icon the dormer won't be visible (it is after all part of the roof now). Make sure the roof areas are visible before you begin.

With the dormer selected, press the **Delete** key to delete the selected dormer. You can also delete the selected dormer with the menu **Edit – Delete**. If you want to delete all dormers, select the menu **Edit – Delete all – Dormers**.

6.10.14.5   Dormer options
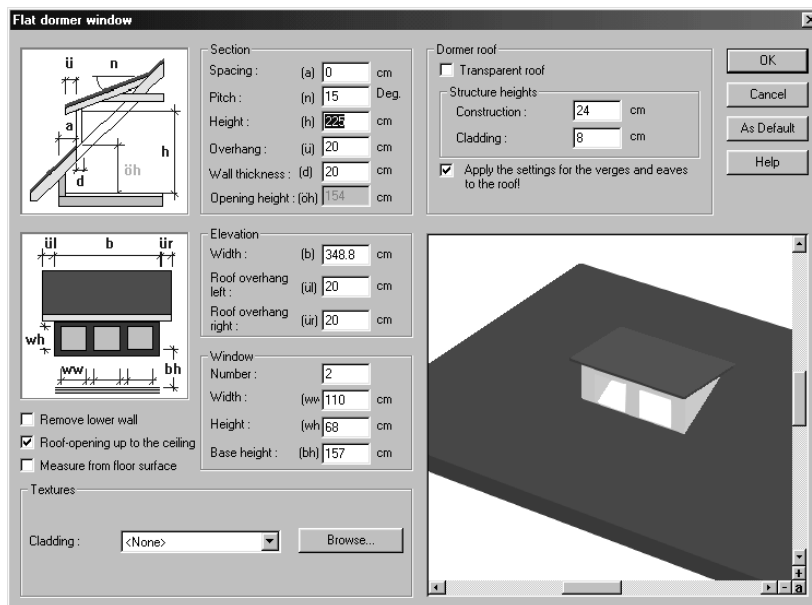
You open the **Dormer** dialog box by either right-clicking the icon in the vertical toolbar, or double-clicking an existing and selected dormer. The dialog is also displayed

318

when you're placing a new dormer.

The dialog box is essentially the same for all dormer types. The main difference is in the preview window. The dialog box, which you receive when placing the dormer or when double-clicking an existing dormer, shows the dormer as part of the roof area. The dialog box for standard adjustments of the type of dormer has no reference to the roof (since there is no roof yet to relate it to).

6.10.14.5.1 Similarities between dormer dialog boxes

All **Dormer** dialog boxes display the appropriate type of dormer in the left upper corner as either a cut plan or a frontal view. Using these drawings the different dimension fields are explained, and you can use them to adjust the desired values.

If you click the mouse button in one of the input boxes, the corresponding dimension indicator in the plan is highlighted in red. If you modify, for example, the width, the **W** is marked in red. With more complex dormer types, you can use the outline to select the field to change; both the letter insignia and the input box are highlighted simultaneously. The abbreviations used in the plan are also listed next to each input box.

The **Section**, **Elevation**, **Window**, **Dormer roof**, and **Textures** sections are available in all **Dormer** dialog boxes with exception of the roof terrace. The dialog boxes differ only with regard to the dimensions and specifications that can be assigned. There are also small differences regarding the options that are enabled with check boxes.

Note that with each modification you make in this dialog box, it does not become visible in the preview window until you move into another input box.

6.10.14.5.2 Section
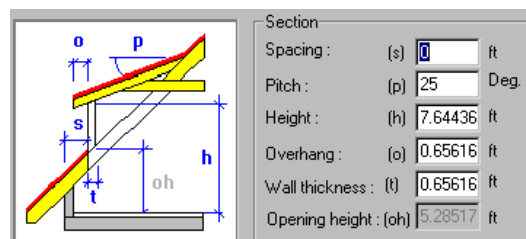
This section corresponds to the section plan of the dormer displayed to the left. The number of input boxes depends on the type of dormer. ArCon offers to you only those

319

dimensions that are required for the construction of each particular dormer type. If you click in one of the input boxes, the corresponding measure in the plan is highlighted in red.

The opening height cannot be entered directly, since this results from the other values. The box is always grayed out.

6.10.14.5.3   Elevation
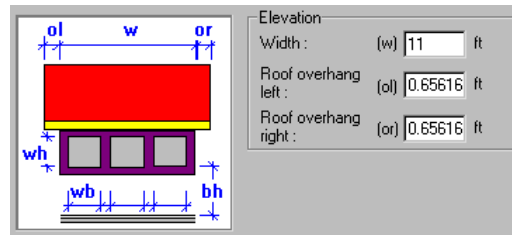
This section corresponds to the front elevation of the dormer shown to the left. The number of input boxes depends on the type of dormer. ArCon offers to you only those dimensions that are required for the construction of each particular dormer type. If you click in one of the input boxes, the corresponding dimension in the plan is highlighted in red.

6.10.14.5.4   Window
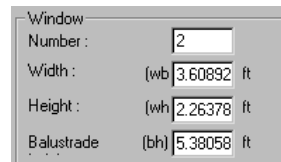
When placing a dormer, ArCon creates both the dormer side wall and the dormer front wall. In the dormer front wall windows are placed automatically, based on the freely definable windows. This placement is basically a type specification, which you can modify to suit your own requirements. Specifically, you have the option when placing the dormer to change the number of windows as well as their **height** and **width** including the sill height. If the windows – depending upon the type of dormer and its size – won't fit in the dormer, based on their width and height, ArCon alerts you so you can correct the error.

320

Since the dormer front wall behaves like other normal walls (with the difference that it is not movable) you can later edit these windows as regular windows. Specifically, the dormer windows can be subsequently edited and changed like other windows. To do this you must select the desired window and then double-click it. The appropriate dialog box will open. You can also delete dormer windows.

Note that you can set the number, height and width of dormer windows in the **Dormer** dialog box only when placing the dormer. If you should open the **Dormer** dialog box (by double-clicking it) after placing the dormer, the **Windows** section is no longer available.

6.10.14.5.5   Dormer roof
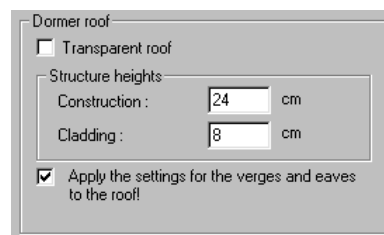
In this section you can determine further details for the roof structure or the view of the roof in ArCon.

6.10.14.5.5.1 Transparent roof

With this check box you can – just like with roofs – set the roofing of the dormer to be transparent. This way you can simulate, for example, glass roofs for gardens etc. With textures you can control the color and hue of the transparent roof.

6.10.14.5.5.2 Structural heights

These two specifications correspond with the same entries in the **Roof settings** dialog box (see page 292) or in the **General** page of the **Roof editor** dialog box (see page 307).

With these fields you can specify the total mass of the roof system's constructional elements, for example, the rafters as well as the roof's subconstruction, for example, slats, lining.

321

6.10.14.5.5.3 Apply the settings for the verges and eaves to the roof

If this check box is active, the attributes of the dormer where it meets the roof, as well as its lower edge (where you'll typically have a gutter), are taken over by the roof. If the switch is not active, the dormer and roof can have different properties. By default, the switch is enabled (simply to make your work easier).

6.10.14.5.6   Additional options

The options described here vary according to the type of dormer. In general, the following check boxes are available.

☐ Remove lower wall
☑ Roof-opening up to the ceiling
☐ Measure from floor surface
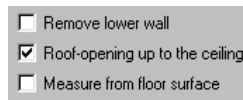
6.10.14.5.6.1 Remove lower wall

If you activate this check box, the front edge of the dormer is put directly on the roof. This can spread and lead to the condition that large dormers present too much of a load for the roof structure.

In this case you would deactivate the check box for structural reasons. This has the effect that the front part of the dormer, i.e. the walls are pulled down to the floor of the attic.

6.10.14.5.6.2 Roof opening up to the ceiling

With this check box you specify that the dormer opening goes up to the ceiling of the floor. If you deactivate the check box, the dormer opening is drawn up to the part where the roof of the dormer merges with the normal roof area. However, with a ceiling the room beyond the dormer is no longer visible on the inside.

In general you should activate this check box in order to minimize wasted space between the dormer and roof lining.

6.10.14.5.7 Textures
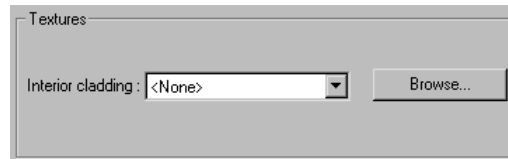
In this section you can select a texture for the roof of the dormer. The texture for the dormer can be selected separately from those for the roof; they are completely independent.

6.10.14.6 Flat dormer options
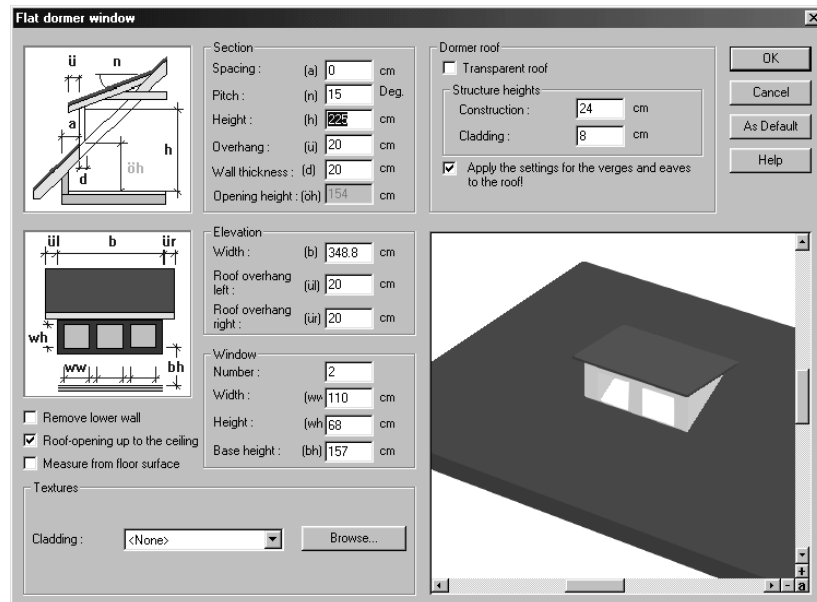
The flat dormer has all the options and input modes, which were previously described, in the **Dormer** dialog box section.

6.10.14.7   Pitched dormer options
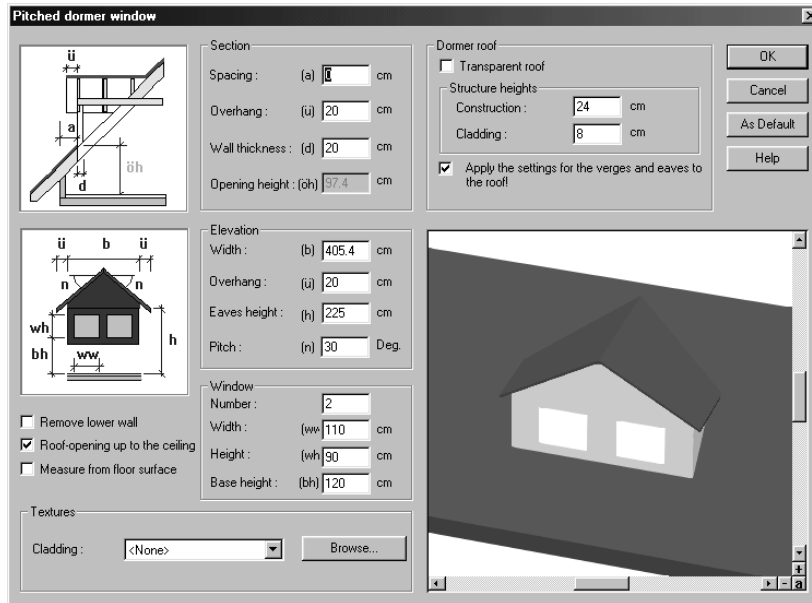
The dialog box for the pitched dormer differs from the standard **Dormer** dialog box (see page 318) in the following sections:

6.10.14.7.1   Section

For a pitched dormer, you cannot specify the front angle or the height.

6.10.14.7.2   Elevation

For a pitched dormer you can specify the eaves height and the pitch.

6.10.14.8   Triangular dormer options
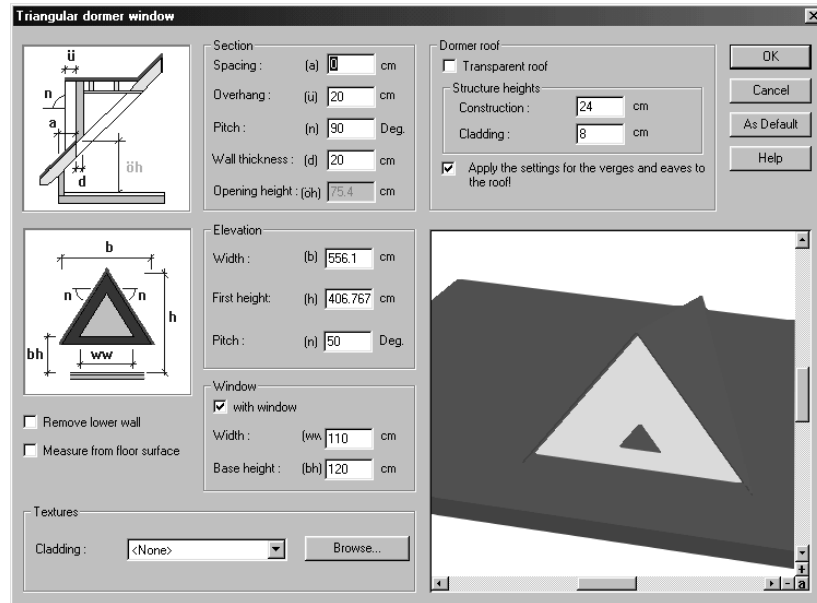
The dialog box for the triangular dormer differs from the standard dormer dialog box (see page 318) in the following sections:

6.10.14.8.1   Section

For triangular dormers no height can be specified.

6.10.14.8.2   Elevation

For the triangular dormer the eaves height and the pitch can be specified.

6.10.14.8.3   Options

For the triangular dormer the opening cannot be limited to the ceiling. It always reaches up to the roof. The **Roof opening up to the ceiling** check box is therefore absent.
Since the opening cannot be limited to the ceiling, this also means that the same wood construction is used.

6.10.14.8.4   Tips for setting triangle dormers

If you enter an angle in the **Section** that is less than 90 degrees, the dormer roof leans forward.
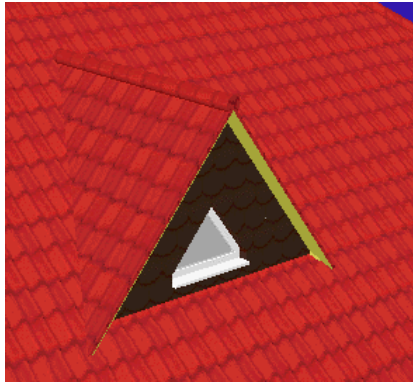
6.10.14.9   Dormers in ArCon+

Besides the three dormer types flat dormer, pitched dormer and triangular dormer ArCon+ lets you place five additional dormer types. These additional dormers, like the other three dormer types, can be selected from the multi-function icon for dormers in the vertical toolbar.

These additional dormers can be placed and edited like the three standard dormers, with the exception of the roof terrace. With this type of *dormer* you can create special modeling effects in the roof area.

Since there is no roof and no roof pitch with the dormer type **Roof terrace**, the depth must be indicated with a third mouse click when you're inputting this dormer type (since, for other dormer types, the depth is automatically generated from the roof attributes).

6.10.14.9.1   Trapezoid dormer options
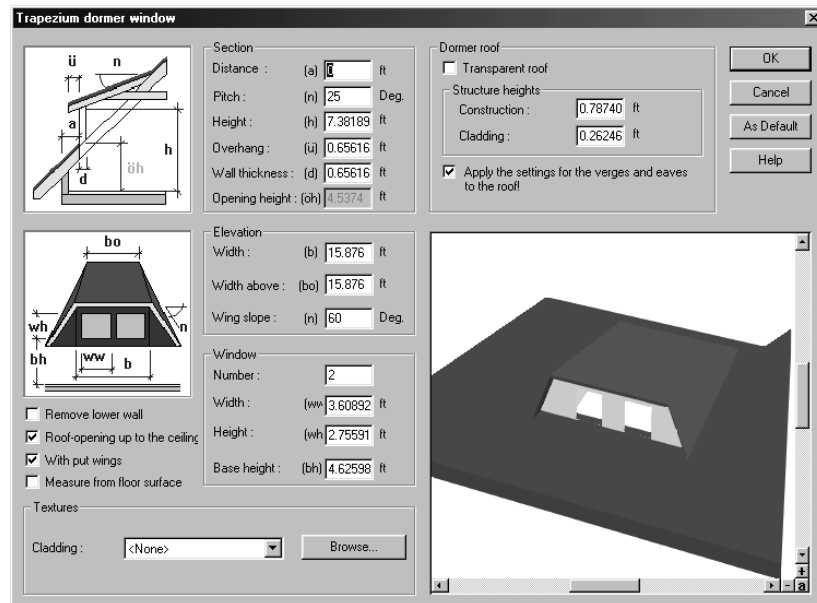
The dialog box for trapezoid dormers differs from the standard dormer dialog box (see page 318) in the following sections:

6.10.14.9.2   Elevation

For trapezoid dormers you can specify and adjust the **Width above** and the **Wing slope**.

6.10.14.9.3   Options

For the trapezoid dormer you can also set the option **With put wings**. If you activate this check box, the room is adjusted between the diagonal sections of the dormer roof and the walls. If the check box is deactivated, the wider walls of the dormer are used.

6.10.14.9.4   Hipped roof dormer options
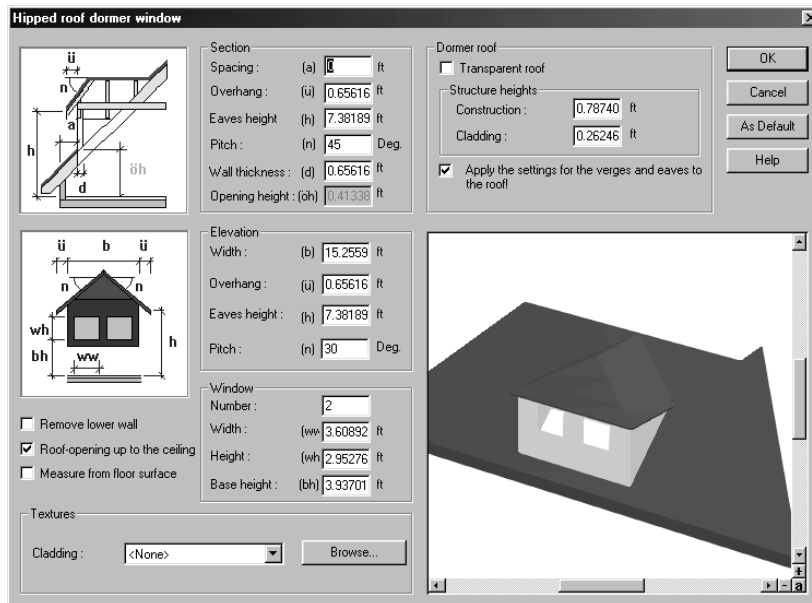
The dialog box for hipped roof dormers differs from the standard dormer dialog box (see page 318) in the following sections:

6.10.14.9.5   Elevation

For hipped roof dormers the **Eaves height** and the **Pitch** can be adjusted for the dormer roof.

6.10.14.9.5.1 Tips for placing hipped roof dormers

If you input an angle of exactly 90 degrees in the **Section** field, you'll get a pitched dormer.
If you enter an angle of less than 90 degrees, the roof leans forward.
If you set the eaves height upward in the **Section**, the dormer is cutout.
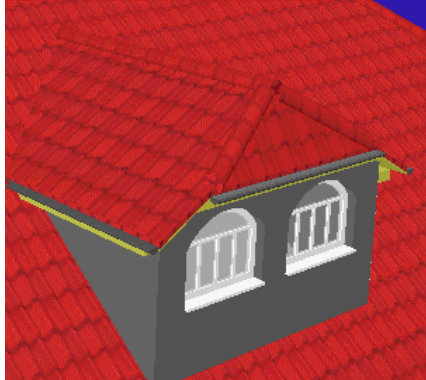
Note that a special form can be created if you adjust the **Eaves height** (in the **Section**) upward and simultaneously set the **Pitch** higher than 90 degrees.

6.10.14.9.6 Barrel roof dormer options
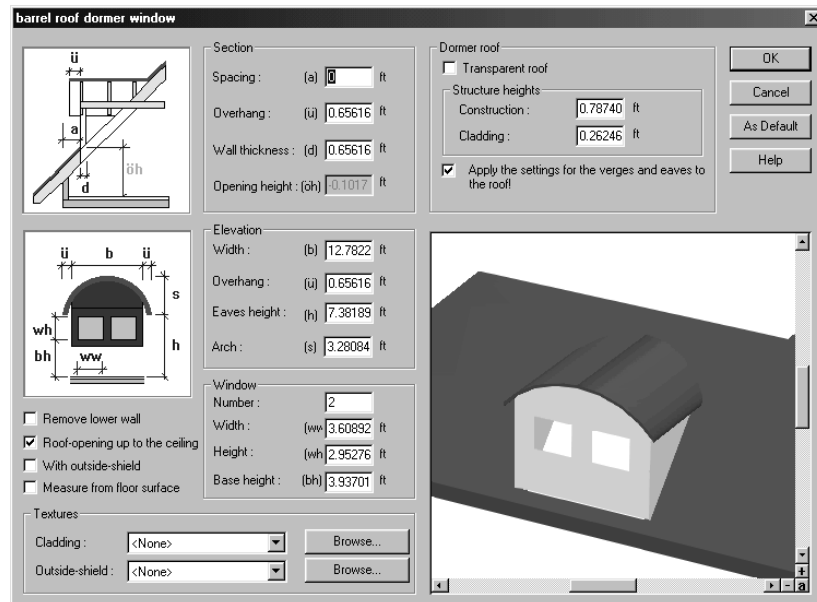
The dialog box for barrel roofs differs from the standard dormer dialog box (see page 318) in the following sections:

329

6.10.14.9.7   Section

For barrel roofs you cannot specify a height or angle of inclination.

6.10.14.9.8   Elevation

For the barrel roof the **Eaves height** and the **Arch** values can be specified. With the **Arch** field you can set the height of the apex of the curved top of the dormer (just like freely defined windows).

6.10.14.9.9   Options

The barrel roof has an additional check box: **With outside-shield**. With this switch you can set an arch outside over the window, which can be assigned a texture.

6.10.14.9.9.1 Tips for placing barrel roofs

With a barrel roof, you can modify the values to make a **Ton dormer**. A ton dormer has the characteristic that the **Overhang** equals zero and the elbow is a perfect semicircle. For the elbow to become a semicircle, the **Arch** value must be precisely half the size of the width. In the **View** section, set the **Arch** value to half of the width value, and set the **overhang** value to zero.

330
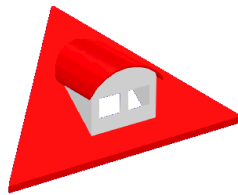
6.10.14.9.10 Bat dormer options
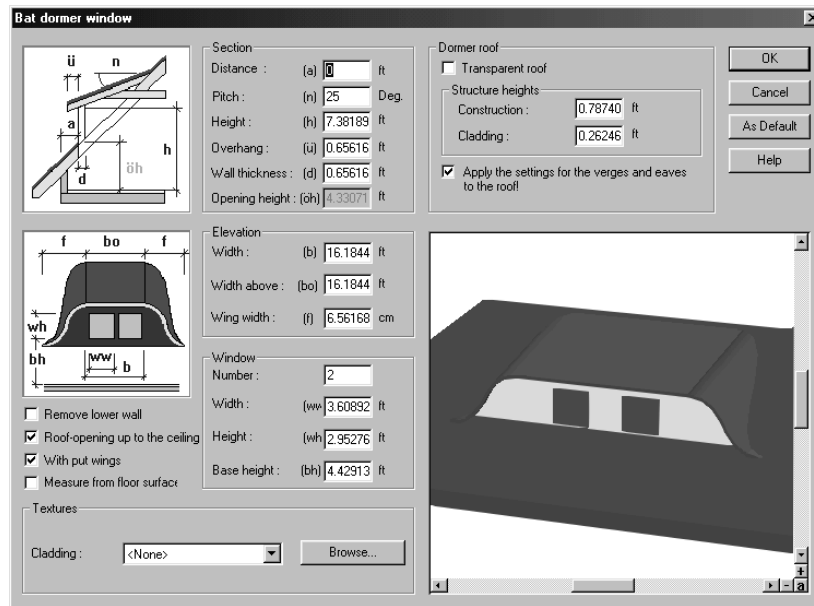
The dialog box for bat dormers differs from the standard dormer dialog box (see page 318) in the following sections:

6.10.14.9.11 Elevation

For the bat dormer the **Width above** and the **Wing width** can be specified.

6.10.14.9.12 Options

For the bat dormer you can – just like trapezoid dormers – enable the **With put wings** check box. If you activate this check box, the room is adjusted between the diagonal sections of the dormer roof and the walls. If the check box is deactivated, the wider walls of the dormer are used.

6.10.14.9.13 Roof terrace options 🗸
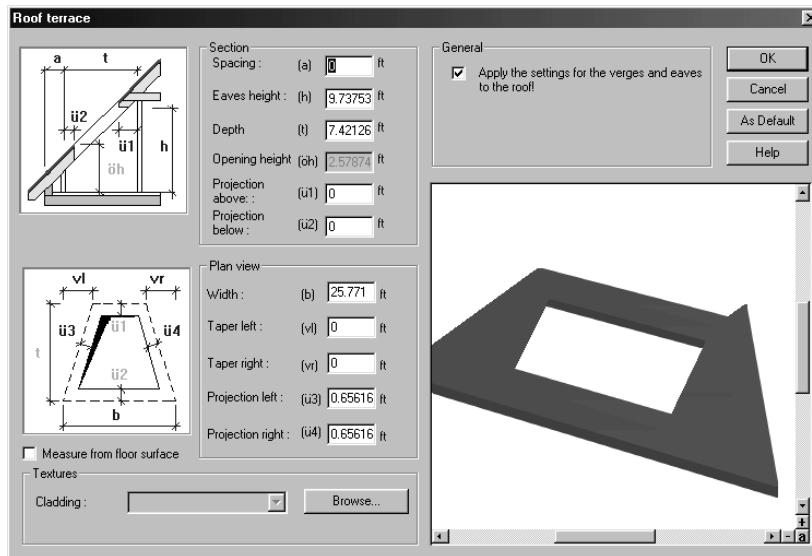
Technically, this type of dormer primarily creates a cutout within the roof area. One can use this cutout, for example, to build a roof terrace. Since this dormer type has no roof and no roof pitch, which is used to automatically determine the depth, you must click three times while inputting the dormer; the third mouse click sets the dormer's depth. The **Roof terrace** dialog box appears after placing the dormer in a roof (like all dormers), where you can change the dimensions of the cutout. Since the roof terrace as a rule includes a projection, even at a minimum a projection results at all four sides of the cutout.

You have the option to influence the form of the cutout. If, for example, you input taper ratios for the left and right sides that are greater than zero, you'll create a trapezoidal cutout. You can also input negative values, which has the result that the upper sides are drawn outwards.

In general, you'll use the cutout to integrate a roof terrace. For this you must place walls around the cutout. These walls should be completely under the roof and outside of the cutout. In this case they will be automatically merged under the roof. If a wall is not under the roof and within the cutout, it is limited in room height, which doesn't make much sense for a terrace.

Note that if a wall is partly within the cutout or partly under the roof, part of the wall is

pulled to the room height, where it normally would be merged under the roof.

With this type of dormer you can start with a roof terrace and modify it to create new roof area forms. All inputs you make in the roof terrace dialog box affect the modeling of the cutout.

6.10.14.9.14 Section

This section corresponds to the section Plan view of the cutout shown to the left. If you click in one of the input boxes, the corresponding dimension in the plan is highlighted in red.

With the **Projection above** and **Projection below** fields you can specify around how much of the roofing the cutout is to project.

The Opening height cannot be entered directly, since it results from the values in other fields. The box is always grayed out.

6.10.14.9.15 Plan view

This section corresponds to the section Plan view of the cutout shown to the left. If you click in one of the input boxes, the corresponding dimension in the plan is highlighted in red.

With the **Projection right** and **Projection left** fields you can specify around how much of the roofing the cutout is to project. You can taper the cutout upward and create a trapezoidal cutout.

6.10.14.9.16 General information

If you check this box, the dormer will apply the verges and eaves to the roof.

6.10.14.9.17 Textures

Textures can be assigned to roof terraces, used in the exposed area between the inside and outside of the roof.

6.10.14.9.17.1 Tips for setting roof terraces

With the help of the roof terrace you can model a low-cut dormer. With a low-cut dormer the roof area underneath the sill is omitted. You can model this in ArCon by cutting out underneath the dormer, i.e. in front of the sill where a roof terrace will be

333

set. The cutout must be started (although it should be larger in the lower area than in the roof) in the roof and pulled up to the inner edge of the dormer wall. Because dormers cannot be situated outside of a roof, you now have the effect that the roof terrace cuts the roof open, but not completely. Therefore, input a negative value for the roof terrace in the **Section** section's **Depth** field. The cutout now completely extends beyond the roof edge and cuts it open.
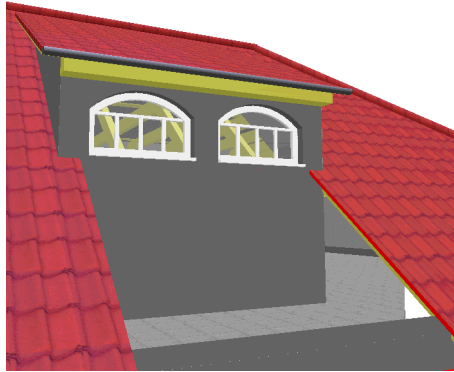
6.10.15 *Skylights*

Besides windows in walls, you can also place skylights in ArCon+. The procedure is quite similar to placing windows in walls. In order to place skylights, you use the multi-function icon .

To place a skylight, select the desired one from the multi-function icon and place the skylight into your project. ArCon+ automatically detects whether the skylight fits into the roof at the defined position i.e., whether it fits completely into a roof area, and how the orientation of the roof area elements should be arranged.

The window is automatically adjusted in inclination and rotation for the selected roof area. Like normal windows, you can press **Ctrl+W** when placing skylights to determine which point of the skylight is the base. Possible bases include the four corners, the middle of the four edges around the skylights rectangular outline, as well as the center of this rectangle. Accurate positioning of the skylight succeeds with the help of snapping.

Unlike normal windows, for which you have three freely definable window versions, only predefined versions are available for skylights.

334

6.10.15.1 Properties of skylights

As with windows for walls, the properties of skylights can be changed in two different ways:

right-clicking the skylight icon (multi-function icon)

double-clicking a selected skylight.

Double-clicking a selected skylight opens the dialog box to change the settings for only the selected skylight. Right-clicking the icon in the vertical toolbar opens the dialog box, where you can make default settings for skylights placed in the future. The possible settings and adjustments for skylights are the same as those for predefined windows.

6.10.15.2 Skylight options
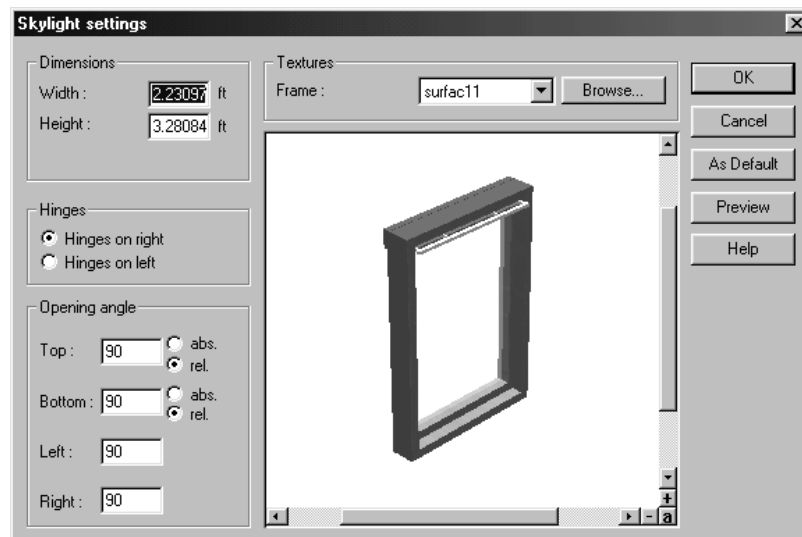
The only extension in this dialog box, compared to windows, is the **Opening angle** section. In this section you can specify, like with a cutout, how the opening is cut for the top, the bottom, the left, and the right sections. You enter here for each of the four areas the angle by which the cutout opens or closes inwardly. The specifications for the left and right edges are always relative to the roof area; for the top and bottom you can indicate whether the specification is relative to the roof area, or absolute.

For relative specifications the following rule applies: If you set the angle to 90 degrees, the appropriate setting is vertical to the roof; Angles larger than 90 degrees reduce the inside cutout, and angles less than 90 degrees increase the inside cutout.

For the top and bottom edges absolute angles can be entered. An absolute angle of 0 degrees causes the opening angle to run horizontally; an angle of 90 degrees runs vertically.

The following figure shows some examples of Openings with the various angle specifications. Note that the angles are used not only with rectangular skylights, but also with curved and even round skylights.

The settings used are identified in the following table. The letter **r** means the angle is relative to the roof area and the letter **a** means the angle is absolute.

	above	down	left	right
Left window	90r	90r	90r	90r
Middle window	40r	40r	40r	40r
Right window	0a	90a	90r	90r

6.10.16 Solar Panels ▦ ⚡

ArCon allows you to build in both photocell elements and solar panels (from the company Braas) into the roof of a building in Construction mode.

The procedure here is identical to the procedure for skylights. Select ▦ or ▦ and then position the required element on the relevant roof side. Just as with skylights, the orientation of the photovoltaic elements or thermocollectors is given by the direction of the eaves selvage for the roof side in which you are positioning the element.

Note: Both photovoltaic elements and thermocollectors are used only for design purposes. Calculations for energy requirements for the house and, where applicable, the automatic planning of the relevant systems is reserved for a future version of ArCon.

The following specific elements can be included in a plan:

BRAAS Photocells 700, 1.05 kWp, 1.4 kWp and 1.75 kWp (Kilowatt peak)

BRAAS Photocells 1800, 1.08 kWp, 1.44 kWp and 1.88 kWp

BRAAS Solar panels TK6, TK8 and TK10

The ArCon Service Team (see back of the ArCon manual) would be pleased to assist with the integration of other elements.

6.10.17 Building and surrounding area

This function lets you mark out and model a building area as well as its surrounding area. As a rule a building is placed on a building area.

In ArCon, various area types are differentiated. The **Landscape** is an area that does not have to be created separately in ArCon. Within this global landscape, the **Property** is marked out and the **Building area** defined. You can create cutouts (in the form of holes to lower the ground), and high points (to raise the ground).
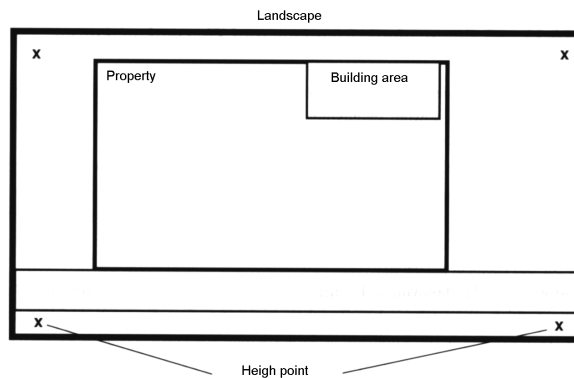
The whole of this group serves to create a realistic view of the direct environment of the house. In general, you'll mark out a property first, then assign a building area to this property, and later define areas such as paths, roads and patches etc. All areas can be colored and textured individually.

6.10.17.1   Types of area

You select a type of area with the multi-function icon in the vertical toolbar.

337

For **Property areas** as well as **Building areas** you have the option of right-clicking the suitable icon (after it's been selected from the multi-function icon) to open a dialog box (see page 345) where you can make adjustments and save them as the default values.

6.10.17.1.1 Landscape

ArCon automatically creates the **Landscape** area as soon as you create a new project. It forms a window of the world on which you define and position **Property** and **Building area** etc.

The landscape area has by default an area of 200 square meters and sets the zero level for elevation calculations and settings. You can modify the landscape while in Construction mode by double-clicking outside of any object, area etc. Subsequently, the **Landscape** dialog box (see page 343) is displayed. Here you can define a color or texture, to assign to the landscape.

If you right-click the **Landscape on/off** icon, you can switch the **Property area** and **Building area** on and off in the following dialog box:
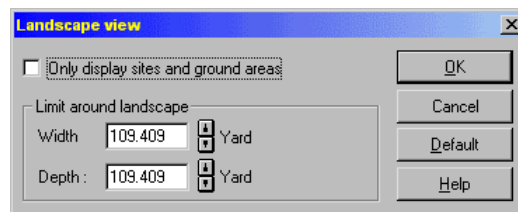
Here you can also change the size of the landscape by adjusting the **Width** and **Depth** fields in the **Limit around landscape** section.

6.10.17.1.2 Property

In general, a **Property** is the area on which an owner builds a house and garden. You can assign textures to the plot, in order to illustrate the ground condition and appearance, for example. You can also enter information, which is used in the **Room info**.

As soon as you set a building onto site, this is assigned to the Building area automatically. As a rule, a building is always entirely situated on a **Building area**.

This way you can plan an entire group of buildings with ArCon. If you create suitable properties for this, provide them with names and assign the appropriate buildings. The data of an individual building, which is situated on a specific property, can be directly

338

analyzed at another time.

6.10.17.1.3   Surrounding area

Surrounding areas are meant in ArCon to identify roads and paths as well as sections of site including yards, garages, flower patches, lawns etc. Unlike with properties, no buildings can be assigned to a **Surrounding area**.

In addition, while a surrounding area is generally assigned to a Property area, it can be situated – as in the case of a road – outside of a Property area. Make sure when allocating a surrounding area that it is situated entirely on a Property area. This way the surrounding area data can be used along with Property area values in the **Room info**.

6.10.17.1.4   Cutout

In the Landscape, Property and Building areas, cutouts can be defined. A section is automatically cut out from the specified area.

Generally cutouts in ArCon are created automatically. For example, when you start a building on a site, the suitable building area is cut out from the Building area. This prevents the unnatural situation of having a lawn grow in the same spot as a cellar or ground floor. There are special cases, however, where you must define a cutout manually. This is the case, for example, if you must place a cutout in an extremely diagonal area of the soil in order to build a terrace into the slope. Otherwise the area would overlay the terrace.

You also have the ability to edit cutouts in floors. These behave like cutouts which you enter yourself.

6.10.17.1.5   High points

By defining high points you can specify the height of the Landscape, Building area or a Surrounding area. The zero level can therefore vary from project to project (as it should, in most cases). Generally this is the base of the ground floor. If you should draw in a slope, however, the floor of the upper floor may become set on the zero level.

Basically, the input of high points in the **High point** dialog box determines the absolute height (in reference to the zero level) or relative to the current floor. ArCon ensures that areas in which no high points were entered are correctly interpolated so the landscape rolls through it nicely and gradually. If you specify a new point, ArCon automatically gives it the elevation level that was calculated for this area.

6.10.17.2   Selecting an area input method

After you've selected an icon in the left vertical toolbar from the multi-function icon, ArCon inserts a second vertical toolbar (*how* bar). Here you can select an input method. The available input methods vary depending on the type of area you selected to define.

For **Plot area** and **Surrounding area** you can select to draw in the area as a rectangle or a polygon. For cutouts there is an additional input method: **Define spaces automatically**. For setting high points there is only one input method, which is done with the aid of a dialog box.

Note that in ArCon+, **Properties**, **Surrounding areas**, and **Cutouts** can be entered with numeric input (activated with **F2)** at the bottom of the display.

6.10.17.2.1   Draw in Property/Building area/Cutout as a rectangle

With this type of input you specify the first point by clicking the mouse button and drawing a rectangle to the desired size. If you make the input with guidelines, you can accurately draw in the space by snapping on the desired guidelines. Set the rectangle by clicking the mouse button a second time. If you're marking a Building area or drawing in surrounding area, a dialog box opens where you can make adjustments to the area. If you're creating a cutout, no dialog box is opened because no additional adjustments are necessary.

6.10.17.2.2   Draw a Property/Building area/Cutout as a polygon

With the polygon input you can arrange the area freely. This input technique is required for any shape that is not a rectangle.

In order to input a polygon, click in sequence at the desired corner points. You can terminate the input when you're done by pressing the **Esc** key or by clicking again on the first point of the polygon. Subsequently, a dialog box is displayed if you're marking a Building area or drawing a surrounding area. If you're inputting a cutout, no dialog box is opened because no additional adjustments are necessary.

6.10.17.2.3   Determine cutout automatically

You use this input method for cutouts, it's only useful when applying a cutout to floors

which are not on the zero level, since for these an area cutout is created automatically. If you generate, for example, an upper floor, which is shifted relative to the plan of the basement, you can automatically set a cutout for this upper floor in this manner.

In general, you will require this function if you want to insert an area cutout into a diagonal area for separate sections of a floor.

6.10.17.2.4 Entering a high point

In order to enter high points, left-click the mouse button on the desired landmark. Subsequently, the **High point** dialog box is displayed for you to set the desired elevation. In this window you enter the height numerically. You can set the height as absolute or relative to the current floor.

6.10.17.3   Show/hide landscape

With the icon in the horizontal toolbar you can switch on and off the display of the landscape including marked out properties, surrounding areas, and cutouts.

That does not apply to objects of an area, since after placement they are no longer linked to the site or surrounding area, but are independent objects.

If you select this button with the right mouse button, you can switch the Property and surrounding areas on and off independently. This action opens the following dialog box:
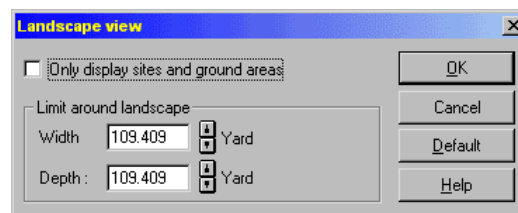
Here you can also adjust the size of the landscape in the **Limit around landscape** section.

6.10.17.4   Modifying areas

You can modify properties, surrounding areas, cutouts, and high points even after they're placed. To do so you must first select the desired area or point with the selection mode (see page 189). You can subsequently open the relevant dialog box to

341

adjust the settings by double-clicking the element.

Since cutouts do not have any special properties, no dialog box appears, either when placing it or selecting it later. You can only change the shape of a cutout, by adjusting or placing the cutout polygon shape after selecting it in the project.

In order to modify an individual type of area within the project, you must first select the desired site, surrounding area, or cutout. The element's corner points of the square or polygon become highlighted. If you now click into the area and keep the mouse button held down, this area can be moved. If you click a corner point and move the mouse (with the left button held down), you can move the point to adjust the size and shape of the area.

A high point can be selected and moved, but if you want to modify the height, you must double-click the point to open the **High point** dialog box (see page 349).

Note that the landscape is made visible with the ![icon] icon in the horizontal toolbar. Otherwise the outlines of the individual areas are not displayed and hence cannot be selected.

6.10.17.5   Deleting areas

You can delete an area by first selecting the desired area, by clicking ![icon] to activate it and then left-clicking the site, surrounding area, cutout, or high point. The selected area or high point is marked in red.

Note that the landscape is made visible with the ![icon] icon in the horizontal toolbar. Otherwise the outlines of the individual areas are not displayed and hence cannot be selected.

By pressing the **Delete** key you can delete the selected element. You can also delete the selected element by selecting the menu **Edit – Delete**. Objects of the area are preserved, since they become independent of areas after they're placed.

The landscape can be neither selected nor deleted.

6.10.17.6   Property dialog box
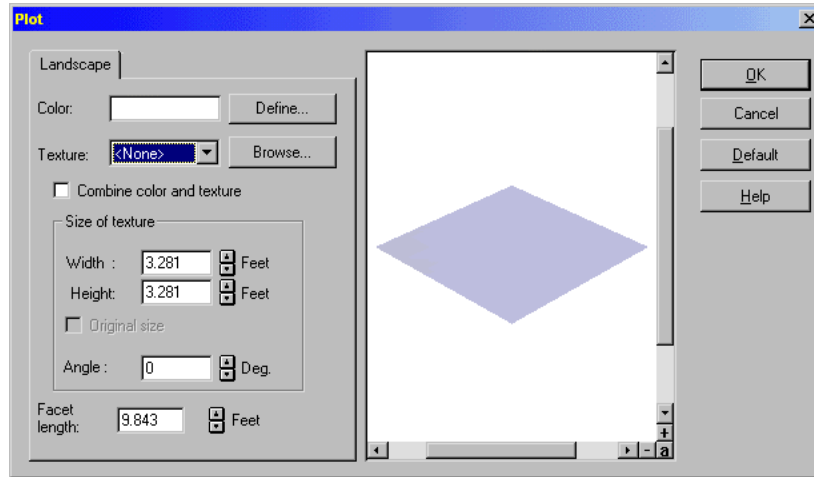
You open the **Property** dialog box by double-clicking in Construction mode outside of any object, site, etc. with the mouse on the background. The dialog box consists only of the **Landscape** page, independent of the work context where you opened the dialog box.

6.10.17.6.1   Landscape tab

6.10.17.6.1.1 Color

You can assign a color to the landscape. If you click the **Define** button, a standard Windows dialog box is opened where you can select the desired color, for example, green for a lawn.

6.10.17.6.1.2 Texture

You can select a texture from those loaded, or you can click the **Browse…** button to open a file selector and load a new texture. Check the **Combine color and texture** box to combine the selected color and texture.

6.10.17.6.1.3 Size of texture

With the **Size of texture** section you can adjust the height and width of the selected

343

texture. If you activate the **Original size** check box the two size fields are grayed out and filled with the original size of the texture. If you would like to rotate the texture, indicate the desired angle in the **Rotation** field.

6.10.17.6.1.4 Facet length

Each area type – landscape, site, and surrounding area – is in ArCon based on facets, for technical reasons, these facets are not visible in Construction mode display. They can be seen however in Design modes wire frame view if you view the project from above.
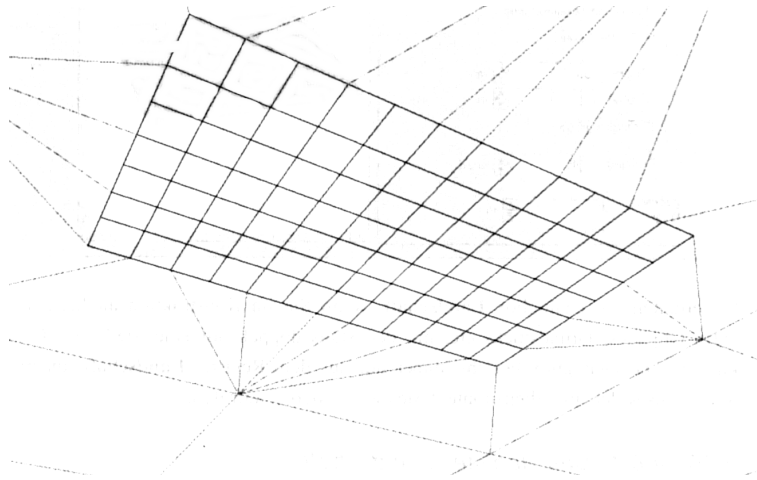
The facets are required in order to model differences in height. If you were to have only one area, no curvatures could be displayed. With facets you can adjust how you want to model fine areas.

In the **Facet length** field you can specify the length of an individual facet. For facets of the global landscape ArCon uses 10 meters as the facet length. This results in 400 areas based on the standard scope of 200 square meters total. You should therefore not reduce the facet length, since too high a number of individual areas would increase the required computing time and slow the display.

6.10.17.7   Property and Building area options
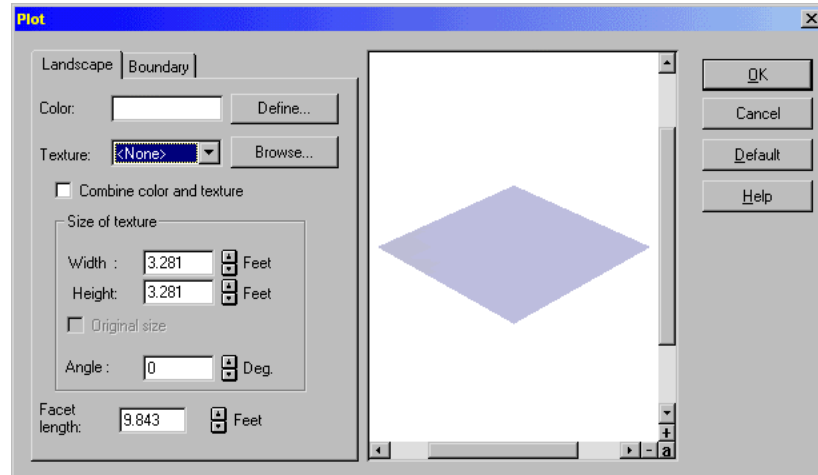
The dialog boxes for Property and Building area are structured identically. These dialog boxes are opened:

- After drawing in a rectangle or polygon when placing a new building area or surrounding area.
- If you click the ⬚ icon and then double-click a selected building area or surrounding area.
- If you right-click the corresponding icon in the vertical toolbar.

The dialog boxes contain pages, the number of which varies depending on the work context in which the dialog box is opened. The dialog box, which opens immediately after placing an area or when right-clicking the corresponding icon in the vertical toolbar consists of two pages, **Landscape** and **Boundary**. If you open the dialog box by double-clicking a selected site or surrounding area, the **Boundary** page is absent.

You can give an area an edge when you're placing it (either for an individual area or by default). Objects situated on it form the boundary. This way, fences or lines of trees can be created at this early stage.

If you later select a site or surrounding area, the **Boundary** page is no longer available. This is because when you create a border, the objects you choose are aligned around the area's border but once they're placed they are no longer connected in any way to the area – they are individual and independent objects, which can individually and independently be moved, edited, and deleted. So the border serves only to aid

positioning objects. And once an area is set, the border function is no longer useful.

In ArCon+, the dialog boxes for **Property and surrounding area**, in certain working conditions, contain the pages **Statistics** and **Room info**. Detailed information on these pages can be found in the *Calculations conforming to TYPE 1 and TYPE 2* section. Here the number of appropriate pages behaves as follows:

Immediately after placing a site or surrounding area, the dialog box contains three pages: **Landscape**, **Border**, and **Room info**.

If you open the dialog box by double-clicking a selected site or surrounding area, the dialog box contains the pages **Landscape**, **Room info**, and **Statistics**.

When defining the default values by right-clicking the icon in the vertical toolbar, the dialog box contains only two pages: **Landscape** and **Border**. The other pages are not available since the missing pages concern a specific, existing area, which does not apply when you're setting defaults.

6.10.17.7.1 Landscape tab
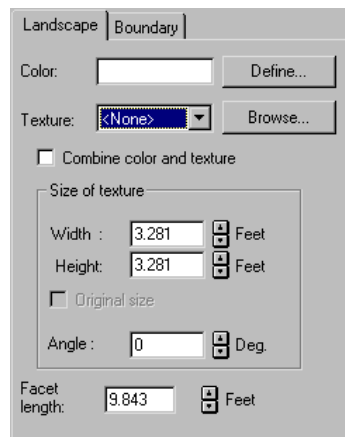
On this page you can assign a color and/or a texture to a site or a surrounding area. It corresponds to the **Landscape** page of the **Property** dialog box (see page 343).

Note that – in contrast to the **Property** dialog box – ArCon uses a default value of 3 meters as the facet length here. This means that you can model a site or a surrounding area substantially more finely than the total landscape area.

The suggested facet length should be nevertheless modified only in those cases where extreme differences in height are very close together. In this case it may be that the

346

facet is insufficient because two high points fall into a single facet. Note that with too small a facet length, a high number of individual areas results, and the display can be dramatically slowed due to the increase in required computing time.

6.10.17.7.2   Boundary tab
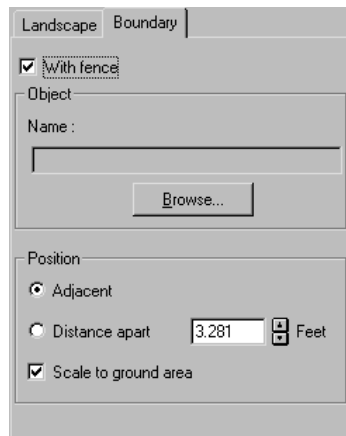
The **Boundary** tab appears only immediately after placing a site or a surrounding area, or if you right-click the icon in the vertical toolbar to set the default values. The page lets you border an area with objects, for example, trees or fences. After the area is placed, these objects are not a characteristic of the site or surrounding area, but are independent objects.
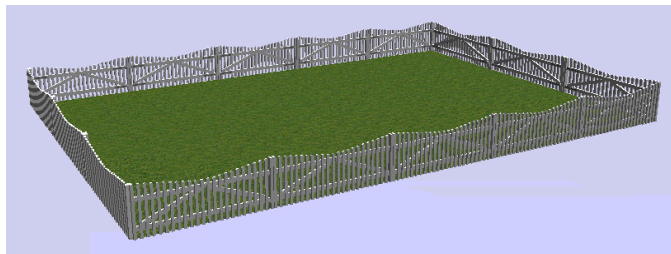
When bordering objects, the selected object types, for example, gates are combined into a group, for example, Fence. You can split this group after placing the site or surrounding area in Design mode with the ⊞ icon in the vertical toolbar (more information about groups can be found on page 431). Here the objects on each side of the area form a subgroup, which can be split up into individual objects in Design mode.

347

Note that objects with the characteristic to *fall downward*, maintain that characteristic as constituent of the area. If you subsequently change the height of the area, the height of the objects is adapted accordingly. If you don't want this to happen, you must deactivate the switch **Adjust height ('after free fall')** in the **Object properties** dialog box in Design mode.

In the case of a sloping area the individual objects are sheared. This means that the objects are adapted in height to the area settings, for example, with fences a symmetrical falling contour results. Here the individual objects are always oriented towards the longest axis (with the fence toward the fence axis).
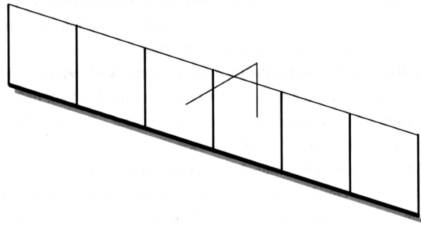
When shearing, you have the option to prevent the adaptation of object heights to areas with the **Adapt to landscape** box unchecked in the **Object properties** dialog box. Deactivating this setting makes sense for objects like trees, for example.

Note: When you place objects on the border, shearing is automatically switched on. If at a later time you manually enter objects into the area, you must explicitly activate the switch **Adapt to landscape**.

6.10.17.7.2.1 Object

In the **Object** area you can select which object is to be set on the entire border. If you select, for example, a tree, the total border consists of the selected type of tree.

6.10.17.7.2.2 Position
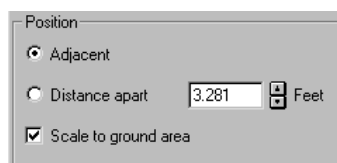
In the **Position** section you can determine how the objects are to be arranged. You can select the option **Adjacent** if, for example, you want to provide the border with a fence.

348

If you select the object tree, you'll probably get best results if you select the option **Distance apart**. In the field next to this radio button you can specify the distance between each instance of the object. The distance here is the distance from the end of one object to the start of the next.

With the check box **Scale to ground area** you can scale the objects for optimal positioning along the site side. For example, if a site side has a length of 4.50 meters, and the selected object – a fence, say – has a length of 1 meter, the fifth instance of the fence would be cut in half. To prevent objects from being cut off, activate the check box. ArCon then automatically ensures that the objects fit entirely by adjusting their size to match the site size.

6.10.17.7.3   Room info tab

This page is displayed only if you're setting a new site or surrounding area or if you're in the selection mode and you've double-clicked a site or surrounding area.

All information you enter into this page (the site name) or calculated (like the site area) is transferred to the **Room info** dialog box as well as to the calculation according to TYPE 1.

6.10.17.7.4   Statistics tab

This page is displayed only if you're double-clicking an existing site or surrounding area previously selected.

All information, which is calculated and displayed, can be transferred to the **Room info** dialog box and to the calculations conforming to TYPE 1 and TYPE 2.

6.10.17.8   High point dialog box
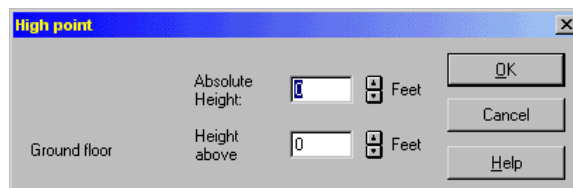
The **High point** dialog box is opened immediately after inputting the point into an area or when you select a high point in your project and then double-click the point.

In this dialog box you can input the height of the point numerically. You can specify the **Absolute height** (in reference to the zero level) or **Height above** (related to the floor of the current floor). Absolute heights which are larger than zero, will result in hills. Absolute heights which are smaller than zero, will result in dips and valleys.

When you define a new point, ArCon automatically inserts the height of the area here for the point's height. Of course, you can change it in the dialog box.
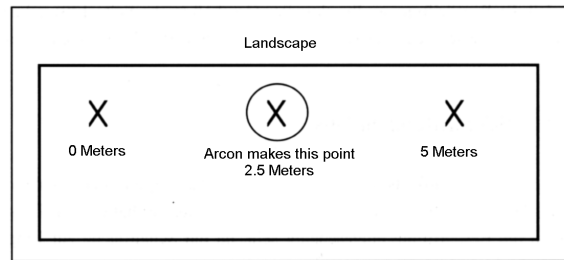
ArCon uses a smoothing algorithm to ensure that areas run smoothly between individual high points.
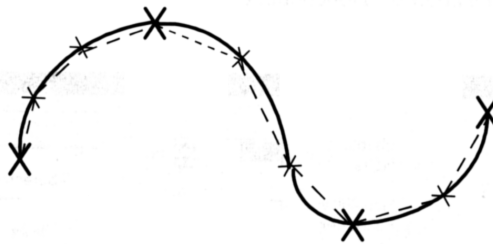
If two high points are very close to each other, you may have to decrease the facet length in the **Landscape** page for best results.

6.10.18 Text Abc

With the text function you can insert text into your plan with different character fonts, colors and sizes. These options are established and modified in the **Font** dialog box.

Note that text is attached to your current floor (see page 131). You can input different text on different floors.

6.10.18.1   Show/hide text

By clicking this icon in the upper horizontal toolbar you can switch the display of text on and off. To input text, the text display must be switched on, since the text icon is otherwise grayed out and you cannot enter any text.

6.10.18.2   Input text

After selecting this function from the vertical toolbar, click in the display at the desired point of input, which marks the beginning position of the text. ArCon then displays a dialog box where you can type in the desired text.
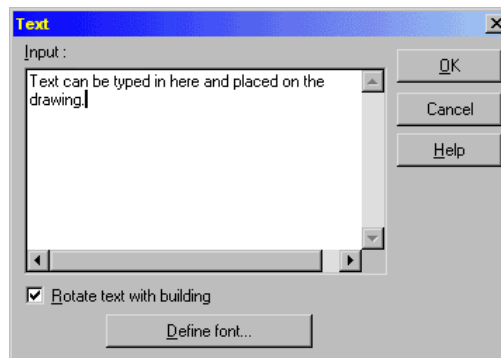
6.10.18.2.1   Text input window

In this window you can type in your text. By pressing **Enter** or **Return** you can insert blank lines into the text.

Under the text field is the **Define font…** button. If you click this button, ArCon displays the **Font** dialog box where you can select the desired font, size, and color.

You can specify the font type by right-clicking the icon, which sets the default font for future text. When you acknowledge the **Font** dialog box with **OK**, ArCon asks you whether these adjustments are to be used as default. If you acknowledge this dialog box with **OK**, the adjustments are preserved even after exiting ArCon.

6.10.18.2.2   Rotate text with building

In ArCon+, the **Text** dialog is extended with the **Rotate text with building** check box.

351
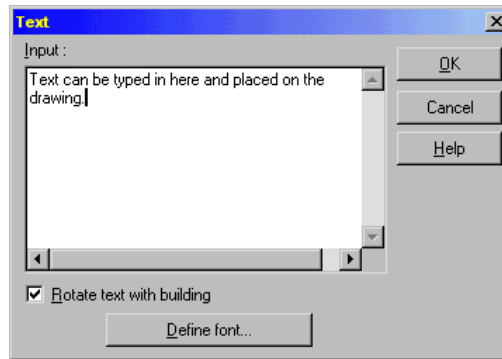
With the rotation of a building (see page 147) the text is aligned at the correct position relative to the rotated building. You can prevent this by deactivating the switch **Rotate text with building**. In this case, when you rotate the building, the text is aligned relative to the page.

If you activate the check box, the text is rotated as well as the building.

6.10.18.3 Moving text

You first select the desired text by clicking and then clicking the text. The text will be marked in red. By pressing the left mouse button and moving the mouse you can move the text. If you select the text, you can rotate it in 90 degree increments by clicking the right-mouse button.

352
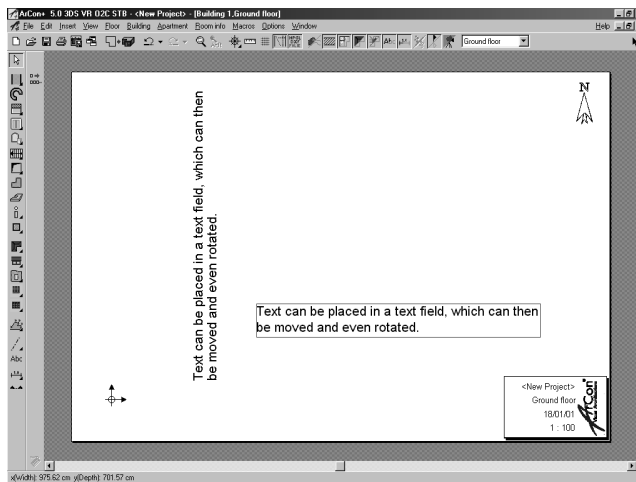
6.10.18.4 Deleting Text

After selecting the desired text, press the **Delete** key to delete the selected text. You can also delete it by selecting the menu **Edit – Delete**. If you want to delete all text, select the menu **Edit – Delete all – Text**.

6.10.19 Dimensions

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 361.

With the dimension function you can provide your plan with single or chained (multiple) dimension strings. You can customize this function's behavior with the **Dimension** dialog box (see page 359). Especially for chained dimensions there is a dialog box that you can open by right-clicking the *how* bar icon when inputting dimensions.

6.10.19.1 Dimensions on/off

By clicking this icon in the upper horizontal toolbar you can switch the display of dimensions on and off. To input a dimension the display of dimensions must be switched on; if it is switched off the icon in the vertical toolbar is grayed out.

6.10.19.2 Selecting dimensions

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 361.

With this multi-function icon you can set up the format of the dimensions. You can place the numeric dimension over, under, and in the middle of the dimension line, and you can choose a style of endpoints for the dimension line. Information about the respective type is displayed in the status bar at the bottom of the display, as you move the mouse over each of the multi-function icons. In the second vertical toolbar you can select between two different measuring methods.

In ArCon+ you can also measure project and relative elevations, measuring points at different elevations.

353

6.10.19.2.1   Single dimension ⟷

This requires three points of input. The first mouse click sets the beginning point, the second sets the end point, and the third sets the position of the dimension line and it's distance from the element measured. This will be parallel to the line you drew in setting the first two points. In the display window, positioning is facilitated with the help of a red cross at the mouse position. Before measuring an element, make sure that the desired snap options are enabled.

6.10.19.2.2   Chain dimension ⟷

With this type of dimension, ArCon considers all guidelines, axes, edges, and cutouts, according to what you've enabled in the dialog box which appears when you right-click the icon in the *how* bar.

With the first two input points you draw a line in the plan (as described in the previous section). All enabled intersections that are situated on this line are considered in the dimension chain. The third input point sets the position of the dimension line, just as with the single dimension operation.

6.10.19.2.3   Height dimension ↗ ▽ ▼

Height dimensions show the exact height of points. Here, there are different operations for measuring the height in a finished construction or a raw construction. If you click the ▽ icon **Measure height (inner)**, the base of the dimension is the finished floor or the finished ceiling. For the dimension of bare or raw floor, use the ▼ icon **Measure height (outer)**. In the sectional view ArCon+ does not examine the type of output. You are responsible to define the correct output format.

Height dimensions are used, in general, in sectional views. They can also be inserted into your project. Adjustments and the view of the height dimensions react differently here in some points. You can always adjust the height dimension specifications in the **Height dimensions** dialog box (see page 356), and special properties of the output text. Height dimensions can be switched on and off in the display (in both the project and sectional views) by clicking the icon described above, or by selecting the menu **View – Dimensions**.

6.10.19.2.3.1 Height dimension in a project ↗

In ArCon the floor height is the same anywhere within a floor, the height dimensions

354

per floor accurately describe the two height specifications mentioned, which differ only by the thickness of the floor construction.

Around the current floor, click in any part of the floor to measure. Subsequently, the absolute height of the floor over zero is displayed here. This height applies to the total floor.
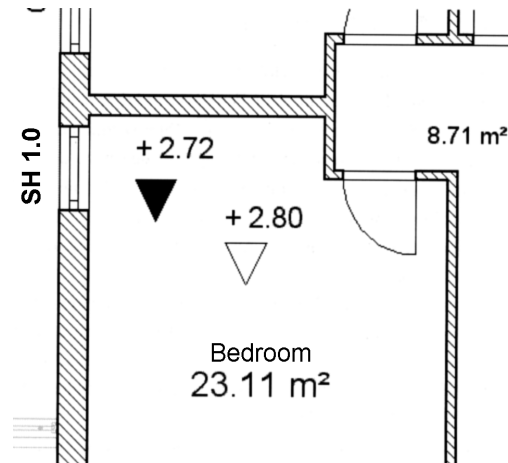
6.10.19.2.3.2 Height dimension in a plan view

The height dimension in plan view is always related to the zero level of the entire project. Unlike in the project, you are not limited here to floor heights, but any points and positions can be measured.

Setting the height dimension generally takes two mouse clicks. With the first click you mark the point whose height you want to measure. This point corresponds to a point on the Y-axis in a imaginary coordinate system. With the second click you set where the output with the height specification is to be displayed. A line now connects the measured point and the display point of the height dimension (which would correspond to a point on the X-axis in the same imaginary coordinate system).

If you set the second point below the guideline, the output arrow points upward; with a second click above the line the arrow points downward.
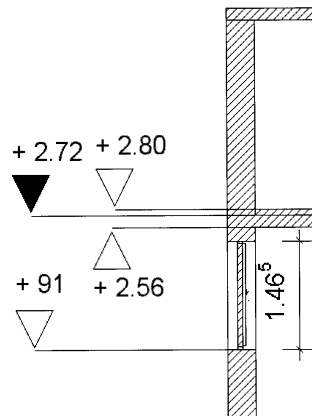
If you want to measure, for example, the bottom edge of a ceiling, the point should point down. You should click below the line to set this. If you want to measure the upper edge of the floor, click above the line so that the arrow points downward to the floor.

6.10.19.2.4   Height dimensions dialog box

In this dialog box you can specify the properties of the text for height dimensions. You can open this dialog box by double-clicking the text of the placed output or by right-clicking in the vertical toolbar on the suitable icon.
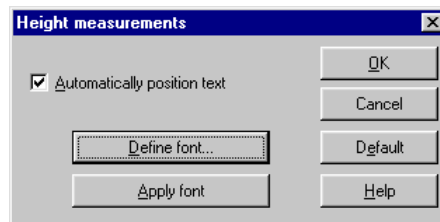
If you have moved the output text, the **Automatically position text** check box is deactivated when you open this dialog box. If you activate it now, the output text is moved to its original position, i.e. beside the appropriate head of the arrow.

If you click the **Define font…** button a standard Windows dialog opens where you can select the character's font, size, and color. This definition applies only to the selected output text.

With the **Apply font…** button you can transfer the character type settings made here to all visible output text (start of construction and finished construction) in the plan.

356

6.10.19.3 Editing dimensions

The dimensions of both single and chained dimensions as well as height dimensions behave just like normal text. This means that you can move or, by right-clicking the element, rotate it. By double-clicking the dimensions you'll open the **Dimensions** dialog box (see page 359) with which you can change the character type, and other properties.

Note: You can only move dimensions above and below the dimension line. Dimensions that are centered in the dimension line cannot be selected or moved. You can modify the dimensions type with the help of the multi-function icon that appears in the dialog box which in turn is displayed after double-clicking a dimension.

6.10.19.4 Moving the dimension line

Mark the dimension line to be moved by first clicking (see page 246) with the left mouse button and then clicking the dimension line. The dimension line is marked in red. You can move a selected dimension line by *touching* in at three different points.

If you click in the proximity of the dimension line itself, you can move it parallel to itself.

The two end points that you entered when placing the dimension – the distance between which is actually measured – can be moved. For this, two red squares appear at each end point. If you position the mouse over these squares you can move them. Note that by moving an end point the dimension line is automatically updated to reflect the new distance. Generally these points are also automatically moved if the element, on which the dimension line *hangs* is moved.

Editing height dimensions is generally identical to the above, with one exception. If you click the triangle of the height dimension, you can modify the direction of the output by pressing the left mouse button and moving the mouse. Move the mouse downward to direct the point upward, and so forth.

6.10.19.5 Measuring windows and doors

When measuring windows and doors with the dimension function, besides the width the height is also given. A prerequisite for this however is that you must select the dimension type where the dimension (dimension number) is displayed over the

dimension line.

If you draw the dimension line along a wall, above the dimension line will be the corresponding width or length. If you measure a window or a door, the height is given underneath the dimension line:
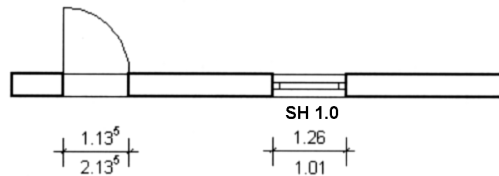
A window is placed with three dimension specifications: the width, the height, and the sill height (see page 229). All three are automatically set when you place the window.

If you measure an entire wall with the chained dimension, ArCon automatically detects where doors or windows are installed and gives the height dimension in the suitable areas automatically.
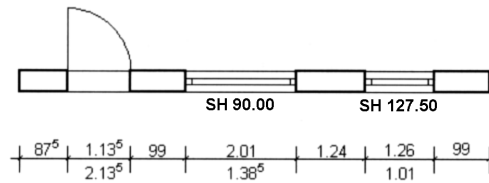
As normal dimensions can be individually selected, so can the height specification for windows and doors. After selecting them, you can move or rotate them. Double-click the dimension line to open the **Dimensions** dialog box (see page 359). Here the height specification can be switched on and off individually, and you can change the character type.

6.10.19.6   Deleting dimensions

You must first select the desired dimension as described above. You can then press the **Delete** key to delete the dimension. You can also delete it by selecting the menu **Edit – Delete**. If you want to delete all existing dimensions, select the menu **Edit – Delete all – Measurements**.

6.10.19.7   Dimensions dialog box

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found on page 361.
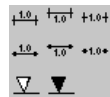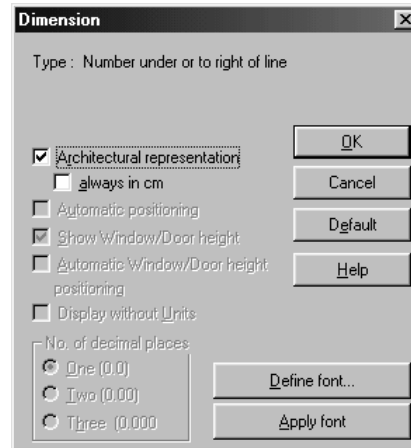
The dialog box is opened by right-clicking the **Dimensions** icon in the vertical toolbar or by selecting the menu **Options – Dimensions**.

You can also open this dialog box by double-clicking an existing dimension. Thus, you can subsequently modify the adjustments for an existing dimension.

6.10.19.7.1   Automatic positioning

If you've moved a dimension, the **Automatic positioning** check box is deactivated upon opening the dialog. If you now activate it, the dimension is positioned according to the selected dimension type i.e. returned to its original position.

6.10.19.7.2   Display window/door height

If you activate this check box, the height of windows or doors is displayed – for this dimension only. If you deactivate the switch, the height specification is not displayed.
The check box is grayed out if you're editing a dimension, which is not of the type **Number above or to left of line** or if the measured area contains no windows or doors.

6.10.19.7.3   Automatically position window/door height

If you've moved the dimension for the window or door height, this check box is deactivated upon opening the dialog box. If you now activate it, the dimension for the relevant door or window is positioned centrally underneath the appropriate dimension line.

6.10.19.7.4   Number of decimal places

These three option fields let you select one, two or three decimal places for the display of dimensions.

6.10.19.7.5   Define and apply font

If you click the **Define font…** button a standard Windows dialog box is opened where you can select a font type. This definition applies only to the selected text.

With the **Apply font…** button you can transfer the defined font properties, including font, size, and color, to all visible dimensions.

6.10.19.8   Dimensions dialog box

You can open this dialog box by right-clicking the ⊞ icon or ⊞.
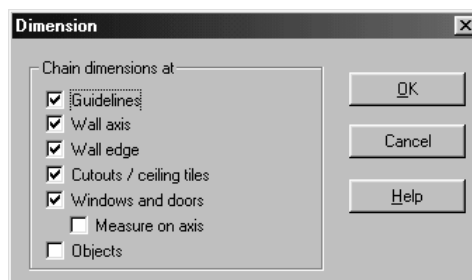
In this dialog box you can specify which elements are to be considered when placing chained dimensions. Chained dimensions measure distances between everything that cuts across the dimension line you draw, so here you can choose to disregard certain architectural elements. The elements you can measure against (or exclude) include **Guidelines**, **Wall axis**, **Wall edge**, **Cutouts/Ceiling tiles** and **Windows and doors** and **Objects.**

6.10.20 *Architectural representation of dimensions*
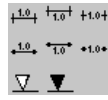
ArCon+ offers the option of outputting dimensions in an architectural representation view. To enable this option, right-click the **Dimensions** dialog box.
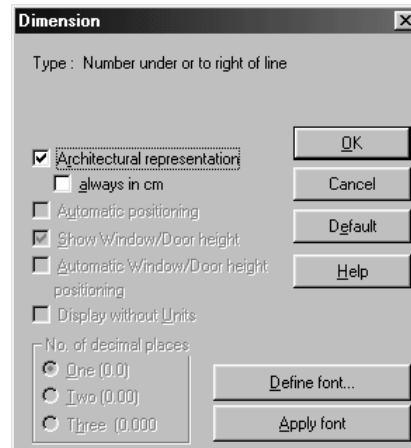
If the **Architectural representation** check box is enabled, the specification for dimensions is formatted as follows: for lengths *larger* than 1 meter the dimension is displayed in meters to two decimal places. If the third decimal place (mm) would be larger or equal to 5, the 5 is attached. For values *smaller* than 1 meter, the dimension is given in centimeters without any decimal positions. In this case, if the first decimal position (mm) would be larger or equal to 5, the 5 is attached. The units are not identified as meters or centimeters. Please note that changing the dimension units in the **Project options** dialog box (by right-clicking the ⬜ icon) has no effect on this output. This means that even if you select, for example, a dimension unit of yards, the dimension specification is always output during the architectural representation as meters or centimeters.

6.10.21 *Collision control*

With this icon activated, you will not be able to walk through walls. If you get too close to a wall, you will bounce off the wall slightly and automatically walk beside the wall you just bumped into.

361

When this icon has not been activated, you can still walk through your building, and walk through walls and doors with no problem.

6.10.22   Sections

You have the option in ArCon+ to define an unlimited number of vertical and diagonal section views, creating different cross sections of buildings. The input of such sections takes place exclusively in Construction mode. You can view these sections in both Construction mode and Design mode. With sections you can create different section views in addition to the normal views of your building, for example, from the side or from the rear. These views are systematically required for a building application. These sectional views can also be used in Design mode and are ideal for creating views of individual rooms. Note that in Design mode the view of a section, including both the position and direction of the viewpoint, cannot be changed. It must be established in Construction mode. In Construction mode different adjustments for the section view can be defined. The view can be defined as a subarea, or drawn rectangle, of the project, or of the entire window. You can also make several sections and view them simultaneously in Construction mode. In section views you can specify the height of any point with the height dimension (see page 354). Like all icons in the vertical toolbar you can right-click the icon to open the **Section** dialog box (see page 364), where you can make adjustments and set defaults which are used when defining a section.

When defining a section or when subsequently editing it you'll likewise open the **Section** dialog box, where you can modify and alter the default values. Note that some areas and input boxes of this dialog box vary, depending on the work context. Also, you can give a name to the section in the **Name** field. The names of the individual sections are available in Design mode, in a list box in the second horizontal toolbar. With this list you can select the section which you would like to display in one of the view windows.

6.10.22.1   Selecting a section input method

After you've clicked the icon, ArCon opens the *how* bar in a second vertical toolbar where you can select a method for specifying the section view. You can input a section horizontally, vertically, or arbitrarily (with the axis in any direction).

6.10.22.1.1   Define horizontal

To input a horizontal section, click the pertinent icon in the vertical toolbar. Subsequently, set the point of origin of the section line with the mouse. The pointer takes the form of a horizontal line with two arrows. The arrows indicate the direction in which one looks (in the section view). This means that if you move the mouse to the left, the line of sight is downward; move the mouse to the right, and the line of sight is upward. With the selection of the origin point on the right or left of a building you also specify (implicitly) the line of sight.

With your second mouse click you set the end of the section line. The length of the input section is insignificant, because ArCon extends the section to a certain extent into the infinite.

Next, the **Section** dialog box (see page 364) is displayed, where you can decide which elements are to be displayed in the section view. When you acknowledge your settings (by clicking **OK**), the section is automatically calculated and displayed. The time required for the calculation of the section view depends on the complexity of the project and the settings you enabled in the dialog box. You can, if necessary, press the **Esc** key to abort this calculation. The progress of the calculation is displayed in the status bar at the bottom of the display.

You have the option of suppressing or requesting the updating of existing sections. For this the **Section** dialog box has options in the **Update after changes** section (see page 370).

6.10.22.1.2   Define vertical

The input of a vertical section is just like the input of a horizontal section. If you move the mouse downward, the line of sight is to the right; if you move the mouse upward, the line of sight is to the left.

6.10.22.1.3   Define arbitary

The input of an arbitrary section is just like a vertical or horizontal section. If you move the mouse to the left or the upper right, the line of sight is to the left; if you move the mouse to the right or the lower left, the line of sight is to the right.

6.10.22.2   Show/hide section

With the icon in the horizontal toolbar you can switch the display of sections on and off. This affects all views in the display window.

6.10.22.3   Editing

Sections can be moved and edited. To move a section, you must click the mouse button on the line of the section and, while pressing the mouse button, move the section to the desired area. If you click and hold the mouse button on one of the two corner points of the section line, you can rotate the section, and change the type of section.

Before you edit any sections, you must make them visible by selecting the icon.

6.10.22.4   Deleting

You must first select the desired section by clicking (see page 189) with the left mouse button. The selected section is highlighted in red in the display. Press the **Delete** key to delete the selected section. You can also delete the section by selecting the menu **Edit – Delete**.

6.10.22.5   Section dialog box

You can open the **Section** dialog box to define default settings by right-clicking the icon in the vertical toolbar.
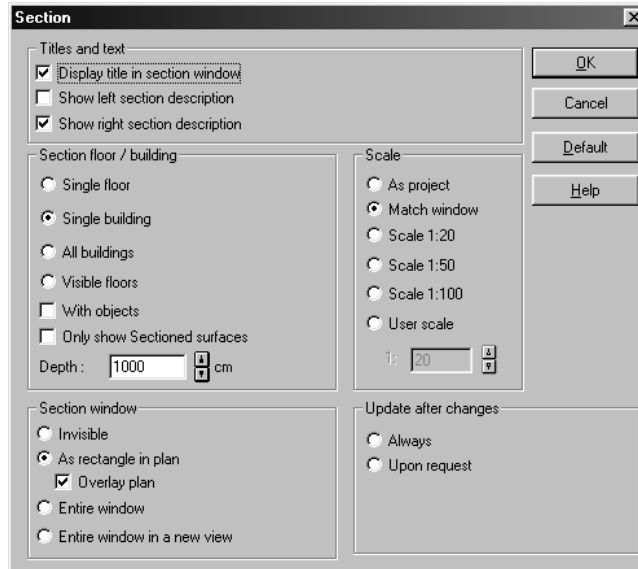
You can also open the **Section** dialog box after inputting the second point when placing a new section or if you've selected a section with the ⬚ icon and double-clicked the selected section. The dialog box has the following appearance:
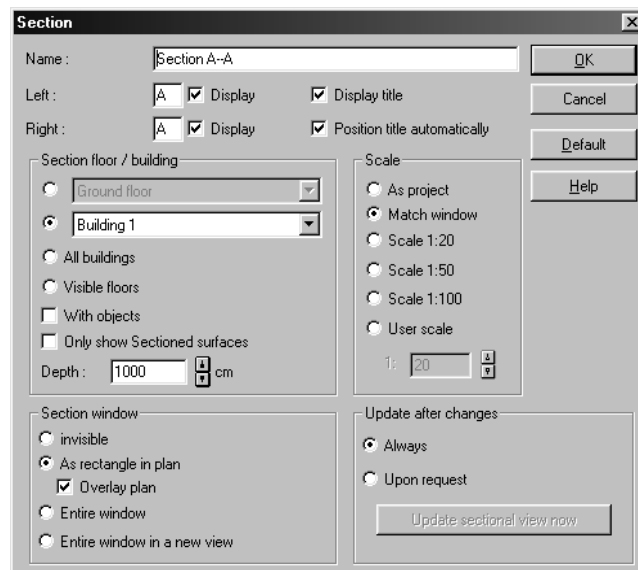
In both dialog boxes, all inputs made here refer exclusively to Construction mode and its view windows.

An exception is the name, which you can enter in the **Name** field or let ArCon automatically designate. This name is listed in Design mode in a selection list in the second horizontal toolbar. With this list you can select the section which you would like to display in Design mode.

6.10.22.5.1   Title and text
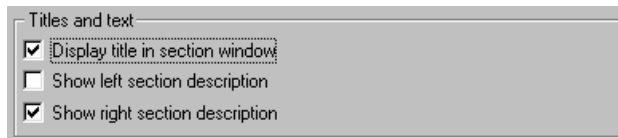
In this section you can specify whether you would like to display the name of the section. The view of the section name occurs both in the section view and its rectangle in the project as well as the entire window.

The **Show left section description** and **Show right section description** check boxes refers to the name of the section line in the project.
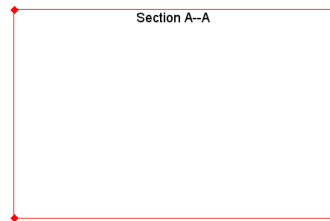
You can specify the actual name of the section in the dialog box that is opened when you input or subsequently modify a section. Here the section has the following appearance:
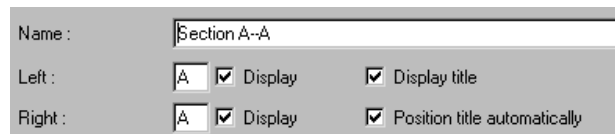
With a new section, ArCon suggests a name: **Section A-A**. The left letter defines the

366

start point and the right letter defines the end point of the section line. You can transfer or modify the letters used in the two fields **Left** and **Right**.

If you enabled, in the default settings, the left and right section names, the **Display title** and **Position title automatically** check boxes are automatically activated. If these check boxes are deactivated, the section line does not include any name.

If you input a further section, ArCon counts up the letters (and numbers) automatically. After **Section A-A** the **Section B-B** will follow.

In general, the name is displayed only if you activate the **Display title** check box. With the **Position title automatically** check box the name of the section is positioned centrally at the top of the window. If you move the name within the section window to another spot, you can reposition the name automatically by activating the **Position title automatically** check box.

Note: If in the **Name** field you specify your own name, for example, **Cross section over ground floor**, this affects the automatic positioning and naming. Either may become unsuitable once you begin using your own names and positions, so keep an eye on the names and placements.

The name specified in the **Name** field is carried to Design mode, where it is listed in a selection list in the second horizontal toolbar. With this list you can select the section which you would like to display in Design mode.

6.10.22.5.2   Section floor/building
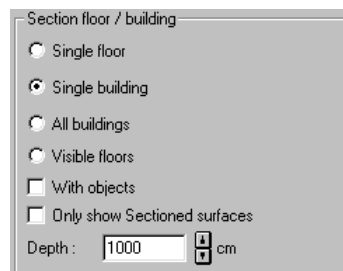
In this section you can specify with one of the four radio buttons, whether the section should be of a **Single floor** or **Single building**, or for **All buildings** or all **Visible floors**. Note that each option is mutually exclusive. If you want to show only one floor or one building, you can specify this in this section of the dialog box.

When placing or editing a section, you can change this option for floors and buildings.

367
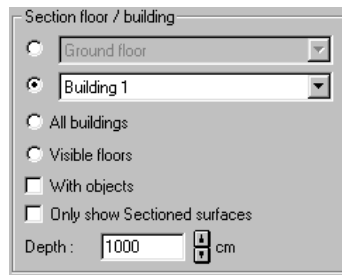
In this dialog box you can also select whether objects should be displayed in the section, and also the depth of the section. If the check box **With objects** is deactivated, no objects are shown. If you activate this check box, all objects within the specified depth are displayed. Only objects within the specified **Depth** are included in the display.

With the **Only show sectioned surfaces** check box you can specify that only the planes of the section are shown, without background. With this check box activated you'll only see the architectural elements at the position of the section line. In this case the **Depth** field is grayed out.

If the **Only show sectioned surfaces** check box is deactivated, you can specify the area beyond the section to be displayed, with the **Depth** field. You can specify the depth of the section view by entering a value directly into the input box or by clicking the up and down arrows to the right of the field. In this way you can show, for example, a kitchen view and fade out everything behind it with a depth of, say 10 feet. This means that once you've set a section line, which sets the left and right side of the view, you can set the third axis that is the depth of the view. So you can create a section using all three dimensions.

6.10.22.5.3   Scale
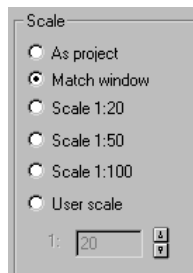
In this section you can determine the scale of the sectional view in Construction mode.

368

You can select one of the following options:

If you select the option **As project**, the section view is the same scale as the project itself. The view of the construction in the main display and the view of the section are equivalent.

With the option **Match window** the view is adjusted so all contents in the section are always displayed. Even if you steeply reduce the window, the entire sectional view is displayed. Note that with this option the scale depends on the window size.

The other options let you select a specific scale, either a predefined scale or an arbitrary ratio.

Note: If you select a predefined scale or the same scale as the project view, the view can still be shifted (see page 374).

6.10.22.5.4   Section window 🖋
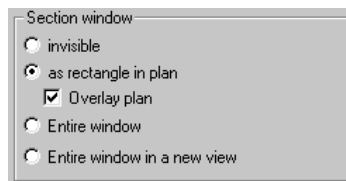
In this section you can specify how the sections in Construction mode are to be displayed. The following options are available:

Invisible: You see the section line, but the section view itself is not displayed in the view window.

As rectangle in plan (see page 372). Here the sectional view is displayed with a rectangle around it to separate it from the rest of the view window.

This rectangle behaves like an individual window on the page. You can move and resize this window with the mouse. If you position the mouse pointer on a side of this window, without actually selecting it, and if the option **Entire window** is not activated, you can adjust the section in the window (see page 374).

In a section view the guidelines, text, dimensions, and high points (see page 354) are considered. These have an orientation to the rectangle that defines the view. This means that, if you shift the rectangle in a project, the text, dimensions, etc. are shifted.

Note that inputs in this window are only accepted, if the **Overlay plan** check box is activated. If the check box is deactivated, the project remains visible through the section.

369

Entire window (see page 373). With this option you can set the sectional view to fill the entire display. The corners of the sectional view are positioned exactly at the corners of the project view, which in turn is completely hidden by the sectional view. Only the sectional view is visible.

If you've selected this option, you can still adjust and move guidelines, text, dimensions and high points within the window.

Entire window in a new view: With this option you can specify that the section will automatically be transferred into a new view. Alternatively, you can create a new view with the 🔳 icon. The sectional view can be edited and adjusted independently in each window.

If you should subsequently edit a section and open the dialog box by double-clicking, this option is grayed out.

Since the type of the sectional view refers only to the current view window, you can open multiple sections and compare them. This way you can compare different section views.

6.10.22.5.5 Update after changes
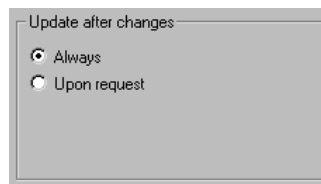
If you adjust a section, the view is basically automatically calculated and displayed. This calculation can last some time, depending upon the complexity of the building, since hidden edges are also calculated.

For the modification of existing sections you can specify whether the view is automatically updated when you make a change, for example, moving the section line – or if the program waits for your input to update the display. You can select the option **Always** or the option **Upon request**.

If you later change a section you can change the setting between these two options.
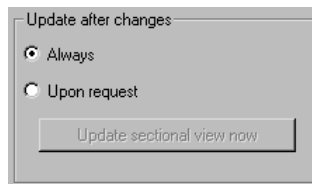
This is activated only if you selected the option **Update sectional view now**. As soon as you click the icon the section view is recalculated and displayed.

Note: When opening a project all sections are always recalculated and displayed with the new settings. In this case you're not asked or warned about a new sectional view.

6.10.22.6 Sectional view in Construction mode

In Construction mode, you have several options for showing a section. The form of the section view is specified in the **Section** dialog box, in the **Section window** section (see page 369).

In the section view you can input text, guidelines and dimensions as well as high points (see page 354). You can also transfer a section into the window of a new view, in order to arrange multiple section views simultaneously in the display.

Note: Within a section window you can use the appropriate icons in the horizontal toolbar to switch the display of guidelines, wall shadings, roof areas, wood construction, text and dimensions on and off.

6.10.22.6.1 Show only the section line

If you select the **Invisible** option, only the section line is shown in the project.
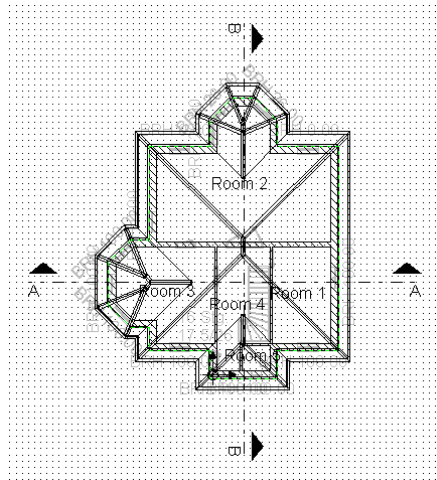
The start and end of a section line characterize the section. This way you can differentiate multiple section lines from each other within a project. The view of the section line can be adjusted and suppressed in the **Title and lettering** section.

6.10.22.6.2   Show the section as a rectangle in the plan

If you select the option **As rectangle in plan**, the sectional view is placed in its own window, which is integrated into the project window. You can also specify here whether the section window should cover the project or not.
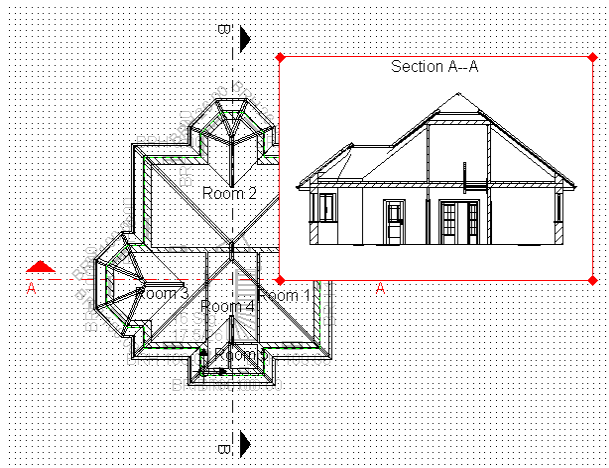
You can input into the sectional view guidelines, text, dimensions, and high points (see page 354). If the section should not cover the project, no inputs are possible in the sectional view. Inputs are automatically assigned to the project.

The rectangle behaves like its own window on the project page. Clicking the mouse button in the window can move it. When you move this section window, all inputs, which belong to the rectangle, are moved with it.

If you want to increase or reduce the size of the rectangle, you must first select the frame to mark the rectangle in red and highlight the corner points. Click a corner point and, while pressing the mouse button, move the mouse to adjust the rectangle's size.

If you position the pointer on the edge of the rectangle, without selecting it, you can move the section within the window (see page 374). Note that the option **Entire window in a new view** cannot be selected, since that setting preempts this movement.

6.10.22.6.3   Show the section as entire window

If you select the option **Entire window**, the sectional view will fill the project display.
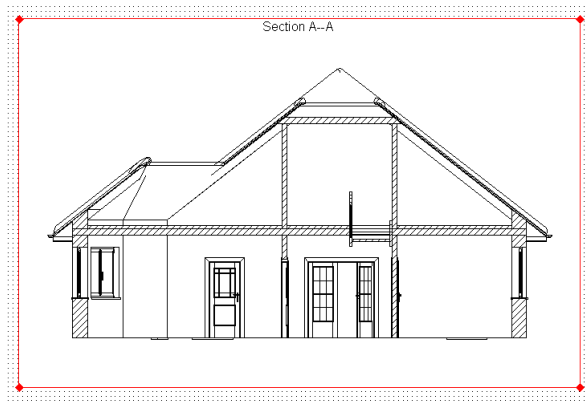
Section A--A

This section view behaves like the regular project view. This means that you can input dimensions, high points, guidelines, and text. You can also move the section within the window.

The window cannot be moved or changed in size, since it is fixed at the maximum size of the display window.

6.10.22.7   Inputs in section windows

Inputs in section windows are possible only if the section covers the project, or if it is the entire window. If the section does not cover the project, any input elements are automatically assigned to the project.

The following elements can be input:

- Guidelines
- Text
- Measurements
- High points

Text and dimensions can be moved in a section window just as they can in the project window. You can also modify the font for text, and transfer a changed font to existing text.

Note: If you try to input elements other than those listed above, ArCon will sound a warning tone.

6.10.22.8   Moving the section window

Sections can be moved within the window. This applies to both sectional views with the project view, and in the entire window section view. A prerequisite for this is that you do not select **Entire window** ratio setting.

Moving sections is required in those cases where the section can't be seen in its entirety due to the scale in the window. This way, areas of a section (detail) can be selected and shown in the desired scale.

The following describes how to move a section within the window, using the **As rectangle in plan** setting:

1. Position the pointer on the edge of the frame, without clicking it i.e. without actually selecting it. The pointer changes into a cross.
2. Click and hold the left mouse button and move the mouse. As you do this, the view changes to the entire window, i.e. the project is covered while you're moving the section window.
3. You can now move the window over the visible section and select the desired section to be displayed.

374
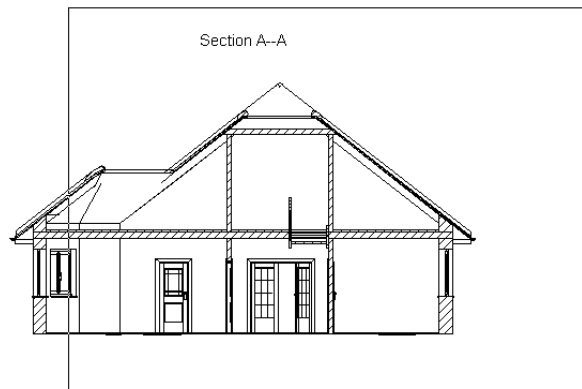
Section A--A

When you release the mouse button, the view returns to the **As** r**ectangle in plan** view, with the section window displaying the selected section area.

6.10.22.9   Sectional views in Design mode

Sections can also be displayed in Design mode. If you've created one or more sections in Construction mode, these are offered to you in a selection list box in the horizontal toolbar. The multi-function icons with which you select the view type in Design mode, including Plan view, Plan view (color) and Perspective view, all have an extra icon to display the section (see page 379).

7 DESIGN MODE

7.1 OVERVIEW

In ArCon's Design mode you create your apartment. To assist you there are a number of toolbars. There are two horizontal toolbars at the top of the window (for changing the display of the current window) and a vertical toolbar where you can edit and change objects in the apartment. In the following paragraphs, all icons in the second horizontal toolbar are described. The status of these icons applies to the current window. If you work with multiple windows, the icons may change when you change from one window to the next. So you can, for example, work in Plan view in one window and in Perspective view in another window. Changes to objects are updated instantly in all views, so you can make a change in Plan view and Perspective view and automatically updated to reflect the change.

If you create an apartment in Design mode and need to make constructional changes, you can switch back into Construction mode by clicking the 🔲 icon.

7.2 VIEWS

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 379.

In Design mode, you have three different view types to display your project. These are Plan view 🔲, Plan view (color) 🔲 and Perspective view 🔲. If you work with multiple windows simultaneously, you can use different types of views in the different windows.

7.2.1 Plan view 🔲

Plan view in Design mode differs only in a few details from Plan view in Construction mode (see page 88). You see here all walls and constructional elements as you would in Construction mode's Plan view. The only difference is that the constructional elements in the current floor are shown in gray, since you cannot modify them in Design mode.

377

On the other-hand, objects and Design mode elements are shown in black. Unlike the other two types of view, selected objects are marked with a red rectangle in Plan view. In the two other types of view, selected elements are identified with a green selection frame. Plan view is very well suited to arranging objects. Naturally, adjusting the height of objects is somewhat more difficult in Plan view. However, since most objects fall downward automatically, you do not need to worry about their height in most cases.

When creating your apartment, don't forget about Plan view. It's easy to ignore it and always work in Perspective view, but many operations can be done more easily in Plan view.

7.2.2   *Plan view (color)*

In Plan view (color) you'll basically see the same view as Plan view, but in color, i.e. all the surface properties of floors and furnishings are visible. In Plan view (color), only the current floor is shown. In contrast to Plan view, Plan view (color) is a 3D view, even if the third dimension (the height) isn't directly evident. You can nevertheless control the height when placing objects, with the help of the right mouse button. This type of view offers the benefits of Plan view combined with the ability to place objects at a specific height. You'll generally detect that an object's height is set incorrectly, when, for example, an object falls under a desk when you're placing it. This is a characteristic of placing an object with the height incorrectly adjusted.

In contrast to Plan view, you can render Plan view (color) by means of raytracing (see page 389).

7.2.3   *Perspective view*

Perspective view is the main view of ArCon. In it you can walk through the building, place objects at will, and change the point of view freely. Perspective view has the benefit that you can very easily control the height of objects when you're placing them, and you can get a very good spatial impression of your project. It has the disadvantage however that controlling the depth of objects when you're placing them is more difficult than in Plan view or Plan view (color). Perspective view is the only type of view where you can wander through your apartment. For this function you have the icon in the second horizontal toolbar which is only available in Perspective view. Like Plan view (color), you can render Perspective view for calculating shadows and reflections with

the help of the Raytracer (see page 389.).

The following figures show the same project in the three different view types (with windows arranged next to each other).
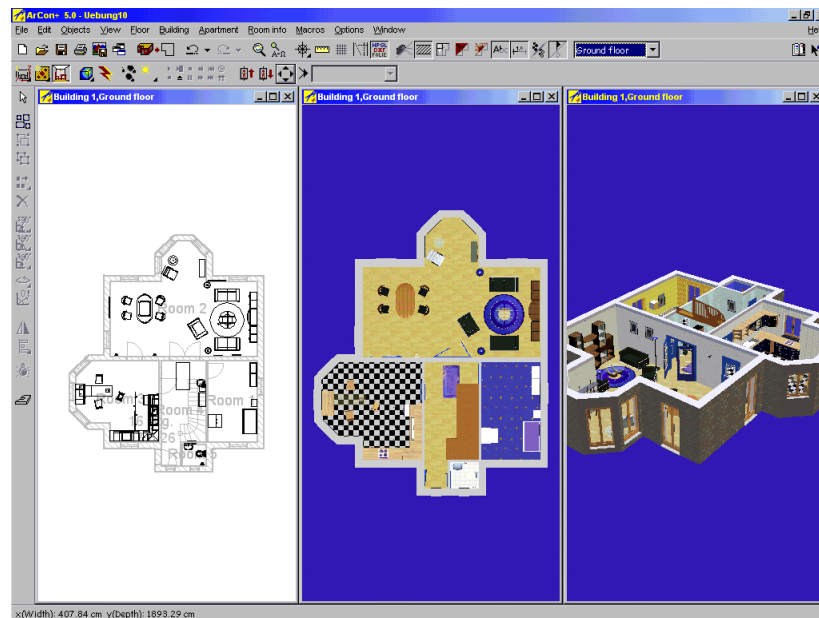
7.2.4   Extended views in ArCon+

ArCon+ offers the possibility, besides those offered in ArCon, of selecting different forms of the individual views. For this the three icons in the horizontal toolbar are redesigned with multi-function icons.

7.2.4.1   Plan view

While in ArCon you can view Plan view only from above, in ArCon+ you can view the plan from the left, the right, above, below, and the rear. If you've defined one or more sections in Construction mode (see page 362) a section view is also offered to you, in which you look at the section from the front.

You can define names for your different sections, which are used to differentiate

379

between each section. These names are displayed in Design mode in a selection list in the second horizontal toolbar. This selection list appears as soon as you select one of the section views. With this list you can select the section, which you would like to show in the window.

To select the desired view, click the multi-function icon. If you now move the mouse pointer down over the icons that appear you can left-click the desired view.

7.2.4.2 Plan view (color)

In ArCon+ Plan view (color) is extended with the views colored view from the left, colored view from the right, colored view from above, colored view from below, and colored view from the rear.

If you've defined one or more sections in Construction mode (see page 362) a colored section view is also offered to you, in which you look at the section from the front.

As in Plan view, you can select the desired section by name from the selection list in the second horizontal toolbar.

To select the desired view, click the multi-function icon. If you now move the mouse pointer down over the icons that appear you can left-click the desired view.

7.2.4.3 Perspective view

In ArCon+ Perspective view is extended with the view **Perspective section view**. This view is available only if you've defined one or more sections in Construction mode. In the display of the building, the view is sectioned off at the defined section line. With this section view you don't see the 2D section as defined in Construction mode, but a Perspective view of the section.

380

As in Plan view and Plan view (color), you can select the name of the section, which you want to view from the selection list in the second horizontal toolbar.

To select the desired view, click the multi-function icon. If you now move the mouse pointer down over the icons that appear you can left-click the desired view:

The following figure shows the same project in the view types **Plan view from the right** and **Perspective view from the rear**.
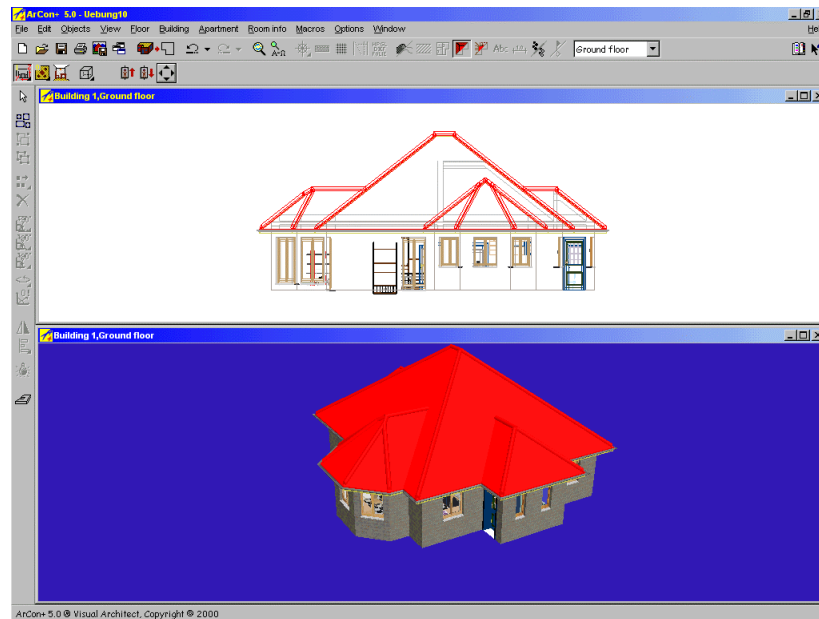
7.3   BACKGROUND PICTURES AND COLORS

Here you can select a background color of your choice to use in Perspective view and Plan view (color). This specification is made separately for **Day** and **Night views**. In each case click the **Define...** button and in the standard dialog box that appears select the desired color. You also have the option to define your own color. This is done with the standard Windows color selector, and so you should consult your Windows documentation for information on this function.

For adjusting the background ArCon uses a dialog box, which you can open and navigate as follows:

By clicking the **Background...** icon in the **Project options** dialog box. You can open

381

the **Project options** dialog box by right-clicking the ⬚ icon or by selecting the menu **File – Project options…**.

You can open the **Background** dialog box directly by right-clicking the multi-function icon ⬚⬚⬚⬚⬚⬚.

In both cases the following dialog box appears:
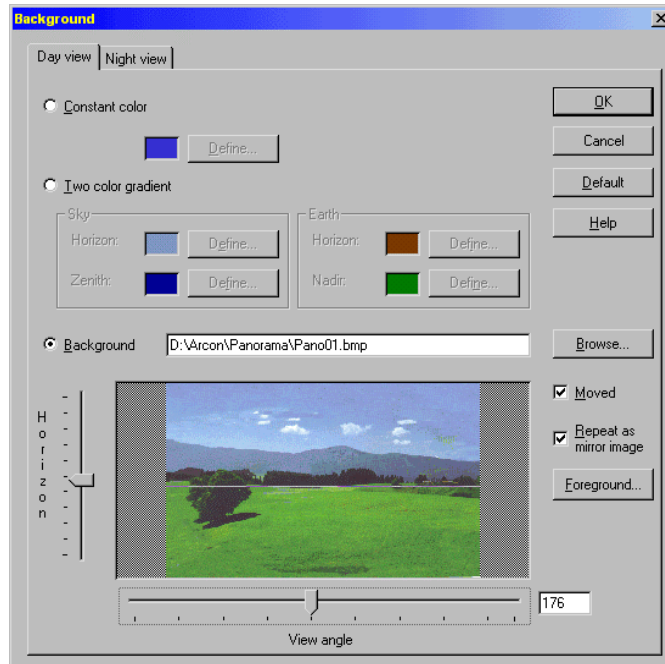
This dialog box has two tabs; one for the **Day view**, and one for the **Night view**. In both tabs you can adjust the same settings for day and night views. You can also select between the three alternatives: **Constant color**, **Two color gradient** and a **Background picture**.

The settings made here can affect printouts so be sure to make the respective settings separately in the print options dialog box (see page 118).

With the setting **Constant color** the entire window background of a Plan view (color) or Perspective view is filled with the selected constant color. By clicking the **Define…** button you open a standard Windows dialog box where you can define your own color.

The option **Two color gradient** lets you define different colors for the *sky* and the *earth*. In order to best understand how ArCon creates these color *ramps*, imagine you're standing at the center of an infinitely large sphere, whose *North Pole* (zenith) would be

382

directly above you and whose *South Pole* (nadir) directly beneath you.

From the zenith of this imaginary sphere up to the equator, ArCon interpolates between two freely defined colors, symmetrically. That is, the color is distributed symmetrically between these two points. Depending on the direction you're looking in, you'll see a part of this color ramp. The same applies from the equator to the nadir. You can obtain realistic results by selecting various blue tones for the sky; for the earth we recommend a horizon color of brown, and a nadir color of green.

The last option for the background is a background picture. Unlike the first two options, where only constant colors are used, drawn line by line, the background picture is drawn differently. You can use any Windows bitmap file, for example, a picture of the Alps or a picture of the building site on which the house is to be built. This can help give you or your client a realistic impression of how the new house will affect the actual building site.

If you select a background picture as the background, you can make various other adjustments to how the picture is displayed:

- The position of the horizon in this picture
- The viewing angle of the picture
- Whether the picture is moved when the display is moved or rotated.

If you click the **Foreground** button, you'll open the dialog box **Foreground picture**. Here you can select a foreground picture for Plan view (color) and Perspective view.

7.3.1   *Position of the horizon*

If you load any background picture (a Windows BMP file), ArCon naturally cannot know where the horizon is in this picture. You must adjust this manually, by activating the slider left of the picture preview. If you move the slider up or down, you'll see that in the picture preview a horizontal line marking the horizon is shifted up and down.

Position the slider in such a way that the horizon marker precisely meets the horizon in the picture. This adjustment is important to achieve, with placed background pictures, a correct position of the horizon in relation to your project. If you look exactly horizontally (by setting 0 degrees in the **Advanced settings** dialog box, for example, which is opened by right-clicking the ⬍ icon, in the **Advanced settings - Head angle** section), the specified horizon of the background picture will be exactly in the center of the view.

7.3.2   Background picture view

Below the background picture preview is another slider, with which you can adjust the view from which the background picture was taken. Generally you will only be able to estimate this value; it is the camera's angle from which this picture was taken. The larger the focal length of this angle, the smaller the angle from which the picture was taken. For most pictures a setting of 60 degrees (displayed to the right of the slider) is *normal*. If you use a telephoto lens, the angle will be accordingly smaller; with a wide-angle lens the angle will be accordingly larger.

The most suitable background pictures are those taken with a wide-angle lens. A picture with 360 degrees would be ideal, but such pictures can be taken only with special cameras or processes. This becomes important when walking through your apartment so the picture will be visible (and correctly adjusted) from all positions.

Note that the specification of the angle as well as the specification of the field of view, made here, affects the current view window. For example, if you enter 30 degrees as the angle for the background picture, and 60 degrees as your field of view for the view window, you'll only see half of the background picture, horizontally. If the field of view is the same as the viewing angle, you'll see exactly one background picture per view.

If you then rotate left or right in the current view, the background picture will move accordingly. Since the picture will *end* as you rotate about the view, ArCon repeats (tiles) the picture at the sides, and also reflects it. This applies not only to the left and right sides, but also to the top and bottom.

If you select 60 degrees, for example, as the viewing angle for the background picture, and you rotate once around by clicking the icon, the background picture runs by 360 / 60 = 6 times around. You'll look exactly at the center of the background picture if you look exactly in the X-direction.

7.3.3   Moved background picture

All comments about moving a background picture, made in the previous paragraph, apply only if this box is checked. If it is not checked, the background picture is shown but it does not move if you change the line of sight, for example, walking through: you'll always look at the center of the background picture. ArCon always increases or decreases the size of the background picture in such a way so it always fits exactly into your current view.

Note: If the scale of your current view does not correspond to that of the background picture, sometimes sections of the background picture may be cut off, in order to avoid distortions.

You can use a motionless background picture to position your project, for example, into a building gap. For this, load the desired background picture, uncheck **Move** then adjust the view position and the screen window of your 3D view in such a way that the building fits exactly into the desired window. Note that the modification of the zoom level can change this adjustment. Correctly adapting the view to the background picture may take a little practice.

Like most other dialog boxes in ArCon, the dialog box for the background contains the **As default** button. If you click this button, all new projects will use the settings you made here.

Note: If you calculate a picture with Raytracing and the scene contains reflected areas, the adjusted background is also reflected on these areas.

7.4 FOREGROUND PICTURES

Similar to background pictures, ArCon lets you select a foreground picture for Perspective view and Plan view (color). To select a foreground picture, first open the **Background** dialog box, which you open by right-clicking the icon in the vertical toolbar, then click the **Foreground** button. With this button you open the **Foreground picture** dialog box , where you can select the foreground picture.

In contrast to background pictures, the foreground picture cannot be moved. It is, as the name suggests, always visible and cannot be covered. A foreground picture is basically loaded as a bitmap file. Here the size of the bitmap file is transferred one to one. That is, a pixel of the bitmap file corresponds precisely to a pixel on the screen. Even if you change the size of the window, the foreground picture's size is preserved according to the size of the bitmap file.

A foreground picture is suitable, for example, for placing the logo of an enterprise as a permanent nameplate on the display. In addition, the foreground picture can serve to display additional information or explanations about legends in order to keep, for example, the names of a prefabricated building available but out of the way (especially when used with multiple views).

Besides that, you can use a foreground picture to include a special display of an object or group of objects. The view of a house can be enhanced this way, for example, to

385

show a hedge in front of a house (with the hedge as a foreground picture).

Note: If the foreground picture should have transparent areas, these areas must be set to black, since the color black is rendered transparent in the display.

7.4.1   Foreground picture dialog box
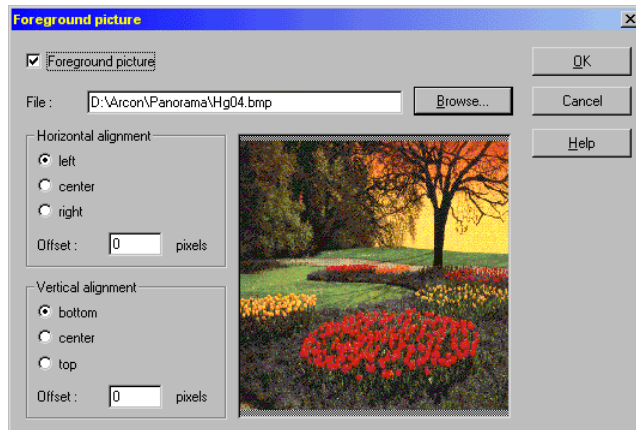
In this dialog box you can specify whether you'd like to work with a foreground picture. If you do, activate the **Foreground picture** check box. If this check box is deactivated, all other sections of the dialog box are grayed out.

In the **File** field you input the name of the bitmap file. Alternatively, you can click the **Browse…** button to open a standard file selector dialog box to look for and specify the desired file.

7.4.1.1   Horizontal alignment

In this section you specify how your foreground picture should be horizontally aligned in the display. The options are **Left**, **Center**, and **Right**.

In the field **Offset** you can specify how off set the adjustment should be. The value is specified in pixels. Note that you can enter both positive and negative values. If you select the alignment option **Left** and you input a negative off set value, the picture is shifted to the right.

7.4.1.2 Vertical alignment

In this section you specify how your foreground picture should be horizontally aligned in the display. The options are **Nottom**, **Center**, and **Top**.

In the field **Offset** you can specify how offset the alignment should be. The value is specified in pixels. Note that you can enter both positive and negative values. If you select the alignment option **Top** and you input a negative offset value, the picture is shifted to the bottom.

7.5 SELECTING A VIEW TYPE

With this multi-function icon you can select between four (six in ArCon+) different types of view in which your project is displayed in the view window. The icon appears only in Plan view (color) and Perspective view. In Plan view this icon is of no use and is therefore omitted.

The view function contains a multi-function icon, characterized by the small black triangle at the lower right corner. If you hold the mouse pointer over a multi-function icon, the additional view types (icons) will be displayed. As you move the mouse pointer over each icon, text about each icon is displayed in the status bar at the bottom of the window. Release the mouse button over the desired view icon to select it.

After you've selected a type of view, the view in your current window is adapted immediately. The different types of view are briefly described in the following paragraphs.

7.5.1 Wire frame

This type of view shows only the outlines of the elements, as well as outlines of walls, windows, doors, etc. The colors of these outlines correspond to the colors of the objects. For example, if you show a blue sofa as a wire frame, its outlines are blue lines.

Wire frame is the fastest of the view types, useful for handling your project.

7.5.2 Color without texture

In this type of view, the program uses a solid color for each area or object in your

387

project. If these areas or objects have a texture, ArCon averages the colors used in the texture to display a suitable solid color. For example, if you show a blue sofa with a light-to-dark blue texture, ArCon computes a medium-shade of blue for the solid color.

Color without texture is not as fast as **Wire frame**, but it's substantially faster than the next option **Color with texture**.

7.5.3   *Color with texture (medium/high quality)*

These two types of view show elements with their assigned textures. The blue sofa from the previous examples would appear with its light-to-dark blue colored texture.

With these colored types of view, you have a choice regarding how the textures are displayed.

The difference consists of the quality in the two types of view. For example, colors and shading in a texture are sometimes not symmetrically drawn with large wall areas in the view **Colored with texture (medium quality)**, while there is no difference with objects. This difference is clearly visible if you click the icon to switch into night view (see page 396).

A further difference concerns the display rate. These two view types are substantially slower than the two types previously described, due to the high or extremely high calculations required. Note, however, that if you use a MMX computer (see page 673), there is no difference in the display rate between the view types **Colored with texture (high quality)** and **Colored with texture (medium quality)**. In this case, you should certainly use the type of view **Colored with texture (high quality)**, in order to guarantee the optimum display quality.

7.5.4   *Wire frame with hidden surfaces*

This type of view shows only the outlines of the elements as well as the outlines of walls, windows and doors, but unlike the **Wire frame** view, the outlines are filled. The color of the outlines is always black, and the areas within outlines are always white.

If you set the background color to white, it will look just like the view type **Wire frame with opaque edges**. This effect is a result of all areas being filled and outlined with black borders.

388

7.5.5 *Wire frame with hidden line removal*

In this view type, areas are calculated and filled (so they're not transparent) and outlined with black borders.

Due to the computation required for this, a substantially more exact view can be achieved but at the expense of the fast display.

7.5.6 *Raytracing*

Don't let the name deter you. In ArCon, raytracing essentially means clicking an icon and waiting for the result. Before the details of raytracing are described, some background information about Raytracing.

Raytracing is a technique with which the lighting conditions of a scene can be precisely simulated on your computer. In contrast to the *normal* lighting and view in ArCon, you can also simulate shadows, reflections and refraction's with raytracing. The disadvantage of raytracing, compared to the *normal* display, is the comparatively higher computing time. For example, if the normal display is so fast that you can walk through your apartment in a *real-time* manner, calculating a raytraced picture will require several minutes or even hours. The very realistic view of the scene makes up for the time disadvantage.

If you have a Pentium-based computer with two or four processors (Pentium II or PentiumPro system) with Windows NT as your operating system, ArCon will use all available processors when raytracing. The speed of the raytracing operation varies according to the number of processors in your computer, where the rate increases in an almost linear fashion to the number of processors. If you use four processors, the Raytracer is almost four times as fast as using a single processor.

Since the raytracer simulates lighting effects very precisely, it is of great importance that the placement and brightness of the light in your scene be *correct*. Just as with normal photography, you can create special effects with the positioning of light sources. You can also over or underexpose your scene by using too many or too few light sources, or light sources that are too bright or too dark. Here a certain measure of experience is necessary, which you'll very quickly obtain due to ArCon's ease of use. When preparing to raytrace a picture, do not be shy about placing lamps in places they're not evidently required.

7.5.6.1 Overexposure and underexposure in ArCon

Just like normal photography, you can easily over or underexpose a scene. In order to avoid this effect, please observe the following: In principle, ArCon never shows textured areas brighter than the original texture. If a medium-gray texture is used, you will never see the texture brighter than the original medium-gray, regardless of the number of light sources in your scene. If you then place a chair in front of this medium-gray area, it may occur that despite the calculation of the light sources and appropriate shadows, the area on which the chair throws a shadow is still overexposed. The effect is that you do not see the shadow, since the area that falls in the shadow is still overexposed. In order to avoid this effect, you proceed as follows.

In the normal view, right-click the icon. The **Brightness** slider that appears in the following dialog box must be adjusted in such a way that the scene begins to get darker. To correct for the gray area in the example, it should be just a slightly darker level of gray. With the **Preview** button, you can very easily control this fine adjustment. If you now acknowledge the dialog box with **OK**, you can assume the lighting conditions are optimally adjusted. Next start the raytracer by clicking the icon and you should see the expected shadows in the gray area.

7.5.6.2 Using the raytracer

Once you've optimally illuminated a scene and you click the icon to start the raytracer, ArCon will calculate the scene with raytracing, starting with rough increments working through ever-finer increments until the picture is completely fine. This step by step process is not only part of the raytracing process, but it lets you abort the process early if you see that it isn't turning out correctly. For example, you can interrupt the raytracing to make lighting changes or to reposition objects. If you are content with the result, simply wait until the picture is completely calculated. This can take some time, depending upon the resolution and complexity of your scene. Here, complexity of the scene basically means how many light sources and objects you have, and even more so, how many of these objects are transparent or reflect light.

Additionally, areas that are lit simultaneously by multiple lamps and not affected by shadows take considerable computing time.

7.5.6.3   Raytracing options

Besides the adjustments of light sources you can make for raytracing, you can make additional adjustments in the **Raytrace options** dialog box. You can open this dialog box by right-clicking the ⚡ icon.
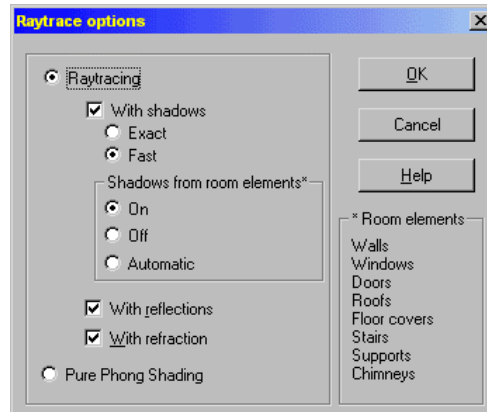
The dialog box is divided into the two options **Raytracing** and **Pure phong shading**, and under the option Raytracing you have additional options. Phong Shading is the name of a computer graphics process that was developed in the seventies by a gentleman named Bui Tuong Phong. It corresponds in principle to raytracing in that it attempts to compute realistic lighting patterns and properties. In contrast to the normal display, with Phong Shading lighting calculations are made for each pixel you see on the screen.

In the normal display, which uses so-called Gouraud Shading, the lighting conditions are calculated only at the corner points of individual areas and distributed within a symmetric area. The technical process in the normal display is bilinear interpolation. This symmetrical distribution with Gouraud Shading has the disadvantage that lighting effects within an area are not correctly calculated or displayed. For example, say you place a lamp on a relatively large floor that consists of only one area. The lighting conditions are calculated only at the four corners of the area, and so the bright spot you would expect under the lamp in the center of the area is not shown. In contrast to this, Phong Shading calculates the lighting conditions for each pixel, so you will see the bright spot under the lamp.

The benefit of Phong Shading compared to Gouraud Shading is better calculation of

391

light distribution. The disadvantage compared to raytracing is that shadows, reflections, and refraction's are not considered or calculated. Pure Phong Shading requires less computing time than raytracing, but more than the normal display using Gouraud Shading.

If you select Raytracing in the dialog box, you also have the option to specify whether shadows, reflections, and refraction's are to be calculated. You can switch individual elements on and off to achieve only the required special effects or to shorten the required computing time.

In the previous sections it was mentioned that calculating shadows or areas which are simultaneously situated outside of shadows and lit up by very many light sources places great demands on the processor and computing time. In order to limit the computing time, ArCon has two different methods for calculating shadows, between which you can select the most suitable. The first option is the **Exact** shadow calculation; the second is **Fast** shadow calculation (not quite as accurate – but definitely faster). The substantial difference between these two options is that with the fast setting ArCon does not test whether the walls of a room throw shadows into the room. Under most conditions, this is effective: Imagine yourself in, for example, a square room; you will never see shadows of the walls inside this room.

However, this can cause errors if the room is, for example, L-shaped. If a lamp is in one leg of the L, a wall in the other leg of the L can throw quite a shadow. If you select fast for the shadow calculation, you will not see this shadow – but with the **Exact** setting, you will.

If you activate the option **With shadows**, you can select whether the raytracer should calculate shadows cast by room elements such as walls, window, doors, roofs etc. The list **Room elements**, lists those room constructional elements which are affected by this selection. This lets you specify that, for example, walls cast a shadow outside, but not inside, a building – since this would create dark lighting conditions inside the building that could otherwise interfere with your work, for example, if you're not considering the position of the sun at this particular moment.

Select the **Off** option if the room elements should not cast shadows.

With the **Automatic** option, the room elements cast shadows only in the night view. In the day view, and the variable time of day view, shadows are only cast outside the building, and so are visible only if you are outside of the room and building and look at the building from this outside position. If you are within a room, the room elements do not cast shadows.

392

If you select the variable time of day view, during the change from day to night the shadows are adjusted automatically according to these settings (and calculated accordingly). As noted above, this applies only to the **Automatic** selection in the **Raytrace options** dialog box. Specifically, this means that as soon as the time turns to night and the lamps are switched on, the room elements within the room cast shadows internally.

7.5.6.4   Raytracing with lights switched on and off

In ArCon you have the option to switch lights on and off individually and also to set a standard daytime light level, by clicking the 🔅 icon (see page 438). This daytime lighting corresponds to sunlight. In the real world, a scene would be lit up through the windows during the day; nevertheless you'll see the sunlight (as shadows) as it comes through the windows, but still the entire room is altogether bright.

This indirect lighting, which results from the light coming through the windows and which affects individual areas of your scene while ultimately lighting your entire scene, is poorly simulated with raytracing. Techniques to accurately calculate such lighting exist, such as the so-called radiosity, but such techniques place heavy demands on computer hardware and memory. At the time of writing, ArCon does not yet support such a technique.

7.5.6.5   Saving and printing raytraced pictures

Beginning on page 120 you'll find a general description of the procedure to store or print a raytraced picture. To save: in the appropriate dialog box, you can indicate whether the saved picture is to be calculated with raytracing. If you save a picture and **Raytraced** is selected in this dialog box, the raytracer is automatically started when you go to save the picture, in order to calculate the rendered picture.

Depending upon the other **Save** specifications set in the dialog box, such as **Size**, **Oversampling**, etc., this save-and-save operation can take a very long time before the final picture is completed and saved. For example, if you indicate a resolution of 2000 x 1500 pixels, and also set an oversampling frequency of **16-times** plus raytracing, you can confidently leave your computer and, say, take in a movie. Please consider before you begin such an operation exactly which options you need enabled, and disable those you do not require.

393

If you need a high resolution picture for a high-quality printout, we recommend the following settings: Resolution approx. 1500 x 1500 depending upon the aspect ratio of the picture; **4-times** (quadruple) oversampling, and **Edge filters**, These settings deliver good results without taking much time.

Note: These setting will take a substantial amount of time for rendering on a 100 MHz Pentium computer. Newer and faster processors can of course produce a picture in much less time. But we encourage you to start with these settings as they set a good middle ground; if you need better quality and can afford the time, please indulge yourself. Similarly, you may be satisfied with lower settings, in which case there's no need to waste the extraneous computing time.

7.5.7   *Walking through projects*

This function is extended in ArCon+ compared to ArCon. Appropriate information can be found beginning on page 523.

The walkingthrough function is activated by clicking (see page 403) in Design mode. In the view window the standard mouse pointer changes; depending on its position its form is either

Directional markers, for example, to move in different directions,

or rotation symbols, for example, to rotate your position.

The arrows show you in which direction you'll move if you press the left mouse button.

Depending upon the position of the pointer, you can move in the following directions:

> Forward and Back
>
> To the left and To the right
>
> Forward and Left and Forward and Right
>
> Rotate to the left and Rotate to the right.

If you now left-click with mouse pointer in the view window, you'll begin to walk through your project. The rate of movement depends on the pointer's position in the view window. The nearer the pointer is to the center of the window, the slower you'll move in the respective direction. When the pointer is in the center of the view window, the pointer changes to:

If you move, while holding down the left mouse button, toward an edge of your view window, you'll walk through your project faster. The closer you are to an edge of the window, the faster you'll move in the respective direction (this applies to all directions).

394

You can increase the movement rate even more by pressing the **Ctrl** or **Shift** keys while pressing the mouse button, and faster still by pressing both **Ctrl** and **Shift** together. When you release the left mouse button you stop at the current position in your project. When you press the mouse button again, you'll start to move again. By clicking any icon in the toolbars the **Walkthrough** function is terminated and the walkthrough icon returns to its inactive state.

Using the walkthrough function requires some training, which you'll easily acquire by working with a simple room and experimenting with this function.

When walking through a project, you can select the type of view for your project, for example, as a wire frame or colored without texture with the **General options** dialog box. You can open this dialog box by selecting the menu **Options – Program – General**.

7.5.7.1   Walkthrough dialog box

If you right-click the icon, you'll open the **Walkthrough** dialog box.
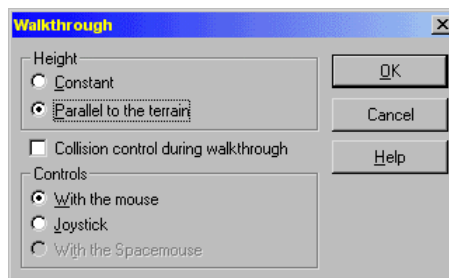
7.5.7.1.1   Height

If you select the option **Constant**, you'll walk through your project at a constant height. If you activate the option **Parallel to the terrain**, the height is adapted to the environment. You will want to select this option if you want to walk through, for example, a very uneven area and want to adjust the walkthrough height over hills and low areas. This is particularly important when walking through a project with the ArCon VR module, since you would run too fast through rooms and risk disappearing.

7.5.7.1.2 Controls

In this section you can select the input device you want to use to control a walkthrough. The option **With the spacemouse** is unavailable and grayed out if no Spacemouse is connected to your computer.

Additional information on the Spacemouse can be found on page 667. The operation of the joystick and keyboard shortcuts is described on page 665.

7.5.8 Day/night/variable time of day view

This function is active only in Plan view (color) and Perspective view (see page 378).

By clicking the multi-function icon you can switch between day view, night view and a variable time of day view. If you right-click the multi-function icon, you'll open the **Brightness** dialog box, where you can set the lighting conditions in detail.

7.5.8.1 Day view

In the day view, your project is shown with a predefined brightness level, which is set in the **Brightness** dialog box (see below). All lights in the project do not affect the brightness of the view in the day view.

7.5.8.2 Night view

In the night view, only the lights that are currently switched on will light your project. All rooms, which contain no light sources, appear dark.

7.5.8.3 Variable time of day view

If you select the variable time of day view, the lamps affect the view automatically as the sun sets, and the day view turns to night view. With the World position dialog box (see page 398) you have the option to consider the position of the sun when setting the lighting conditions in the view. You can use this effect with animations, made with recordings over changing time periods, created with the video recorder (see page 526).

With the variable time of day view, shadows can be more accurately rendered by the raytracer. For example, you can create an accurate view of a room and the shadows

396

therein as the sun throws light into the room.

Altogether, the variable time of day view lets you create a more realistic view of your project. You can accurately simulate, for example, the lighting conditions in a room with a window to the east side, as the sun rises in the morning.

7.5.8.4   Brightness dialog
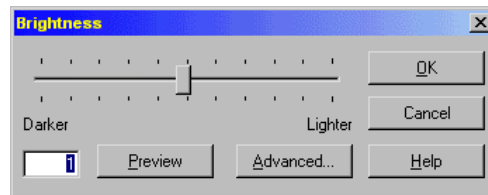
You open this dialog box by right-clicking the icon or by selecting the menu **Options – Brightness**.

With the slider you can set the numeric value of the brightness by moving the slider bar left and right. This way the intensity of the light, in which your project will appear, can be set darker (<1.0) or brighter (>1.0).

The current brightness value is displayed at the lower left-hand corner of the dialog box, in an input box. You can input the brightness value directly into this box with the keyboard. If the numeric value is less than 1, your project will appear increasingly darker at lower brightness levels.

You can preview the current brightness setting by clicking the **Preview** button. The input values are directly transferred to the project (but not made permanent until you exit the dialog box by clicking **OK**).

With the **Advanced** button you can open the **World position** dialog box (see page 398). In this dialog box you can make various adjustments which are used in the variable time of day view, including the viewer location, the local time, the position of the sun, and other lighting conditions. For example, you can specify whether the sun should be visible, or only its light.

7.5.8.5 World position dialog box
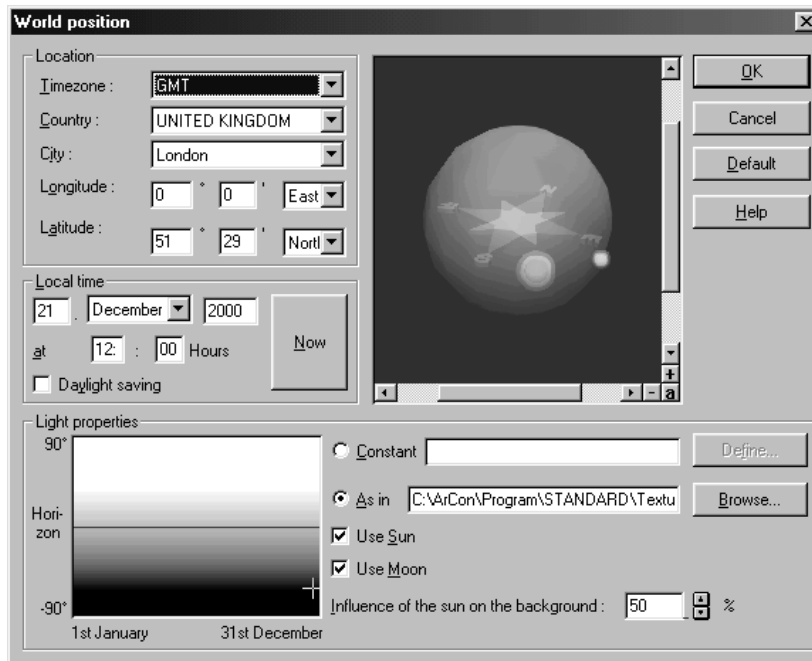
You open this dialog box by clicking the **Advanced** button in the **Brightness** dialog box.

You can control the lighting conditions in the variable time of day view here, by animating the sun and moon dependent on the viewer location (the geographical latitude and longitude) as well as the local time (the exact date as well as the time of day). On the basis of this sun-moon constellation, accurate lighting effects can be created over a freely selectable colored background, which creates the most realistic view of brightness or darkness as possible.

You can also use these lighting effects, in order to record time changes with the video recorder (see page 526).

7.5.8.5.1   Viewer location

You have different options for setting the viewer location. In general you will first select the desired country from the **Country** selection list. Then, you can select a predefined city from the **City** selection list. For each city the corresponding latitude and longitude are displayed in the **Latitude** and **Longitude** fields.

If the desired location is not available in the **City** selection list, you can enter the correct location by inputting the appropriate latitude and longitude. Note when you specify a location this way, only the longitude and latitude are displayed – no other information can be deduced. Thus, the **Country** and **City** fields are grayed out.

The **Timezone** field is automatically calculated and displayed for both input versions. A change of country, city, latitude or longitude is not possible from this field. Since the time zone of a place cannot be accurately determined from longitude and latitude alone, you can select the time zone from a list.

Together with the **Local time** settings (described below), these settings establish the constellation of earth, sun and moon, which is visualized in the preview window.

7.5.8.5.2   Local time

You can specify here, with the input boxes and selection list boxes, the exact date as well as the time of day. Both values refer to the position of the selected viewer location. Together with the **Viewer location** settings (described above), these settings establish the constellation of earth, sun and moon, which is visualized in the preview window.

If you click the **Now** button the current date and time of day, according to the clock in your computer, are inserted in the appropriate fields and used for the view of the sun

399

and the moon in the preview window.

Daylight saving is not automatically detected. You can indicate that daylight saving time is in effect by checking the switch **Daylight saving**. Note that when this switch is checked, the sun and moon are adjusted one hour forward.

7.5.8.5.3 Preview window

The preview window shows the constellation of earth, sun and moon according to the indicated **Viewer location** and **Local time**. All modifications you make in these two sections immediately affect the view in the preview window.

The focal point of the cross is the point specified as the viewer location. The viewer then is to a certain extent at this focal point and from there looks in different directions to see sun and moon.

To modify the point of view, for example to look in another direction, you must move the pointer over the preview window. The pointer changes to ⚕. If you now click the mouse button you can change the point of view by moving the mouse. The viewing position in the preview window is like that of a satellite, which flies around the viewer and can be seen from all sides.

The preview window is also very well suited to freely animating the sun and moon. If you modify, for example, only the date and not the time of day, you can change the moons position relative to the earth without changing the sun's position. With this animation of the sun and moon you can also determine when the next solar eclipse will occur.

7.5.8.5.4 Lighting conditions
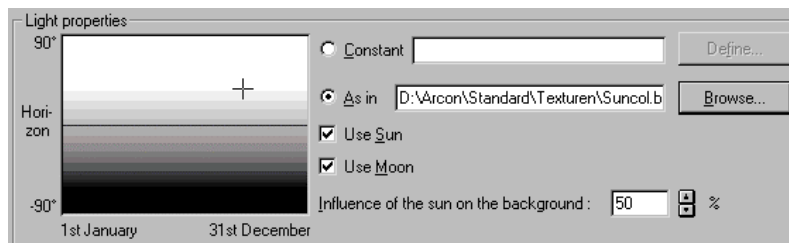
In this section you can control the lighting conditions in the variable time of day view. This means that you can select either a bitmap image or a constant, solid color, for the color of the sunlight. The color of the sunlight affects the entire background, so that the

lighting effects create the most realistic view possible of brightness or darkness.

Note that the sun and moon are not the only sources of environmental light. ArCon also has a second unchangeable light source which lightens the view altogether. This environmental light is required for night views.

7.5.8.5.4.1   View window

If you've loaded a bitmap image file as a background picture, you can detect the sun's position over the horizon using the cross hair. This position depends on the viewer location and the local time. If you change, for example, the month from January to May, you'll see the sun i.e. the cross move from left to right.

The axes over the picture indicate coordinates. The X-axis marks the season, from January 1 through December 31. The Y-axis shows the position of the sun over or under the horizon, indicated by the centerline – from 0:00 o'clock (midnight) to 24:00 o'clock.

The cross hair on the colored background of the bitmap file shows you which color of the bitmap file is used for the sun in the variable time of day view. If the cross hair, for example, is on a reddish area, the sun assumes this color; this is practical for creating a morning or dusk redness in the lighting. The color of the sun also affects a background picture, for example, a picture of clouds can be illuminated.

The bitmap is a sort of diagram. It specifies the color of the sun as a function of the season and time of day.

7.5.8.5.4.2   Constant option

If you select this option you can define a solid **Colored background** for the sunlight by clicking the **Define** button. When you click this button you open the standard Windows color selector dialog box. If you activate the **Constant** option, the input box for the option is inactive but displays the selected color.

If you, for example, define the color as yellow, the input box shows yellow indicating that the sun will shine yellow light. The background would be yellow, and the individual elements and objects will be colored (lit up) with a yellow light.

7.5.8.5.4.3   As in option

If you activate this option, you can enter the path and filename of a bitmap image file, or search for one by clicking the **Browse** button. The selected bitmap is displayed in the view window and forms the basis of the sun's color in the variable time of day view.

You should select a bitmap according to the climate conditions of the viewer location.

Usually if a cloudless, radiating sky exists at the specified location, the color tone shown in the bitmap should reflect this, over the course of the whole year (as opposed to a place with mostly covered skies). In the first case, you should load a bitmap with white, clear colors; in the second case a bitmap with symmetrical gray colors is appropriate.

You can create the bitmap images with Windows Paintbrush or other pixel-based painting program. Remember that the color scale in each picture should reflect an approximation of actual lighting conditions.

7.5.8.5.4.4   Use sun/moon

With these options you can choose whether, in the variable time of day view, the sun or the moon should itself be displayed, or only the light created by them.

You will want to suppress, for example, the view of the sun, if it is in front of the clouds in a background picture. In this case the light created by the sun is preserved, but the sun itself – as in nature – disappears behind the clouds.

7.5.9   Influence of the sun on the background

Here you specify the percentage of the sun's color (as defined by the constant color or the cross hair's position over the bitmap image) that is to influence the background color.

For example, let's say you've loaded a bitmap on whose basis the sun assumes a reddish tone in the morning and in the evening. If you now enter an influence value of 50 per cent, the clouds in the background picture appear orange. Thus you can simulate the effect of morning or dusk redness in the sunlight.

The sun's color should generally affect the background to some degree, since it can otherwise occur that you'll have a blue sky at night, although the sun's color should become black after sunset according to the bitmap.

You should always check this setting when you have a loaded bitmap image as the background picture. Additionally, the setting is appropriate if the background (see page 381) is set up to use **Variable color** (between two colors).

7.5.10   Go up or down a floor 🔼 🔽

7.5.10.1   Go up a floor 🔼

If you click this icon, you shift your project a floor upward in the view. If you press the **Ctrl** key while clicking the 🔼 icon the change between floors is animated. This icon is only available in Perspective view. In the other types of view the icon is omitted from the horizontal toolbar (see page 377).

7.5.10.2   Go down a floor 🔽

If you click this icon, you shift your project a floor downward in the view. If you press the **Ctrl** key while clicking the 🔽 icon the change between floors is animated.
This icon is only available in Perspective view (see page 378). In the other types of view the icon is omitted from the horizontal toolbar.

7.5.11   Adjustments for perspective view

In Perspective view there are two options to change the position of the viewer as well as the point in which the viewer is facing. One is the walkthrough icon 🐾 (see page 394) with which you quasi-interactively change your position; the other is to adjust the settings in the following dialog box.
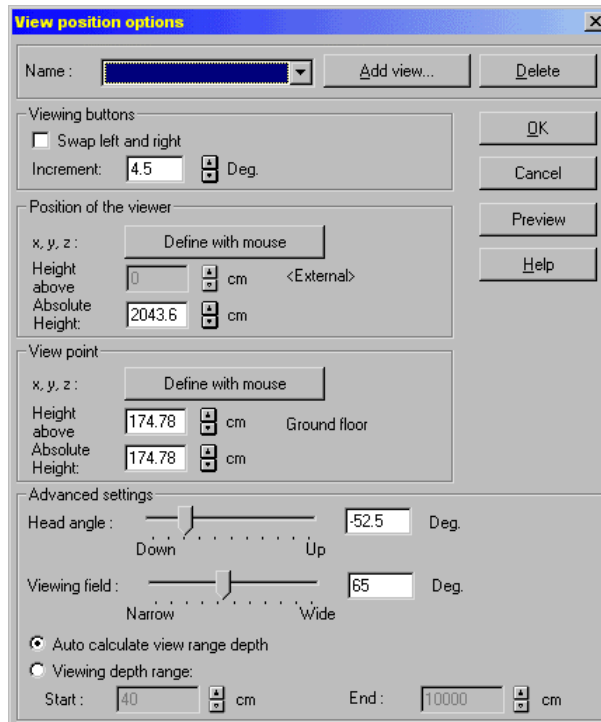
You open this dialog box by right-clicking the view icon ⬧. The sections of the dialog box (**Viewing buttons, Position of the viewer, View point,** and **Advanced settings**) serve to define the related settings. At the top of the dialog box there is an input box where you can name and save the settings for this view position.

7.5.11.1 Position of the viewer

ArCon gives you the ability to define and save multiple viewer positions for your project. You can then arbitrarily shift between different viewpoints in Design mode.

Working with defined viewpoints is particularly helpful in ArCon+ when you're recording movements with the video recorder, since you can easily access certain positions. You can set yourself exactly at defined viewpoints and continue your walkthrough from there.

Defined viewpoints are listed by name in a **Selection list**. If you select a defined position from the list and acknowledge it with **OK**, the view in Design mode changes

according to the settings for the selected viewpoint. If you've defined no viewpoints – which is always the case with a new project – the list is empty.

In order to save the current viewer position, proceed as follows:

If you click the **Add view…** button in the **Save user viewpoint** dialog box, a dialog box appears where you can name the viewpoint.

Here you can save all the specifications you've made in the **View** dialog box using a name of your choice.

If you acknowledge with **OK**, you return to the **View** dialog box. The name of the viewpoint now appears in the **Name** selection list.

If you want to delete a viewpoint from the list, you must first select it in the list then click the **Delete** button. The entry is subsequently removed from the list.

7.5.11.2   Directly saving the current viewpoint

Beginning with version 4.0 of ArCon, you can directly save the current viewpoint, and switch to existing viewpoints, without opening the **Save user viewpoint** dialog box by right-clicking . For this you have the icon which is to the left of the icon, as well as a selection list of existing saved viewpoints.

 lets you save the current view as a saved viewpoint. Clicking it is just the same as clicking the **Add view…** button in the **Save user viewpoint** dialog box. In the selection list to the right of the icon you can select one of the previously defined viewpoints; it corresponds to the **Name** selection list in the **Save user viewpoint** dialog box.

Deleting defined viewpoints can only be done in the **Save user viewpoint** dialog box, and not directly from the second horizontal toolbar.

7.5.11.3   Position of the viewer and view point

The position of the viewer (viewpoint) and the focus can be defined with the mouse. To do so, click the appropriate button in either of the two sections **Viewpoint** or **Position of the viewer**. Next, the dialog box temporarily disappears and you can set the

405

respective location with the help of the 3D mouse pointer.

In contrast to the X and Y-coordinates, you can also input the height of the **Viewpoint** or **Position of the viewer** numerically. When doing so, you can input the absolute height or the height relative to the floor. The **Height above floor** field is only available if the position of the viewpoint or the focus is situated in a room –otherwise this input box is grayed out and inactive.

7.5.11.4   Advanced settings

In the **Advanced settings** section you can change the head angle and viewing field. The **Head angle** corresponds in principle to the viewer nodding his or her head. You can use either the slider or the numeric input box to set this value. Note that while modifying the head inclination the focus height changes, since by changing the head inclination you're in turn changing the focal point.

Changing the **Viewing field** corresponds in principle to changing the respective setting on a camera. This way you can input values between wide-angle and telephoto – a **Narrow** value corresponds to telephoto, and **Wide** corresponds to a wide-angle setting. You can also enter the depth of field specification numerically by typing it into the field to the right of the slider.

For a more practical display, you can also adjust the visible depth range. In principle, ArCon can limit the range in Perspective view so only those things that are appropriate and pertinent are displayed. If you select **Auto calculate view range depth**, ArCon adjusts the values in such a way that you'll generally see your complete project – everything that lies before you and extends to the end of your project. If you select **Viewing depth range**, you can specify the visible depth range, from the starting point in front of you, extending out to the end point in the distance. Thus, you can cut out *sections* of your project; everything in front of it and everything behind it are not visible. In order to check the specification you've entered before you confirm it with **OK**, you can preview the settings by clicking the **Preview** button. Only when you click **OK** and exit the dialog box are the settings made permanent.

Note: When you're defining the viewpoint or the focus with the mouse, you can abort this process by pressing the **Esc** key. The dialog box appears again and the viewpoint or the focus (whichever you were working on) remains unchanged.

7.5.11.5 Move viewer

With this icon it is possible to view your project from all sides in the three views of Design mode (see page 377).

The operation of this icon differs from all other icons, which you either click or press down. The difference is in which part of the icon you click. Each of the four arrows in the icon has a different function. If you click the arrow at the left side, the left arrow is marked in red (and the function is executed). The same applies to the arrows for up, down, and right.

In Perspective view the picture changes as if you're rotating around the project, looking at the same part (focal point), exactly the same as pressing the arrow keys. In Plan view and Plan view (color), clicking this icon's arrow corresponds to scrolling the project in the view window.

You can change the focus – the point in your project you'd like to focus on – any time with the **Save user viewpoint** dialog box. As described above, you can also save such positions and quickly restore them from the selection list in the horizontal toolbar. You open the **Save user viewpoint** dialog box by right-clicking or by selecting the menu **Options – View**.

7.6 OBJECTS AND GROUPS

Most functions on objects and groups of objects are the same.

7.6.1 Placing objects and groups

Placing objects or groups of objects differs slightly, depending on whether you've chosen to place a single object or a group of objects.

Furthermore, this placement depends on which of the three types of view you are in. In the following sections, placing objects, with regard to the object type and view type, is described in detail.

In Plan view (see page 377) the pointer has the form and functions of the 2D pointer in Construction mode (see page 161). In Plan view (color) and Perspective view (see page 378) the pointer has the form and function of the 3D pointer.

7.6.1.1   Plan view

If you have selected an object or a group of objects with the object and texture catalog (see page 443), keep the left mouse button held down and pull the selection into your project. When you release the left mouse button the element is placed.

The pointer changes form, from the arrow to a cross, as soon as you pull the element into the view window in order to place the object. The selected object is not displayed as long as the pointer is moving over the view window. Only after placing the object is the selected object displayed with a selection frame around it.

If you've selected an object or a group of objects through the **Object** menus, pull it into your project without pressing the mouse button. The element is placed at the designated position when you click the left mouse button.

When placing elements, you can enable the **Collision control** function by pressing the **Ctrl** key. This **Collision control** prevents you from placing an element on, over, or otherwise in the same space as an existing object.

7.6.1.2   Plan view (color)

In this type of view, the pointer takes the form of the 3D mouse pointer, and has all its functions. You can place your objects precisely in the X-, Y-, and Z-directions.

7.6.1.2.1   Loading objects from the catalog

If you have selected an object or a group of objects with the object and texture catalog (see page 443), pull this into your project while pressing the left mouse button. By pressing the left mouse button alone you place the element in the X- and Y- directions, and if you press the left and right mouse buttons together you place the elements in the X- and Z- directions. Release the left mouse button to place the element.

The pointer is seen in the view from above as a red cross. The selected object is not displayed as long as the pointer is moving over the view window. Only after placing the object is the object itself shown, and then it will be marked with a selection frame (after placing an object, it's still the selected object).

7.6.1.2.2   Loading with the menu

If you've selected an object or a group of objects with the **Object** menu, pull it into your

project without pressing the mouse button. You place the element in the X- and Y-directions, while you can place the element in the X- and Z- directions by pressing the right mouse button. When the element is in position click the left mouse button to place it.

The selected element is immediately displayed in the view window and after it's placed it is marked with a selection frame.

When placing elements, you can enable the **Collision control** function by pressing the **Ctrl** key. This **Collision control** prevents you from placing an element on, over, or otherwise in the same space as an existing object.

7.6.1.3   Perspective view

In this type of view the pointer, like in Plan view (color), has the appearance and full functions of the 3D mouse pointer. You can place your objects in all three (X-, Y-, and Z-) directions.

The movement and function of the 3D mouse pointer in the project, in combination with the left and right mouse buttons, varies according to the settings made in the **General options** dialog box. The specific settings are made in the **Viewing buttons and 3D movement** section. You can open this dialog box by selecting the menu **Options – Program – General**. You'll find details about the adjustments on page 97.

7.6.1.3.1   Loading objects from the catalog

If you have selected an object or a group of objects with the object and texture catalog (see page 443), pull this into your project while pressing the left mouse button (or both left and right mouse buttons).

Depending on the settings in the **General options** dialog box placing the element varies in behavior depending on whether only the left mouse button is held down, or if both the left and right mouse button are held down. When you release the left mouse button the element is placed.

7.6.1.3.2   Loading with the menu

If you selected an object or a group of objects with the **Objects** menus, pull this into your project without pressing any mouse buttons.

When the element is in position, place it by clicking the left mouse button. In this

scenario, the left mouse button has no function. With the right mouse button you control the depth.

After placement, the selected element is displayed immediately in the view window and is marked with a selection frame.

When placing elements, you can enable the **Collision control** function by pressing the **Ctrl** key. This **Collision control** prevents you from placing an element on, over, or otherwise in the same space as an existing object.

7.6.2   Selecting and deselecting objects

All elements that you want to process must first be selected. The method of selecting objects in Design mode is identical in all three types of view. It also applies equally to both objects and groups of objects. Only the selection frames differ in their appearance from each other, depending on the type of view.

7.6.2.1   Selecting or deselecting a single object

You can select an object by left-clicking it. The selected object is then show with a selection frame. You can deselect a selected object by selecting another object, or by clicking in an area containing no objects.

7.6.2.2   Selecting or deselecting multiple objects

You can select multiple objects by pressing the **Shift** key while you left-click the desired objects. If you click a second time on an already selected object while pressing the **Shift** key, it is deselected.

7.6.2.3   Selecting all objects

You can select all objects in your project by left-clicking the ⊞ icon or by selecting the menu **Edit – Select all**.

7.6.3 Moving objects and groups of objects

Only objects and groups of objects that are selected can be moved. The type of movement differs somewhat between the three types of view (see page 377). The selection frames indicate different types of view, i.e. they too vary according to the type of view. While you're moving objects or groups of objects, the objects' selection frames are temporarily hidden (just like when you placed the objects in the first place). The pointer's form and function depends on the type of view you're in.

In order to prevent objects from setting into one another or being moved into a wall, press the **Ctrl** key when moving objects. Hereby **Collision control** is switched on. The object can now be easily placed, for example, directly beside another object or directly at the wall's edge without any conflict.

The **Snap** in Design mode function can also be used to make objects snap to other objects when being moved.

7.6.3.1   Moving objects and groups of objects with the grid enabled

If the ▦ icon (see page 165) is activated in Design mode, the objects you're moving will snap on the grid, exactly the same as moving elements in Construction mode. This also applies in Perspective view, where the objects will snap on the grid not only in width and depth, but also along the height of the adjusted grid.

If the snap function in Design mode is also activated, other objects or construction elements will also be used during snapping.

Note: In Plan view (color) and Perspective view, the grid is not displayed even if it is switched on.

7.6.3.2   Moving objects in plan view ⊠

(see page 377.). A black selection frame surrounds the selected objects and groups of objects. You can only move the objects in the X- and Y- directions. The pointer has the function of the 2D pointer.

411

7.6.3.3 Moving objects in plan view (color)

7.6.3.3.1 Movement in width (X) and depth (Y)

Move the pointer into the area of the selected objects or groups and move the objects or groups of objects while pressing the left mouse button. Releasing the mouse button places the element.

The selected objects and groups can be moved only in the X- and Y- directions. Movement in the Z-direction is not possible using only the left mouse button.

7.6.3.3.2 Movement in width (X) and height (Z)

Move the pointer into the area of the selected objects or groups and move the objects or groups of objects while pressing both the left and right mouse buttons. Releasing the mouse button places the element.

The selected objects and groups can be moved only in the X- and Z- directions. Movement in the Y-direction is not possible using both the left and right mouse button together.

7.6.3.4 Moving objects in perspective view

In this type of view the 3D mouse pointer contains a *shadow*. The pointer's shadow is displayed under the selection frames and indicates the connection between the floor level of the floor and the objects to be moved. You can use this shadow jet in order to measure where the object will land after releasing the left mouse button, if this object is set to fall to the floor.

You can control how the right mouse button affects moving objects in the **General options** dialog box.

7.6.3.4.1 Movement in width (X), depth (Y), and height (Z)

The movement and function of the 3D mouse pointer in the project when using both the left and right mouse buttons is dictated by the settings in the **General options** dialog box. You can open this dialog box by selecting the menu **Options – Program – General**. You'll find details about these settings on page 97.

Note: In order to simplify the process of moving objects, it can be practical to open a

second view window of the project. The first window, for example, could show Plan view or Plan view (color), and the second window could show Perspective view. You might find that it's easier placing objects this way, using multiple – and different – view types.

In Plan view or Plan view (color), objects can be easily moved in the X- and Y-directions, while Perspective view is best for easily moving objects in the Z-direction.

7.6.4 Loading and saving objects

Besides working with objects and groups of objects through the object and texture catalog, you can also load and save objects through the **Object** menu. If you select from the **Object** menu the element **Load object…** or **Save object…** a dialog box appears where you can continue the respective function. These dialog boxes are described in detail in the following paragraphs.

7.6.4.1 Save object dialog box

You can open this dialog box by selecting the menu **Object – Save object…**. This menu is only available if one - and only one object - is selected. If no object is selected or if multiple objects are selected, this menu is grayed out and inactive.

The dialog box that appears is the standard Windows file selector dialog box.

7.6.4.2 Load object dialog box
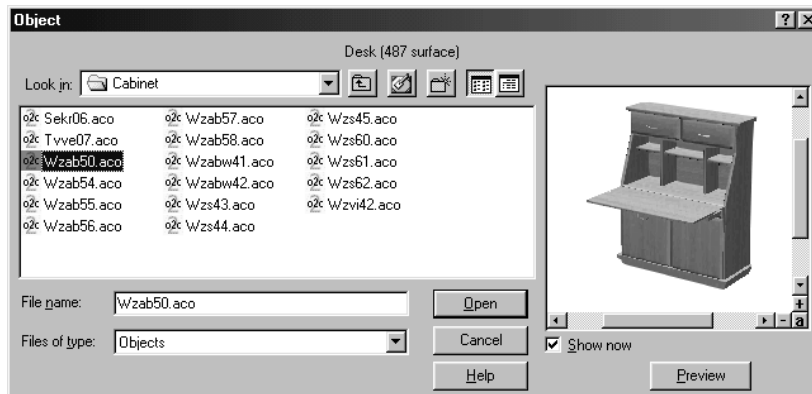
You can open this dialog box by selecting the menu **Object – Load object…**.

The only difference between this dialog box and the normal Windows file selector dialog box is that this dialog box has a preview window. In the preview window you can see an object before you actually load it into ArCon. Before you can preview an object, however, you must select a valid ArCon object (*.**aco**) in the file list.

Note: After selecting a file in the file selector, but before you actually load it, you can rapidly preview multiple objects in the same folder by pressing the up and down arrow keys. This changes the highlighted file in the file selector and displays the current file in the preview window. Note that this only works if you've checked the **Preview** box. In ArCon Online and ArCon version 5.0 and later, o2c objects can also be used in ArCon (in other words, objects made especially for the o2c Player from Eleco Software GmbH).

7.6.4.2.1 Options for o2c objects
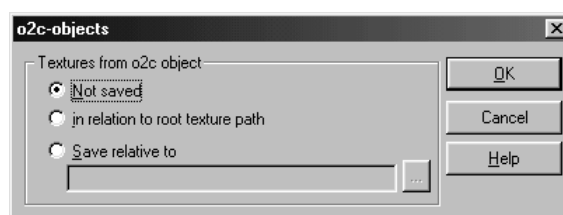
414

This dialog box is opened using the **Options/Program/o2c Object** menu.

This option can be used to set what happens to textures saved in o2c objects. As textures can normally be loaded from the hard drive in ArCon, different objects can also use them together. This requires much less memory. The textures themselves are saved in o2c objects, however. In order to enable these textures to be used for other objects (and for other o2c objects), there is the option of saving textures for o2c objects as separate files on the hard drive when loading those objects. It is not actually the textures themselves, which are saved in the o2c object, but rather their *history of origin*, in other words, their filename including the path relative to the basic default path. If an o2c object finds this file during loading, the texture of the file is used which means that other o2c objects can also use the same textures in ArCon. If you select **Not saved**, the o2c object textures are not saved when loading o2c objects. The alternative **Save relative to root textures path** saves the texture relative to the path entered in the **Program options** dialog box in the **Path for textures** section. The **Save relative to** alternative provides you with an option for specifying a separate basic path. The textures are then saved relative to this path. This last alternative can be used to prevent the *normal* texture directory becoming *overloaded* with textures, particularly when using many o2c objects.

7.6.4.3   Loading MicroFe FEA files

The request for static calculations of buildings has increased in recent years. 3D FEM models help to enter and transfer into calculation results a near-reality model. The finite elements program MicroFe, produced by Eleco Software GmbH, makes efficient modules available for the input, calculation, and resulting views of 3D FEM models (also see the *mb support for ArCon* section at the end of the manual).

Now there is a helpful supplement to the geometrical checking of the created FEM models. In ArCon, the created FEA files can be read in and displayed in 3D. Walls and other elements are shown in their true thickness. You can immediately detect errors in the thickness specification here. Supports and upper beams display their true cross-sectional dimensions. Thus, incorrect inputs of support dimensions and their adjustments can be identified.

The size and mass of upper beams is considered for the view and can easily be checked. The cross-section and materials used are shown in different colors.

With complex constructions, subranges of the model can be defined as transparent so

that you can identify certain details behind them. Naturally you also have the option of moving the spatial arrangement with the mouse using ArCon's basic techniques.

To load FEA files, simply use the same dialog box as the normal file selector for loading objects. You need only select the option **MicroFe FEA-files** in the **Files of type:** field.

7.6.5 Snap in Design mode

In ArCon 5.0 and later, objects in Design mode will also snap in a similar way to elements in Construction mode. If the snapping is activated using the relevant dialog box and you move a 3D object – regardless of the view – it will snap to objects and elements if it gets too close to objects or even walls and other construction elements. This is shown in the fact that the object will adopt this snapped position and only a transparent *shadow* from the object remains at the point where the mouse is positioned.

If there are various different objects close to the object which that object could snap to, the alternative snap positions can be selected using the key combination **Ctrl+F**, in exactly the same way as in Construction mode. If an object is snapped to by another object or design element, the orientation of the snapped object or element will also be modified accordingly. For example, if you move a sofa rotated by 20 degrees and drag it close to a straight wall, the sofa will automatically be rotated back by 20 degrees as well.

The snapping function in Design mode can also be useful when you want to compile a construction element from various objects and you want each object to be positioned directly against the other.

7.6.5.1 Snap in Design mode dialog box

This dialog box is opened by right-clicking in Design mode or by using the key combination **Ctrl+Spacebar**.
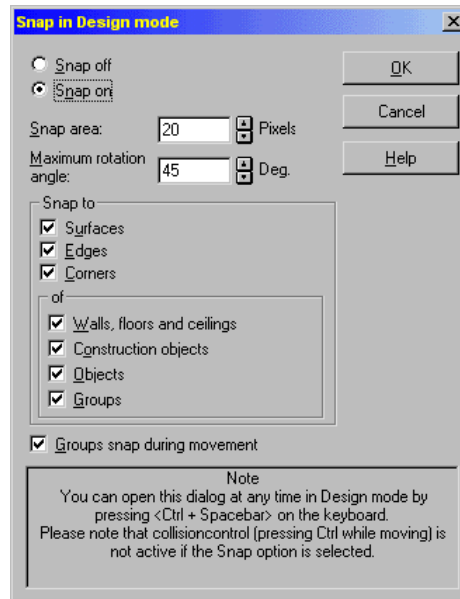
This dialog contains the settings for the snapping functions for objects in Design mode, and how those objects behave during the snapping process.

Select the **On** option to use the snapping function, and use **Off** to deactivate all the snapping functions when moving objects.

The **Snap area** and **Maximum rotation angle** input boxes are used to specify the strength of the snapping force exerted on objects. The **Snap area** input box determines the maximum size of the distance between objects before an object snaps to the other. This is specified in pixels. For example, if 20 is entered here, and an object being moved approaches an object at closer than 20 pixels (this specification applies to the center of the depth range in Perspective views), this object will be snapped. The **Maximum rotation angle** input box is used to specify the maximum amount a snapped object can be rotated for its position to be adjusted to the snapped object. A value of 0 means that the object is not rotated at all.

7.6.5.1.1   Snap section

This subsection is used to specify the points to which an object being moved can snap. The details can be entered separately for **Surfaces**, **Edges** and **Corners** to specify whether or not these are used for snapping.

417

Here is an example: Let's say you are moving a sofa in the direction of a wall. If **Surfaces**, **Edges** and **Corners** are selected, the sofa will snap both to the surfaces (sides of walls) and to the edges (external edges of the wall sides) and to the corners (the corners of the wall sides). Corners have priority over edges, and edges have priority over surfaces. In other words, if the sofa comes close to the corner of a wall, the sofa will snap to this corner if **Corners** is selected. If the sofa is moved close to the edge of a wall (and if there is no corner nearby or **Corners** is not selected), the sofa will snap to the edges of the wall. Lastly, the sofa will snap to the wall surfaces if those surfaces are closer than an edge or corner of a wall, or if **Corners** and **Edges** are not selected.

The subsection of the **Snap to** is used to set which object is to be used as the *snapping object* for objects being moved. Walls, floors and ceilings, other construction objects, for example, windows or doors, furnishing objects and groups can be switched on and off separately.

So if you only want objects to snap to walls, and not to other objects, for example, select only **Walls**, **Floors** and **Ceilings**. If **Groups** is selected, the box surrounding the group will be used as the *snapping object*. If **Groups** is not selected, the objects will behave as normal objects, i.e. each object will be snapped separately.

7.6.5.1.2   Groups snap during movement check box

Just as groups can be used as *snapping objects* - as described above - they can also be snapped when being moved. With the **Groups snap during movement** option selected, the entire group is used as an *object* when being moved, where the *snapping object* is the box surrounding the group. If the check box is not selected, each object in the group will be snapped separately.

Note: If normal ArCon objects are being used, the box surrounding the objects will be used as the snapping object. However, the information on where an object's snapping points, edges and surfaces are located, are normally properties of that object. This means it is possible that there is an object called *reel*, for example, which can only snap into a gap in a working surface made specifically for that object. These special objects and other features are included in special versions of ArCon, for example, kitchen plans.

7.6.6   Object properties dialog box

This dialog box is displayed after double-clicking an object. The object can – but

doesn't have to be – selected before the double-click.

It consists of the two tabs **Object properties** and **Internet**. The **Object properties** tab is used to make general specifications relating to the object, and the **Internet** tab provides more detailed information on the object from the Internet.
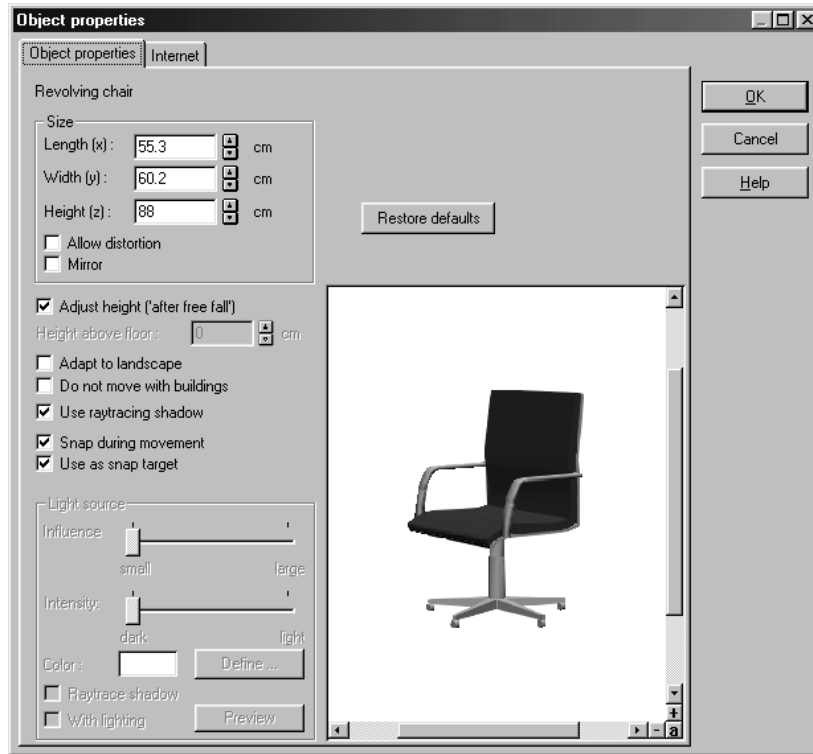
7.6.6.1 Object properties tab

All objects have predefined properties, such as its appearance, as well as other properties, which may not be immediately obvious. This dialog box can be used to change those properties. This means, for example, that you can change the behavior of an object during positioning or change the details for the light source for lighting objects.

The top section of this box gives the name of the object. Underneath the name, on the left, is a section with the properties to be changed, and on the right is the section with

the preview window.

7.6.6.1.1   Size

In this section the current dimensions are displayed numerically. These include the object's **Length (x)**, **Width (y)** and **Height (z)**. These values can be changed by clicking the up and down arrows to the right of each field, or by clicking in the respective field and entering a value with the keyboard.

7.6.6.1.1.1   Allow distortion

If you activate the **Allow distortion** check box, the dimensions of the object are not dependent upon each other and can be modified independently as you desire. Normally (without this switch checked) the object's proportions remain intact, so if you change one value the others change accordingly. But if you check this switch, you can change each value independently, for example, to change the length but keeping the height and width at their original values. You can also interactively modify the dimensions of an object by clicking and dragging on the corners of the selection frame. When you do modify an object's size interactively in this manner, the **Allow distortion** setting is considered, and the function and the object's appearance vary accordingly.

7.6.6.1.1.2   Mirror

If the **Mirror** check box is activated, the object's sides are interchanged, i.e. reflected over the object's center. This function is identical to clicking the ◿◣ icon (see page 437).

7.6.6.1.2   Adjust height ('after free fall')

If you activate **Adjust height ('after free fall')** objects fall automatically into your project when you place or move them. If this function is activated, **Height above floor** is grayed out and inactive.

This function is not available for all objects. There are objects for which it is undesirable to fall to the base, for example, a heating element. With such objects this check box is grayed out and you can numerically specify the height in the field **Height above floor**. If the **Height above floor** field is grayed out, still the actual height of the object over the upper edge of the floor is indicated here. For example, if a cup is to sit at 80 cm on a desk, the height of the cup (80 cm) is indicated here.

If you do not activate **Adjust height ('after free fall')** you can specify the object's height in the field **Height above floor**, where the object is placed at the specified height over the floor via numeric input. For example, sinks and their taps can be attached at an exact distance from the floor and heating elements can be mounted at a certain height.

7.6.6.1.3   Adapt to landscape

This check box serves to accurately adapt objects' form to areas. When active, an individual object is always adapted along its longest axis. This means that ArCon calculates the height of an area at the beginning and end of the object. The distance between them is adjusted so that, for example, with fences, symmetrical contour results. When moving site lines (see page 345) all objects are automatically adapted to the area (if this box is checked).

For example, the automatic adaptation of objects or groups of objects to areas when shifting site lines makes sense for fences, but not for trees, which should remain in their original position and state. If you select a group of trees, you can switch off this adjustment for the entire group in the **Group properties** dialog box.

If you do not move a fence manually over the site edge, you must activate the check box, which by default is deactivated, in order to adapt the fences to the area.

7.6.6.1.4   Do not move with buildings

When you move or mirror a building (only ArCon+ has the mirror function), that contains objects, these objects are generally moved or mirrored accordingly. This also applies to objects that are outside of the building, but were placed at the time that the building was the active building (in this case, the object still *belongs* to the building, regardless of the fact that the object is outdoors).

If an object should be fixed in its location and not moved or rotated along with the building, this check box should be checked. Note that ArCon automatically enables this check box for edges of areas. The reason for this is as follows: If a building is moved, the area under the building is not moved; so the area edges accordingly are not moved.

7.6.6.1.5   Use raytracing shadow

With this check box you can specify whether an individual object should cast shadows or not when the display image is rendered with the raytracer.

This option is practical, for example, if you have an object *gutter-pipe* and you don't

want the gutters throwing shadows onto the exterior walls of your building. In this case you would want to uncheck this box to disable shadows for this object.

By default, this switch is enabled for all objects.

7.6.6.1.6 Light source

This section is active only with lights (lamps); otherwise the section is grayed out and does not function. In this section of the dialog box, you can optimize and change the light source, and its intensity. You can control the size of the light *cone* section, the brightness of the light, the color of the light bulb, and even switch the light off altogether.

All modifications made here affect only the view of the project in the night view (see page 396).

7.6.6.1.6.1 Influence

The **Influence** controls the size of the light cone. The larger you set this value, the further this lamp, projects light into the scene.

7.6.6.1.6.2 Intensity

If you move this slider, you'll change the brightness of the light in your project. The brighter the lamp i.e. its intensity the higher the contrast of objects' shadows in your project. This affects only those objects that are illuminated by this lamp.

In particular, when calculating raytraced pictures it is important that you do not set the intensity of light sources too high, because otherwise overexposure will occur.

7.6.6.1.6.3 Color

With this function you can adjust the lighting color of the lamps.

By clicking the **Define…** button, you'll open the standard color selector dialog box.

By adjusting the lighting color, you can mix different light effects by assigning different colors to different lamps. The colors of the individual lamps ignore each other (they operate independently, as they should) and so you can create interesting effects with the Raytracer.

7.6.6.1.6.4 Raytrace shadow

If you activate this check box, each object that is illuminated by this lamp throws a

shadow. A prerequisite for this, however, is that each object must have the attribute **Use raytracing shadow**, which can be enabled or disabled in the **Object properties** dialog box for each and every object.

The lamp in this case of course is the source of the shadows. The contrast of the shadow varies according to the settings **Influence** and **Intensity**.

With this adjustment you can control the lighting effects upon different objects which are illuminated by multiple lamps, and adjusting the parameters for individual lamps and objects, you can achieve interesting effects with the raytracer. You'll find detailed information on the raytracer on page 389.

You may want to deactivate the **Raytrace shadow** check box if, for example, you simply want to hang a lamp and see how its light affects the overall light level, without regard to shadows.

The basic rule is that you'll always have shadows cast from objects, which are set to cast shadows, if they're lit by a lamp with the **Raytrace shadow** box checked.

You'll find detailed information on the raytracer on page 389.

7.6.6.1.6.5   *With lighting*

This check box is just like a light switch. The lamp and its light are switched on or off according to this switch. When it is switched off (the box unchecked), the lamp has no effect on the lighting of your project in the night view (see page 396). This function is identical to clicking the ⚫ icon (see page 438) when the lamp is selected in Design mode.

With this function you can switch on or off individual lamps in an object in order to evaluate their individual effects upon the illumination of your project.

7.6.6.2   Internet tab

In ArCon version 5.0 and later, the *origin* of an object on the Internet can normally be saved in any object. Particularly if you are using o2c objects downloaded from the Internet, a Web address will normally be saved in these objects. Double-click an object to call up the relevant information again on the **Internet** tab. The computer must have an open connection to the Internet in order to do this.

The entire Internet page will be displayed on this tab. In addition, the **URL** input box can be used to enter a different Internet address and to use this tab to *surf* the Internet.

If there is no URL saved in the object, a default Internet page will be displayed.
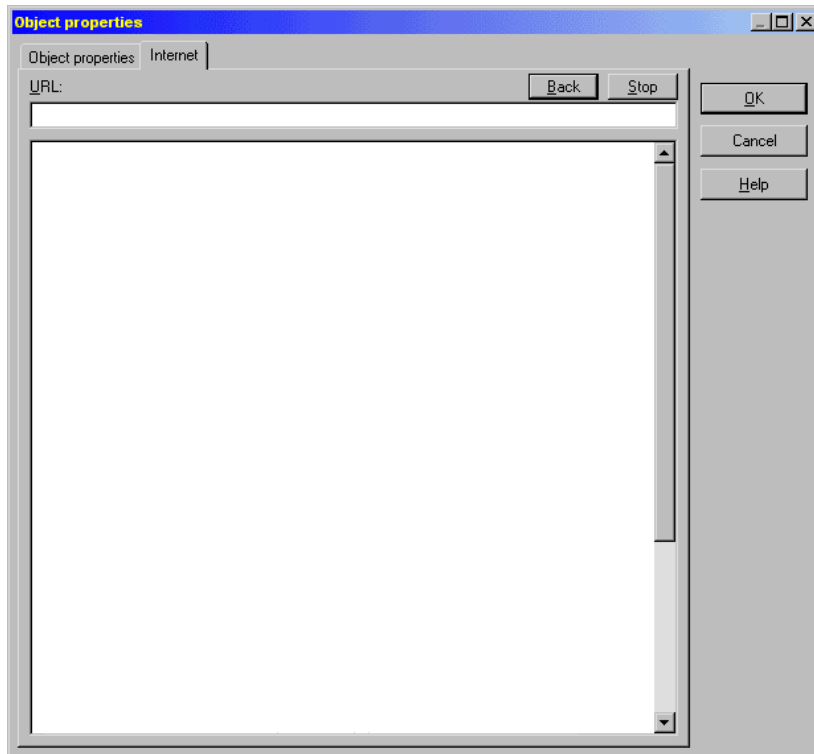
If the connection to the Internet is taking too long due to a poor connection, the **Cancel** button can be used to cancel the download process. The **Back** button can be used to open up the previous address entered into the **URL** input box.

Note: The size of the **Object properties** dialog box can be changed. For example, double-clicking the title bar for the dialog box will maximize the box in order to view the entire Internet page, or the right-hand bottom edge can be dragged to change the size of the box.

7.6.7   Animated objects

Some of the objects used in ArCon can be animated. For example, an animated cabinet can have doors that open and close and drawers that pull out from the cabinet.

You can detect animated objects in the following ways:

If you double-click an animated object or if you see it in a preview window, directly

424

under the preview window you'll see a slider control as well as a **Start** and a **Stop** button.

If you move this slider, you'll see the object move through its animation. The slider determines the pace and position of the animation. If you click the **Play** button, the animation is played in sequence. By clicking the **Stop** button you stop the animation playback.

If you've placed an animated object in your project, and you move the mouse pointer over the object, the mouse pointer changes to:

If you right-click an animated object in Design mode, a pop-up menu appears. This menu varies depending on the type of object you clicked.

In the menu different options let you play back different proportions of the prescribed animation. For example, if you have an animated cabinet, with which the cabinet doors can be opened, one menu entry would be **Open cabinet doors**. If you click the respective menu, the cabinet doors are opened through animation. If you again right-click the cabinet (now with its doors open), you'll see the context menu has changed. The menu **Open cabinet doors** is gone, replaced by **Close cabinet doors**.

When you see the menu **Arbitrary time…** (the last element in the pop-up menu), you can select this element to open a dialog box where you can enter any point in time of the objects' movement. If you move the slider control in this dialog box, the object will go through its animation steps according to the slider position. Once you've achieved the desired position or appearance, click **OK**.

If an animated object is not in its original state (the status it had when you loaded it into your project), the first menu in the pop-up menu is always **Restore initial position**. If you select this menu the object is reset to the status it had when it was first loaded.

Note: Some independent movements of animated objects can last quite a while. You can abort the animation by pressing the **Esc** key. The object will immediately terminate its movement and its position will be set to that of the end of the animation.

7.6.8   Defining groups

In ArCon you can define groups of individual objects in order to use the group later or to save such groups in your own catalog and use them later in different projects. You can quickly access these often-used object groups. In doing so, you save the time you'd

otherwise need for loading the individual objects and grouping them.

For example, you can create and save whole combinations of individual objects, such as a complete dinette with desk, chairs, dome lamp, and desk decorations.

7.6.8.1   Creating groups

All objects that you would like to compile into a group in your project must first be selected and then grouped.

In order to select multiple objects, keep the **Shift** key held down and click successively on the objects you'd like to group. Next, left-click the ▣ icon or select the menu **Edit – Group**. The selected objects are grouped and marked with a large selection frame. By clicking ▣ or selecting the menu **Edit – Ungroup** the group is split up into individual objects. You'll find details about grouping on page 431.

In the **Group properties** dialog box you can assign a name to this group, and change it.

7.6.8.2   Saving and loading groups

If you would like to save a group of objects that you've created for later use, or if you want to load a saved group, select the menus **Object – Save group** or **Object – Load group** respectively. You can also draw the group of objects into a file in the object and texture catalog.

By using the menus **Object – Save group** or **Object – Load group** a dialog box is opened where you can save or load a group, respectively. After you have loaded and placed a group, a selection frame appears around the group (just like loading any object). Such groups have the same properties as any other objects, and can be edited the same way as well.

To delete a saved group, first select the file (in which the group was saved) in one of the dialog boxes by clicking it. If you then press the **Delete** key the group file and its contents are deleted.

7.6.8.2.1   Group properties

If you've combined several objects or groups into a group, you can adjust their settings like any object. You can open the **Group properties** dialog box by double-clicking any of the objects in the group. The following dialog box appears.

426
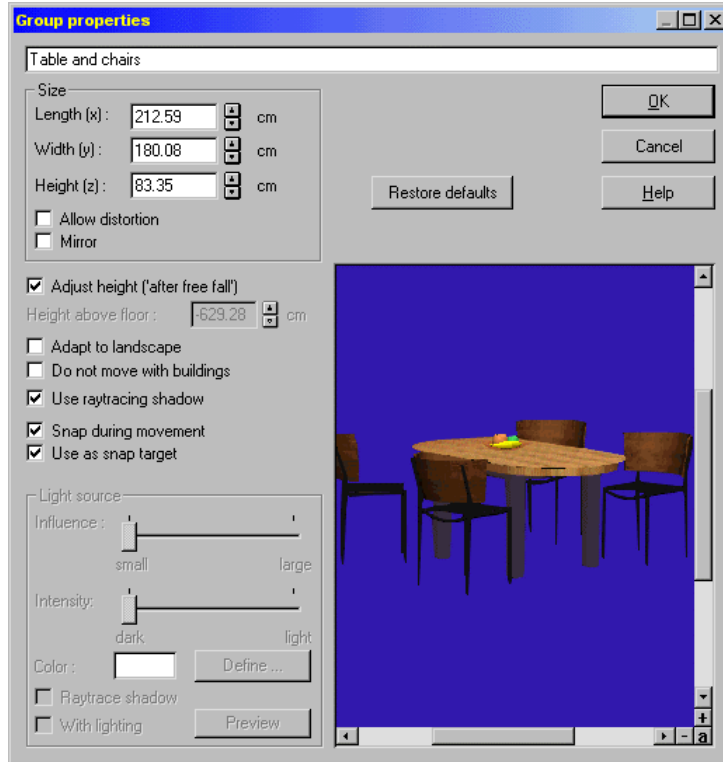
This dialog box is almost identical to the **Object properties** dialog box. In this paragraph the differences between the two dialog boxes are described.

In the dialog box there is an input box at the top where you can give a name to the group. <Unnamed group> is the default. The other inputs in the dialog box refer not to an individual object like the object properties, but to all objects in the group.

The **Size** section of the dialog box specifies not the size of an object in the group, but the size of the total group in width, length and height. If you adjust the specifications for light sources, these specifications are used for all lamps in the group.

7.6.8.2.2   Designating groups

Contrary to objects, for which a name is already established and saved in the object, groups do not have a predefined name. You can enter the desired name at the top input box of the dialog box. You see the group names by clicking them again, and when you use drag-and-drop to copy the group into the catalog (see page 443).

7.6.9 Collision control

Basically you know that an object or groups of objects has limits on its placement in any part of the project. It is possible to place, say, an armchair into a cabinet that of course will not appear naturally.

In order to prevent this you can use the so-called **Collision control**. This function internally calculates while you're placing objects and groups of objects whether it would collide with any other existing objects.

Since **Collision control** is a laborious and computing-intensive operation, it is switched off by default. Also, it's generally not needed, for example, if you're simply moving a cabinet from one corner of a room to another. You can switch **Collision control** on by pressing the **Ctrl** key while you're placing or moving an object or group of objects.

While pressing the **Ctrl** key, an object can be adjusted only in free space. This means that, continuing with our example, if you are moving the armchair and come too close to the cabinet, ArCon will prevent further movement in that direction.

Collision control is also very well suited to placing objects, for example, in Plan view or in Plan view (color) .

It is also very helpful, for example, during the composition of a wall cabinet from several individual cabinet sections. To do this, select a cabinet section already placed in the room and move it while pressing the **Ctrl** key so it's up against a wall, until it cannot be moved any further. The cabinet section is now as close as possible to the wall. Next, proceed with a second cabinet section exactly as you did with the first. Move this cabinet section as close as possible not only to the wall but also to the first cabinet section, until it likewise cannot be moved any further. The cabinet sections now lie side by side and directly against the wall. If any adjustment is necessary, simply press the **Ctrl** key and move the cabinet in the desired direction so it's flush with the wall and the other cabinets. By continuing this, you can build in a nice cabinet set, placing the sections exactly where they should go and without placing any one object over or in another.

You can also use this procedure for placing furniture freely in a room, to control the distances between objects and ensure that no unnatural placements occur.

7.6.10 Selection frame

If an object is selected, it is enclosed in Plan view with a line frame and in Plan view

(color) or Perspective view with a transparent frame. You can edit objects in ArCon's Design mode only if you have first selected the object.

The view of the selection frame varies depending on which type of view you're in.

7.6.10.1   Plan view

Selected objects and groups of objects are shown in Plan view with a green frame with red corners. If the object is set for distorted scaling (as set in the **Object properties** dialog box), blue markers appear at the centers of the green edge lines. In this case you can pull on the edges or corners of the object (or the group of objects) to scale it. If distorted scaling is not active, you can only pull on the red corners of the selection frame to scale the object (or group of objects) symmetrically.

The right mouse button does not have a function, and thus no effect, on the selection frame in this view. If distorted scaling is not active, you can resize the object only symmetrically in width, depth and height.

By double-clicking the selected object or group of objects you'll open the **Object properties** dialog box or **Group properties** dialog box. In this dialog box you can check the **Allow distortion** box. If you do, the selection frame now displays eight squares: Four in the corners and four more, which are situated in the centers of the selection frame's edges. With these squares you can change the width, the height and the depth of the object independently.

7.6.10.2   Plan view (color) and perspective view

If you are in one of these types of view, the selected objects or groups of objects are enclosed with a 3D selection frame. The edges and corners as well as the middle of this frame are colored. These colored markings indicate the fact that you can change the object's dimensions independently with **Allow distortion** checked.

Colored markings of the selection frame are as follows:

Red corners Change all three dimensions:
  (width, height and depth).
  The diagonally facing corner remains unchanged.

Green edges Change two dimensions:
  (width + height, width + depth, or height + depth).
  The diagonally facing edge remains unchanged.

429

Blue disc   In the center of the selection area changes the dimensions:

(width or height or depth) independently.

The opposite side or area remains unchanged.

If the pointer is over one of the colored markings, its form changes to a cross. You can change the size or dimensions of the object by moving the mouse while pressing the left mouse button.

If distorted scaling is inactive, you can scale the object only at the red corners and only symmetrically in width, depth and height. In the selection frame's center, the blue ball indicates that distorted scaling is active and you can scale any one of the object's dimensions independently of the other dimensions.

In the **Object properties** dialog box you can activate **Allow distortion** as described previously. The blue discs on the selection frame are then shown. All corners, edges and sides have the functions described above.

Any modifications you make to objects and opening the **Object properties** dialog box and clicking the **Restore defaults** button can reverse groups of objects. This will restore the object to its original size.

7.7   USING THE VERTICAL TOOLBAR

With the following described functions you can change the position and status of elements already placed in your project. These functions apply to individual objects as well as groups of objects in Plan view and Plan view (color). You cannot directly modify an object's dimensions with these functions.

7.7.1   Select all

Each object in your project that you want to edit in any way must first be selected (and marked with a selection frame).

By left-clicking or by selecting the menu **Edit – Select all** you will select all objects and groups of objects in your project. Every object and group in your project is selected and marked with its own selection frame.

Please note that all objects and groups of objects are really selected, even those on floors which are not visible (see page 131).

7.7.2 Group objects

By left-clicking or selecting the menu **Edit – Group**, all selected objects are grouped together, into a single group. A single large selection frame around the entire group replaces the individual selection frames of the objects.

You can treat such a group as if it were an individual object; i.e. you can move all objects in the group simultaneously, or copy them, (see page 431) or delete them (see page 432).

Groups of objects that you use often can be saved, and for easy access you can save these defined groups in the object catalog. So you can define your own catalogs where you can save and load frequently used objects and groups of objects. Additionally you can use the menus **Save group** (see page 426) and **Load group** (see page 426).

7.7.3 Ungroup objects

With this function you can ungroup a group of objects, into the objects or groups that compose it. This icon is active only if a group is selected.

You can ungroup a group of objects (or groups) by left-clicking or by selecting the menu **Edit – Ungroup**.

7.7.4 Copy

This function is active only if there is at least one selected object or group of objects. If there are no selected objects or groups, this function is inactive and grayed out.

The selected objects or groups are copied when you left-click or you select the menu **Edit – Copy**. The newly copied object is displayed with the selection frame, i.e. the original is deselected and the new copy is selected. If you make additional copies without changing anything, the copy will be copied. The position of the copy, relative to the original, can be adjusted in the **Copy options** dialog box.

The copied objects have the same properties as the original, which can be changed in the **Object** dialog box or by changing it with the selection frame.

7.7.4.1   Copy options dialog
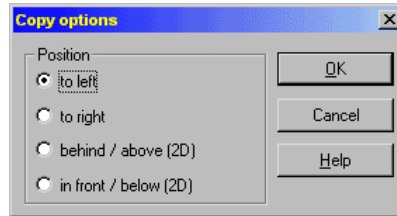
You open this dialog box by right-clicking the ▣→ icon. In the **Position** section you can specify the direction of the copy, relative to the original. Options include **To left**, **To right**, **Behind/above (2D)** and **In front/below (2D)**.

7.7.5   Delete ✕

This function is active only if at least one object or group is selected. If no objects or groups are selected, the function is inactive and the icon is grayed out.

Selected objects and groups of objects can be deleted by left-clicking ✕, pressing the **Delete** key, or by selecting the menu **Edit – Delete**.

With the **Delete** dialog box you can enable the option to confirm deletion when you're deleting multiple objects or groups. This works as a simple safety mechanism.

7.7.5.1   Delete dialog
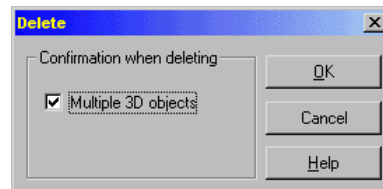
Right-clicking ✕ opens this dialog box or by selecting the menu **Options – Delete**.

If you've checked **Multiple 3D objects**, you'll get a warning dialog box whenever you're attempting to delete multiple objects or multiple groups. With this dialog box you can cancel the operation in case you've made an error, or if you've changed your mind. This is a safety measure, useful for those times, for example, when you have

432

selected a group when you thought you selected an object, or if you intended to select a single object but accidentally selected multiple objects.

7.7.5.2 Confirming a deletion
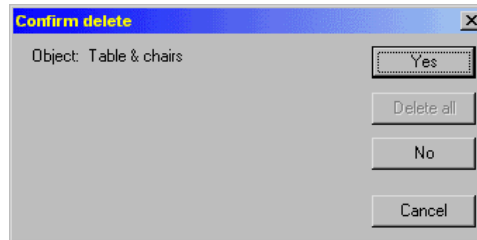
If you've checked **Multiple 3D objects** in the **Delete** dialog box, this dialog box is automatically opened when you attempt to delete multiple objects or groups. If you delete only a single object, this dialog box will never appear.

In the dialog box, the name of the respective object or group of objects about to be deleted is displayed. This dialog box goes through each object or group one at a time. You can click **Yes** to delete the object whose name is shown. You can click **No** to save the object named and continue to the next object scheduled for deletion. You can click **Delete all** to delete all selected objects and groups and close this dialog box. Finally, you can click **Cancel** or press the **Esc** key to close this dialog box without deleting any more objects or groups.

7.7.5.3 Delete all menu

Selecting **Edit – Delete all** menu option will present you with a further menu containing a list of possible elements that you can delete. Selecting an element type will delete all of those elements.

7.7.6 Rotate

ArCon lets you rotate objects or groups of objects around any axis and reset the degree of rotation – if required – to the load position of the object or group of objects. All icons with which you can execute a rotation are active only with one or more selected objects

433

or groups of objects. If no elements are selected, all of the rotation icons are inactive and grayed out.

In detail, the following rotations are available to you:

1. **Rotate about the Z-**, **X-**, **or Y- axis:** Here the rotation of the object or group of objects can be executed over all directions of the 3D room. You can select to rotate an object or group of objects by a fixed angle, or by an arbitrary, free angle. To select the desired axis, click one of the three multi-function icons.

If you right-click one of the three icons, the **Rotate** dialog box (see page 434) will appear in which you can specify whether the rotation should be based on the Model or the World coordinates.

Basically, all objects and groups of objects always rotate about their centers, around the upright central shaft of the selection frame. Positive angles specify a rotation in the clockwise direction and negative angles specify a rotation in the counter-clockwise direction.

2. **Free rotation:** With this rotation form (see page 436) the object or group of objects can be rotated freely – depending on which icon you selected – around the perpendicular axis and independently of a specific axis or angle. You can move, shift, and twist the object in the display.

3. **Reset rotation:** If you want to cancel all rotations previously executed, a **Reset** button (see page 436) is available. This resets the object or the group of objects into their original, load positions.

7.7.6.1   Rotate about the Z -, Y -, or X- axis
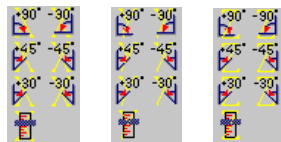
Before you rotate an object or group of objects around one of the axes freely or by a fixed angle, you must determine whether you want to use the model coordinates, or the world coordinates for the rotation. This distinction is important if an object or group has already been rotated; in which case you modified the axes in the rotation. Since in this case, the object axes and the world axes no longer correspond, you must specify the axes system around which to rotate. When you first load an object, the difference is

insignificant because the object is placed with regards to both axes systems.

To make the desired adjustment, you must right-click the suitable multi-function icon. Subsequently, the **Rotate** dialog box is displayed.
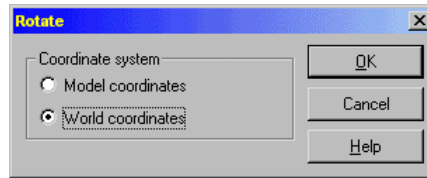
If you select the option **Model coordinates**, the object or the group of objects rotates around its own axis, or around itself. With the option **World coordinates** (absolute Cartesian coordinates) the world system is used, and the object's position in the *world* will change accordingly. This adjustment corresponds to the rotation you typically use for rotating the view.

7.7.6.1.1   Rotate by fixed angle

In order to rotate a selected object or a selected group of objects by a fixed and defined angle, select the appropriate angle of rotation around the desired axis with the respective multi-function icon. Alternatively you can select the menu **Edit – Rotate over**.

With the predefined fixed angles, you can rotate an object or a group of objects over any axis by 90°, -90°, 45°, -45°, 30°, and -30°.

If you want to rotate, for example, an object 30 degrees around the X-axis, select from the multi-function icon the specific icon. If you now click the icon in the vertical toolbar, the selected object or group, continuing with our example, is rotated 30 degrees around the X-axis. If you click again on this icon, you'll rotate the object another 30 degrees around the X-axis.

7.7.6.1.2   Free rotation about an axis

Besides rotating around fixed angles, ArCon offers a free rotation technique. This special type of rotation – which cannot be selected through the menus, but only with the icons in the vertical toolbar – makes it possible for you to rotate elements around an axis by any degree.

You can freely rotate an object or group of objects around any of the three axes. To do this, you must click ⬜ from one of the three variable axes icons. The **Rotation** dialog

435

box subsequently appears.

In this dialog box you can adjust the rotation angle via a slider control. By changing the value with the slider, the object or group of objects is rotated by the specified angle. If you're happy with the angle and object's rotation, acknowledge it by clicking **OK**. The element is placed in the new position and the dialog box is closed.

Besides controlling the rotation with the slider, you can input a specific angle numerically. This accurate input of angles is useful if, for example, you're aligning an object precisely to a wall, which was rotated within the room. In this case you will first select the wall in Construction mode and read from the status line the angle of the wall. Subsequently, you can return to Design mode and rotate the object to exactly the same angle.

If you click the **Reset** button, the rotation angle around the axis is reset to zero. The object or group of objects is again in its original position, where it was before you accessed the rotation function. You can also abort free rotation by pressing the **Esc** key, in which case the object likewise returns to its original position.

7.7.6.2 Free rotation

Selected objects or groups of objects can be rotated freely in a room. As soon as you click the icon, the mouse pointer changes to . Subsequently, you can rotate the object or group of objects in all directions, independent of any axis or angle.

By clicking and pressing the left mouse button you can move the selected object and see its position in real-time. You can also abort this procedure by pressing the **Esc** key, which restores the element to its original position.

If you select the first icon of the multi-function icon, you can rotate an object or group of objects freely around the perpendicular axis. This function corresponds to freely rotating around the Z-axis. This way, you can align the object or group of objects directly in the display without opening the **Rotate** dialog box or **Rotate** slider control.

7.7.6.3 Restore objects to original orientation

With this icon, all rotations are reset. The object or group of objects appears in the position it had when it was first loaded. This means that the orientation of an object appears as if it had just been loaded.

The **Reset** button in the **Rotation** dialog box only restores the object to its orientation

436

before you began rotating it within the dialog box. This position may or may not be the same as the object's original position.

7.7.7   Mirror objects and groups

This function is active only with one or more selected objects or groups of objects. If no elements are selected, this icon is inactive and grayed out.

The selected objects and groups of objects are mirrored, or reflected, by left-clicking the icon or by selecting the menu **Edit – Mirror**.

All objects are mirrored over their central shaft, i.e. the sides of the objects are interchanged. For objects within a group, not only are the sides interchanged, but also the object's position within the group.

7.7.8   Align
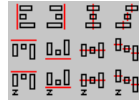
These functions are active only if you've selected at least two objects or groups of objects. If only one object is selected, or if no object is selected, this button is inactive and grayed out.

The selected objects and groups of objects are aligned by left-clicking the multi-function icon **Align** or by selecting the menu **Edit – Align**.

With the **Align** icon in the vertical toolbar you can select the type of alignment; with the menu you don't have this control – you'll align the selected objects according to the selected icon in the multi-function icon.

You have the following options for aligning objects and groups of objects to each other:

Objects and groups of objects **Left justified** or **Right justified**.

Objects and groups of objects aligned horizontal centrally or horizontal by the same distance to a central point.

Objects and groups of objects aligned **Above** or **Below** each other.

Objects and groups of objects above or below, centrally or by the same distance to a central point.

Objects and groups of objects aligned in their height.

Objects and groups of objects in their height centrally or by the same distance to a

central high point.

The following explains these functions.

In the 2D views – Plan view and Plan view (color) – the terms **Left**, **Right**, **Top** and **Bottom** are obvious. You can identify these terms by simply looking at the view window. You can also align objects in their height with these views, but it's unlikely you'll use it since you cannot see the result directly.

For Perspective view, you can orient yourself to the specification of the **Left** and **Right** likewise in the display (this does not change whether you're looking at your project from the front or from the rear). The specification **Align behind** and **Align front** is relative to your position – if you select **Align behind** , the objects are always aligned in the direction running away from you (the function is independent, regardless of which direction from which you look at your scene). The specification for Z-direction always concerns the height, vertical to the floor, and upward in your project (which may not be evident in your display).

If you have selected at least three objects or groups of objects, you can move them in such a way that the distance between them is the same. For example, if you select four objects and then select the icon **Align equal spacing** the first and last (fourth) objects remain unchanged in their position. The intermediate objects are moved to the left or the right so the resulting distances between the individual objects are all equal.

Aligning objects and groups can require some training. Nevertheless, try working with the example files and the different alignment functions to get a basic understanding of how it works, and you'll find it a practical tool.

7.7.9   *Lights on/off*

This icon is active only if you've selected an object that projects light. If no lights are selected or if you have no lights in your project, this icon is inactive and grayed out.

You can switch individual lights on and off by left-clicking or selecting the menu **Edit – Object lights on/off**.

If you switch to **Night view** (see page 396), these lamps light up all rooms and their objects. If you are in the day view (see page 396) the icon has no effect, as the lights in the room do not affect the lighting of your project in the day view. The brightness of each light is set in the **Object properties** or **Group properties** dialog boxes.

438

7.7.10 Optimal color palette

This icon appears only if you are running Windows in the indexed color mode, or the 256-color mode. In this mode, Windows uses only 256 or fewer colors. If you're running Windows in **High color** or **True color** mode this icon is not shown.

When you run Windows in 256-color mode (indexed color), ArCon reduces the colors for the rendered pictures in the view. The technique used for this, called Dithering, resembles that of pictures in a newspaper. It has the benefit that images are calculated very quickly. The consequence is that the appearance is seriously degraded.

By clicking you have the option of calculating an optimal color palette for a colored view. Despite the limitation of 256 or fewer colors, acceptable results can be obtained for the color quality of the output.

The current view is only temporarily optimized for the current window. All other views and Windows applications may appear with distorted colors since their color palettes have been adjusted and no longer fit the views.

When saving colored views as a file (see page 120) you also have the option of optimizing the color palette. This way you can not only improve the image quality, but the size of the file can be reduced, up to a factor of three.

Note that this option exists to deliver the best possible screen display, and the same for saved pictures. However, you can substantially improve the quality of the screen display and saved pictures by running Windows in High color or True color modes. This depends on your computer hardware; for additional information please consult your Windows documentation or the documentation for your video card.

7.7.11 Platform designer

ArCon version 5.0 and later allows you to do more than just open ready-made objects from the Object Explorer or from files - you can also create them yourself to a certain extent. However, the design process is restricted to platform or platform-type objects, which can be described primarily by defining the outline.

Once you have defined the platform - as described below - you can work with it just as with any other design objects - i.e. you can move it around, as well as rotate, distort and mirror it, and use other similar functions.

The process for defining and positioning blocks in Design mode is very similar to the process for defining and positioning platforms in Construction mode using the input

method . After clicking , the first thing to do is to define the outline, surface properties and other settings, and then confirm the dialog box using **OK**. The platform will then be *attached* to your mouse and you can position it by clicking a point in your plan.

For platforms, ArCon will detect that these objects have not been loaded into the project, but have been created by you. This means that – if you double-click a platform later on – you will open the dialog box for platforms and not the normal dialog box for objects. The properties of the platform can therefore be changed later on, for example, the outline.

7.7.12   *Block dialog box*

This dialog box is opened by right-clicking in Design mode or double-clicking an object which has been constructed as a block.
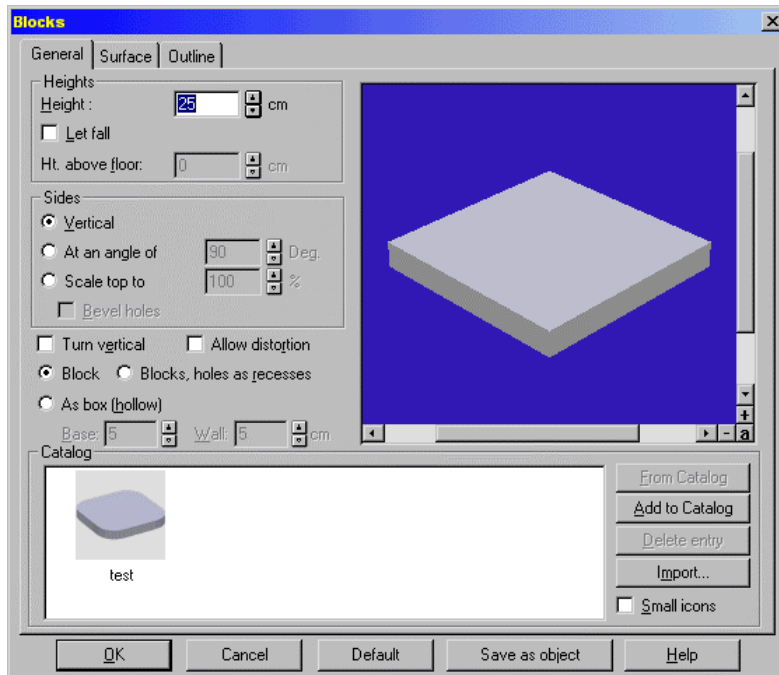
The dialog box for blocks is not different to the dialog for platforms in Construction mode. All entries made for the platforms can also be made for blocks. The sections on

the **General**, **Surface** and **Outline** tabs are basically identical to the equivalent sections for platforms. Only a few additional input options - described below - demand more detailed definitions than for platforms.

7.7.12.1   General tab

As for platforms the **General** tab consists of the sections **Heights**, **Sides** and the standard preview window and the catalog.

In addition, the **Heights** tab can be used to determine whether or not the block drops down after construction. Normal objects also have similar properties.

The **Sides** section is identical to the section for platforms.

In exactly the same way as the corresponding check box in the **Object properties** dialog box, **Scale top to** is used to scale the blocks directly in the plan independently from one another in all three directions using the selection frame.

Unlike with platforms, the **Turn vertical** check box can be used to position the boards you create not horizontally but vertically. Boards are normal objects, which you can then move using the orientation icons:
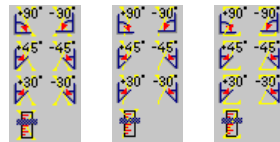
or , but in some circumstances it can be useful to get an accurate view of the block's actual position during the construction process in the preview window.

Unlike platforms, which are the same thickness all over (except for the edges in the case of beveled edges), specific settings can be made for blocks to give them a different thickness inside than on the outer edges. For example, if you are using a square as the outline and use the **Blocks, holes as recesses** option instead of the **Block** option, holes in the outline will not be created as cutout holes in the block, but only as dents. In other words, the base of the block is still continuous at those points. The thickness set in the relevant input box will be used for the **Floor**. If you use the **As box (hollow)** option, not only a square block with a specific thickness will be created, but the edges of the block (and of the holes, if applicable) will have a different height to the inside of the block. This will basically create a box. Selecting the **As box (hollow)** option also means that you can use the **Base** and **Wall** input boxes to specify the thickness of the floor surface

441

and the sides of the box.

Using outlines, which are rather more complex than the square used in the example, 2 ½ -dimensional objects can be created with virtually any level of complexity.

As blocks can be saved in a catalog in exactly the same way as for platforms, it is very easy to create a collection of these objects, which can then be used as required.

7.7.12.2   Surface tab

The **Surface** tab is basically identical to the corresponding tab for platforms. The only difference is that there are two different inputs for color and texture in the **Base** section, which can be used separately for **Interior** and **Exterior**. In this case, **Interior** corresponds to the inner floor surfaces of a box, and **Exterior** relates to the outer surfaces, in other words, the lower floor surfaces.

7.7.12.3   Outline tab

The **Outline** tab is used to specify the actual outline for the block and the outline of the holes. The procedure here is identical to the procedure for platforms.

8 TEXTURE AND OBJECT CATALOG

8.1 OVERVIEW

In ArCon's Design mode you have a very large number of materials, textures and objects, which you can include in your design, for example, the bath or kitchen. In order to organize and access these sets of textures and objects, they are grouped and organized in an **Texture and object catalog**.

You can open and close the object and texture catalog by clicking the ▦ icon in the horizontal toolbar or by selecting the menu **View – Texture and object catalog**.

That object and texture catalog is very similar in both form and function to the Explorer program under Windows 95 or NT.

The catalog can be moved and positioned as an independent window, independent of ArCon's main window anywhere in the display, or it can be docked into ArCon's main window. You can switch between these two modes by selecting the menu View – Dock catalog to window. If the catalog is docked to the main window, you can specify its position by moving the catalog's title bar to the left, right, to, or bottom edges of the ArCon main window.

The object and texture catalog is described in the following sections.

The object and texture catalog makes extensive use of context menus – this means that when you right-click an icon a menu appears. Depending on the status and which

443

element you right-click, the appropriate menu appears where you can select one of the menus.

Two of the menus that are offered to you in the context menus are the elements **Refresh** and **Help**. If you click **Refresh**, the information shown in the catalog is read again from your hard disk; i.e. if any modifications were made on the hard disk, the catalog is updated to reflect them. So, for example, if any textures, objects, or materials were moved, copied, or changed through Windows or another program, the changes can be updated in the catalog by clicking **Refresh**.

The elements **Open** and **Properties**, which appear if you right-click an element in the catalog (as opposed to clicking a folder), open the respective element (the object, texture or material). If you select **Open** the element's dialog box is opened with the preview page displayed. If you select **Properties**, the dialog box is opened with the **Data** tab displayed. Note that the menu Delete is grayed out – and so unavailable – for objects and textures, but it is available for materials. The reason for this is that both objects and textures can be used in ArCon, but not created in ArCon. If you want to delete an object or texture, you should do it with the programs you used to create them or with the Windows Explorer. Materials can be created in ArCon (see page 454)

8.2 STRUCTURE OF THE OBJECT AND TEXTURE CATALOG

The object and texture catalog is accessed by either a menu or icon interface.

8.2.1 Title bar

The title bar contains the standard windows buttons which can be used to minimize, maximize or resize the window. The catalog window can also be moved from its default position to any of the four sides of the display, by clicking and dragging the window.

8.2.2 Menu bar

In the menu bar you will find the menus **Catalog** and **View**.
Catalog lets you select between the individual directories for **Objects**, **Textures**, **Loaded textures**, **Materials** and **Animations**, in order to load these into the catalog.

View is for switching the toolbar on and off as well as the detail list on and off. With the latter you'll get additional specifications on the objects or textures, such as manufacturers, article numbers, prices and filenames.

8.2.3   Toolbar

If the toolbar is enabled, you can access menu items (from the menu bar) by left-clicking the respective icons.

8.2.4   Directory pane

In the left pane of the object and texture catalog you'll find the **Directory pane** which shows the folder structure for objects, textures, and materials.

Note: When you use the catalog for the first time – after you've started ArCon – you'll see that the directory pane is minimized; that is, it does not appear. In order to display it, use the mouse to click and move the thin vertical line at the left side of the explorer window. This way you can adjust the relative position of the line and thus the relative sizes of the two panes in the window.

With the icon you can move through the folder structure by moving up a folder level (you can move down a level by opening one of the visible folders, or by double-clicking a folder in the contents pane).

8.2.5   Contents pane

In the right pane of the explorer window is the **Contents pane**, which displays the contents on the currently selected folder, i.e. the current texture or object files.

All adjustments of the object and texture catalog's size and position are remembered by ArCon, the catalog appears in the same location and with the same size the next time you run the program.

You can define your own groups of objects, for example, a complete dining room, and save them in the catalog. This way you can define your own furniture catalog.

8.3   OBJECTS IN THE CATALOG

In ArCon you have a very large stock of furniture objects available. There are over 1,000 objects, including furniture for baths, kitchens, living rooms, etc. To successfully work with all these objects, they are grouped and organized into folders of related objects in the object and texture catalog. These folders can contain additional folders within them, or individual objects.

These object catalogs and individual objects are illustrated within the contents pane by a thumbnail, so you can browse the objects by what they look like, as well as text descriptions. An idea of what the element looks diagram, in order to receive a visual view of the elements which can be placed immediately. Folders are shown with yellow-colored backgrounds, and objects – the things that you can actually place – with gray backgrounds.

8.3.1   Loading objects

By left-clicking a folder in the directory pane of the catalog all subfolders and objects in the folder, for example, hall, bath, office etc. are loaded and displayed in the contents pane. Within the directory pane you can open subfolders by left-clicking them, while you open the files within the contents pane of the catalog by double-clicking them.

With additional subfolders such as the **Office** folder you have subfolders for **Desks**, **Chairs**, **Cabinets**, etc. available and you can open these so the catalog shows the individual objects in this folder. If a subfolder contains a large number of individual objects, a dialog box appears which shows the progress of loading the objects – behind it the objects are displayed as they're loaded.

You can interrupt the loading of objects by clicking **Cancel** in this dialog box. This shortens the loading but only those objects already loaded are shown in the contents pane.

With the ![icon] icon you can move up one folder in the directory structure. By clicking the ![icon] icon or using the menu bar, where you select the type of elements to be displayed, you always move first into the folder that was last opened. By clicking the ![icon] icon the catalog displays details of the objects as well as the individual objects as small thumbnail pictures within the contents pane. This additional information includes manufacturers, article numbers, prices, and filenames.

The current version of ArCon does not contain manufacturer-specific objects, but rather

fantasy furniture, which is generic, but practical, just the same. The specifications for these objects have the manufacturer, article number, and price set to *unknown*. With manufacturer-specific add-on modules, ArCon will use the real specifications for the objects.

8.3.2 Selecting objects

An individual object displayed in the contents pane can be selected by clicking it with the left mouse button. This object is highlighted to emphasize it compared to the unselected objects.

Just as textures can be pulled from the catalog into your view by means of drag-and-drop, you can draw objects into a view window by drag-and-drop. The specifics of placing objects into a view window are explained in the section placing objects and groups.

Besides these functions, ArCon gives you the possibility to define and compile recurring object groups. For example, you can define a dining room, complete with six chairs, an oval desk, desk decorations, and a suitable desk lamp, and save it in the catalog as a group. You can subsequently drop the whole set into your project by means of drag-and-drop. Here the *source* and *target* are interchanged accordingly: The current view is the source of the group – the catalog (contents pane) is the target. Copying the group is the same as bringing an object into your view window, but you simply reverse the operation.

Loading such groups of objects from the catalog is done just like loading individual objects.

8.3.3 Object dialog box
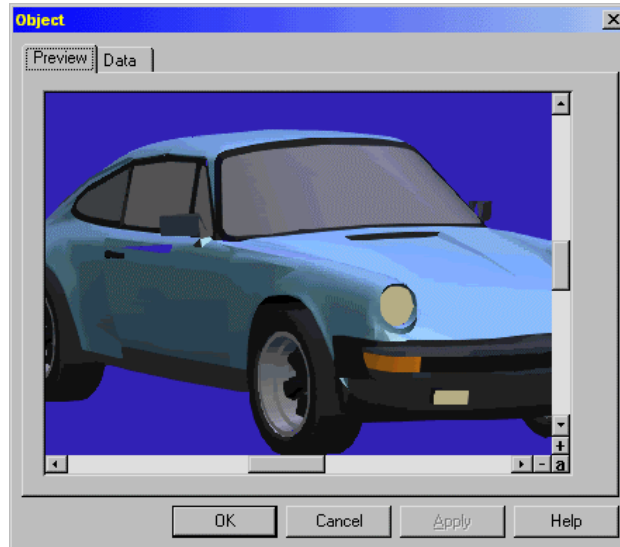
You open this dialog box by double-clicking an object within the contents pane of the catalog. This dialog box consists of at least two tabs: **Preview** and **Data**. If a text file with the same name as the object exists in the same folder as the object, an **Information** tab is added to the dialog box. This text file can be either a standard text file (*.**txt**) or a formatted Rich Text Format file (*.**rtf**).

8.3.3.1   Preview tab

This tab contains the preview window, in which the selected object can be viewed from all sides and at varying sizes.

If you have selected an animated object (see page 424) additionally underneath the preview window is a slider control, with which you can step through the animation frames. The **Play** and **Stop** buttons beside the slider let you play the animation automatically in the preview window.

8.3.3.2   Data tab
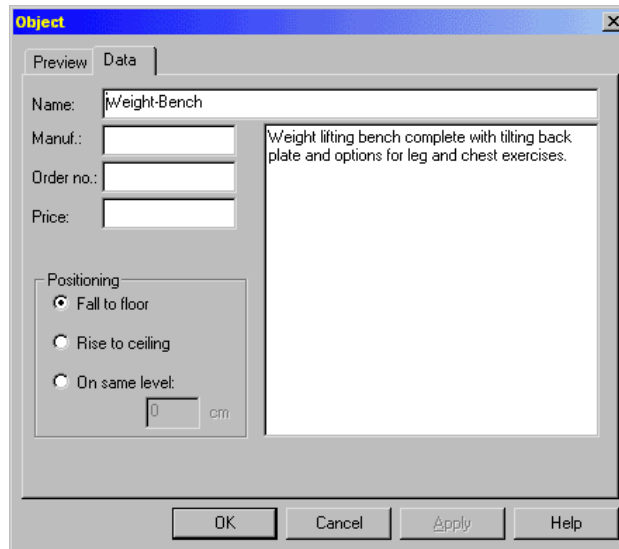
In this tab, specifications are displayed. These specifications are the **Manufacturer**, **Order no.** and **Price** of the current object. You can enter in the appropriate information so it can be analyzed in order to create, for example, order lists or price lists of the placed furnishings in a project (and these with a program extension using the ActiveX interface).

8.3.3.3 Information tab
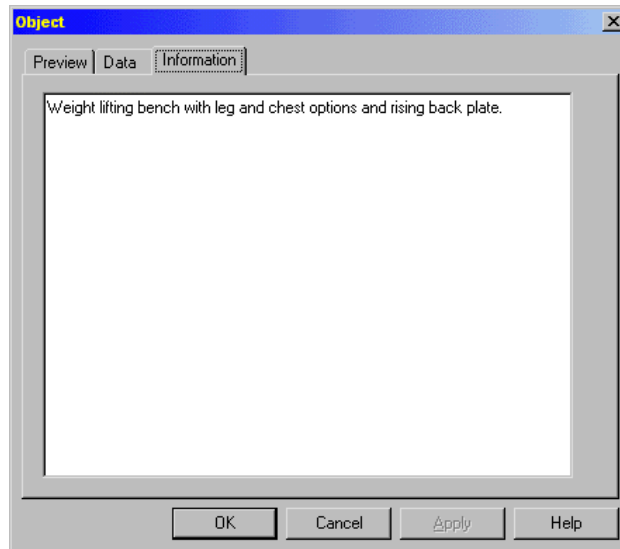
If a text file (*.**txt** or *.**rtf**) with the same name as an object is placed in the same folder as the object, a third tab is displayed in this dialog box. This tab is named **Information** and displays the contents of the text file.

8.4 TEXTURES IN THE CATALOG

In ArCon, the textures available in the object and texture catalog (see page 443) are surface textures that can be used as floor coverings, wallpapers, and many others. With textures, you can see the appearance and properties of materials, for example, while adding in furniture, and with specialized computer-created pictures, which simulate 3D *objects* you can visualize structural properties of surfaces that are commonly found in nature.

In ArCon, textures have a special meaning. You can create very realistic looking objects and surfaces with them.

All these textures are saved in the **Textures** folder, and are shown in the contents page of the catalog.

With textures you can change and arrange the surface textures in your projects by

manually placing textures wherever you like. You can design floors with carpet or parquet wood floors, textures or color walls and ceilings, build in doors and windows made of spruce or other types of wood, select curtains in many materials and colors, ultimately completing your apartment. There are no predefined limits regarding the organization and use of textures. You can place and exchange textures as you desire.

You cannot modify or create textures in ArCon. However, these pictures are saved in the standard Windows bitmap format (*.**bmp**), and so you can create your own pictures with Microsoft Paint or Adobe PhotoShop, and use them as textures. Just remember to save the pictures as Windows Bitmap format, and to save them in the desired folder in the **Textures** folder. **Loading**, **Selecting**, **Exchanging**, and **Placing** textures are all described in the following sections.

8.4.1   Loading textures

You can load the textures into the catalog's contents pane by left-clicking the textures folder (in the directory pane), by clicking the ![icon] icon in the toolbar, or by selecting the menu **Catalog – Textures**. Here all the different textures are sorted separately in different subfolders, so you must select a subfolder before any actual textures are shown in the contents pane.

Note: Like object subfolders, the texture subfolders are also shown with a picture.

When loading a large number of textures from a folder, a dialog box opens which displays the progress of the loading. You can cut this operation short by clicking the **Cancel** button. The contents pane then shows only the textures that were loaded before you aborted the loading operation.

By clicking the ![icon] icon the **Catalog** displays only loaded textures, that is, only the textures which are already being used in your project (or that were used, but currently might not be). This has the benefit that you can work with a subset of desired textures without having to load the entire texture catalog. In the **Loaded textures** contents pane, there is a *special texture* which you can use to delete textures that are being used in your project. This **Delete texture** is used like all other textures – drag it onto a surface or object to delete the existing texture.

With the **Details** icon you can change the display of the contents pane, so the thumbnails are smaller and you get additional information about the textures, such as each texture's width and height.

451

8.4.2   Selecting textures

If one of the texture catalogs is open and loaded into the contents pane, you can select a texture by clicking it with the left mouse button. The selected texture is then highlighted to differentiate it from the other – unselected – textures.

8.4.3   Placing and exchanging textures

Pull the selected texture while pressing the left mouse button into the view window of your project. If the mouse is over an area where a texture can be placed or exchanged, for example, a wall, the pointer changes its appearance to suggest that *textures can be placed or exchanged here*.

By releasing the mouse button the designated surface is changed, i.e. textured. You can adjust the appearance of your entire project this way. This process of placing and exchanging textures is equally portable to almost all areas and objects of your project. For example, the appearance of a seat set can be modified in this way. There are also objects that cannot take textures. These objects were so designated in the construction of the project (in Construction mode).

8.4.4   Deleting textures

Used textures can be deleted by pulling the **Delete texture** from the loaded textures content pane over the object or surface (as if you were placing a new texture). The old texture is deleted but no new texture is assigned to the object or surface.

8.4.5   Previewing textures

Exactly the same as with objects, you can in the textures catalog double-click one (or select the **Open** or **Properties** menu from the context menu) to open a dialog box where you can preview the texture.

In the preview window an area appears, on which the selected texture is displayed (tiled in an array of 3x3 frames over the sides of the area).

The placing of additional text, as is possible with objects described (see page 450), is likewise possible. The **Data** page is identical to the *Data page for objects* (see page

452

449), but the section on object positioning is accordingly removed.

Note: Unlike objects, data on textures is not saved in the texture image file itself, but in a single file named TEX.INI, which is stored in the same folder as the texture image files. If this folder already has a file with this name, the name is extended for the respective texture file.

Note: TEX.INI is created automatically if you make entries on an existing texture's Data page, and the file does not yet exist.

8.4.5.1   Resolution tab

Double-click a texture (or select the **Open** or **Properties** menu from the context menu) to open a dialog box where you'll find the **Resolution** tab. This page contains information about the texture image file. If the file here is a Windows BMP file, you can specify the texture's height and width in the input boxes, adjusting it to appear as it would in reality. For example, say you have a photo 1m x 1m to appear correctly in Design mode, you should input 1m here for both the width and the height. The specification you give here is stored in the BMP file itself and used by ArCon with design features where you can edit its size (see page 214).

8.4.6   Using your own textures

You can transfer pictures you've created yourself to ArCon for use as textures. Please note the following:

Textures are stored internally with a maximum resolution of 256 x 256 pixels. Even if you load a picture that has a higher resolution, it will be reduced to this lower resolution.

Textures are stored within the program using indexed color. Each pixel requires eight bits. If you load a genuine true color picture, it will be converted to indexed color (8-bit).

Beginning with version 4.0, ArCon supports, in addition to Windows BMP, the formats GIF, PCX, TIFF, JPEG and PNG. Especially with the TIFF and JPEG formats, make certain that these pictures are not too large. This slows down the program during conversion (see the first point above), which substantially increases the loading time.

Mind the available memory and disk space in your computer. If you use lots of textures, memory can fill up fast, requiring Windows to swap data to the hard disk, which will

slow ArCon (and your whole computer) down dramatically.

8.5   MATERIALS IN THE CATALOG 🖌

By assigning material properties you can define texture structures and properties for objects. This way you can modify light effects and reflections, which are particularly suited to rendering with the Raytracer (see page 389).

8.5.1   Loading materials

By left-clicking the **Materials** folder, clicking the 🖌 icon in the toolbar, or by selecting the menu **Catalog – Materials** you will load the material catalog into the contents pane.

8.5.2   Selecting and placing materials

You select a material by left-clicking it within the contents pane of the catalog. The selected material is now highlighted to differentiate it from the other materials.

Pull the selected material, while pressing the left mouse button, into the view window of your project. When the pointer is over an area where a material can be placed or exchanged, the pointer changes its appearance to suggest that *materials can be placed or exchanged here*.

By releasing the mouse button, the surface finish of the object changes. Now the selected material is assigned to the selected object or area.

Unlike textures, which you can use for all objects of your scene differently, when you modify materials, all homogeneous objects are changed simultaneously. If, for example, you have a bathroom with two sinks, and place a material on one of the sinks, the material of the second sink changes, too.

8.5.3   Editing materials/defining new materials

By double-clicking a material thumbnail picture in the contents pane, or by selecting **Properties** from the context menu (which opens when you right-click a thumbnail), the materials dialog box appears:.

454
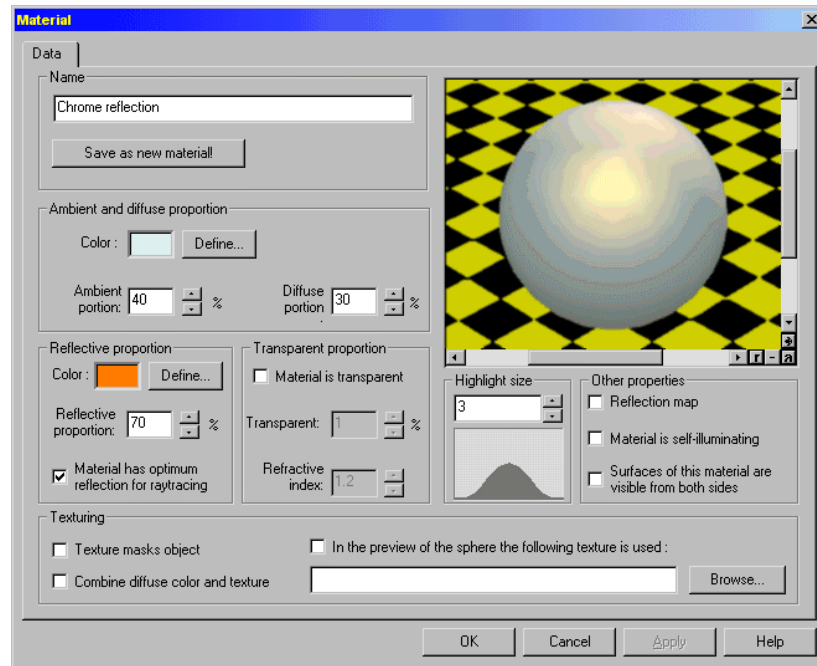
In this dialog box you have on one hand the possibility of editing existing materials, and on the other-hand you can create new materials based on existing materials.

The displayed dialog box is relatively powerful due to its many sections and you will likely require some time of experimentation with it in order to learn all the abilities of materials and how to control them.

8.5.3.1   Name

In this section the name of the current material is displayed in an input box. If you modify this name in order to define a new material, the **Save as new material** button is enabled. If you click the button, the adjustments made in this dialog box are saved as a new material with the name you entered.

Note: You can delete an existing material by selecting the menu **Delete** in the context menu for the material (right-click the material to open this context menu).

8.5.3.2 Sections for defining material properties

Besides the **Name** section, other sections exist, including: **Ambient and diffuse proportion, Reflective proportion, Transparent proportion, Highlight size, Texturing,** and **Other properties.**

Within these sections you can control the actual appearance of the material. Before the sections are described in detail, you should read the following explanation, especially if you are not familiar with these terms.

8.5.3.3 Different material parameters

When simulating real elements with the help of computer graphics, the surface property of a material is simulated based on various parameters. Depending upon how these parameters are set up, more or less realistic surfaces can be created.

In ArCon a material model was implemented which is based on a standard model PHIGS PLUS. This material model has certain limitations, which are usual for a real-time renderer, like ArCon.

As an object which is assigned a specific material appears, it is affected by both the material and the lighting (based on all light sources which light the object). Only through the interaction of both properties – the light sources and the material – is the actual appearance of an object defined. The property of a material is in principle an overlay of different lighting properties; the ambient proportion, which is responsible for the reflection of environment light; the diffuse proportion, which is responsible for the simulation of matte material properties; the reflective proportion, which is responsible for the simulation of polished material properties, and the transparent proportion, which is responsible for the simulation of transparent material properties.

Furthermore, objects can be showed in more detail with textures; these textures are in principle material properties. In ArCon, materials and textures are stored separately, for convenience when accessing and working with one or the other (or even both).

With the help of the preview window you can observe how different parameter modifications affect the material in real-time; this updating of the preview window occurs automatically when any of the values are modified.

Certain properties of materials can only be seen when you raytrace pictures. In order to make these properties also visible in the preview window, an additional small icon exists at the lower right corner of the preview window ⌐. If you click this icon, the

preview window is raytraced so that you can then observe not only the totality of all the settings, but how different settings vary when raytraced, and when not.

8.5.3.4 Ambient and diffuse proportion/reflective proportion

In these two sections you define the parameters for these proportions. Within the **Ambient** section and **Diffuse proportion** you can define the ambient or the diffuse color of an object.

In the input boxes **Ambient proportion** and **Diffuse proportion** specify the proportional degree of reflection for ambient and diffuse reflections. If the ambient proportion is too high, the object will appear relatively pale (like plastic), since it will very strongly reflect the environment light. If the diffuse proportion is too high, the light from defined light sources is reflected very strongly into various, nonspecific directions. However, large values for the diffuse proportion are necessary, for example, for the simulation of velvet.

In the **Reflective proportion** section you can define both the color and the proportional degree for reflecting reflections. The color defines, in principle, the color of the highlight on the objects.

The use of the reflective proportion along with the ambient and diffuse proportions overlaid can be clearly understood from the following example: Imagine you have a red velvet surface, on which a very light glass block is situated. This surface will look as if it would be red velvet; nevertheless it appears glossy (from the color reflecting from it), which is a result of the glass which is situated on it. With the reflecting proportion then, you define the exact properties of this glass.

Besides the field for the color and the reflective proportion, there is a check box in **Reflective proportion** called **Materials has optimum reflection for raytracing**. If you check this box the preview window is not automatically updated. Only after clicking the ⌐ icon at the lower right of the preview window will you see that the displayed sphere reflects the crosshatched surface area ideally.

8.5.3.5 Transparent proportion

In this section you determine whether a material is transparent, and if so, the degree of transparency and the refractive index value.

A material is exactly transparent if the **Material is transparent** box is checked. Only

457

in this case the input boxes for transparency and refractive index are grayed out. You can indicate in the **Transparent** input box the degree of transparency for the material. A value of 50% means that when examining an object with this material, 50% of the color behind the object shows through it, and 50% of the object's color is visible.

With the input box for **Refractive index** you specify, in principle, the *hardness* of the transparent material. Modifications to this input box likewise require the raytracer and are directly visible in the preview window; only when you activate the **⌐** icon you will see the differences.

In order to simulate, for example, glass, you should use a refractive index of 1.2; if you want to simulate something like bubbles in water, you should use a refractive index smaller than 1.0.

8.5.3.6   Highlight size

Adjustments in this section become visible only if you set a relatively high reflective proportion in the reflective proportion section. By modifying the values in this input box you can observe the effect of the highlight size – and how the curve shown under the input box becomes more or less pointed. This curve is in principle a measure of the intensity process of a highlight as a function of the angle. The higher the value is, the smaller the highlight becomes.

For matt-shining materials, for example, unpolished gold, anodized aluminum you should use small values around 3; for high gloss materials, for example, polished gold or polished plastic you should use large values.

8.5.3.7   Other properties

This section consists of the check boxes **Reflection map**, **Material is self illuminating**, and **Surfaces of this material are visible from both sides**.

8.5.3.7.1   Reflection map

If you check **Reflection map**, textures will be shown on the object not handled as bitmap pictures, which modify the color of the object from pixel to pixel, but as quasi – *mirror images*. Depending from where you look at object with this material, you'll see different parts of the reflection map.

458

This technique for textures serves for the simulation of ideal reflections; whereby the environment of the object is not reflected, but the texture. It is opposed to the real ideal reflection to show possible reflection maps in real-time.

If you check **Reflection map**, the preview window will only show a modification if you have made suitable adjustments in the **Texturing** section (see below).

Since the preview window always uses a sphere, which looks the same from wherever you look at it, this doesn't offer the best preview of what the reflection map will do to the object. A simple view of the texture is all that can be seen. But this simple view is still somewhat effective because the sphere is not perfectly round – it is made of many small triangles, which approximate the sphere.

In order to observe the behavior of reflection maps, you should define exemplary materials and pull them onto curved objects of your project. If you freely (see page 436) rotate these objects you can observe the effect of the reflection map very well.

Note that the extended characteristic **Reflection map** is used only for objects, which are actually assigned a texture.

8.5.3.7.2 Material is self-illluminating

If you check this, the material will be seen even if you did not define any light sources in your project and you switch to night vision. The material serves as a quasi – light source, however it does not light up its surrounding environment.

This material is well suited for control lights or even advertising signs.

8.5.3.7.3 Surfaces of this material are visible from both sides

Under normal conditions ArCon only shows areas of objects which are visible to the viewer; with a sphere, for example, only the front half of the sphere is shown. Showing the rear half of a sphere would unnecessarily disturb computing time and this area would not be visible anyway since it's covered by the front half of the sphere.

However, under certain circumstances this behavior is not requested or desirable. Particularly if you use textures for masking objects, you can also see into the object. In this case, you would also see the rear side of the sphere (even if only partially). So in this case you would want to check the box.

Note: Avoid unnecessarily using materials which have this check box set, since it may reduce ArCon's display rate.

8.5.3.8   Texturing

In this section you control the interaction of textures and the defined material. Making adjustments in this section makes sense only if you place the material on areas that are actually textured. Whether an area is actually textured or not can best be identified as follows: Take a texture from the catalog and pull it onto the object that is to be tested. If the pointer changes to [OK], the object can be textured. If it does not change, i.e. ☐, the object cannot be textured.

8.5.3.8.1   Texture masks object

If you check this box, the object is shown only in the parts where the texture used is not totally black (color value of 0.0.0).
You can use, if you check this box, textures to *punch out* areas of an object. The trees defined in ArCon are partially provided with such a material.
If you check this box, you will detect only a few modifications in the preview window if you've selected a texture for the preview.

8.5.3.8.2   Combine diffuse color and texture

Normally a texture replaces the diffuse color of the object pixel by pixel. It is no matter whether it is selected for textured objects.
Under certain circumstances it can make sense to mix both colors – the diffuse color and the texture color – together. Particularly if the texture has a gray tone, you can use it as a sort of brightness texture; the diffuse color appears to be the actual color.
For example: Imagine you have a texture, which appears as a black-and-white picture. If you now define, for example, a diffuse color of dark red, and you check **Combine diffuse color and texture**, you will see something like a dark red wood texture. If you use the same texture with a diffuse color of yellow, the texture resembles a fir wood texture.
The possibility to mix the diffuse color and texture is also available for walls (see page 213) and similar design features.

8.5.3.8.3   In the preview of the sphere the following texture is used

Certain material properties can be made visible only if objects with this material are

also textured.

For the sphere shown in the preview window, you yourself can specify whether it is textured or not, and if so, which texture is to be used. Check this box and enter in the input box the name of the texture, which is to be used. Of course, you can click the **Browse** button to search for the file using the Windows file selector.

You should use a texture especially in connection with the **Texture masks object** check box within the **Texturing** section, as well as the **Reflection map** and **Surfaces of this material are visible from both sides** check boxes in the **Other properties** section.

8.5.4   *Tips for using materials*

ArCon includes a set of predefined materials. In order to understand how the various material functions work, we recommend you open these predefined materials, and examine and change the settings.

The same object can appear very differently by changing its materials. So you can make, for example, a high gloss steel armchair from a rustic leather armchair; similarly, you can make an enameled bath tub from an acrylic bath tub.

9 EXPORTING ARCON+ PROJECTS

9.1 OVERVIEW

ArCon+ supports not only inserting ArCon formats as transparencies, but exporting ArCon projects from Construction and Design mode.

In Construction mode the entire construction plan is exported; from Design mode the current view is exported as a line diagram or as a diagram with opaque edges.

For exporting from Construction mode, select the menu **File – Export as…** and a submenu appears with the following export options: **Enhanced Windows Metafile**, **VRML**, **MB Exchange Format**, **HPGL**, **DXF** or **ProCaD**.

Note: Unlike all other exchange formats, when exporting files in the VRML format, the construction view is not exported but the 3D model (Design mode).

In Design mode you export the current view, by selecting one of the desired export formats from the menu **File – Export as…**. In contrast to Construction mode, the current view – be it a 3D view or a view from overhead– is exported in the selected format.

Besides the submenu export there is the **Save as VRML…** menu, which in principle is identical to the same entry in Construction mode. The only difference is that when exporting as VRML in Design mode the settings for the current 3D view are used; in Construction mode there is no 3D view and so the settings can subsequently still be modified.

9.2 SETTINGS FOR EXPORTED FILES

Depending on whether you export data from ArCon's Construction mode or Design mode, you have various options, which are described, in the following sections.

463

9.2.1 Export from Construction mode

The export function of ArCon+ for the three formats HPGL, 2D-DXF and ProCad (ProCad is the CAD SYSTEM for architects and constructional active engineers) exports the following in Construction mode:

HPGL: Here the plan lines of the walls and openings, text, dimensions, and lines of the currently visible floor in 2D. Sections are exported if you use the entire page as the view.

DXF: Here the plan lines of the walls, openings, text, dimensions, and lines of all floors are stored into their own layers (each floor is a layer). Sections are exported into individual layers.

ProCad: Here the walls and openings are exported as 3D objects into individual ProCad files, along with text, dimensions, and lines of the currently visible floors (each floor is a file). The files are created in the selected directory. A specification of the file name is not necessary with the ProCad export (see the respective documentation for ProCad). Sections are saved as separate files.

The export in the **MB exchange format** is described in the respective section in the eLines manual and on page 467.

The export as **Enhanced Windows Metafile** (EMF files) exports all elements of Construction mode as Windows GDI lines.

Note: Some character programs convert these files during reading as EMF files into their own internal format, which does not always guarantee error-free results. Whether an ArCon+ file is exported correct as an EMF file, should be verified with the Windows 95/NT viewer or with the intermediate file.

The export as **VRML file** in Construction mode is the same as saving from Design mode and is therefore described in the following paragraphs.

9.2.2 Export from Design mode

All export formats besides VRML use the same information in Design mode for their export: the current view as line view, with or without opaque edges. If you select the menu **File – Export as…** and then any of the available formats, the following dialog box appears:
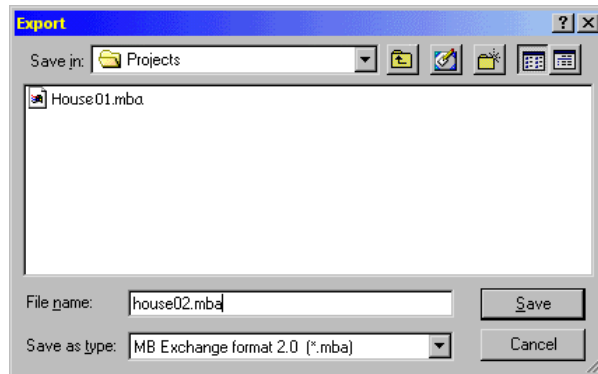
It is a standard Windows file selector dialog box. If you check this box, only visible edges of the wire frame are exported.

9.3   EXPORT AS VRML FILES

Both in the Construction and in Design mode, you can export VRML files. Here the complete 3D model of your project is exported. If you select the menu **File – Export as… – VRML** in Construction mode or **File/Export 3D information as/VRML…**, in Design mode, the following dialog box appears:
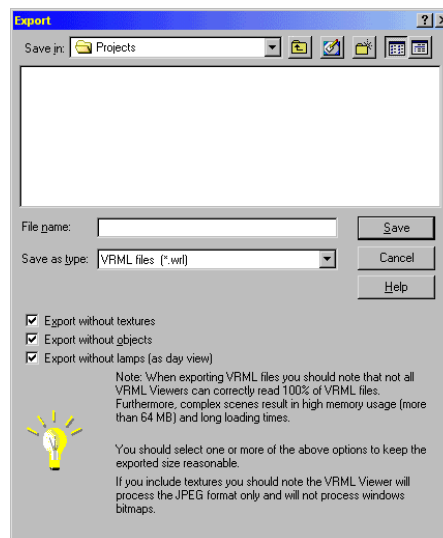
In this extended file selector you can additionally select whether textures and/or objects are to be exported and whether the lighting in the day view is to be exported. The dialog box itself includes notes on the use of these options.

9.4   NOTES ON THE VRML EXPORT

You can export VRML files both in Construction mode and in Design mode. Generally it is more favorable to make the export from Design mode since you can see exactly what is to be exported – that is, the current 3D view.

Projects exported by ArCon correspond to the VRML specification version 1.0. Despite this unique specification VRML files can be displayed differently depending upon the viewer. Particularly when using textures and light sources the viewer can react differently. It depends not only on the manufacturer of the viewers/browser, but also on the version number, as loaded VRML files are shown.

In order to avoid these anomalies, you can in ArCon+, when exporting VRML files, select whether you would like to export textures and/or objects, and whether you would like to export light sources. If you do not export objects, the project size of the VRML file will be substantially reduced, resulting in faster loading times and display rates. Here you can, in principle, effectively deal with the many VRML viewers that can only handle scenes of low complexity.

Using textures in VRML viewers is problematic in two different ways:

The loading of textures over the Internet can sometimes last a very long time, since the amount of data to be loaded is very large.

Also, the texture formats used in ArCon are not absolutely supported by all browsers/viewers. In the VRML specification, only the support of JPEG files is prescribed; ArCon can also use as textures BMP and other image formats. Depending upon the browser these *foreign formats* may or may not be displayed.

If you want to create a project for VRML, you should by all means stay within the VRML-inclusive specifications. You should use only JPEG textures. When in doubt you can also use GIF files, since most VRML viewers/browsers support this format too.

Additionally it is possible with some viewers/browsers to use image files as textures that are not squarely represented.

Finally, VRML viewers/browsers do not possess uniform mechanisms to search the path specification for external and internal files to be loaded. For this reason it is almost impossible to create textured VRML files which can be loaded from local disks and

over the Internet by all browsers.

9.4.1 Export as day view

If you export all ArCon projects in the night view, all lamps are exported as lamps with the status of whether they are switched on or off. When showing VRML files with lamps some browsers/viewers control the lamps differently from ArCon.

In ArCon, in the normal view only such elements are lit up by a lamp, which are located in the same room (and also without raytracing). VRML viewers do not support this characteristic. Here all light sources light up all objects in a scene. This can lead very quickly to the result that your scene is overexposed. Additionally, some viewers/browsers ignore the fact that a light source is switched off, i.e., light sources that are switched off still light up the scene in the viewer/browser.

In order to avoid this characteristic, you can in ArCon export the day view; in this mode no light sources will be exported, and then in the viewer/browser shown without light.

9.5 EXPORT IN THE MB-EXPORT FORMAT

The eLines format is the same as the mb-export format; you can export files in this format also without clicking the ⊬ icon. Here you can input the path and the file name of the project to be exported. The contents are in principle the same as if you click ⊬.

467

10 SIMPLIFIED COST ESTIMATES

10.1 OVERVIEW

Planning a building is one side of the coin, the other side is the costs involved. This is why ArCon does not just provide support for displaying the plan or in performing calculations in accordance with TYPE 1 and TYPE 2. ArCon can also be used to produce an estimate of costs on the basis of 7 cost groups. The number of square meters for the base area and the cubic meters for the room contents are automatically calculated from the plan in this process.

The costs are normally estimated in ArCon itself at the top level only, in other words, without using the calculation module. This means, cost groups 100 to 700 only are included in the calculations without any further subdivision.

It is possible to estimate the costs right at the start of the project. In this case, however, no data can be transferred from the plan. If you are creating a costs estimate on the basis of the finished project, the property area and the values for cost groups 300 and 400 can be derived directly from the plan.

The basis for the approximate cost calculation in ArCon is the gross room content (GRC). The level at which the individual square meters or cubic meters are evaluated per cost group depends on the *Construction Price Table*.

In ArCon, the values for the two cost groups 300 and 400 have been included for all construction price tables. In other words, you can call up the costs per cubic meter of converted room directly, regardless of the size of the project. The costs for all other cost groups need to be entered manually.

The construction price tables included in ArCon are maintained in the file **COSTS.INI** in the installation directory for ArCon \STANDARD\Costs and can be expanded there (see page 474).

The table below provides a brief summary of the values which can be transferred from the plan and which cost groups are automatically calculated on the basis of the construction price tables.

Cost Groups	Figures taken from plan	Evaluated Automatically
100 Property	100 Property	
200 Preparation and development		
300 Building - Building constructions	300 Building - Building constructions	300 Building - Building constructions
400 Building - Tech specifications	400 Building - Tech specifications	400 Building - Tech specifications
500 External Systems		
600 Fittings and Decorations		
700 Incidental Expences		

10.2 APPROXIMATE COST CALCULATIONS

The **Approximate cost calculation (conforming to TYPE 1)** dialog box is opened using the **Cost estimate** command in the **File** menu. In order to use this function you need to have created a project first.

Rough cost calculation

Specification to the project size (according to area calculation type 1)
<New Project>

Gross surface area, covered and surrounded on all sides at full height (BGFa):	81.3 m²
Gross volume, covered and surrounded on all sides at full height (BRIa):	227.6 m³
Main effective area, covered and surrounded on all sides at full height (HNFa):	70.7 m²

OK
Cancel
As Default
Help

Building cost table:
(in accordance with construction costs database)

Example 01: EMa-Cat-A
Example 02: EMa-Cat-B
Example 04: EMa-Cat-C
Example 05: EFeB-Cat-
Example 06: EFeH-Cat-
Example 07: EFeL-Cat-
Example 08: MF2-Cat-A
Example 09: MF3-Cat-A
Example 10: RH2-Cat-A
Example 11: RH3-Cat-A

Description of the current building cost table (Example 01: EMa-Cat-A)

Single family house; Brick
Category : A

Use for unit prices:
○ Minimum
● Mid value
○ Maximum

Cost groups:	Mass: Tansfer from plan		Unit prices:		Total prices:	
100 Plot	☐	0 m²	× 0 $/m²	=	0	£
200 Preparation and development	☐	0 m²	× 0 $/m²	=	0	£
300 Building - building constructions	☑	227.585 m²	× 400 $/m²	=	91033.9	£
400 Building - technical specifications	☑	227.585 m²	× 100 $/m²	=	22758.5	£
500 External systems	☐	0 m²	× 0 $/m²	=	0	£
600 Fittings and decorations	☐	0 m²	× 0 $/m²	=	0	£
700 Incidental expenses	☐	0 m²	× 0 $/m²	=	0	£

Total costs: 113792 £

This dialog box is used mainly to carry out the following tasks:

1. You specify the construction price table according to the type of building, and as an option, specify the level at which the two cost groups 300 and 400 are evaluated. This means you can obtain information on the maximum or minimum costs per cubic meter of the room at the touch of a button at any stage.

2. The corresponding check boxes are used to specify which data is transferred directly from the plan.

3. In the **Unit prices** column, the data transferred from the plan or entered manually can be evaluated. ArCon calculates the unit prices for cost groups 300 and 400 on the basis of the construction price table selected, and depending on the option selected. The other costs need to be entered manually. The overall prices and total costs are output automatically.

The following diagram provides a brief summary of the working steps involved:

471

Construction price table: Forms the basis for evaluating the figures

Description for the construction price table

As an option, the price calculations can be controlled

Note: All values in the **Approximate cost calculation conforming to TYPE 1** dialog box including the construction price tables can be transferred into **Room info** using the relevant keywords.

10.2.1 Details on project size

The current values for your plan are displayed as a report in this section. If you have not yet created a plan, the display boxes will be empty.

The gross room content (GRC) is used for estimating costs in ArCon, in other words, the number of cubic meters for all the rooms with the usage type **Covered and surrounded on all sides at full height**. In ArCon+ the **Type 1** tab in the **Room data** dialog box can be used to specify the usage type for a room. This means that if you define the usage type b or c for a room, you can prevent that room being included in the calculations for the gross room content and therefore in the estimate of the costs, because only rooms of usage type a are included in that calculation.

The gross area (GAa) and the main usable space (MUS) are calculated and displayed in

472

ArCon, but are not included in the calculations for the estimate of costs.

10.2.2 Construction price table
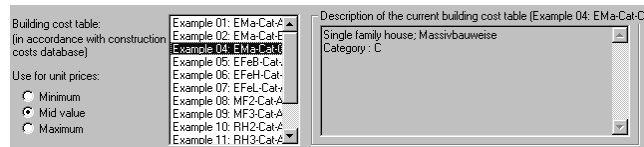
This section can be used to select the **Construction price table**, which you want to use as the basis for the estimate of costs, depending on the project size. The **Description of the current building cost table** is displayed in the box next to the selection list.

The construction price tables included in ArCon contain only the values for the two cost groups 300 and 400. These figures are used for calculating the unit price and total price of the cost group **Building - Building construction** and **Building - Technical specifications**. There are three different cost groups here, which can be used to calculate the number of cubic meters for a room: select **Minimum**, **Average** or **Maximum**. This means you can quickly determine the maximum costs, which need to be considered, for example.

At this point it should be noted that the manufacturer of this software can not guarantee that the sums in German Marks contained in the construction price tables are correct. In view of continually rising prices in the construction industry, this would certainly be a risky undertaking in any case.

10.2.3 Cost calculation

This section is used to specify the cost groups for which data is to be transferred directly from the plan. There is one check box available for each cost group. If the box is

473

checked, the corresponding value will be automatically entered into the box next to that box. This will then be grayed and cannot be modified.

Do bear in mind that you can only transfer values for the cost groups **100 (Property)**, **300 (Building - Building construction)** and **400 (Building - Technical specifications)** from the plan. The information for the remaining cost groups needs to be entered manually.

The cost per unit is specified in the **Unit price** column. In other words, you specify the cubic meter or square meter costs for each cost group. ArCon then multiplies the values transferred from the plan or entered manually by these costs to produce the **Total prices**.

For cost groups 300 and 400, the costs per unit are provided automatically, depending on the construction price table selected and the option set. These can be changed at a later stage.
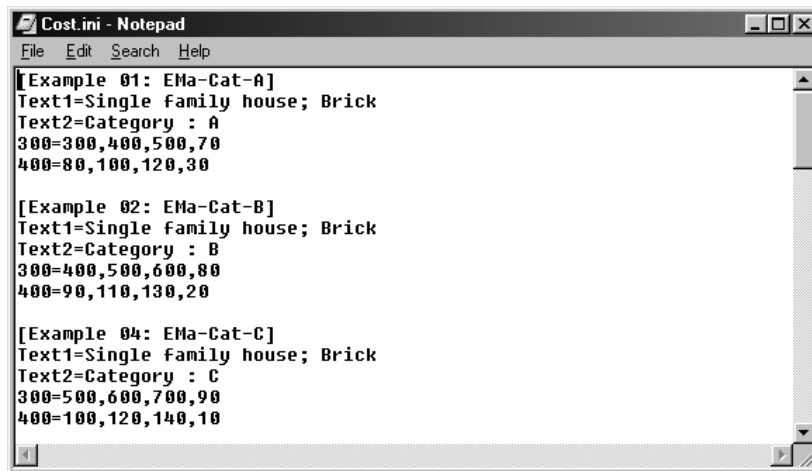
The unit prices for all other cost groups need to be entered onto the system manually.

The total costs of the project are entered in a separate field.

10.2.4 Expanding the building prices tables

The entries in the building price tables are made and managed in the file **COST.INI**. The file is located in the installation directory for PROGRAM\STANDARD\COSTS.

```
[Example 01: EMa-Cat-A]
Text1=Single family house; Brick
Text2=Category : A
300=300,400,500,70
400=80,100,120,30

[Example 02: EMa-Cat-B]
Text1=Single family house; Brick
Text2=Category : B
300=400,500,600,80
400=90,110,130,20

[Example 04: EMa-Cat-C]
Text1=Single family house; Brick
Text2=Category : C
300=500,600,700,90
400=100,120,140,10
```

There is the option of editing the Costs.ini (with Notepad) to add entries to the construction price tables and to modify existing entries.

Each construction price table comprises multiple rows. The first row contains the abbreviation, which is displayed in the selection list of construction price tables. The second row **Text1** contains a detailed description of the construction price table. If several lines of description are created, these will start with **Text2**, **Text 3** etc., accordingly.

The remaining rows can be used to define the sums to be used as the basis for calculating the costs per unit for the individual cost groups. In this process, the first number specifies the minimum value, the second the mean value, and the third the maximum value. The last figure stands for the proportion of the total costs; this entry is not currently used.

11 ROOM INFO AND AREA

The Room Info and Area calculations conform to DIN 276 and II.BV, the German area calculation standards (referred to as Type 1 and Type 2 in the international versions). Throughout the software and documentation these area measurement methods are defined as Type 1 and Type 2 respectively. Although they are not expected to be used outside of Germany, we have included then for those users that wish to experiment with these standards.

In ArCon+ information can be compiled and calculations carried out for the base areas and room contents of buildings in accordance with TYPE 1 Parts 1 and 2 and in accordance with the German Second Calculation Regulations (German Official Federal Gazette I, p. 2178). Formatted text files for your current plan can be created from this information. These files can then be edited in Microsoft Word for Windows (version 7.0 and later), or in any other word processing program which can read what are known as **RTF** files. Included with ArCon+ is the Microsoft program **Word viewer** which can be used to view and print this room information, but not to edit it.

11.1 CREATING ROOM INFO

The **Room info** menu is used to create room information. This menu can be opened both in Construction mode and in Design mode. The menu itself consists of two parts.
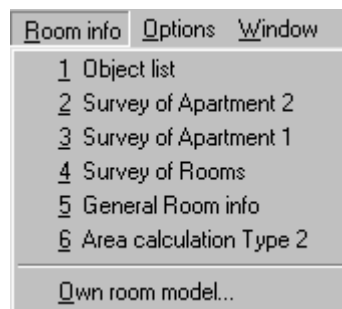
A list of ready-made templates is displayed in the top section. In the lower section you can use your own templates. The procedure for defining templates can be found in the

477

next section.

If you are using one of the ready-made templates, by selecting it in the menu, this will first be displayed in a **File – Save** dialog box where you can specify the filename for the **Room info** to be generated. ArCon+ will then create this room information and open a word processing program where this **Room info** is displayed directly. Which program this is depends on the word processing program which has been registered on your computer for files with the extension .**RTF**. If no registration has been made during the installation of ArCon+, the program Word Viewer will be installed and then started as appropriate – otherwise, Word for Windows may be launched. This text editor can then be used to print or even edit the **Room info** displayed.

ArCon+ uses what are known as **Room info** templates for creating **Room info** and room logs, which are interpreted in the generation process. Changing these templates can change the appearance of these documents to a great extent. In this way, a letterhead or similar can be added directly to the template, for example.

In order to obtain an overview of how the ready-made **Room info** templates will look, it is a good idea to load one of the ArCon+ example projects and then use the ready-made templates to create a **Room info**.

As the user you can generate your own templates in order to format the **Room info** files according to your personal requirements. However, this formatting process does require comprehensive knowledge of Microsoft Word for Windows (version 7.0 and later). This program needs to be used to create the template files. Alternatively, you can simply use the template files included with ArCon+. You can then define your own templates or modify the existing templates according to your requirements once you have exhausted the possibilities of the existing ready-made templates.

The description given below is aimed at experienced Microsoft Word users who have ideally already written a small program in WordBasic or another programming language.

Template files, like the **Room info** generated from these files by ArCon+, are **RTF** files and can be generated using Word for Windows.

A **Room info** template file, which is suitable for use with ArCon+ is basically a normal text file with a few specially reserved keywords. These keywords are evaluated during the interpretation process in ArCon+ and replaced by the relevant text where appropriate. All the formatting in the template file is retained in this process, which means that simply formatting the template file can format the result.

Note: During the save process in Word for Windows, don't forget to specify the relevant

478

file format (RTF)! Explanations for further options for **Room info** can be found on the following pages. Click at the top of the toolbar in the Help window to obtain the relevant information.

11.1.1 Keywords in template files

Keywords interpreted by ArCon+ normally start with an @ followed by an identifier, which may be specified in more detail by and separated by a dot. There is also an option for specifying the format of the output.

ArCon+ does not recognize any difference between upper and lower case. Any combinations are possible. Different variants can be used for the various keywords.

For example, `@ForFirst` can be used instead of `@ForFirst`.

If keywords in ArCon+ are replaced by values for creating the room information, the formatting of the keywords is retained. For example, if the format for the keyword `@Room.Area` is *10pt, bold, italics, arial*, ArCon+ will use the relevant value with precisely that formatting. Formatting such as *align right*, *align left*, etc. is retained.

Note: In order for ArCon+ to recognize keywords, the entire keyword must have the same format. For the example mentioned above, formatting such as `@Room.Area` would not be permitted.

If you want text to be displayed immediately after a keyword, this can mean that the keyword is not recognized. In this case, you can either change the format of the keyword or add] immediately after the keyword. This] is not read, but is used as a separator.

Example 1: `@ForAll.RoomsRoom @Room.Name ...`
This example is incorrect because `RoomsRoom` is an invalid keyword.

Example 2: **`@ForAll.Rooms`**`Room @Room.Name ...`
This example is correct, because `Rooms` and `Room` are separated by a difference in format.

Example 3: `@ForAll.Rooms]Room @Room.Name ...`
The latter example is also correct,] will not be displayed in the **Room info**.

479

11.1.2 Loops in the room info templates 🔺

In ArCon+ **Room info** templates *live* mainly through the definition of loops. For example, this means that all rooms on a floor are shown separately, which is carried out using a loop. A loop basically has a start and an end, which is modified in accordance with the start. Possible keywords for the start of a loop are:

```
@ForAll
@ForCurrent
@ForAllNotLast
@ForAllNotFirst
@ForAllNotEnds
@ForFirst
@ForLast
```

The meaning of these keywords should be self-explanatory. `@ForAllNotEnds` is a combination of `@ForAllNotFirst` and `@ForAllNotLast`.
`@ForCurrent` equates to the element currently selected in the project (for example, a room, a building, as well as an object in Design mode).
The relevant keywords for the end of a loop are:

```
@EndForAll
@EndForCurrent
@EndForAllNotLast
@EndForAllNotFirst
@EndForAllNotEnds
@EndForFirst
@EndForLast
```

After the keywords given here, there must be a specification of what a loop is to include. These specifications are separated from the keywords given above by a dot. The possible values are:

```
Property
Propertiesection
Apartment
Enclosure
Room
WallSide
Window
Door
Column
Chimney
Object
```

480

The end of a loop should be completed with the same keyword.

Tip: The keywords for the start and end of the loop can be formatted to be *invisible*. This makes the template formatting easier to understand.

The listing type `@ForLast..EndForLast` is not used if no elements or only one element is defined in the specified type. This fact can be exploited if you only want to output specific values when more than one element is defined. In the ready-made templates supplied for calculating the living area calculation in accordance with TYPE 1, this *trick* is frequently used.

For loops across enclosures, a specification of which of the possible enclosure types – and where applicable which usage types – are to be used, can be added immediately after the keyword `Enclosure`. An optional printout [TYPE] can be used here, which is described in more detail later.

Within a loop, certain *variables* can be used, which are replaced by true values when interpreting ArCon+. Unlike keywords for loops, which are no longer visible in the **Room info**, these *variables* are replaced by text – the current value will be entered. The formatting of the keywords mentioned above is still advisable in this situation.

The list of *variables* to be replaced comprises of the following words.

```
@Property
@Propertiesection
@Apartment
@Enclosure
@Building
@Floor
@Room
@WallSide
@Window
@Door
@Column
@Chimney
@Object
```

In addition to the *variables* listed above, there are also *specifiers,* which specify the part of the variable, which is actually used. These specifiers are:

```
Variable                Possible specifiers
@Property               INFO, PROPERTYVALUES,
                        QuantityPropertiesections,
                        QuantityBuilding
@Propertiesection       INFO, PROPERTYVALUES
@Dwelling               INFO, [TYPE]QUANTITY,
                        [TYPE]ROOMVALUES
```

481

```
        @Enclosure               [TYPE]QUANTITY,
                                 [TYPE]ROOMVALUES,
                                 SurfaceType,EnclosureType
        @Building                INFO, FLOORVALUES,
                                 [TYPE]QUANTITY,
                                 [TYPE]ROOMVALUES
        @Floor                   INFO, FLOORVALUES, Height,
                                 Level,
                                 ExteriorPlasterThickness,
                                 ExteriorPlasterName
                                 [TYPE]QUANTITY,
                                 [TYPE]ROOMVALUES
        @Room                    [TYPE]INFO,
                                 [TYPE]ROOMVALUES,
                                 [TYPE]PlasterThickness,
                                 [TYPE]PlasterName,
                                 [TYPE]UsableAreaType,
                                 [TYPE]UsableAreaNumber,
                                 [TYPE]UsableAreaName,
                                 [TYPE]EnclosureType
        @WallSide                Number, Length, Material,
                                 WALLVALUES
        @Window                  INFO, Width, Height, Area,
                                 SillHeight
        @Door                    INFO, Width, Height, Area
        @Column                  INFO, Length, Width, Height
        @Chimney                 INFO, Length, Width, Height
        @Object                  INFO, Quantity, ItemPrice,
                                 Price, Manufacturer,
                                 ItemNumber
```

In this case, INFO may be one of the following values:
```
        Name,
        Note,
        Number
```

The following keywords can be used for PROPERTYVALUES:
```
        Scope,
        FormulaScope,
        Area,
        FormulaArea
```

The following variants are possible for FLOORVALUES:
```
        GrossRoomContents,
        FormulaGrossRoomContents,
        GrossProperty,
        FormulaGrossProperty,
        ConstructionArea
```

QUANTITY will be one of the following values:
```
        QuantityBuilding,
```

482

```
QuantityDwellings,
QuantityEnclosureAreas,
QuantityFloors,
QuantityRooms
```

The following values are possible for ROOMVALUES:
```
BaseArea,
FormulaBaseArea,
TopArea,
FormulaTopArea,
Scope,
FormulaScope,
Volumes,
FormulaVolumes,
QuantityChimneys,
QuantityColumns,
QuantityObjects,
QuantityWalls,
TYPE 2use,
WALLVALUES (see below)
```

Lastly, the following values can be used for WALLVALUES:

```
WallArea,
FormulaWallArea,
WindowArea,
FormulaWindowArea,
DoorArea,
FormulaDoorArea,
QuantityWindows,
QuantityDoors
```

For [TYPE] (the function of which is described in the section below) which is described between *variable* and *specifiers*, separated by a dot, the following values are:

```
A, B, C, MUS, MUS1, MUS2, MUS3, MUS4, MUS5, MUS6,
AUS, FS, AS, X, K150, KMin, GMin, KMax, GMax,
ZMinMax, TYPE 2
```

11.1.3   *Meanings for the specifiers*

The specifiers have different meanings, depending on the *variables* with which they are used. For example, `Room.Name` produces the name of the room used, and `Floor.Name` produces the name of the floor. The most frequently used specifiers should be self-explanatory from their names. The values, which are replaced when

creating the calculation according to TYPE 1, generally correspond to the values entered for you in ArCon in the relevant dialog boxes.

11.1.4 Meaning of [TYPE]

Further restrictions can be placed on some of the specifiers described above. The specifiers which can be restricted further include all those which start with a [TYPE] in the list above. The square brackets around TYPE indicate that this additional restriction is optional.

The possible values for TYPE relate to the use and enclosure type for rooms according to TYPE 1, with one exception (K150, see below). If one of the possible variants is set between *variable* and *specifier*, it means that only the parts of ArCon which meet the relevant restriction will be used in calculating the values to be generated.

In other words, only these rooms or the elements defined in the hierarchy (see section below) *underneath* rooms (for example, windows in rooms) for which the relevant restriction is defined will be used.

Bear in mind that only *variables* which are located *above* rooms in the hierarchy can be subspecified using TYPE. These are @Dwelling, @Enclosure, @Building and @Floor. The reason for this is obvious: For all hierarchy levels below this level, a more precise specification is not necessary and not possible because the values have already been precisely defined using the settings for the room.

In ArCon+ version 5.0 and later, keywords for [Type] can also be used directly for rooms. This is especially useful for the output of values for the German Second Calculation Regulations.

If a room which has been *restricted* using an entry in [Type] is used in a higher level loop – which also uses a restriction, but which conflicts with that used for the room – the result produced for the corresponding room values will be 0 or *undefined*. These types of combinations should be avoided.

The meanings of the possible values for TYPE are as follows:

A   Enclosure type for the rooms used is type a) (enclosed on all sides and with a roof)

B   Enclosure type for the rooms used is type b) (not enclosed on all sides but with a roof)

C   Enclosure type for the rooms used is type c) (surrounded by objects on all sides but without a roof)

MUS   Usage type of rooms used is MUS1..MUS6 (the use of the rooms used is the one main usable space)

MUS1 Usage type of rooms is main usable space 1 according to TYPE 1

MUS2 Usage type of rooms is main usable space 2 according to TYPE 1

MUS3 Usage type of rooms is main usable space 3 according to TYPE 1

MUS4 Usage type of rooms is main usable space 4 according to TYPE 1

MUS5 Usage type of rooms is main usable space 5 according to TYPE 1

MUS6 Usage type of rooms is main usable space 6 according to TYPE 1

AUS   Usage type of rooms is additional usable space according to TYPE 1

FS   Usage type of rooms used is functional space according to TYPE 1

AS   Usage type of rooms used is access space according to TYPE 1

X   The usage type of the rooms used has not been entered, i.e. no specifications were entered into the **Room data** dialog box for the relevant rooms on the TYPE 1 tab under usable space type.

K150 In the output of base areas and the relevant formula (specialized `BaseArea` and `FormulaBaseArea`, both components of ROOMVALUES) only the part of the room which is at least 1.50m in height is normally used. If `K150` is used, the base area relates to the remainder of the room, in other words the area where the head height is less than 1.50 meters. In general, the difference between rooms with eaves is important. The general rule is `@Room.BaseArea` + `@Room.K150.BaseArea` = total plot for the room.

KMin, GMin, KMax, GMax, ZMinMax

The function of this *limiter* is basically the same as that for `K150`. Other rules are only used for calculating `BaseArea` and `FormulaBaseArea`. The settings made on the **TYPE 2** tab in the **Room info/Type 1/TYPE 2** dialog box (see page 517) in particular are used here.

The following specifics apply:

`KMin`: Instead of including areas only where the head height is less than 1.50 meters as with `K150`, with `KMin` the height of the lower height line is used as the height limit. The weighting factor is *not* taken into account.

`GMin`: As for `KMin`, except that for `GMin` the area with a clear height *greater* than the lower height line is used.

`KMax`, `GMax`: As for `KMin` and `GMin`, but relates to the top height line.

485

`ZMinMax`: Using this restriction means that only parts of the base area where the room has a clear height which is between the height of the lower and top height lines are used.

`TYPE 2` Using `TYPE 2` as a restriction means that with the output for `BaseArea` and `FormulaBaseArea` all the rules set in the **Room info/TYPE 1/TYPE 2** dialog box (see page 517) are used. Lastly, `TYPE 2` is used to generate room information based on the German Second Calculation Regulations.

The individual variants for TYPE can also be combined. To do this, all that is necessary is to add a dot after each variant. The conditions listed need to be met simultaneously in this case. For example, if you only want to use rooms from one particular floor which have enclosure type a) and which have the usage type MUS1, this can be specified using a `@Floor.A.MUS1.Specifier` type command. However, it is only really useful if a combination is created from different TYPE groups, as combinations from the same group would be mutually exclusive. An example of a meaningless combination would be `@Floor.A.B.Specifier`. The elements of the following groups should not be combined with one another:

Group 1:	A, B and C
Group 2:	MUS, MUS1, MUS2, MUS3, MUS4, MUS5, MUS6, AUS, FS, AS, and X
Group 3:	K150, KMin, GMin, KMax, GMax, ZMinMax and TYPE 2

The following examples should explain the use of TYPE a little more clearly:

@Floor.MUS1.QuantityRooms produces the number of rooms on the floor which have the usage type MUS1.

@Floor.FS.K150.BaseArea produces the area of a building, which has a room height of less than 1.50m in rooms with the usage type functional space.

@Dwelling.A.MUS.QuantityRooms produces the number of rooms in the house which are enclosed on all sides and which have a roof, and for which MUS1,2,3,4,5 or 6 is defined as the usage type.

As mentioned above in the **Loops** in the **Room info** templates section, the subspecifier

from TYPE can also be used to restrict a loop above enclosures. For example, the command sequence

```
@ForAll.Enclosures.A
  @ForAll.Rooms
....@Room.Name
  @EndForAll.Rooms
@EndForAll.Enclosures
```

means that all the rooms with the enclosure type A are output, regardless of the usage type.

Do remember that the TYPE must not be specified again for the end of the loop above the enclosures. Just as for the subspecified *variables*, a multiple specification can also be made for the subspecification of enclosure loops, where the same restrictions apply to the combination of the subspecifiers.

For example, replacing the first line in the example with:

```
  @ForAll.Enclosures.A.MUS1
```

would mean that all the rooms with the enclosure type A and the usage type MUS1 are output.

11.1.5 *Embedding loops and hierarchies*

It is possible to create loops within loops, while observing specific general conditions. For example, an embedded loop of the type

```
@ForAll.Floors
  @ForAll.Rooms
     @Room.BaseArea etc.
     ..........
  @EndForAll.Rooms
@EndForAll.Floors
```

can be used to output all the rooms, classified according to floor. This means some specifications can be made after the start of the floor loop. These are then output in the **Room info** accordingly in front of the list of all rooms.

The following hierarchy must be observed when embedding loops:
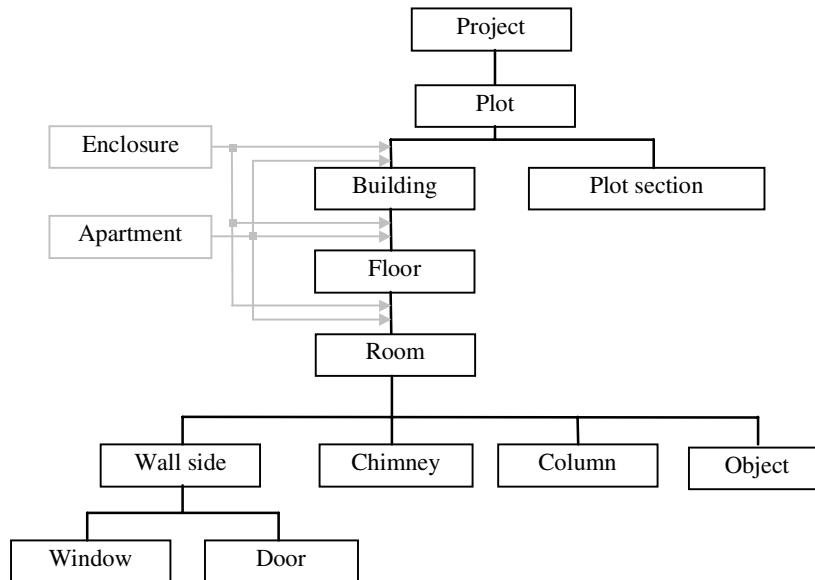
This means, for example, that in a loop above all rooms, *no loops* can be defined for all floors. The reverse is also possible. In order to start certain loops, it is *not* necessary to define all higher level loops. For example, it is possible to output all the wall sides for a building, without starting loops for floors and rooms.

It is also possible to output all the doors on a floor or even an entire project, for example. The relevant construction for the floor would look like this:

```
@ForAll.Floors
  @ForAll.Doors
    @Door.Height
    .....
  @EndForAll.Doors
@EndForAll.Floors
```

For the doors in the entire project, the loop would be:

```
@ForAll.Doors
  @Door.Height
..
@EndForAll.Doors
```

The loops above enclosures and dwellings are of particular importance. Unlike the other levels, their position is not fixed. As you can see from the diagram above, they can be started before a loop above buildings, floors or rooms. However, no additional loops above enclosures can be opened within a loop above enclosures. The same applies to apartments.

The following examples are therefore possible:

Example 1:
```
@ForAll.Enclosures
  @ForAll.Floors
     Rooms on the floor "@Floor.Name]" with the
                            enclosure type
     @Enclosure.EnclosureType]:
     @ForAll.Rooms
          @Room.Name
     @EndForAll.Rooms
  @EndForAll.Floors
@EndForAll.Enclosures
```

Example 2:
```
@ForAll.Floors
  @ForAll.Enclosures
     Rooms with the enclosure type
                          @Enclosure.EnclosureType]
                          located on the floor
                          "@Floor.Name]":
     @ForAll.Rooms
        @Room.Name
     @EndForAll.Rooms
  @EndForAll.Enclosures
@EndForAll.Floors
```

To explain these two examples, imagine that they are being used for a two-floor apartment, where there are two rooms "living" and "bedroom" on the ground floor, each with the enclosure type a. On the top floor there is the room "terrace" (enclosure type b) and the room "child" with enclosure type a.

For example 1, the following output would be created:

Rooms on "ground floor" floor with enclosure type a):

Living

Bedroom

Rooms on "top floor" floor with enclosure type a):

489

Child

Rooms on "ground floor" floor with enclosure type b):

Rooms on "top floor" floor with enclosure type b):

Terrace

Example 2 would produce the following output:

Rooms with enclosure type a located on the "ground floor" floor:

Living

Bedroom

Rooms with enclosure type a located on the "top floor" floor:

Child

Rooms with enclosure type b located on the "top floor" floor:

Terrace

Note: In order to prevent the output of the line "Rooms on "ground floor" floor with enclosure type b):" in example 1 above (for the ground floor there are no rooms with enclosure type b)), it is useful to insert headings of this type into a `@ForFirst.xxx`, `@EndForFirst.xxx` loop. As this loop is only run when at least one element of the corresponding type exists, the heading will therefore only be output at that point.

From the line
```
        Rooms on the floor "@Floor.Name]" with the
                          enclosure type
                          @Enclosure.EnclosureType]:
```
from example 1, this would be
```
        @ForFirst.Room
          Rooms on the floor "@Floor.Name]" with the
                          enclosure type
                          @Enclosure.EnclosureType]:
        @EndForFirst.Room
```

As mentioned above, an additional subspecifier can be used for enclosures. This can then be used to output all rooms with usage type MUS1, for example. The templates for performing calculations conforming to TYPE 1 included with ArCon+ exploit this fact. This could (and should) be used as an example when creating new templates.

11.1.6   *Using variables within loops*

"Variables" of a certain type may only be used when they are located within a loop of

the same type. For example, the "variable" @Room.Name may only be used within a loop @ForXXX.Rooms… @EndForXXX.Rooms. In this case, whether or not there is another loop open within this loop is a critical factor. For example, @Room.Name could also be used in a loop across all wall sides, if a loop for the rooms has been defined around this loop.

In the expansion of loops, ArCon+ ensures that multiple counts are made *logically*. If all the doors on a floor are output room by room, for example, each door (except the external doors) will occur twice; once for one room, and once for the other. If all the doors are output floor by floor, they will only be counted once. The same applies to windows.

11.1.7   Format specifications for variables 🏹

For the "variables" given in the previous section it is possible to attach a formatting specification after the specifier in order to determine the number format and the degree of precision used for the output of the replaced values. This formatting is optional. However, if this formatting option is used, it must be written directly after the "variables." It will always start with a percentage sign % followed by several control characters.

The formatting instruction is compatible with formatting instructions in the programming language C, such as are used with printf, for example. This means that @Room.Scope%.2f, for example, will output the scope of the room to two decimal places. A formatting instruction with the form @Room.Scope%10.2e would create an output in the exponential view with a character width of 10 and a number of decimal places of 2.

The syntax for formatting instructions is:

```
% [flag] [width] [.prec] type
```

The format parameter for [flag] controls the alignment of the format and addition of empty spaces and zeros to fill space.

[flag]	Meaning
(none)	Right align; fill space with 0 or empty spaces left
-	Left align; fill space with empty spaces right

The format parameter for [width] controls the length of the string, which is output.

491

[width]	Effect
n	At least n characters
0n	At least n characters, zeros left

The format parameter for [.prec] describes the degree of precision of the display in number of figures.

[.prec]	Effect
(nothing)	Preset precision
.0	type = d, i, o or x: Preset precision
	type = e, E or f: Without decimal point
.n	Maximum of n characters

The most important format parameter type describes the type of information to be output.

Type	Output format
d	whole number
i	as for d
o	whole number in octal view
x	whole number in hexadecimal view
X	as for x
f	floating-point number, format [-]dddd.ddd
e	floating-point number, format [-]d.ddd e [+/-]ddd
g	depending on the precision .prec, as for e or f. e is used if the exponent is less than -4 or not less than the precision
E	as for e, "E" as exponent sign
G	as for g, "E" as exponent sign
s	Character string

With the format specifications for "variables," the type of format specification must match the type to be formatted. The type of format specification for "variables" replaced by floating-point numbers, must be the type f, e or E; for whole numbers d, x or o (where x and o would not be very useful) and for character string s. Bear in mind that when using character strings, it is not possible to use specifications for [flag], [width] and [prec]. The only possible (and therefore redundant) specification for character strings is %s.

492

Examples of formatting (a "-" equates to an empty space):

%10.2f	----123.45
%-10.2f	123.45----
%10d	-----12345
%08x	00003039

The list below gives the different specifiers for keywords and the type they are replaced by in the **Room info** to be generated.

Specifiers replaced by floating-point values (type=e,E,g,G or f):
```
Width, Length, Height, SillHeight, Level, BaseArea,
TopArea, WindowArea, Area, DoorArea, WallArea, Scope,
Volume, GrossPlot, GrossRoomContents,
ConstructionArea, Price, ItemPrice, FormulaBaseArea,
FormulaTopArea, FormulaVolume, FormulaWindowArea,
FormulaDoorArea, FormulaScope, FormulaWallArea,
FormulaGrossPlot, FormulaGrossRoomContents, Quantity,
Min, Mid, Max, MinCosts, MidCosts, MaxCosts
```

Specifiers replaced by whole numbers (type=i,d,x or o):
```
QuantityPlots, QuantityDwellings, QuantityEnclosures,
QuantityWindows, QuantityObjects, QuantityChimneys,
QuantityColumns, QuantityDoors, QuantityWalls, Number
```

Specifiers replaced by character strings (type=s):
```
Name, Salutation, Address1, Address2, Address3,
Extra1, Extra2, Extra3, Note, Date, Material,
Filename, Manufacturer, ItemNumber
UnitQuantity, UnitMinMidMax, UnitCosts
```

11.1.8   *Keywords with any position*

Unlike "variables" which may only be positioned within the bodies of loops, the following keywords can also be used outside loops, for example, right at the start or at the end of a text, as well as in headers and footers:

```
@Project
@Architect
@ConstructionFirm
@CostsEstimate
@UnitInMeters
@UnitInCentimeters
@UnitInMillimeters
@UnitInInches
```

493

```
    @UnitInYards
```

The keywords @Project, @Architect, @ConstructionFirm and @CostsEstimate have to have the following specifiers added (separated by "."):

"Variable"	Possible specifiers
@Architect, @ConstructionFirm	Name, Salutation, Address1, Address2, Address3, Extra1, Extra2, Extra3, Note
@Project	Name, Filename, Date, Address1, Address2, Address3, Extra1, Extra2, Extra3, Note, FLOORVALUES, [TYPE]ROOMVALUES, [TYPE]QUANTITY
@CostsEstimate	Note, MinimumTotalCosts, MediumTotalCosts, MaximumTotalCosts, UnitTotalCosts, SINGLECOSTS

The possible variants for FLOORVALUES, [TYPE]ROOMVALUES and [TYPE]QUANTITY and the meaning of [TYPE] have already been described. The variants for SINGLECOSTS are `100, 200, 300, 400, 500, 600` or `700`, separated by a dot, expanded using one of the following alternatives: `Quantity, UnitQuantity, Min, Mid, Max, UnitMinMidMax, MinCosts, MidCosts, MaxCosts, UnitCosts`. These specifications conform to the various cost groups from TYPE 1 for the lowest, medium and highest values.

The keywords @UnitInMeters to @UnitInYards are of special significance. They can be positioned at any points in the text. From its occurrence to the next occurrence, the output will then be made in the specified unit or in multiples of that unit. This method can be used, for example, to switch between outputs in meters and outputs in millimeters within **Room info**. The default setting is meters.

11.2   PATHS AND INI FILES FOR ROOM INFO 🖋

The **Room info** templates need to be located in the directory **Standard/Roominfo** (subdirectory of the main ArCon+ directory). All files located there with the extension .**RTF** are included in the menu for the runtime. The filename is displayed as a menu

option, unless there is a section with the name of the **Room info** file located in the file **Roominfo.INI** (also in the directory **Standard/Roominfo**).

For example, if RI1.RTF is a file located in the **Room info** directory, an entry in the file **Roominfo.INI** will be in the format

```
[RI1.RTF]
```

description=a **Room info** template (example)

that **A Room info template (example)** is displayed in the menu rather than **RI1**.

11.3 CONTROL OF THE OUTPUT, COMMENTS

The user may employ a special construction within the **Room info** template to switch specific parts of that template on and off during the generation process. The command `@Question.` is used to do this. The text coming after this command, up to the next standalone @ is output as a question while the **Room info** is being generated. If the user answers this question with *Yes*, the following text in the **Room info** template up to the keyword `@EndQuestion` will be used, otherwise it will be completely ignored.

In order for the syntax in a **Room info** template to remain correct, even if the user answers with *No*, no loops may be opened or closed in any part relating to the question, which are closed or opened *after* or *before* the related part.

If a question is used within a loop, there will be a prompt for each loop to run individually, as necessary.

Example 1:
```
@Question Should all the floors be listed?@
  @ForAll.Floors
    @ForAll.Rooms
      ....
    @EndForAll.Rooms
  @EndForAll.Floors
@End.Question
```

Example 2:
```
@ForAll.Floors
  @Question Should all the rooms be listed?@
    @ForAll.Rooms
      ....
    @EndForAll.Rooms
  @End.Question
@EndForAll.Floors
```

In the first example, there is a single question to ask whether or not the floors are to be

495

output. If not, both loops are ignored, in other words the loops for the rooms and the floors. In the second case, there is another question for each floor as to whether or not the rooms should be output.

Comments in **Room info** templates are used for completely different purposes in terms of content, but are very similar to the question part of questions in terms of syntax. These comments are used in the template solely for overview purposes, but are never included in the **Room info** or room logs generated from the template.

Comments start with a @[character string and go to the next standalone (in other words not followed by a keyword) @. The next line would therefore be a comment (the] character before the last @ is only used for appearance purposes; it could also be left out):

@[This is how a comment in an ArCon+ **Room info** template might look!]@

11.3.1   *Room info templates and tables*

Due to the diverse *features* of **RTF** files, the following should be observed when using loops, as described above, in combination with Word tables:

It is *not* possible to start a loop in one table cell and to end it in another cell in the table. The entire loop either needs to be located in one single cell, including the start and end, or the loop starts above a column and ends below a column. The three examples below show possible (examples 1 and 2) and impossible (example 3) constructions.

Example 1 (ok):

@ForFirst.Object **Object:** @EndForFirst.Object	@ForFirst.Object @Object.Name @EndForFirst.Object

Example 2 (ok):

@ForAllNotFirst.Object

	@Object.Name

@EndForAllNotFirst.Object

Example 3 (incorrect):

496

@ForAll.Object	@Object.Name
@EndForAll.Object	

ArCon+ will not recognize the last impossible construction during the interpretation process and no error message will be issued. One **RTF** file is generated. However, if you confront Word or even Word Viewer with the result, both programs will *give up* when loading this type of **RTF** file.

In order to generate tables, which are nevertheless interrelated, simply define a row in the table and write the start of the loop into the previous table row as *hidden text*, and write the end of the loop into the next row in the table as *hidden text*. This means that in table 2, the rows "@ForAll.Objects" and "@EndForAll.Objects" would be used as hidden text.

Another *special feature* of tables in Word needs to be observed if the same tables are used several times in succession, when all the tables have been created as a copy of the first table and when the first table in the template is superfluous due to empty loops. Word saves the format of these tables in RTF files only once, namely, for the first table. If this table is left out because of an empty loop, the formatting may also be missing in some situations, so that the rest of the tables are without formatting. The effect is the same as described in the previous section: Word will *freeze*. These types of table are not normally generated. If this is ever required, however (as in some templates on the CD), the *disappearing act* by the first table because of a table in front of the loop, which is formatted as hidden text, can be prevented.

11.3.2   Language definition of ArCon+ room info documents

```
PROJECTDATA ::=          {".Name" | ".Filename" | ".Date"
                         | ".Address1" | ".Address2" |
                         ".Address3" | ".Extra1" |
                         ".Extra2" | ".Extra3"| ".Note" |
                         ".QuantityPlots" | FLOORVALUES |
                         [TYPE]ROOMVALUES |
                         [TYPE]QUANTITY}
PERSONALDATA ::=         {".Name" | ".Salutation" |
                         ".Address1" | ".Address2" |
                         ".Address3" | ".Extra1" |
                         ".Extra2" | ".Extra3" | ".Note"}
INFO ::=                 {".Name" | ".Note" | ".Number"}
TYPE ::=                 {".A" | ".B" | ".C" | ".MUS" |
```

497

	".MUS1" | ".MUS2" | ".MUS3" | ".MUS4" | ".MUS5" | ".MUS6" | ".AUS" | ".FS" | ".AS" | ".X" | ".K150" } [TYPE]
NUMBER ::=	{".QuantityBuilding" | ".QuantityDwellings" | ".QuantityEnclosureTypes" | ".QuantityFloors" | ".QuantityRooms"}
WALLVALUES ::=	{".WallArea" | ".FormulaWallArea" | ".WindowArea" | ".FormulaWindowArea" | ".DoorArea" | ".FormulaDoorArea" | ".QuantityWindows" | ".QuantityDoors"}
ROOMVALUES ::=	{".BaseArea" | ".FormulaBaseArea" | ".TopArea" | ".FormulaTopArea" | ".Scope" | ".FormulaScope" | ".Volumes" | ".FormulaVolumes" | ".QuantityChimneys" | ".QuantityColumns" | ".QuantityObjects" | ".QuantityWallSides" | WALLVALUES}
FLOORVALUES::=	{".GrossRoomContents" | ".FormulaGrossRoomContents" | ".GrossPlot" | ".FormulaGrossPlot" | ".ConstructionArea"}
PLOTVALUES ::=	{".Scope" | ".FormulaScope" | ".Area" | ".FormulaArea"}
COSTSENTRY ::=	{".Quantity" | ".UnitQuantity" | ".Min" | ".Mid" | ".Max" | ".UnitMinMidMax" | ".MinCosts" | ".MidCosts" | ".MaxCosts" | ".UnitCosts"}
SINGLECOSTS ::=	".100" COSTENTRY | ".200" COSTENTRY | ".300" COSTENTRY | ".400" COSTENTRY |".500" COSTENTRY | ".600" COSTENTRY |".700" COSTENTRY
NUMERATOR ::=	{".Plot" | ".PlotSection" | ".Dwelling" | ".EnclosureType"[TYPE] | ".Building" | ".Floor" | ".Room" | ".WallSide" | "Window" | "Door" | "Column" | ".Chimney" | ".Object"}
Unit ::=	"@UnitInMeters" |

```
                              "@UnitInCentimeters"  |
                              "@UnitInMillimeters"  |
                              "@UnitInInches"       |
                              "@UnitInYards"
Question ::=                  "@Question"
EndQuestion ::=               "@EndQuestion"
Comment ::=                   "@["
ForAll ::=                    "@ForAll" NUMERATOR
ForCurrent ::=                "@ForCurrent" NUMERATOR
ForAllNotLast ::=             "@ForAllNotLast" NUMERATOR
ForAllNotFirst ::=            "@ForAllNotFirst" NUMERATOR
ForAllNotEnds ::=             "@ForAllNotEnds" NUMERATOR
ForFirst ::=                  "@ForFirst" NUMERATOR
ForLast ::=                   "@ForLast" NUMERATOR
EndForAll ::=                 "@EndForAll" NUMERATOR
EndForCurrent ::=             "@EndForCurrent" NUMERATOR
EndForAllNotLast ::=          "@EndForAllNotLast" NUMERATOR
EndForAllNotFirst ::=         "@EndForAllNotFirst" NUMERATOR
EndForAllNotEnds ::=          "@EndForAllNotEnds" NUMERATOR
EndForFirst ::=               "@EndForFirst" NUMERATOR
EndForLast ::=                "@EndForLast" NUMERATOR
Project ::=                   "@Project" PROJECTDATA
Architect ::=                 "Architect" PERSONALDATA
ConstructionFirm ::=          "@ConstructionFirm" PERSONALDATA
Plot ::=                      "@Plot"{INFO | PLOTVALUES |
                              ".QuantityPlotSections" |
                              ".QuantityBuilding"}
PlotSection ::=               "@PlotSection"{INFO |
                              PLOTVALUES}
Dwelling ::=                  "@Dwelling"{INFO |
                              [TYPE]ROOMVALUES |
                              [TYPE]QUANTITY}
Enclosure ::=                 "@Enclosure"{[TYPE]ROOMVALUES |
                              [TYPE]QUANTITY | ".SurfaceType"
                              | ".EnclosureType"}
Building ::=                  "@Building"{INFO | FLOORVALUES |
                              [TYPE]ROOMVALUES |
                              [TYPE]QUANTITY}
Floors ::=                    "@Floor"{INFO | ".Height" |
                              ".Level" |
                              ".ExteriorPlasterThickness" |
                              ".ExteriorPlasterName" |
                              FLOORVALUES | [TYPE]ROOMVALUES |
                              [TYPE]QUANTITY}
Room ::=                      "@Room"[TYPE]{INFO | ROOMVALUES
                              | ".PlasterThickness" |
                              ".PlasterName" |
                              ".UsableSpaceType" |
                              ".UsableSpaceNumber" |
                              ".UsableSpaceName" |
                              ".EnclosureType"}
```

499

WallSide ::=	"@WallSide"{".Number" | ".Length" | ".Material" | WALLVALUES}
Window ::=	"@Window"{INFO | ".Width" | ".Height" | ".Area" | ".SillHeight"}
Door ::=	"@Door"{ INFO | ".Width" | ".Height" | ".Area"}
Column ::=	"@Column"{INFO | ".Length" | ".Width" | ".Height"}
Chimney ::=	"@Chimney"{ INFO | ".Length | ".Width | ".Height"}
Object ::=	"@Object"{INFO | ".Quantity" | ".ItemPrice" | ".Price" | ".Manufacturer" | ".ItemNumber"}
Numerator ::=	ForAll | ForCurrent | ForAllNotLast | ForAllNotFirst | ForFirst | ForLast
EndNumerator ::=	EndForAll | EndForCurrent | EndForAllNotLast | EndForAllNotFirst | EndForFirst | EndForLast
Numerator ::=	Plot | PlotSection | Dwelling | Enclosure | Building | Floor | Room | WallSide | Window | Door | Column | Chimney | Object
Numbering ::=	Numerator [body] EndNumerator
Various ::=	Unit | Architect | ConstructionFirm | Project | CostsEstimate
QuestionPart ::=	Question Text '@' Body EndQuestion
CommentPart ::=	Comment Text '@'
Body ::=	[[Text] [Numbering | Numerator | QuestionPart | CommentPart | Various] [Text]]>=0
End ::=	EOF
File ::=	Body End

11.3.3 Reserved words for Room info templates 🖊

The list below contains all keywords defined for ArCon+ **Room info** templates. Alternative keywords with the same meaning are given in the list, separated by commas.

".Name"	".Max, .MaxValue, .MaximumValue"
".Filename"	".UnitMinMidMax, .UnitMMM"
".Date"	".MinCosts, .CostsMinimumValue,

	".MinimumCosts"
".Salutation"	".MidCosts, .CostsMidValue, .MediumCosts"
".Address1"	".MaxCosts, .CostsMaximumValue, .MaximumCosts"
".Address2"	".UnitCosts"
".Address3"	".100, .Plot"
".Extra1"	".200, .PlanningAndDevelopment"
".Extra2"	".300, .BuildingConstruction"
".Extra3"	".400, .TechnicalSystems"
".Note"	".500, .OutdoorSystems"
".Number"	".600, .Fittings, .Decoration"
".WallArea"	".700, .BuildingExpenses"
".FormulaWallArea"	".QuantityPlotSections"
".WindowArea"	".MinimumTotalCosts, .LeastTotalCosts, .LowestTotalCosts"
".FormulaWindowArea"	".MediumTotalCosts"
".DoorArea"	".MaximumTotalCosts, .HighestTotalCosts"
".FormulaDoorArea"	".UnitTotalCosts"
".QuantityWallSides"	".UsageName, .Name, .UsableAreaName"
".QuantityWindows"	".MUS"
".QuantityDoors"	".MUS1"
".GrossPlot, .GP"	".MUS2"
".FormulaGrossPlot, .FormulaGP"	".MUS3"
".BaseArea, .NetPlot, .NP"	".MUS4"
".FormulaBaseArea, .FormulaNetBaseArea, .FormulaNBA"	".MUS5"
".TopArea, .NetTopArea, .NTA"	".MUS6"
".FormulaTopArea, .FormulaNetTopArea, .FormulaNTA"	".AUS"
".Scope"	".FS"
".FormulaScope"	".AS"
".Volume, .RoomContents"	".X, .NotAssigned"
".FormulaVolume, .FormulaRoomContents"	".A, .EnclosuredWithRoof"
".Dwelling, .Dwellings, .Apartment, .Apartments"	".B, .WithRoof"
".EnclosureType, .EnclosureTypes, .Enclosure, .Enclosures"	".C, .Enclosed"
".Plot"	".K150, .Substructure"
".PlotArea"	"@["
".Building"	"@UnitInMeters"

".Floor, .Floors"	"@UnitInCentimeters"
".Room, .Rooms"	"@UnitInMillimeters"
".WallSide, .WallSides"	"@UnitInInches"
".Window"	"@UnitInYards"
".Door. .Doors"	"@UnitInFeet"
".Column, .Column"	"@Question"
"Chimney, .Chimneys"	"@EndQuestion"
".Object, .Objects"	"@ForAll, @For"
".Height"	"@ForCurrent"
".Level"	"@ForAllNotLast, @ForAllNotLast, @ForAllNotLast"
".Length"	"@ForAllNotFirst, @ForAllNotFirst, @ForAllNotFirst"
".Material"	"@ForAllNotEnds"
".Width"	"@ForFirst"
".Area"	"@ForLast"
".SillHeight"	"@EndForAll, @EndFor"
".QuantityObjects"	"@EndForCurrent"
".ItemPrice"	"@EndForAllNotLast"
".Price"	"@EndForAllNotFirst"
".ItemNumber"	"@EndForAllNotEnds"
".Manufacturer"	"@EndForFirst"
".QuantityChimneys"	"@EndForLast"
".QuantityColumns"	"@Project"
".QuantityBuildings"	"@Architect"
".QuantityDwellings, .QuantityApartments"	"@ConstructionFirm"
".QuantityEnclosureTypes, .QuantityEnclosures"	"@Dwelling, @Apartment"
".QuantityFloors"	"@EnclosureType, @Enclosure"
".QuantityRooms"	"@Building"
".OrdinalNumber, .EnclosureNumber, .UsableSpaceNumber"	".Floor"
".UsableSpaceType, .SurfaceType"	"@Room"
".QuantityPlots"	"@WallSide"
".PlasterThickness, .InteriorPlasterThickness, .PlasterThickness"	"@Window"
".PlasterName, .PlasterType"	"@Door"
".ExteriorPlasterThickness, .ExteriorPlasterThickness"	"@Column"
".ExteriorPlasterName, .ExteriorPlasterType"	"@Chimney"
".GRC, .GrossRoomContents, .GrossVolume"	"@Object"
".FormulaGRC, .FormulaGrossRoomContents,	

```
.FormulaGrossVolume"       "@Plot"
".ConstructionArea,
.CA,.ConstructionPlot,
.CP"                       "@PlotArea, @PlotSection,
                           @PlotPart"
".FormulaArea"             "@CostEstimate, @Costs, @CE"
".Quantity"                ".KMin"
".UnitQuantity"            ".GMin"
".Min, .LowestValue,
.MinimumValue"             ".KMax"
".Mid, .MiddleValue"       ".GMax"
".TYPE 2,
Second Calculation Regulations" ".ZMinMax"
```

11.4   AREA CALCULATIONS

In addition to the detailed room information which it is possible to generate in ArCon+, there is also the option of performing calculations for the plot and volumes of building. ArCon+ provides special **Room info** for this purpose, which produce the calculations in accordance with TYPE 1 and TYPE 2 in order to use the print-out for a construction job. These templates are included with ArCon as standard and are treated in the same way as the templates for a normal **Room info**. The requirement for transferring data into a calculation conforming to TYPE 1 is that you have provided all the specifications for the rooms, etc. correctly. This is because not all the values can be derived directly from the plan, but need to be entered manually.

The **TYPE 1** tab in particular contains the information, which needs to be included in the TYPE 1 calculations. The **Room info** or **Statistics** tabs have specifications and calculations which can be used as useful additions to TYPE 1 calculations.

503
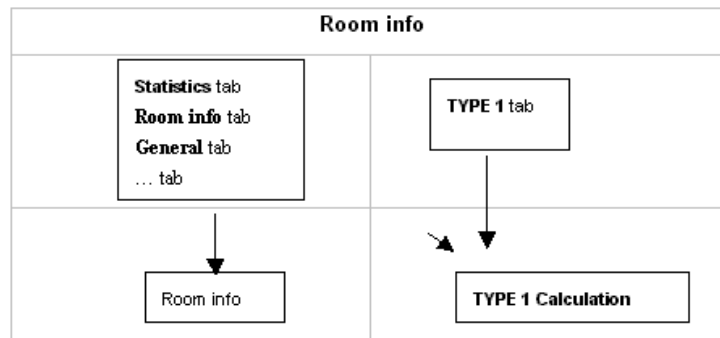
Information anticipated by TYPE 1 and entered on the **TYPE 1** tab or calculated automatically and output, includes, for example:

Evidence for the surface area, minus the interior/exterior plaster thickness,

Calculations for the room dimensions with heights in excess of 1.50 meters, etc.

Values required for TYPE 1 should always be entered into ArCon+ if they are not derived directly from the plan. In this process, it may be that certain information cannot be output at all, because it is calculated specifically for the room information and will therefore only be displayed in the **Room info**. An example of this is the construction area. In other words, the area covered by the components built (for example, walls, columns and arrows, etc.). ArCon+ would automatically calculate the enclosure area for a floor, minus the room areas, for a floor plot area of 120 m^2 and three interior rooms. This will output the square meters occupied by walls, plaster, etc. Other specifications, such as the usage type for a room, need to be entered separately.

Inputs which can be output in the **Room info** for the calculations conforming to TYPE 1 are not restricted to just one actual room in ArCon+ and therefore limited to the **Room data** dialog box. These inputs will be required or possible at various points.

This includes the following specific working areas:

    Plot/Site

    Building

    Floor

    Room

The diagram below provides an overview of the dialog boxes and tabs, which can be used to enter information for TYPE 1 calculations. The tabs outlined in bold contain data which must be entered.

    Living space calculation conforming to TYPE 1

    Plot/Site -> Plot/Site dialog box -> Room info tab / Statistics tab

    Building -> Building data dialog box

    Floor -> Floors dialog box -> General tab / TYPE 1 tab (no statistics)

        Current Floor dialog box -> General tab / TYPE 1 tab (statistics)

        Floor Properties dialog box -> General tab / TYPE 1 tab (no stats)

    Room -> Room data dialog box -> General tab / TYPE 1 tab

The overview table below covers the working areas in which the relevant dialog boxes and tabs can be used, and how to open those dialogs/tabs.

Working area	Tab / dialog box	... is opened in the following situations
Plot / Site	**Room info** tab	When creating a new plot or site
		When editing a plot or site
	Statistics tab	When editing a plot or site
Building	**Building data** dialog box	Using the command **New building** in the **Building** menu
		Using the command **Edit current Building** in the **Building** menu
Floor	**Floors** dialog box using the tabs **General** and **TYPE 1**	Using the command **New floor Above/Below** in the **Floor** menu
	Current floor dialog box using the tabs **General** and **TYPE 1 (with statistics)**	Using the command **Edit current Floor** in the **Floor** menu
	Floor properties dialog box using the tabs **General** and **TYPE 1**	When creating a new project using the **New** command in the **File** menu or by clicking the relevant icon in the vertical toolbar
Room	**Room data** dialog box using the tabs **General** and **TYPE 1**	When double-clicking a room already selected (alternatively, using the **F11** key, if the mouse is positioned within a room)

In Type 2 calculations the relationships are less complex because in this case only the degree to which each individual room is to be included in the calculations needs to be specified (100%, 50% or 0%). All other values are calculated from the geometry of your plan and do not need to be set separately. This is why the **TYPE 2** tab in the **Room data** dialog box is the only tab requiring any input in order to produce correct living area calculations conforming to TYPE 2.

Note: If you use the TYPE 2 tab in the **Room info/TYPE 1/TYPE 2** dialog box (see page 517) to specify that the finished dimensions of a room are used for TYPE 2 instead of a fixed 3% deduction for the plaster, the Plaster thickness, which you have set for the various rooms in the TYPE 1 tab (see page 515) will still be used for rooms.

11.4.1   Plot/site 🔏

Information on the plot or site section (and related calculations) which is derived directly from the plan, is output on the two tabs for **Room info** and **Statistics**. This data is not necessarily required for a calculation conforming to TYPE 1. Information – such as the plot name or the plot section – should still be included as useful extras in the special **Room info** section.

11.4.1.1   Room info tab 🔏

The dialog box on the plot or site area is opened in the **Room info** tab once the plot or site area has just been created, or if you double-click an area which has already been placed.
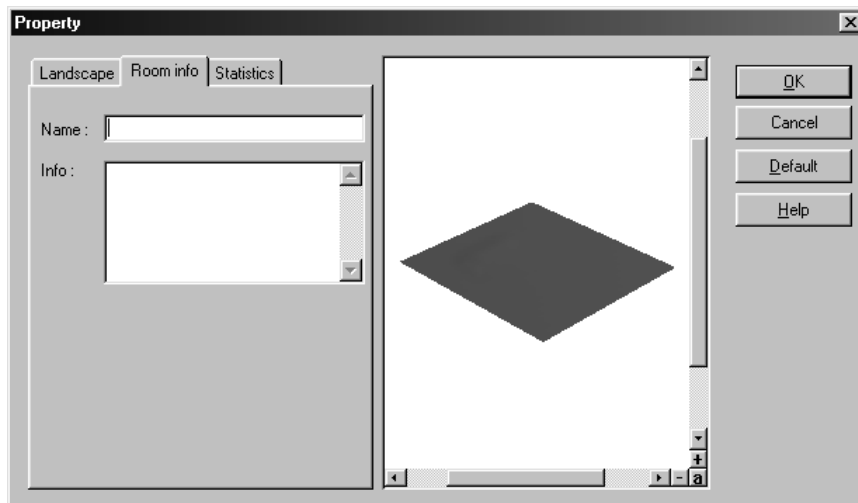
The Plot **Name** and **Info** on the plot, for example, the soil quality or the height of the plot – can be entered on this tab. Usefully, both inputs can be transferred into the **Room info** for a building quotation, but neither is necessarily required for a TYPE 1 calculation.

11.4.1.2   Statistics tab

The **Statistics** tab is only displayed if you have already defined a specific plot or a specific site area and double-clicked the relevant plot.
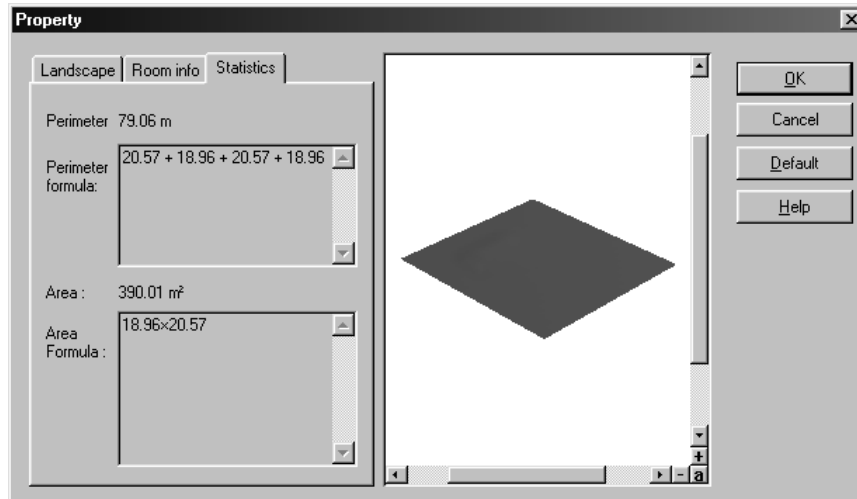
The plot area and the scope of the plot are calculated automatically and the formulas for these calculations are output on this tab. This information should be included in the TYPE 1 calculation. A prompt will be displayed for you to enter the relevant keywords.

11.4.2   Building

Information on the building and calculations for the building, which are taken directly from the plan, are entered into the **Building data** dialog box.

Enter the **Name** of the building here. The **Info** field can be used to add extra information on the building (for example, Millers family house). It is useful to include both inputs into a TYPE 1 calculation, but neither is strictly necessary for TYPE 1.
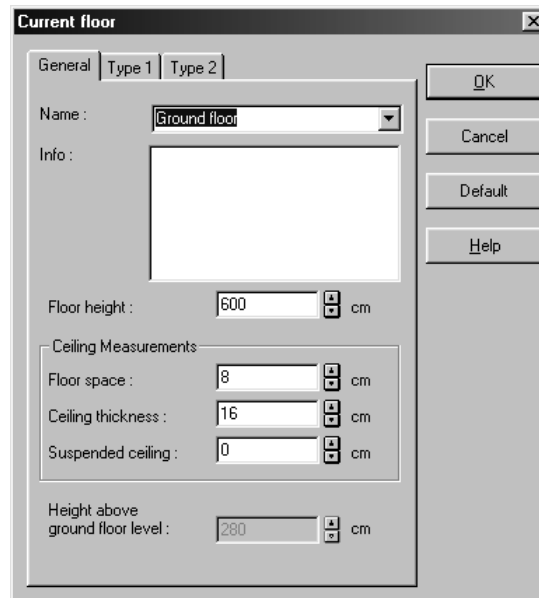
The **Statistics** section is used for the automatic output of calculated values such as the number of floors and apartments, etc.

11.4.3   Floor

All data which can be included in a TYPE 1 calculation for a floor is entered directly into the two tabs **General** and **TYPE 1** or taken from the plan. These two tabs are included in both the **Current floor** dialog box and the **Floors** dialog. The **Floors** dialog box is opened using the **New floor above** or **New floor below** command in the **Floor** menu. The **Current floor** dialog box is displayed using the **Edit current floor** command in the **Floor** menu.

Do bear in mind that the **TYPE 1** tab has different features. In the **Current floor** dialog box, this tab contains the **Statistics** section with the data for the actual floor. This section is not included in the **Floors** dialog box because the actual floor needs to be created first in that dialog.

The **TYPE 1** tab is also included in the **Floor properties** dialog box. This dialog is opened when a new project is created. Remember that the tab will not contain the **Statistics** section.

508

11.4.3.1   General tab

Both the **Name** and the **Info** can be entered in the **General** tab when creating a floor
(**Floors** dialog box) or when editing a current floor (**Current floor** dialog box). These
can be useful additions for a TYPE 1 calculation.

The name is also used to identify the individual floor. This name can then be found in
the selection list for the current floor in the top horizontal toolbar.

11.4.3.2   Type 1 tab ✐

All inputs made in this tab are required for a TYPE 1 calculation and are intended especially for output into the specific **Room info**. The individual sections are explained below.

11.4.3.2.1   Exterior plaster ✐

The **Exterior plaster- thickness** needs to be specified for a floor so that the construction area can be calculated. For all interior wall sides on a floor, the plaster thickness is specified in the **Room data** dialog box. As the exterior walls cannot be recorded using the room details, the specifications for the exterior plaster thickness need to be made separately.

The name of the plaster can also be noted. A name can be selected from the selection list or a new name can be entered to do this. A name just entered is automatically added to the selection list. It is not necessary to specify the plaster name for TYPE 1. However, it is useful for generating order lists, etc. and can therefore be output in **Room info** reports.

11.4.3.2.2   Statistics

The values calculated are output in the **Statistics** section. This section is only displayed if you are editing a current floor. In other words, if you are using the **Current floor** dialog box, the **Floor area** is the area which the floor covers from outside, including the plaster. This value can be calculated using the formula, which is output. The **Floor space formula** section shows the number of cubic meters of enclosed room space included in the floor.

11.4.3.3   Type 2 tab
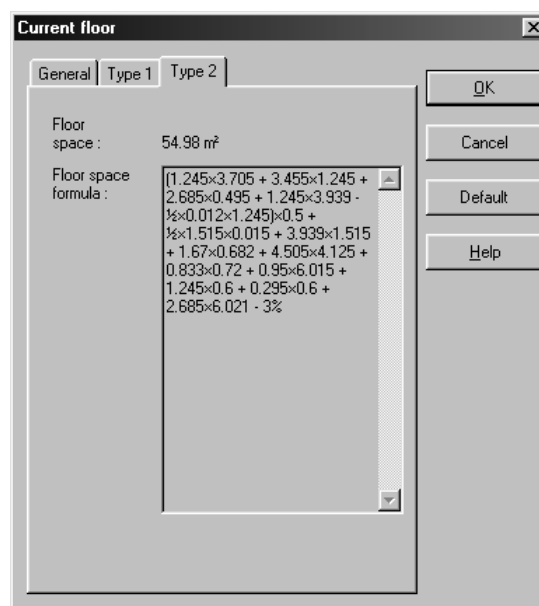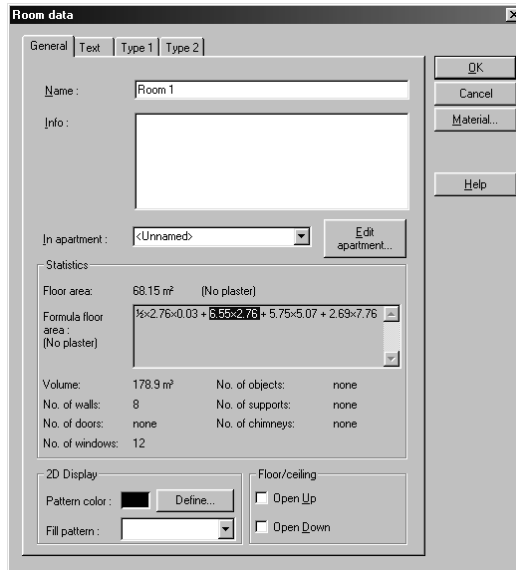
This tab displays the totals for all the living space for all rooms on the floor, both as a value and as the formula used to produce the calculation. No inputs are required or possible for a floor.

In addition to the output of values, these can also be used with special keywords in **Room info**. This means that there is nothing to stop you creating a plan in ArCon, including the fully automated generation of area calculations.

11.4.4   Room

All values and data for rooms that can be output are entered using the tabs **General**, **TYPE 1** and **TYPE 2**. These tabs are part of the **Room data** dialog box. Double-clicking a room in Construction mode opens this dialog.

11.4.4.1   General tab

The top part of this tab is used to enter general information on the room, such as its name. The lower part is reserved for calculations, which are made directly from the plan.

This tab is explained in detail under **Rooms**.

11.4.4.2   Type 1 tab

All inputs made in this tab are for calculating the living area, in accordance with TYPE 1. Values output in the **Statistics** section are calculated values. They cannot be changed, because they have been calculated directly from the plan.

11.4.4.2.1   Usage type

The **Utilization type** section is used to define how a room is used. Generally speaking, a distinction is made between the following usage types in the context of TYPE 1:

　Main **U**sage **S**pace 1 to 6 (MUS1 to MUS 6),

　Additional usable space (AUS),

　Functional space (FS),

513

Access space (AS).

All usable space types listed and selected in the **Type of floor** list box can be subdivided further using an **Order number**. For example, the main usable space **MEA1** has the ordinal number 1. It can be divided into other units using the ordinal numbers 1.1 to 1.6. The detailed name of the usable area type can be found in the **Name** field. For example, if you have selected ordinal number 1.3 for the MUS1, the specific type of main usable space 1 - the **Break room** - will be used.

In the logical system of the interaction between the individual fields, the ordinal number in front of the dot (in other words, the 1, for example) corresponds to the specification in the **Usage space type** box. The number after the dot corresponds to the usable area type specialization, as output specifically in the **Name** box. This means there is a direct correlation between the ordinal number and the name. The combined effect of the individual boxes could also be compared to the contents page of a book. You would therefore use the area type to choose the chapter, and the ordinal number or the name to select the name of the individual sections within the chapter.

During the input process, you will normally select the usable area type first, and then specify more detail using the ordinal number. The **Name** selection list can only ever be used to open the subtypes for the current usable area type. It is not possible to change the usable area type in this box.

11.4.4.2.2　Enclosure

As in a TYPE 1 calculation of all the rooms needs to be listed separately according to enclosures, one of the options needs to be used here to specify the type of room.

If the **automatic** check box is selected, ArCon will automatically calculate the enclosure type for the room.
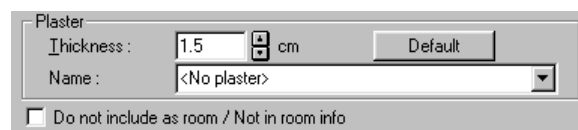
The following rules apply:

> If the room is fully or partially enclosed by virtual walls, the enclosure **type b** is used if the room has a ceiling, if not, enclosure **type c**.

> For a room entirely enclosed by actual walls, enclosure **type a** will be used if the room has a ceiling; enclosure **type c**, if not.

This automated feature can be deactivated so that you can define the enclosure type for a room yourself. To do this, deselect the check box and then select the option you require.
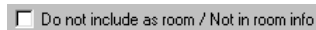
11.4.4.2.3   Plaster

The **Thickness** needs to be specified for a room so that the net plot area can be calculated, i.e. the actual usable area of the interior rooms. The plaster thickness will normally be 1.5 cm.

The name of the interior plaster can also be specified. A name can be selected from the selection list or a new name can be entered to do this. A name newly entered is then automatically included in the selection list. It is not necessary to specify the plaster name for TYPE 1 or therefore for the **Room info** tab.

11.4.4.2.4   Including information in the TYPE 1 calculation

If you have selected the check box **Do not include as room/Not in room info**, an enclosed construction such as a cable box will be excluded from the TYPE 1 calculation.

ArCon interprets everything, which is enclosed as a room. This could mean that in some cases it may be that this does not necessarily reflect the reality of the plan.

11.4.4.2.5   Statistics

Whereas on the **General** tab the room area is output without including the thickness of the plaster, the net usable area of a room is shown in the **TYPE 1** tab, minus the plaster thickness and depending on the room height.

In a **TYPE 1** calculation, only room dimensions with a height of at least 1.50 meters are included. Areas with a room height less than 1.50 meters need to be calculated separately. At the same time, the **Statistics** section for the net usable area is divided into the following two parts:

• **Net usable area > 1.50 m**: ArCon calculates the net usable area of the room, minus the plaster thickness, where only the sections of a room, which have a room height over 1.50 meters are calculated. Eaves less than 1.50 m would not therefore be included in the net usable area. The calculations can be completed using the formula. In this case, you will also see that the plaster has been removed.

• **Net usable area < 1.50 m**: ArCon calculates the areas for a room, which have a room height less than 1.50 meters. The areas calculated here are not included in the plot and are given separately in a TYPE 1 calculation.

In the **Height dimensions (h)** section, ArCon+ automatically produces the height of the room, depending on the enclosure types or the room/rooms above. This height is required to calculate the net room contents and therefore also for calculating the volume of the entire building, which is composed of all the room volumes.

The height of the room is clearly defined as the difference between the top edge of the floor and the top edge of the floor of the floor above. It is therefore necessary to check the enclosure type of the room above, so that no ceilings or floors, and therefore no volumes, are counted twice or omitted. ArCon also calculates cases where there are two rooms above the current room, where one of the rooms has no ceiling, for example.

516

The net room contents are output in the **Net room contents (NRC)** section, taking into account the height calculated in the top field. The formula can be used to calculate the value (for example, if a room is to have different height values).

11.4.4.3   Type 2 tab
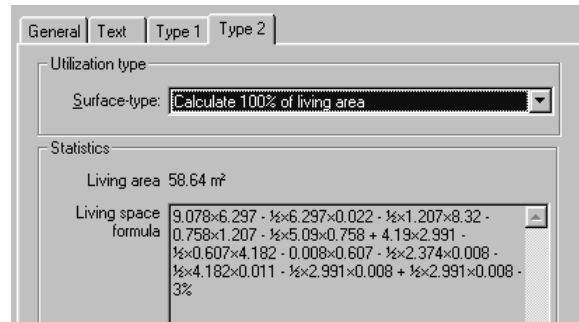
The inputs required for calculating the areas in your plan correctly are made in the **TYPE 2** tab. This tab consists of only one section for **Utilization type** with the **Surface-type** selection box and the **Statistics** section, which contains the output for the **Living space** f**ormula**.

Inputs can only be made into the **Surface type** selection box. This is used to specify whether all, half or none of the selected room is included in Type 2 calculations.

The relevant regulations are applied when calculating the area contents based on the Second Calculation Regulations in ArCon. Very precise control over these regulations is provided using the settings in the options dialog box described below.

11.4.5   Room info/TYPE 1/TYPE 2 options dialog box

This dialog box can be opened both in Construction mode and in Design mode using the **Options** menu and the option **Room info/TYPE 1/TYPE 2...**
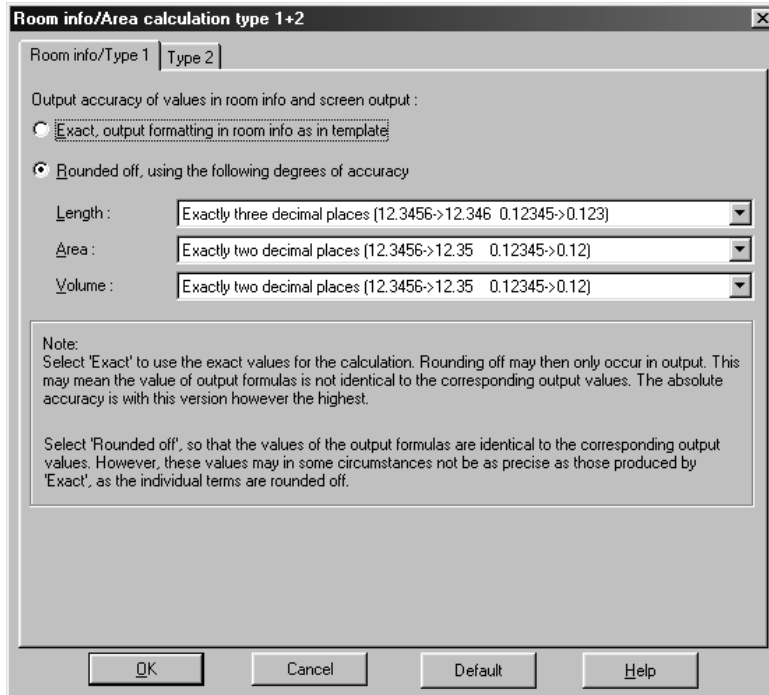
It comprises the two tabs **Room info/TYPE 1** and **TYPE 2**

This dialog box is basically used to set the formula output in the various dialog boxes and how they are used in the output of Room info, otherwise the TYPE 2 tab is used to determine the rules used when calculating the area contents for a room .

11.4.5.1   Room info/TYPE 1 tab

This tab is used to define the precision of the output for values in the **Room info** and for the screen output.

There are basically two alternatives: firstly, exact output and secondly, rounded output. Selecting the **Exact** alternative will use the exact values in the calculation. Rounding will only be carried out in the output of the values, if necessary. The result may be that the value of formulas output may not be identical to the corresponding value output. However, the absolute precision is highest using this option.
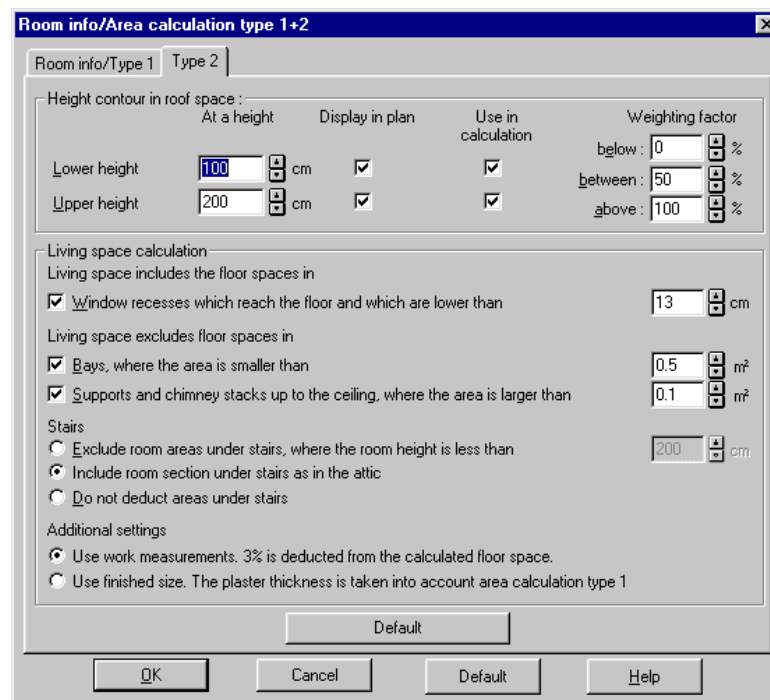
Using this setting with **Room info** means that the output precision used in the **Room info** is determined by the **Room info** themselves – in other words, by the output

518

formatting. If this option is not active, the output precision specifications in the **Room info** will be ignored and the settings made in the remainder of this dialog box will be used.

Selecting the **Rounded off using the following degrees of accuracy** option means that the values of formulas output are identical to the corresponding values output. In some cases, these values may not be as accurate as those produced using the **Exact** option due to the rounding of the individual terms. Format specifications in the **Room info** are ignored, unlike with the first option. Instead, the formats specified in the **Lengths**, **Areas** and **Volume** sections are used. An output precision level can be specified separately for all three types of values in the relevant selection boxes.

It is normally advisable to specify the volume with a higher number of decimal spaces because these will generally be small values and half a cubic meter may well represent a considerable volume, for example.

11.4.5.2   TYPE 2 tab

519

This tab is basically used to set the rules according to which the area is calculated.

The tab comprises the sections for **Height contours in roof space** and **Living space calculation**. The settings in the **Height contours in roof space** section allow you to control how these height contours are displayed and how these contours affect the calculation of the area content for the rooms in question.

The input boxes for **Lower contour line** and **Upper contour line** are used to specify the height above the finished floor at which the height contours are used. The **Show in plan** check boxes can be used to define whether the contours are displayed in the plan. This can be done separately for the lower and top height contours. Independently of this, the check boxes **Use in calculation** can be used to determine whether or not these height contours are also used when calculating areas for TYPE 2. The three weighting factors, **Below**, **Between** and **Above** are then also used in this process.

According to the Type 2 regulations, 0% of all areas less than one meter is included, 50% of all areas between 100 and 200 cm in height and 100% of all areas over 200 cm. For the Type 2 regulations, you would therefore select **Use for calculation** both for the lower and the top height contour and then enter 50% or 100% for the weighting factors. However, if you wanted all areas less than 1.70 meters in height to be completely excluded, and 100% of all areas over 1.70 meters to be used, the settings would look something like this:

11.4.5.2.1   Living space calculation

With the exception of the rules outlined in the section above for calculating the living space in the loft, all possible regulations in this section are used in the Second German Calculation Regulations. In other words, the check box **Window recesses which reach the floor and which are lower than** is checked, and 13 cm should be entered as the limit value. Both the plot areas for **Bays where the area is smaller than** 0.5 m² and **Supports and chimneys extending to the ceiling where the area is larger than** 0.1 m² should be deducted from the living space. The relevant check boxes should be selected for this reason and 0.5 or 0.1 should be entered in the input boxes.

For **Stairs** you can also specify the rules according to which surfaces under stairs are

calculated for TYPE 2. The TYPE 2 itself is not entirely clear in this case, and different rules may be used by different users in some cases. The following possible alternatives are available for use:

1) **Exclude volume area under stairs, where the room height is less than 200 cm**.

2) **Include room section under stairs as in the attic**

3) **Do not deduct areas under stairs**

Selecting the second alternative means that the procedure for calculating surfaces underneath stairs is exactly the same as for eaves. In a normal situation (assuming the relevant inputs have been made in the **Height contours in roof space** section) sections with a clear height < 1m will not be calculated, 50% of sections between 1m and 2m will be calculated, and sections > 2m will be calculated in full.

Lastly, you can also determine if a basic 3% of the plot area is used for plaster deductions or if completed dimensions are used. When using completed dimensions, the plaster thickness' set for the various rooms on the TYPE 1 tab (see page 515) will be used.

The **Set as default values** icon can be used to set the settings just described for the Second German Calculation Regulations.

Note: If you click the **As default** button at the bottom of the dialog box after you have made settings in the **TYPE 2** tab, which do not conform to TYPE 2, and if you then press the **Set as default values** button, the settings required for TYPE 2 will not be used. In order to restore the settings required for TYPE 2, they need to be entered once again manually.

12 RECORDING MOVEMENT AND TIME

12.1 OVERVIEW

As in ArCon you can walk through your project with the help of the ⬚ icon. ArCon+ also offers the possibility of recording a walkthrough or viewing from different angles using ⬚. These recorded movements can subsequently be played back. It is insignificant when playing back, whether you are saving the movement for the current project or playing back from a different project. The position of the viewer and its line of sight is key, not the contents of the project.

ArCon+ permits not only a recording of spatial changes, but also the recording of temporal movements or modifications as well as the combination of movement between rooms and time. This means that you can create still frames within an animation and let time elapse without changing the position. In this way ArCon+ gives you the possibility to record the changing lighting conditions, for example, a sunrise or a sunset.

Saving and playing back spatial and/or temporal movements is possible only in Perspective view ⬚. Here, between the multi-function icon for the day, night, and variable time of day view ⬚ ⬚ ⬚ and the elevator icon ⬚ appears a set of 11 small icons:

The symbols on these small icons correspond to those that you should already be familiar with on a home video recorder. Using exactly the same controls on a video recorder, the ArCon+ video recorder records and plays movements.

In general, recording temporal movement makes sense only if you have set the variable time of day view and lighting conditions to change. On the other-hand, you can record a series of still frames during the recording of a walkthrough to show various points of view.

Basically, you can determine during the recording of spatial and temporal movements

523

how long your animation will last in real-time, i.e. how much time is to be simulated. All animations – both spatial and temporal – can also be recorded onto video and exported (see page 530).

12.2 PRINCIPLE

The principle for recording spatial movements is very simple. Just as a video recorder requires a cassette to record television pictures, ArCon+ requires a file for recording movements into. In order to make the recording you must first place a cassette, i.e. in the jargon of ArCon: create or open a file. To do this, click the **Load/Eject** icon . In the dialog box that is then displayed you can select an existing animation file in order to play it or to overwrite it. Naturally you can create a new file in order to name this *empty cassette* with a new recording.

If you want to record or play another file, other than the specified file, you must likewise click the icon, in order to eject the old *file* and start a *new* file.

In order to start the recording, click the **Record** icon and move through your project with the help of the icons , , , , or . Each new frame calculated and displayed corresponds to a frame on the video recorder, which is then recorded. If you want to terminate recording this movement, click the **Stop** icon .

For each recording you can see in the status line, how many frames are recorded or played. In this you'll see how many frames have played and the duration at a playback rate of 15 frames per second. This specification is important if you want to record the whole thing as video.

Please you note that you overwrite the specified file by using the **Record** icon, if this file is not new. For example, if the file contains 500 frames, and you record 10 frames, 10 of the 500 frames are overwritten.

When you first open a file, you always start at the beginning (the *tape* is always *rewound*). This means that you would overwrite the first 10 frames in the file. You can with the help of the icons , , and adjust the recording. Use the status bar information to help select the current frame you're at. If you press the **Record** icon at frame 490, for example, and if 10 frames are recorded, the final 10 frames of the file are overwritten.

If you want to play back a previously recorded file, first rewind it with the icon to the beginning of the file, and then click the icon. You'll see here how the individual frames are played back in sequence.

524

You can also switch during playback between day and night views, or the variable time of day view [icons] (see page 396) as well as the different view modes [icons]. You can also modify the window size during playback. This way you can optimize the playback rate by, reducing the window size or selecting the wire frame mode as the view mode.

12.3   RECORDING [icon]

Recording (and showing) temporal modifications is in principle the same as recording (and showing) spatial movements. Either way, you must first start by selecting a file to playback or record onto, by clicking the **Load/Eject** icon [icon]. Of course, you can overwrite an existing file.

The prerequisites for and the method of recording temporal movements differ in some ways from the recording of spatial movements. This is clearly described in the following sections using an example.

12.3.1   Introduction [icon]

Say you want to examine, how the lighting conditions in the living room of your house change during the day and merge this modification into your animation. Additionally you will create, without changing the position, a precisely determined number of still frames, in which only the time changes, whereby the position of the sun is accordingly animated.

Still frames can demonstrate – as their name suggests – movement, but only within a single frame. By lining up several still frames (frames) modifications can be visualized, which are temporally justified, for example, different brightness levels.

12.3.2   Prerequisites [icon]

The animation and recording of time are practical only in connection with variable time of day [icon], so you should make certain that you have set these before starting the recording. Naturally, you have the possibility even after you've activated the **Record** icon to change the view.

525

Also note that you must be oriented towards the building in such a way as found in nature. For example, with the house positioned on the page as a result of *best fit*, it can occur that the setting of the directions does not correspond correctly with reality.

12.3.3   Method

Place the *cassette* by clicking the **Load/Eject** icon and in the following **Open animation** dialog box create a new file (or load an existing file).

Click the **Record** icon . Now start your walkthrough by moving through the room using . Each position is recorded in sequence. Create your walkthrough in such a way that you arrive at the desired viewer position at the window after 12 steps (frames) in your living room. In order to record temporal movements, without changing the position, you must now create **Still frames**.

Make sure that the variable time of day view is switched on , and define in the **Daylight** dialog box (see page 398), with the latitude and longitude settings the exact viewer location. You do not have to enter the exact local time in this case in the **Daylight** dialog box. The time, over which the respective position of the sun is animated, is determined later.

Left-click the **Create still frame** icon . The **Create still frames** dialog box (see page 527) appears. In this dialog window you specify how many still frames are to be created. Enter here in the **Frames** box the value 12. That means that 12 still frames are inserted into your animation. Subsequently, acknowledge the settings with **OK**.

Before you conclude your recording, you must indicate the time period over which the complete animation passes, in reality. You must determine at which point in time the animation starts and how long it is to last, i.e. when it should end. In general, you'll want to create a realistic animation, so you'll want to pay attention to the time settings. This *time association* is determined in the **Time during movement playback** dialog box.

Right-click any active button of the video recorder. The **Time during movement playback** dialog box is displayed. In this dialog box, you determine what real-time is to have passed when playing the animation. Since we want to document a whole day from 0 o'clock to 24 o'clock, activate the **Simulate time passing** check box and put there as **Start Recording** the date of 13th July 2001, and the time at 00.00 o'clock. In order to determine the recording end, select the option **End time (simulated time)**. Subsequently, you have selected the Recording end/duration as **End time select**

(**simulated time**), for the 13th July 2001, with the time-of-day set to midnight.

If you click **Stop**, the recording is terminated.

Now, when playing the frames; first the frames with the 12 cyclical frames, the 12 still frames. This total playing time corresponds to the settings as determined in the **Time during movement playback** dialog box – a realistic 24 hour period.

These settings means that time is simulated, as the time per frame progresses exactly around one hour, and whereby the lighting conditions change accordingly. The first 12 hours fall here during the walkthrough; the second half of the day is captured by the still frames. If you sat down at the window of your living room during the recording and if this is aligned to the west, you can see the suns lighting effects. At the end of the simulation, it is midnight again and night has fallen.

12.3.4   Create still frames
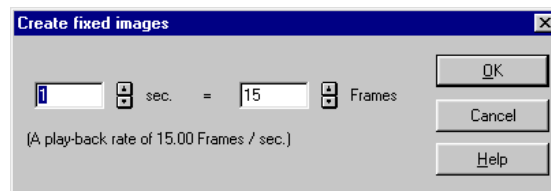
You open this dialog box by left-clicking the icon. This icon is activated only if a cassette is loaded, i.e. a file has been opened and the **Record** icon has been activated. The definition of still frames causes several pictures to be saved in the animation, without changing the viewer position. You can remain in the same spot so nothing can change except the time. Here, you can focus on the changes in the lighting conditions.

Enter in the **Frames** box how many still frames are to be inserted into the animation. ArCon automatically calculates how long the animation will last, at the default playback rate of 15 frames per second.

Or you can reverse this – you can determine the duration and ArCon will adjust the number of frames accordingly. ArCon always calculates how many still frames are inserted into the animation based on a playback rate of 15 frames per second.

Both input boxes are perfectly synchronized together, so that modifications in one input box affect the other input box immediately.

527

12.3.5   Time during movement playback

You open this dialog box by right-clicking any active button in the video recorder icon block. You must first have opened a file for any buttons to be active.
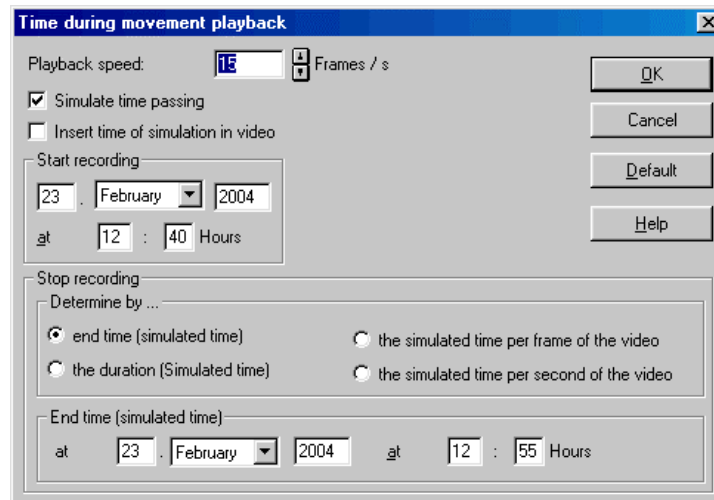
In this dialog box you specify how many frames per second should be created in the AVI file and how long your simulation lasts in the *real world*. This way you associate certain real time duration with the simulated playing time. If you have created, for example, 365 frames, you can determine with the specification of the start and end times that when playing these frames back a whole year is to have elapsed. In this case a whole day would be simulated for each frame.

In the input box you can specify the playback rate, which is how many frames of the animation are played each second. Note that large values (>20) can lead to dropped (missing) frames when playing back the created AVI files; this can happen when the computer can't keep up – rather than slow down, it maintains the frame rate you specified by dropping frames where necessary.

If you do not want to specify a temporal situation for the animation, you must deactivate the **Simulate time passing** check box. In this case all other input boxes in the dialog box are grayed out.

If you would like to define the duration for the animation, you must activate **the duration** check box. Subsequently, you can specify the recording start and end times or

528

the duration of the total animation.

During the recording of a video, you can check the **Insert time of simulation in video.**

12.3.5.1   Start recording
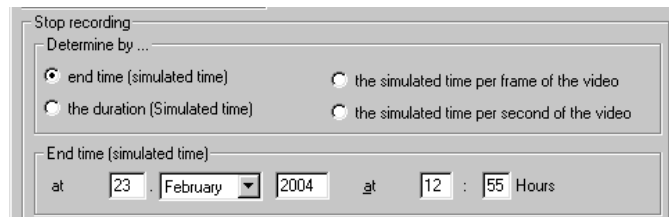
Here you indicate the point in time when the animation is to start. Enter the **date** and **time-of-day**. You can determine in this way, for example, that the beginning of the animation should be at 6:00 hours in the morning.

12.3.5.2   Stop recording

Within this section you can determine how long the animation is to last. Here you can optionally determine whether you want to define the end time of the simulation by specifying a single point in time, or with the specification of the recording duration. Note that the lower area of this dialog box changes with these options.

12.3.5.2.1   Specify the end time of the simulation

If you select the option **end time (simulated time)**, the input **End time (simulated time)** section is inserted at the bottom of the dialog box.

Enter the date and time-of-day that you wish your simulation to end.

12.3.5.2.2   Specify the duration of the simulation

If you select **the duration (simulated time)** option the **Duration (simulated time)** input section will be inserted at the bottom of the dialog box.

Enter the total duration of the simulated time alternatively in hours and minutes, or in the larger units of days, months and years.

529
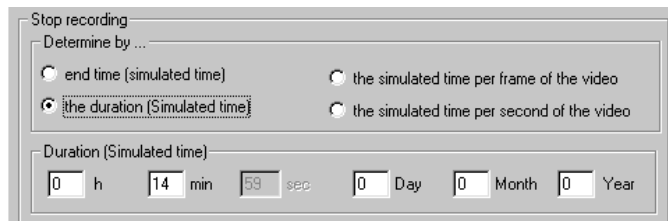
12.3.5.2.3   Specify the simulated time by video

Select the option **the simulated time per frame of the video** or **the simulated time per second of the video**. The input section is inserted at the bottom of the dialog box.
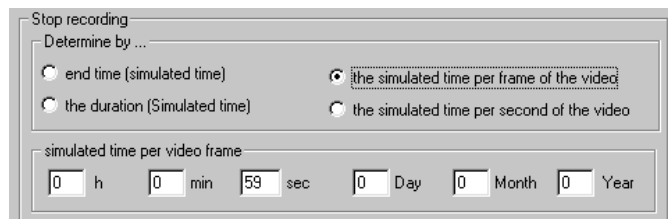
These inputs are effective only with the generation of a video.

12.4   VIDEO CREATION

Instead of playing the recorded movements in the current window on the display, these pictures can be also saved in a compatible Windows video file (with the file extension AVI). This video file can be played, for example, with medium-quality playback independent of Windows or ArCon+. Additional information on AVI files can be found in your Windows documentation.

Just as when you're playing back a recorded video with the current adjustments for day, night view or time-independent view   and for view options   , these also apply when playing into a video file. Additionally the adjustments made for saving pictures are used (achieved by right-clicking   ). All settings you've made in the option dialog box for saving bmp files will apply to saving video files.
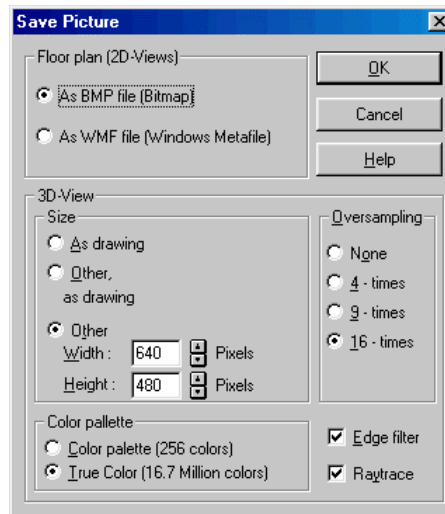
You can determine, before you save the video, which format the video is to be saved in, with the help of the **Save picture** dialog box. Here you should observe the following points:

- The dimensions should not be excessively large. Typical dimensions for a video file are 320x240 pixels.
- For the color palette you should select **True color;** there are some video compressors that produce inaccurate results with indexed-color (256 colors) pictures.
- The **Oversampling** should be at least **9-times** or better, in order to avoid flicker effects during movement. The reason for this is that the human eye reacts much more sensitively to such effects, which can result in unwanted movement in the animation.
- The **Edge filter** should be activated.

Just as you can make a raytrace calculations when saving pictures, you can also raytrace the frames when saving a video, if **Raytrace** is checked. You should realize that the raytracer is engaged for each frame.. If the calculation of only one frame takes 10 minutes, and you would like to create a video with 500 frames, you might paralyze your computer after starting the recording for several days. Such videos should be calculated over a weekend, to save your own sanity.

531

12.5 COMPRESSING VIDEOS

After you have made your adjustments in the dialog box for saving pictures and AVI files, and you've started recording your video with the help of the ⬛ icon, a dialog box is opened where you enter the file name of the video to be saved. As a suggestion the default file type and file extension is AVI. If you acknowledge this input, another dialog box appears in which you can select the compressor that is used for the video. This compressor ensures that the videos you create do not take up too much room on your hard disk.

Besides the benefit of creating smaller files, compressors always have a disadvantage: the quality of the compressed videos is reduced. The quality is worse when the compression is higher. Furthermore, the quality depends on the type of the selected compressor. Additional information about compressors in Windows can be found in your Windows documentation.

It has been demonstrated that for compression by ArCon+, videos using the CinePak codec produces the best results. CinePak is a standard Windows video compressor and is largely supported across applications and platforms (Note that new compressors are coming out all the time, and you may find one that produces excellent results – but beware that you must have the compressor available on any computer you intend to play back the animation on). For compression quality you should select 100, and for key frames we recommend 15. Depending on your requirements, you may want to lower these values.

12.6 NOTES ON CREATING VIDEOS

If you have never created videos on your computer, we recommend you read the preceding paragraphs and experiment with ArCon and its videos. We also offer the following tips:

Avoid large resolutions. A resolution of 320x240 pixels appears optimally; 640x480 pixels are generally possible on faster computers. Also note that some compressors cannot properly handle very high resolutions.

Pictures, which are saved as video, should be very-highly filtered. Select in the **View/Video options** dialog box **Edge filters** and **Oversampling** of at least (**9-times** is even better).

If you record the movement (not when playing back the video) with very large view

windows, and as view mode, for example, the 3D fully textured mode is selected, the frame rate will be significantly lowered, as will be the image quality. In order to avoid this effect, you should select a relatively small picture for recording the movement. Also, we recommend a view type of wire frame or colored.

If you want to record raytraced animations, you should in any case first use the same project and activity and make a video file using the normal dithering. Or you can try out raytracing with a relatively small picture size, for example, 160x120 pixel. Either way, you'll get an idea of the image quality and the time it takes to create the animation file. The calculation duration is approximately proportional to the size of the pictures multiplied by the oversampling rate: for instance, a picture with 320x240 pixels and quadruple oversampling lasts 2x2x4-times as long as a 160x120 pixels picture without oversampling.

13 2D EDITOR MACRO

13.1 OVERVIEW

The 2D Editor is a macro for ArCon, which is included with ArCon+ as standard for version 3.0 and later.

The 2D Editor can be used in Construction mode in ArCon to create simple 2D drawings, in order to use with additional plans (such as drainage plans) or detailed views.. The 2D Editor should not be considered as a replacement for a true 2D construction program, but it should be sufficient for adding drawing elements to your plan, which have not been generated in ArCon itself.

If you want to make more changes to the 2D view in ArCon, or to use ArCon 2D views to compile entire plans, it is advisable to use the program eLines from mb.

All information visible in ArCon's Construction mode is recognized in eLines and can be edited from there. This also includes the elements entered using the 2D Editor macro. In other words drawings, which have been edited using the 2D Editor macro can still, be read in eLines and further edited in that program.

Although the 2D Editor is a standalone program, it is integrated into ArCon to such an extent that it appears to be a full component of ArCon. The 2D Editor adds to several menu options in ArCon. In addition, an icon is added in Construction mode in the top horizontal toolbar, which can be used to show and hide 2D elements. In the left-hand vertical toolbar, the 2D Editor adds a multi-function icon to ArCon, which can be used to select various 2D elements and insert them into the plan. Lastly, it adds an extra tab to the dialog box. If you have ever used a 2D drawing program, you will have no difficulties in using the 2D Editor in ArCon. However, you should always observe the notes when using the 2D Editor. These notes include various properties of the 2D Editor which may be not obvious at first glance, but which are very useful when using the program.

The individual elements in the 2D Editor are used in largely the same way as the normal elements in ArCon. Accordingly, right-clicking the various icons opens the default values for the different 2D elements, and double-clicking a 2D element will normally open the same properties dialog box where you can change the properties of

535

the selected 2D element. You can select it and move it with the left mouse button held down. Selected 2D elements are identified using a selection frame.
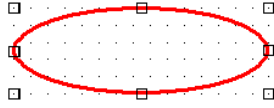
Moving the selection squares on the selection frame with the left mouse button held down will change the size and position of 2D elements.

Unlike other construction elements in ArCon, several 2D elements can be selected at the same time in order to group or delete them simultaneously, for example. To do this, proceed as follows: Select the first element by clicking it once, then select further elements by holding down the **Shift** key before selecting the additional elements. If you want to deselect one of the elements, simply click it once more. If several 2D elements are selected, they can be grouped, or they can be deleted by pressing the **Del** key.

13.2   NOTES ON USING THE 2D EDITOR

A summary of the functions in the 2D Editor, which are not immediately obvious, is given below:

Copying 2D elements:

1) If you move a 2D element and you have the **Ctrl** key held down when releasing the left mouse button, the element will be copied rather than moved. The original element will stay in the same place and the new element will be generated at the point in which the old element would have been moved.

2) Snapping when moving 2D elements:

Moving a 2D element normally means that the point directly underneath the mouse is used for snapping. This is the point you clicked as you started the move operation. If instead you want to use one of the corner points on the selection frame, or even the center point of the selection frame, select and begin to move the object while the mouse button is still held down, press **Ctrl + W** to change the snapping point.

3) Double-clicking the element can access its properties.

4) The ⊞ and ⊞ icons can be used to specify not only the relative character string for 2D elements, but also relating to normal ArCon character elements by clicking both icons twice.

Clicking ⊞ means, for example, that a 2D element is drawn behind all the other 2D elements and double-clicking means that it will be behind the normal ArCon

536

construction elements as well.

All other functions in the 2D Editor are either exactly the same as in ArCon, and for other Windows graphic programs.

13.3   LINES

As well as circles, squares, polygons, etc. the line is one of the basic elements in the 2D Editor. A line is entered by selecting the ⁄ icon from the 2D Editor multi-function icon.

Clicking the start and end points creates a basic line. If ≡ is selected as the input type, several parallel lines will be created, and you only need to enter the basic line. The number of parallel lines here and the properties they have can be set in the dialog box by right-clicking ≡.

The parallel lines created are automatically grouped together once entered.

13.4   POLYGONS

The polygon is another 2D element in addition to lines, circles, etc. It comprises a number of connected lines either closed or open.

A polygon is entered by selecting the icon from the 2D Editor multi-function icon. The icon will then be displayed in the How bar, which is used to create closed polygons, and the icon, which can only be used to create open polygons. Clicking the corner points of the polygon in sequence in the ArCon working area enters a polygon. To complete the polygon entry, press the **Esc** key.

Using the input variant and clicking the first point entered during the input process means that the polygon is automatically recognized as closed, and the input will be ended. Incidentally, the same applies to the input type – in this case the polygon is also closed when the **Esc** key is pressed to end the process.

Just as for lines, a whole series of polygons can be created simultaneously when entering polygons. In this process, the polygon sides will be parallel to the polygon you entered manually. To do this, use the input type or .

Unlike lines, however, when using parallel lines with polygons the end points of the parallel lines produced are extended so that they intersect the lines of the previous polygon edge, as if on the miter joint. For example, this function can be used to

537

reformat walls to be multiple walls.

13.5   RECTANGLES 🖊 ⬜

The ⬜ icon from the 2D Editor multi-function icon can be used to enter rectangles. Alternative input options are provided in the shape of ⬜ and ▣. Both alternative input methods can be used together with the snapping function for various construction purposes. The appearance of the rectangle you enter depends on the settings you have made once completed.

Double-clicking it and changing the settings in the dialog box that appears, can change the properties of a rectangle.

13.6   CIRCLES 🖊 ○

The ○ icon from the 2D Editor multi-function icon can be used to enter circles. Alternative input options are provided in the shape of ○ and ⊙. Both alternative input methods can be used together with the snapping function for various construction purposes. The appearance of the circle you enter depends on the settings you have made once completed.

Double-clicking it and changing the settings in the dialog box that appears can change the properties of a circle.

Note: Remember that it is possible to snap to the edge of the circle with the relevant settings. For example, you could construct a ready-made line vertical to the edge of a circle.

13.7   ELLIPSES 🖊 ⬭

The ⬭ icon from the 2D Editor multi-function icon can be used to enter ellipses. Alternative input options are provided in the shape of ⬭ and ⬭. Both alternative input methods can be used together with the snapping function for various construction purposes. The appearance of the ellipse you enter depends on the settings you have made once completed.

Double-clicking it and changing the settings in the dialog box that appears can change the properties of an ellipse.

538

Note: It is not possible to create rotated ellipses using the 2D Editor. For this reason, the input box for angles in the **Enlarge/Rotate** section will be grayed in the **Position** dialog box that appears when you click **Position…** in the **Properties** dialog box for ellipses.

13.8   TEXT

The icon from the 2D Editor multi-function icon can be used to enter text. To do this, first drag out a box where the text is to be displayed, by double-clicking. Then enter the text you want to use into the dialog box, which will be displayed. This dialog box is identical to the dialog opened by double-clicking a selected piece of text.

13.9   BITMAP FILES

The 2D Editor can be used to insert graphic files into your plan in ArCon's Construction mode. The 2D Editor supports the graphic file formats *.bmp, *.ico, *.wmf, *.gif and *.jpg in this process.

A bitmap can be inserted into your plan by selecting . Once this has been selected, a standard Windows **Open file** dialog box will be opened where you can select the graphic file to be loaded. After this has been selected, position the bitmap in your plan by clicking with the left mouse button, once to set the top left position and again to set the bottom right position. These two clicks mark out the frame where the bitmap is positioned. The appearance of the bitmap in this frame depends on the settings you have made for bitmaps.

13.10 LAYERS

The 2D Editor in ArCon allows you to load AutoCAD DXF files as elements. Select the icon from the 2D Editor multi-function icon to open a dialog box, which is identical to the dialog box that appears when loading layers into ArCon+. This dialog box is used in the same way as loading layers. In other words, you can select one or even several layers of a DXF file and a preview of them will be displayed.

Confirm this dialog box with **Open**, and then click twice in your plan to specify the box where the layer is to be loaded. During the loading process, the layers are converted

into elements of the 2D Editor, in other words, into lines, polygons, text, etc. A group is automatically created from all these elements.

In order to edit individual elements in this group or in order to delete individual lines from the loaded DXF file, the group can be ungrouped.

Unlike graphic files, DXF files that are loaded using the 2D Editor are not saved as references but as 2D elements directly in the ArCon project.

Note: For technical reasons the maximum number of 2D elements, which can be loaded, using the 2D Editor is limited. This limit is around 3,000 elements. If you try to load more complex elements, the 2D Editor will prompt you that the maximum number has been exceeded, and the element in question will not be loaded.

13.11 LAYER IMPORT TO SCALE

In addition to the option for loading DXF files and then positioning them by dragging out a box, it is also possible to load DXF layers to scale. To do this, use . This *to scale* loading process is particularly useful if you want to load DXF layers which you know have been generated in meters. You can load these types of layers without changing their size by dragging out a box.

The process for selecting the DXF file and the layer to be loaded in that DXF file is identical to the normal selection process. In this case, however, you should single-click rather than double-click to position the layer. This click determines the top left corner of the layer. The size of the box will then be determined automatically from the DXF file values.

Depending on the type of DXF files you are loading, it may be that the information saved in the DXF file is larger than the current paper format for your plan. The 2D Editor will alert you to this fact and you will have the option of selecting a different scale for the layer during the loading process itself. This may be useful if the layer has not been modeled in meters after all, but in millimeters, for example.

A layer of this type will not normally fit on your page, because it would be too large by a factor of 1000. Then enter 1:1000 as the scale into the dialog box, a layer of this type will then be displayed with the correct size.

Note: It is also possible to change sizes in the 2D Editor. To do this, double-click a loaded layer, the edit group dialog box will appear where you can enter a value into the factor input box to change the size accordingly.

13.12 GROUPS IN THE 2D EDITOR

The 2D Editor in ArCon allows you to compile several 2D elements into a group. This group can then be moved or enlarged/reduced in size, and can also be rotated. All elements in this group will be enlarged/reduced or rotated as a single element.

To create a group, proceed as follows: Select the first 2D element to be included in the group by Left-clicking this 2D element. Then press the **Shift** key and click further elements to be added to the group. All selected 2D elements will then be identified using a selection frame.

Once you have selected all the 2D elements you want (you can also select groups in this process), click the group icon in the vertical toolbar. The 2D Editor will then combine all the selected 2D elements into a group and display a large selection frame around all the 2D elements.

The group created in this way will behave as a single 2D element. This means you can move the group as one, as well as delete, scale and rotate it. If you want to divide the group into individual elements, select the group and then click the icon in the vertical toolbar.

Note: Groups can also be selected in order to create a larger group. All the elements will then be included in the new group, but the original group information will be lost (no hierarchical groups).

13.13 BRING TO FRONT/SEND TO BACK 2D ELEMENTS

If you have created several 2D elements both of which cover one another, or which cover parts of the remaining ArCon plan, the and icons can be used to specify the order in which they appear.

To bring a 2D element to the front, select it by left-clicking the 2D element and then click the icon. The 2D element will then be in front of all other 2D elements. Clicking will position the 2D element behind all other 2D elements. Clicking this again will position this 2D element behind the normal ArCon construction elements as well, for example, walls, guidelines, etc.

A careful combination of selecting single elements and using these two icons can be used creatively to build up the image.

541

13.14 SNAP OPTIONS FOR 2D ELEMENTS

When starting the 2D Editor macro, the **2D Graphics** tab is added to the options dialog box for the snapping function when the macro is started (opened by right-clicking). This tab is used to set whether or not, to which of the 2D elements ArCon should snap.

If you have selected the option **Snap to the following items**, for example, and checked the **Circles** box, guidelines can be created which snap to 2D elements of the type circle when created. For example, this method can be used quite effectively to construct tangents to circles.

Bear in mind that these snapping options will also be used when positioning 2D elements. In other words, 2D elements that are already in place can be used as snapping objects when positioning new 2D elements.

Note: The snapping function can also be used when moving 2D elements. The point used as the snapping point for the 2D element being moved can be set. This point will normally be the position directly underneath the mouse. However, pressing **Ctrl+W** will alternate the snapping points on the 2D element being moved as snapping points. Lastly, the center of the 2D element can also be used as a snapping point.

You can switch between the various alternatives by the multiple use of **Ctrl+W**.

13.15 SWITCHING 2D ELEMENTS ON AND OFF

The icon displayed to the right of the horizontal toolbar can be used to hide or show the 2D elements. It is basically the same as the other **Show/Hide** icons .

13.16 GENERAL PROPERTIES OF 2D ELEMENTS

The elements **Line, Polygon, Square, Circle** and **Ellipse** in the 2D Editor use different properties for the frame, the thickness of lines, edges, and fill patterns for the display. You can set these properties using the relevant dialog boxes. Right-clicking the relevant variants of the 2D Editor or double-clicking a special element in your view opens these dialogs.

For example, right-clicking the icon will set the properties for circles subsequently created. Double-clicking that circle can set the properties for a specific circle. Remember that the properties of lines, squares, polygons, etc. created subsequently may

be different (but the same for all lines, squares etc).

In contrast, the appearance of the dialog box that is used to set the properties is virtually identical for the different elements. It comprises the sections for **Style for edge, Line/Edge width, Fill pattern, Colors** and an **Example** section where the current settings are displayed on an example (the dialog box for line properties is different to the other dialogs because neither fill patterns nor background properties can be set for lines).

Style for edge

This section is used to set the style to be used for drawing the edge or the line. Using the first alternative means that no special frame is used (not applicable for lines).

Line/edge width

This section is used to specify the thickness of the line or edge to be drawn. The specifications made in this section on the thickness of the line relate to the *paper coordinates*. In other words, the page formats currently being used. The **Hairline** alternative uses an option, which is always 1 pixel wide, regardless of the display size.

Bear in mind that hairlines can only be used for dotted lines with circles and ellipses. With all other elements, a different thickness can be specified for the lines.

Fill pattern

This section is used to specify the pattern to be used to fill the 2D element.

Colors

This section comprises the three subsections for **Border, Fill** and **Background.** For line properties, only a color can be selected, which is used for the line itself. In the example section you will see the various colors currently set. Clicking **Define…** can change these. A standard Windows dialog box will then be displayed for inputting the colors.

In the **Background** subsection you can select whether the background is filled in or left transparent. Selecting **Transparent** means that only the border and the fill are displayed. Parts of the 2D element not covered by the edges or pattern lines will be see-through. This means you will be able to see the ArCon elements or other 2D elements behind those parts.

As well as the sections already mentioned the **Properties** dialog box also contains **OK, Cancel, As default, Position…** and **Help** buttons with the standard ArCon functions. **As default** will therefore save the current for future use. Clicking the **Position…** button

543

will open a dialog box, which can be used to set the position of the frame.

13.17 POSITION DIALOG BOX

This dialog box is opened by clicking **Position…** in the **Properties** dialog boxes for the various 2D elements. Note that the position tab will only be available if a 2D element is selected. The Position dialog can be used to change both the position and the rotation of a 2D element. It comprises the two sections for **Position/Size** and **Increase/Rotate**.

The **Position/Size** section outputs the coordinates for the top left corner of the selection square relative to the origin. **Width** and **Height** relate to the width and height of the selection frame.

In the **Increase/Rotate** section you can specify an enlargement or reduction factor. For example, if you select 0.5, the width and height in the **Position/Size** section will be simultaneously multiplied by a factor of 0.5. Using the **Factor** input box creates an equal reduction/enlargement. The rotation of the 2D element can be entered in the **Angle** section.

Do remember that it is not possible to rotate all 2D elements. In this case, the **Angle** input box will be grayed.

Note: As in ArCon itself, you can also perform calculations in the input boxes in the 2D Editor.

13.18 PROPERTIES OF PARALLEL LINES AND POLYGONS

When creating 2D lines, the ☰ icon can be used to create several parallel lines simultaneously. Right-clicking ☰ opens a dialog box that can be used to specify the properties for these various parallel lines.

This dialog box can be used to specify whether or not the original line is displayed, and clicking **Properties…** specifies the properties of the original line. In this dialog you can also specify which of the parallel lines (up to five) are displayed, as well as the distance (in world coordinates) of these parallel lines from the original line.

For each of the individual parallel lines you can click **Properties…** to specify the line color, line thickness and line style.

After creating parallel lines, the 2D Editor will automatically create a group from these lines. This group can be ungrouped in order to change the specific lines within the

group, for example.

If you use the input options ⬚ or ⬚ when creating polygons, the same properties will be used as for parallel lines.

Unlike individual parallel lines, which are added to a group after they have been created, using ⬚ or ⬚ will also create a group, but the individual elements in the group are open or closed polygons.

Note: For the properties of the various parallel polygons, you can create a kind of color-fill pattern for the various strips in a closed polygon group by specifying that these polygons are to be color-filled. For example, the fill color for the original line could be set to blue. Set the fill color for the first parallel line to white. As the 2D Editor paints polygons on top of one another, this will create a kind of blue stripe. Do bear in mind that this process will depend on whether you specify clockwise or anti-clockwise when entering a polygon. Depending on the input type, the original polygon will be the outer or the inner shape in the group of polygons.

13.19 EDIT TEXT DIALOG BOX 🖋

This dialog box is opened either when entering text, after you have dragged out the text box, or by double-clicking existing positioned text.

This dialog box consists of the **Text** section where you can enter or change the text, and the **Position/Size** section.

The **Position/Size** section is the same as the **Position** dialog box for the other 2D elements. The position and size of the text box can be changed in this dialog. Angled text can also be created using the angle of rotation.

Note: For technical reasons, Windows can only display TrueType fonts as rotated text. If you are using a non-TrueType font, the text will be displayed horizontally, even if you enter values ≠ 0 for the angle of rotation.

As well as the **OK, Cancel** and **Help** buttons, the dialog box also has a **View…** button. Click this to display another dialog box where the text properties can be changed.

13.20 TEXT PROPERTIES 🖋

The dialog box for the text properties comprises the sections for **Options**, **Alignment, Define font** and **Define color.**

The **Options** can be used to specify whether the text is wrapped if it is too long to be

545

displayed on one line in the text box, whether the text box has a frame around it, and whether the frame is filled with a color.

Note: If the text for which you want to change the text properties is rotated text, it is not possible to use the first option (line break).

The **Alignment** section is used to specify how the text is aligned relative to the text frame. In other words, whether it is aligned to the left, right, or centered.

The **Colors** can be used to set both the background color (this is only visible if the **Filled background** option has been selected in the **Options** section) and the color of the text.

Lastly, clicking **Define font…** will define the font used. After clicking here, a standard Windows dialog box will be opened where you can set the font, as well as the font style and font size.

13.21 BITMAP PROPERTIES

Double-clicking a bitmap in the 2D Editor in Construction mode or right-clicking the option for the 2D input elements opens this dialog box. The dialog box comprises the two sections for **Fit to size** and **Options**.

Fit to size

This section is used to specify how the size of the image is adjusted for the size of the frame.

Selecting **Do not resize** means that the bitmap will always be displayed so that one pixel of the bitmap precisely matches one pixel on the screen/printer. If you want to enlarge or reduce your plan, you will see either more or less of your bitmap accordingly.

Selecting **Fit image to frame size** means that the bitmap is scaled to fit precisely in the frame you have entered. This feature can also be used to distort a bitmap.

Selecting **Fit frame to image size** means that the frame size for the bitmap is selected to be the exact size for the bitmap to fit into the frame undistorted. In this case, one pixel on the bitmap will correspond to one pixel on the screen/printer.

Options section

Selecting **With frame** in the **Options** section means that the bitmap is drawn with a black border around it. The size of this border will correspond to the frame size of the bitmap.

546

The **OK**, **Cancel**, **As default**, **Position…** and **Help** buttons have standard functions as in ArCon. **As default** will save the current settings permanently and not just for the project. This means that they will still be used in new projects the next time bitmaps are used.

Clicking the **Position…** button will open a dialog box, which can be used to set the position of the bitmap. Bear in mind that **Position…** will be grayed if you right-click the bitmap icon. Right-clicking the bitmap icon changes the properties of all future bitmap files loaded. As you are not setting the properties for a specific bitmap file in this case, you cannot enter the position either.

Note: If you are saving an ArCon project in which bitmap files are used, links to the bitmaps are saved rather than the bitmaps themselves. These bitmap files will then be reopened when opening projects of this type. This can result in bitmap files not being found because they have been deleted in the meantime, for example. A prompt will be displayed during the loading process should this be the case.

The 2D Editor will save the filenames of the bitmap files used, along with the relative file paths, if the bitmap files are located in a subdirectory of the ArCon directory. Bitmap files located anywhere else on the hard drive are saved with absolute path names.

13.22 OPENING/SAVING PROJECTS WITH 2D ELEMENTS

If you are using 2D elements in your construction and you save the construction as a project, the 2D elements used will also be saved in the project (*.acp). In other words, no separate 2D project file is created, although the 2D Editor is a macro. If you are opening a project of this type and the 2D Editor is started as a macro, the relevant elements will be displayed.

Depending on the installation, ArCon will behave as follows if you open a project with 2D elements and the macro has not yet been started:

Option 1:   The project is opened, but the 2D elements are not displayed.

Option 2:   The project is opened; the 2D Editor is automatically started when opened and the 2D elements are then displayed as well.

Option 3:   The 2D Editor has already been started. Open the project. The 2D elements will also be displayed.

If the 2D Editor macro has not yet been started, then option 1 and option 2 occurs, depending on the type of installation. If you want to change this later on – without

547

reinstalling ArCon – editing the **Macros.ini** file in the **Standard/Macros** directory will resolve this.

Replace the section [Edit2D.exe] with one of the following three options:

1) Always active

In this mode, ArCon will start the macro automatically when the program is started. The section in question is:

```
[Edit2D.exe]
Name= 2D Graphics editor
Modi= 3
Description=edit 2D drawings in ArCon
Automatic
```

2) Load as necessary

In this mode, the 2D Editor is started on command (via the **Macros** menu) or as soon as a project, which contains 2D elements, is opened. The **Macros.ini** section will then be:

```
[Edit2D.exe]
Name= 2D Graphics editor
Modi= 3
Description=edit 2D drawings in ArCon
ChunkID=2fffffff
```

3) Default

In this mode, the macro is started on command only and projects with 2D elements can be edited without those elements being displayed.

```
[Edit2D.exe]
Name= 2D Graphics editor
Modi= 3
Description=edit 2D drawings in ArCon
```

14 TILE MACRO

14.1 OVERVIEW

Included in ArCon+ version 5.0 is a macro, which can be used to define tiles in an ArCon project.

Selecting the **Creating tiles** option from the **Macros** menu starts the tile macro in ArCon.

14.2 THE PRINCIPLE

The tile macro is basically a standalone program which uses the walls, ceilings and floors in ArCon and creates special objects, that can be textured with the tiles you have selected.

When working with the tile macro, it replaces the working area in ArCon. When transferring data in ArCon, the tile macro disappears and you will see the normal ArCon display once again.

14.3 THE TILE MACRO IN ARCON+

After the tile macro has been started via the **Macros** menu, the following icons are added to Construction mode in ArCon+:

The icon will be displayed in the vertical toolbar in Construction mode. Clicking this icon will display a group of three icons in the How bar in ArCon+ (the second vertical toolbar).

These icons can be used to select the walls, ceiling or floors where you want to position tiles. To do this, proceed as follows: Click - if it not already held down - and then click the icons , or , depending on whether you are tiling a ceiling, a floor or a wall.

Then move the mouse in your plan into the room or near the wall side you want to tile. The rooms or wall sides in question are displayed as selected in red. If you now left-

click the mouse button, ArCon will disappear and the tile macro will be displayed. After completing your work with the tile macro, click the ⇨🏹 icon and the tile macro will disappear and ArCon will reappear – now with the tiles in place.

Note: If you open a project containing tiles and the tile macro has not yet been launched, it will be started automatically.

14.4 WORKING WITH THE TILE MACRO 🏹

After selecting the wall, floor or ceiling to be tiled in ArCon, the tile macro will be displayed. The wall, floor or ceiling transferred into the macro will be displayed in the working area. Cutouts for windows, doors and walls, and in floors and ceilings, are regarded as cutouts in the working area. The remaining area (the actual wall side or the actual floor or ceiling) can be tiled.

To do this, the tile macro can be used both to define different areas which can be tiled, or even the entire wall (the floor or ceiling) as a whole. The principle for doing this is really very simple:

Simply select a tile out of the right-hand tile list and drag it onto the area to be tiled. The tile is placed automatically when the mouse button is released.

Note: If there are no tiles in the right-hand area, click ▦.

Most icons in the tile macro will be similar to those in ArCon+. The function of these icons is identical in the tile macro. However, they are not divided into the horizontal and vertical toolbars.

As in ArCon, you can use guides in the tile macro (╲, ╲, ✕, ━, ┃) to construct precise areas. The 🔲 icon is used to import areas from DXF or HPGL transparencies. Unlike in ArCon+, however, these background images are not used as actual backgrounds. Instead, closed contours on the backgrounds are used automatically as areas.

The ▨ and ▧ icons are specific to the tile macro. They are used to define squares or any polygon-shaped areas for tiling. The icons ✛ and 🔄 are used to define the tile position. ✛ is used to define the tile position for an area, and 🔄 can be used to change the angle interactively.

The icons ⬒ and ⬓ are used with overlapping areas to define one area to be positioned in front of another area.

Note: During tiling, the areas that are covered - are not tiled. However, it is still not a good idea during tiling to cut out these areas to start with, because they may be used

550

later during further editing.

The ✖ icon is used to delete an area. Selected elements can also be deleted using the **Del** key. The 🔍 and 🔍ₙ icons are used for zoom in and zoom out functions and are used in precisely the same way as in ArCon+. ▦ is used to switch the grid on and off, and ◩ toggles between the tile textured view and the tile outline view in the working area. The ▦ icon can be used to switch the selection list of available tiles on and off. Last of all, ➡🖋 is used to transfer the data to ArCon+. Clicking this icon will display a dialog box where you can select how your inputs are used.
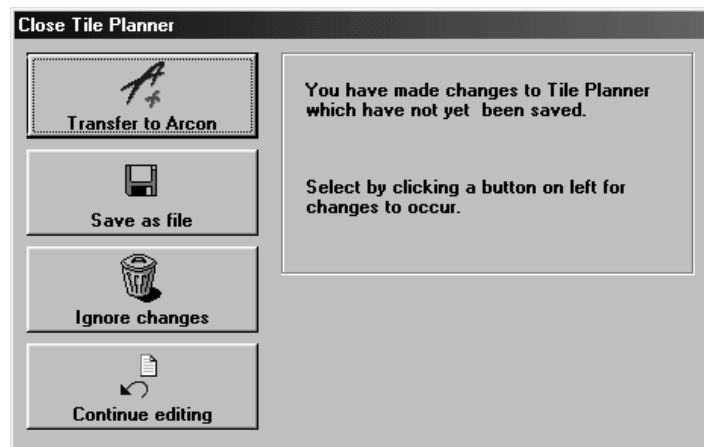
Clicking **Transfer to ArCon** will close the tile macro and transfer all the data into ArCon+.

Note: The data can be transferred directly by clicking ➡🖋 and holding down the **Ctrl** key.

The two list boxes to the right of ➡🖋 are used to select manufacturers and tile styles. The tiles used in the tile macro are taken from a database to which you can add your own tiles. When adding tiles to this database, both the manufacturer and the style need to be defined.

14.5   THE TILE MACRO IN DETAIL 🖋

Although working with the tile macro is intuitive and easy-to-use after a little practice, some of the details of the tile macro are explained in more detail below. Some of the working steps may not be immediately apparent in some circumstances when simply

551

trying out the program, which means that it is still advisable to study this part of the manual.

14.5.1   *Loading/saving tiles and backgrounds*

The **File** menu can be used to save different tile variants for one and the same plan.

If you save an ArCon project in which you want to use tiles, the current tile will also be saved in that project, which does mean that only one variant is possible. If you want to save different variants, this can be achieved using the following menu.

The **Import DXF/HPGL Transparency** menu option is used to import areas from those formats. For example, if you want to define a company logo in one of these formats as a tile area, this menu option can be used to do just that.

The **Exit** menu option is the same as the ⟶ icon. If you have made any changes in the tile macro, a prompt will be displayed as to whether or not you want to reject or save the changes separately.

14.5.2   *The working modes in the tile macro*

The tile macro has different working modes, which can also be accessed using the relevant icons. Along with these icons there is a corresponding menu option for each icon in the **Work mode** menu.

The selection mode (**Select object** menu option or the icon) is used to select or edit defined tile areas. To select an area, click the area with the icon. The area is selected and can then be moved by moving the mouse within the area with the left mouse button held down. **Ctrl+W** can also be used (see *Keyboard Assignments* chapter). You can also move individual corner points on the area, in exactly the same way as in ArCon with polygonal areas. If you hold down the **Ctrl** key after completing the move, the area will be copied to the new position rather than moved.

Right-clicking an area will open a context menu where you can also set the various working modes for this area separately.

14.5.2.1   Guidelines in work mode

This working mode is basically the same as the icon in ArCon+. It can be used to

552

enter different guidelines to permit the construction of more complex areas. Just as the main ArCon+ program, the tile macro supports snapping to corner points and lines (set using **Options, Snap**.

The ⬊ icon can be used to enter parallel guides where only the numerical distance is required, just as for the function available in ArCon+ using the 🔟 icon.

14.5.2.2   🖊️🔲🪟 Create rectangular/polygon areas in work mode

These menu options or the two icons can be used to define tile areas. After you have finished defining an area, it still hasn't yet been tiled. The actual tiling process is carried out using drag & drop to move the selected tiles from the tile catalog into the area.

The third option for defining an area is the import process for DXF/HPGL transparencies.

Note: If you drag a tile from the tile catalog into the area using drag & drop, and you approach the edge of an area in the process, the corresponding part of the frame is selected. Releasing the left mouse button means that the rotation of the tiles is automatically set so that the selected edge is the base edge for the tiles (the tiles all run parallel to this edge).

14.5.2.3   🖊️ Tile origin

During the tiling process for areas, both the type of tile, tile position and the tile joints are important. To define these, the tile origin (the bottom left-hand corner) of a tile can be defined using the ✥ icon. Click this icon and then in the area for which you want to change the tiling point (if the area does not yet have any tiles on it, first drag a texture onto this area). Then move the tile origin with the left mouse button held down and observe how all the tiles are adjusted to the new position of the tile origin.

In addition to this interactive option for defining the tile origin, the coordinates of the tile origin can also be entered in the status bar.

These coordinates will always relate to the old tile origin, which is selected with the

553

help of a cross hair.
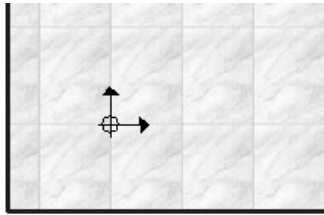
If you use drag & drop to drag a tile into an area, which is not yet tiled, the point at which you release the tile is the tile origin.

14.5.2.4   Tile angle

In the same way as you can define the tile origin for an area; you can also define the orientation of the tiles for this area. The icon or the **Tile Angle** menu option from the **Work mode** menu is used to do this. Selecting the corresponding context menu option also accesses the same menu option by right-clicking in an area.

Once you have selected the working mode, moving the mouse with the left mouse button held down will allow you to rotate the tiles interactively around the working point. In addition to the interactive option, the required angle of rotation can also be entered numerically in the tile macro status bar.
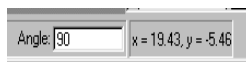
14.5.3   View options

Just as in ArCon, the tile macro has different views. Guidelines and the grid can also be displayed or hidden. To do this, use either the **View** menu or one of the icons , ,
, .

The menu option **Show Grid** or is used to switch the grid on and off (**Note:** With the grid switched off, the snap to grid functions will not work either). The menu option **Show Guidelines** or is used to switch the guidelines on and off (**Note:** With the guides switched off, the snap to guides functions will not work either).

or **Tile Outline** from the **View** menu is used for a *black and white* display of the

554

tiles. Only the joins are displayed with this icon depressed. Due to the grid effects, the joins can also be displayed as dotted lines with a very small display of the entire tiled area. A display is only achieved using a specific zoom factor.

The **View, Show Tile List** menu option or ▦ is used to hide the list of tiles to the right of the working area. This means you can no longer select a tile using drag and drop, but you will have more space in the working area.

14.6   OPTIONS IN THE TILE MACRO ✐

In a similar way to ArCon, the way in which the tile macro behaves can be defined using various options. Right-clicking the relevant icons can access most options.

14.6.1   *Program settings* ✐

This dialog box is opened using the menu option **Program settings…** from the **Options** menu or by right-clicking ▨ . This dialog box comprises of two tabs; the **Paths** tab where different directories can be entered for the tile macro, and the **Areas/Tiles** tab where the default values for newly created tiled areas and the tiles used can be defined.
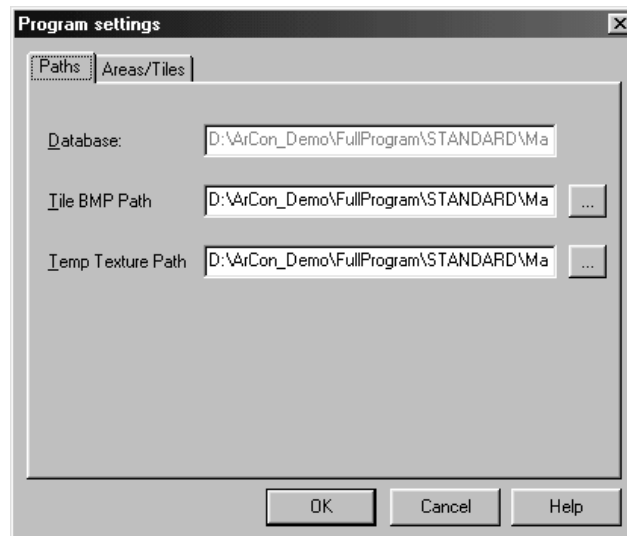
14.6.1.1   Paths tab

The Path tab comprises of three input boxes where the directories used in the tile macro can be entered.

The **Database** input box is used to define the tile catalog to be used. When installing the tile macro the correct path will be set here, which means that you will not normally have to change them.

However, if you want to create a new tile database, for example, using Microsoft Access, the relevant database can be selected from here.

The input box **Tile BMP Path.** defines the directory where the program will search for tile textures. The bitmap files used are not saved in the tile databases, only the names.

This directory specifies where these textures are actually located; this entry is also set automatically during the ArCon installation process. However, in some situations you can also use other textures by changing this directory.

The input box for **Temp. Texture Path** is used to define a directory where the tile macro stores temporary textures. ArCon uses these temporary textures to display the actual settings made in the tile macro. These are basically the same as the textures you used for the tiles, although they need to be scaled accordingly and expanded around the joints. The tile macro generates names for these temporary textures automatically. ArCon+ requires these textures for display purposes.

This section is also set automatically during the ArCon installation, and does not normally need to be changed, even if new databases are defined.

14.6.1.2   Areas/Tiles tab

This tab consists of two sections, the **Join properties for new area** section and the **Reactions to dimension changes in existing tiled room/wall** section.
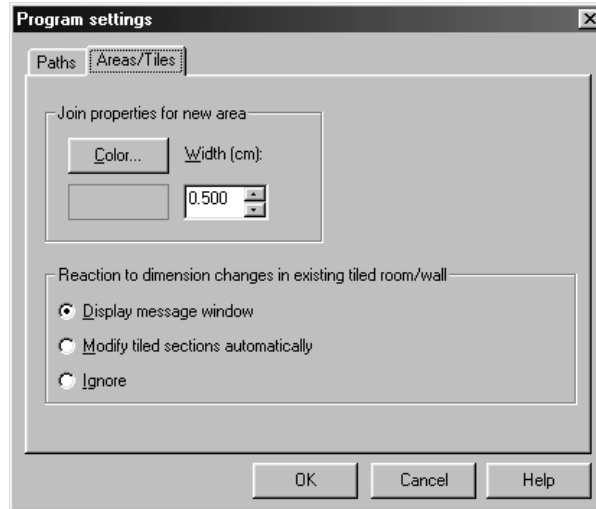
14.6.1.2.1   Join properties for new area

This section is used to define which join properties the tile macro uses when defining a new area. These settings are used when you use drag & drop to place a tile onto an untitled area.

If you drag a different tile onto an already tiled area, the settings made for that area would be transferred.

14.6.1.2.2   Reaction to dimension changes in existing tiled room/wall

If you have defined a tiled area for rooms or walls using the tile macro and go back to ArCon+ using the ➡️⚡ icon, rooms or walls, which have already been tiled, these can be changed here.

At this point the problem is how to proceed with the defined tiled areas. The tile macro monitors your inputs in ArCon, and notifies you if a situation of this type occurs. The precise way in which it does this is specified in this section.

Selecting the **Display message window** option means that the tile macro will notify you at the point when a tiled area is being implicitly changed and you can then restart the tile macro to modify it according to the new situation.

Selecting **Modify tiled sections automatically** means that the tile macro will

557

automatically proceed as follows: if a wall divides the tiled area, the wall which is longer following the division will be tiled. The tiled area for the other part of the wall is deleted.

If a new room is created during the process, and the ceiling or floor is tiled in the old room, the room with the largest combined wall length will be tiled with the original room, after the wall has been created.

Note: The same thing also happens with the first option **Display message window**. With this option it is normally possible to make changes later on.

Selecting the **Ignore** option means that the tiled area is not changed; it will instead go *through* the wall. However, there may be display problems caused by this, as the layout of the tiled area for a room is no longer entirely clear.

14.6.1.2.3   Notes on editing rooms after a tiled area has been defined

If several tiled areas have been created due to the changes in ArCon+, on the ceiling and the wall, for example, it may be that some of the tiled areas created need to be changed manually.

You should avoid editing rooms after sections of them have been tiled because the automatic adjustment process for the tiled area might not generally turn out, as you would expect.

You should therefore only create a tiled area if you are sure that the properties of the room to be tiled will not change.

14.6.2   Guide settings dialog box

This dialog box is opened by selecting a guide and then selecting **Attributes…** from the context menu or using the **Options, Guidelines…** menu option or by right-clicking one of the icons , , , , .
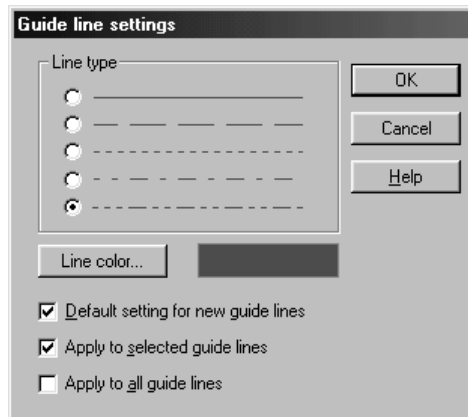
The dialog box is used to define the **Line type** and the **Line color** in the same way as in ArCon. The **Default setting for new guide lines, Apply to selected guide lines** and **Apply to all guide lines** check boxes are used to select how these settings are used.

Depending on the way in which you open this dialog box, some of the fields may be grayed out if no guides are selected, for example.

14.6.3   Area Properties dialog box 📐

This dialog box is opened using the **Area…** menu option in the **Options** menu or using the context menu by right-clicking an area and then selecting the **Attributes…** menu option or by double-clicking an area.
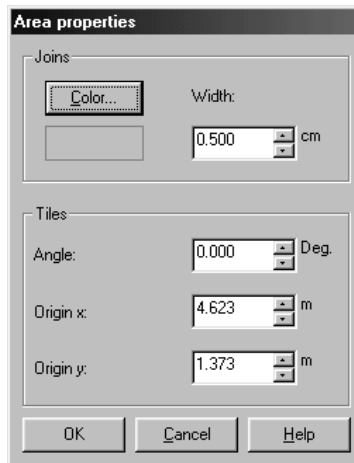
This dialog box comprises the sections for **Joins** and **Tiles**. The **Joins** section is used to specify the **Color** and the **Width** of the joins used for this section, and the **Tiles** section is used to enter the position of the tiling point and the **Angle** of the joins or tiles. These options can also be changed later using the ⊕ and ⟳ icons.

14.6.4   Snap options dialog box

This dialog box is opened using the **Options/Snap…** menu. The dialog is used both to specify whether or not the snap functions are actually active (**Snap enabled** check box activated), and the size of the snap area. You can also define the types of element to snap to.

Area border are the limits of sections which you have entered yourself using the tile macro;

Work area border are the limits specified by wall or ceiling/floor limits using ArCon.

14.6.5   Grid settings dialog box

This dialog box is opened using the menu **Options/Grid…** or by right-clicking the ▦ icon. This dialog box is used to specify the size of the grid used.

14.6.6   Tile properties dialog box

This dialog box is opened by right-clicking a tile in the tile strip and selecting the context menu **Attributes…** or by double-clicking one of the tiles.

This dialog box displays additional information on the relevant tiles to be taken from the tile database and not used further directly in the tile macro.
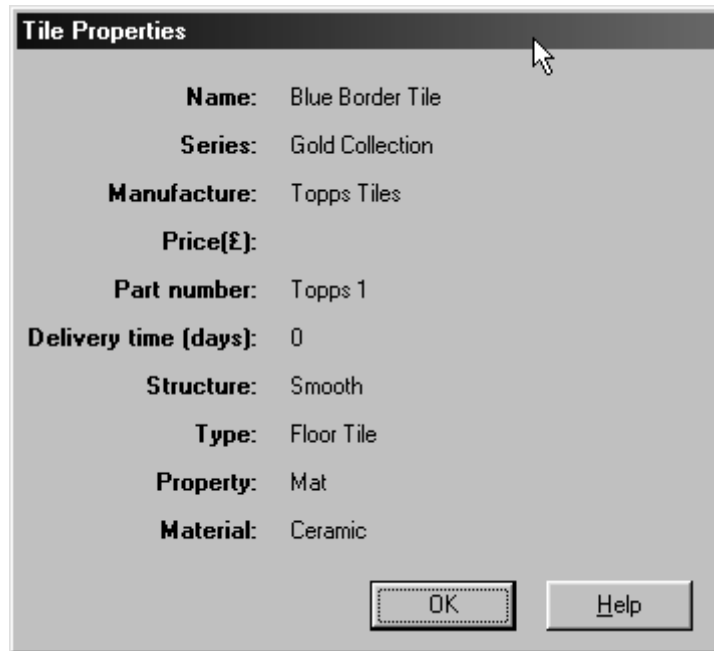
The details displayed are extracted from the tile database. Most details such as Manufacturer, Name and Series can be edited with the Tile Database macro, but details such as Price and Delivery time have to be edited directly with a program such as Microsoft Access.

14.6.7   DXF and HPGL files as areas

Selecting **Import DXF/HPGL Transparency** from the **File** menu or clicking will display the dialog box for opening backgrounds from ArCon+. All closed polygons in these files are inserted as areas.

After you have selected a file, the following dialog box will be displayed:

If you select **Original size**, and if one of the areas to be imported is larger than the total area to be tiled, the dialog box will be expanded like this:
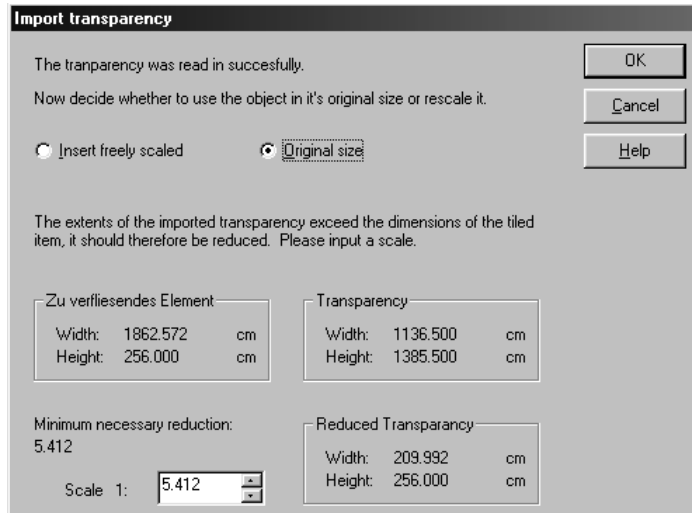
In this expanded area, a scale factor can then be specified in order to adjust the size of the areas to be imported.

14.7 DISPLAY OF TILED AREAS IN ARCON+

Once you have created a tiled area using the macro, and transferred that area into ArCon, this tiled area will appear at various points.

In Design mode you will see the tiles in question, but with the dialog boxes for walls and rooms a **Tiles** tab will be added. The tabs for walls and rooms are identical; the defined tiled areas are shown here in a list. If you click an element in this list, the values, which apply to that section, will be displayed below the list.

Room data

General | Text | Type 1 | Type 2 | Tiles

OK

Cancel

Material...

Help

Area:

Area (Floor) No. 1

Type: Rechteck (6.69m x 13.86m)

Surface: 92.70 m²

Tile name: Rustic floor

Join width: 0.50 cm

Join color:
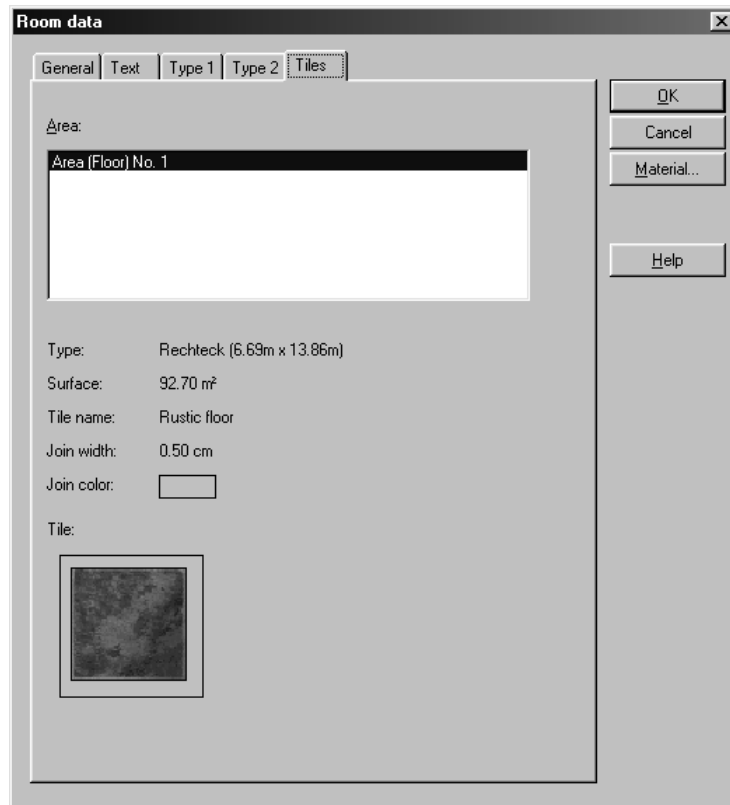
Tile:

If you move the mouse over a tiled area using the tile macro in Design mode, the normal cursor will change into FL.

If you then double-click, the tile macro will be started and the tiled area you clicked will be selected. You can then drag a different tile type onto that area, for example.

It is not possible to retexture tiled areas using drag & drop directly in ArCon, because the textures used in ArCon do not normally contain sufficient information in order to be able to use those textures as tiles.

15 TILE DATABASE (TILEDB.EXE)

15.1 OVERVIEW

The TileDB.exe program is supplied as an add-on module to the ArCon+. This program can be used to specify the appearance of the tiles, which are displayed in the list of tiles. It can be activated from the ArCon Macro menu This macro is an excellent example of how ArCon can be expanded by the use of external macros for specific applications. This application is an example of how tile manufacturers can demonstrate their products and allow customers to experiment with tile sizes, textures and colors.

Once the program has been started, all the tiles contained in the database are displayed in the top list. Moving through the list will display the detailed information on the selected tile. The right-hand preview window is an actual size display of the textured tile. If the geometric information is incomplete (for example, because the texture in question was not found), the message N*o geometry file found* will be displayed instead.
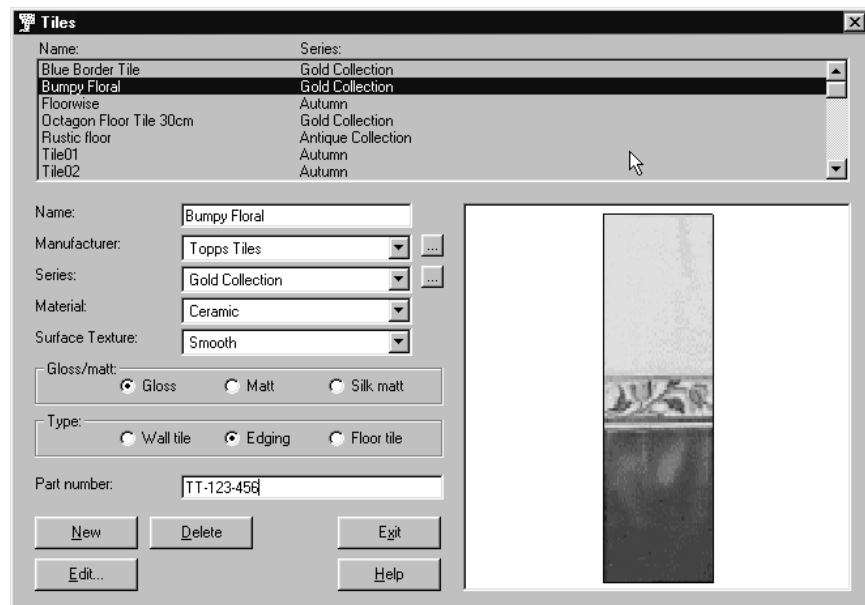
A tile can be deleted from the list by pressing the **Delete** button.

To insert a new tile into the database, press the **New** button. Additional information can then be specified by selecting the fields Name, Manufacturer, Series, Material and Surface Texture etc.

The actual appearance of the tile is specified in the **Edit Tile** dialog which is displayed after pressing the **Edit** button.

The ⋯ button can be used in subsequent dialogs both to edit the list of available manufacturers and to specify the styles linked to a manufacturer. The tile data base is in Microsoft Access .mdb format and can be created and updated using Access.

15.2   EDIT TILE DIALOG BOX

The **Edit** dialog box is used to define the dimensions and texture of a tile.
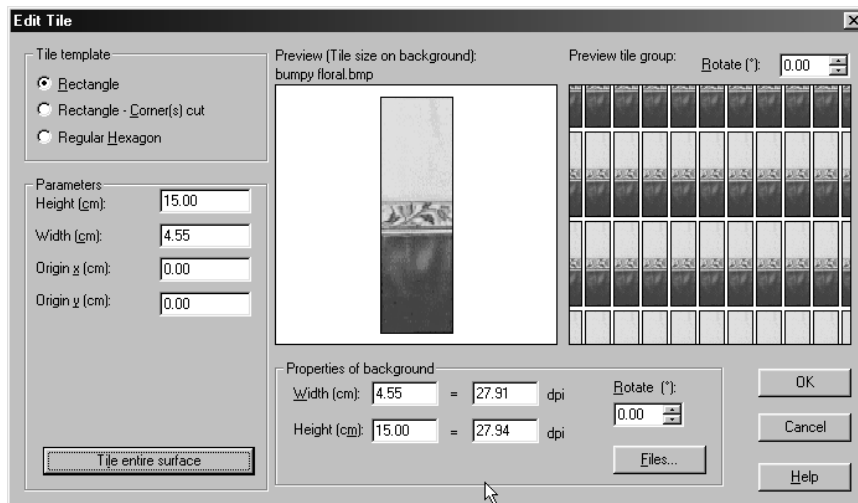
In the **Tile shape** section there is the choice of 3 outline shapes **Rectangular**, **Rectangular with cut corners** and **Regular Hexagonal**

Depending on the tile shape selected, other input boxes will be displayed in the **Parameters** section, which are used to specify the dimensions (edge lengths) of the tile.

Rectangular
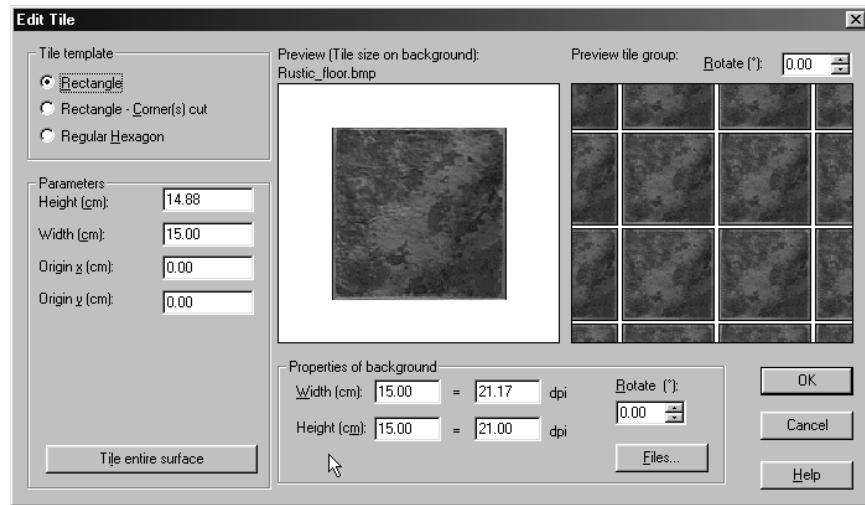
For rectangular tiles, only the Height, Width and Origin are specified.

Rectangle with cut corners
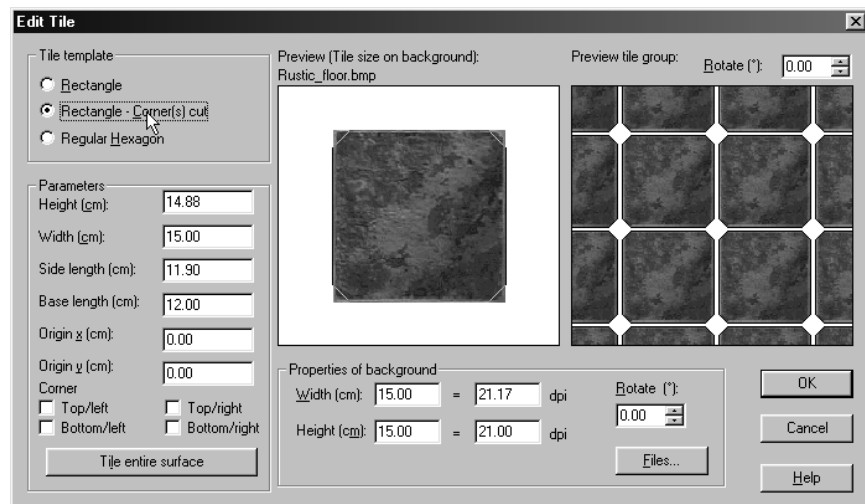
For rectangular tiles, with cut corners, you can specify which corners are cut and the base and side length of the tile.

Regular hexagon
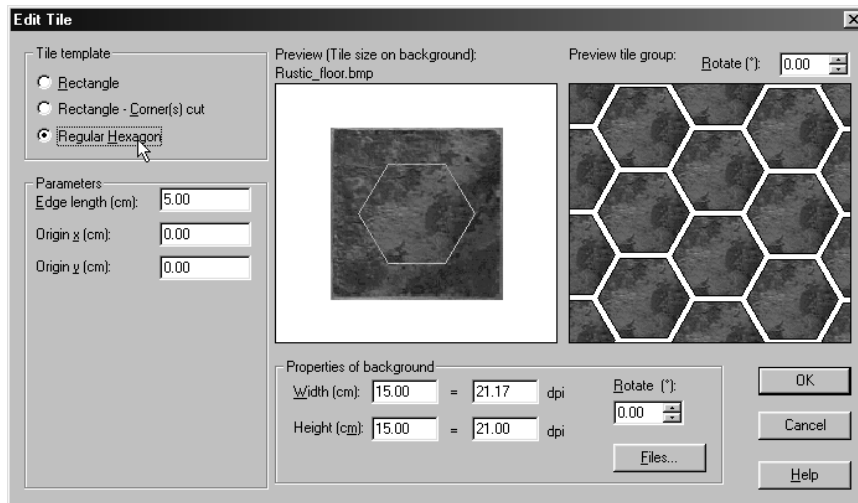
Regular hexagonal tiles need only to define the length of one edge of the hexagon.

The **Texture properties** section is used to assign the tile a texture. After selecting a bitmap file using **Files…**, all that needs to be specified are the dimensions (cm) of that texture. The input boxes **Width** and **Height** are available to do this. Alternatively, the adjacent **dpi** input boxes can also be used if you know the resolution in which the textures have been scanned. Whichever option you use, the other values are automatically adjusted when a value is entered.

As the default setting, the texture is arranged so that the bottom edge of the texture is the bottom edge of the tile. If this assumption is not correct (for example, the texture has been rotated by 90° or if the tile was not properly aligned during the scanning), you can rectify this by specifying an angle in the **Rotate** input box.

The same applies to the origin of the texture relative to the tile. It is assumed that the top left edge of the tile will coincide with the top edge of the texture. This setting can be changed using the input boxes **Origin x** and **Origin y** in the **Dimensions** section.

The **Tile entire surface** option is used as a quick method for entering tile dimensions. If you have specified the texture and its dimensions, this can be used to modify the tile edge lengths of the tile quickly so that they frame the texture accurately.

The two preview boxes display the appearance of a single tile for the settings selected (left-hand preview window), but also provide an impression of how the tile will look in a group of tiles (right-hand preview window). For the preview of a group of tiles, a

568

rotation angle can also be specified in order to gain an impression of tiles not positioned horizontally.

16 3DS-Import filter module

A lot is sometimes not enough…

With regard to ArCon's object catalogs, this possibility is alleviated by the availability of the 3DS-Import filter. The 3DS-Import filter is an additional module for ArCon and ArCon+, which is not included in the standard package. The filter gives you the technical facilities to extend ArCon catalog at will – by accessing new objects and catalogs. If the objects are modeled and presented in the necessary format (3DS format), you can use them without trouble in ArCon and place them as catalog items. The 3DS-Import filter is not a modeling system, but you can use it to make certain modifications to existing objects. The prerequisite, however, is that any object model must be available in the 3DS format.

The 3DS format is selected because it is the probably the most popular format for 3D objects. Many commercial and public domain objects and object libraries are available in this format, and most popular modeling systems support this format as well. If necessary, freely available conversion programs can be used to convert existing object libraries into the 3DS format.

This part of the manual will teach you about the 3DS-Import filter and how to use it. You will learn the basic procedures for converting 3DS objects for use in ArCon, as well as techniques for modifying objects to best suit your needs in ArCon.

The following text is not meant to teach you the use of 3D-Studio or 3D-Studio MAX. If you need to not only convert objects but also to create or edit existing objects, you will need the appropriate modeling software. The complexity of such modeling systems and learning to use them can take several weeks; just as a carpenter cannot make the most complicated cabinets on the first day, you will need some training with a 3D modeler before you can produce complex objects. But with training and practice, you will.

You should already have a furniture object or an object library, which you want to convert with the help of the import filter, but keep in mind that the 3DS-Import filter is not able to invent information, which is not already in the object. A basic desk with four legs is a simple shape, but may require some tooling and detail work before it's realistic and ready to use in your ArCon project. It may be useful to assign materials and textures, or make minor modifications to the object, which you're converting, for use in ArCon.

571

16.1 WHAT IS THE 3DS-IMPORT FILTER?

The 3DS-Import filter for ArCon consists of various program modules that together make a program, which offers the possibility of reading 3D-Studio files and converting them to ArCon objects. These tools are separate from, but work together with, the regular ArCon functions.

All normal ArCon functions are available in the 3DS version. If you are a beginner at using ArCon, you should first read the early chapters of the ArCon manual. To effectively use the 3DS-Import filter you should have some experience, especially in Design mode. You should also be familiar with the use of the ArCon Explorer (object and texture catalog).

The 3DS-Import filter of ArCon makes itself available in Design mode. Besides the three menu items **Load 3DS-object…**, **List 3DS-objects convert…**, and **Save ArCon object (.ACO)…**, Design mode has an additional icon which is located at the far right of the lower horizontal toolbar. This icon is required for converting 3DS-objects and lets you create catalog icons for the Explorer.

For creating objects, a modeler that is able to create 3DS or PRJ files is required. 3D-Studio MAX is best suited to this; additionally a previous version of 3D-Studio will suffice as a modeling system. Other modeling systems can be used, but you should exercise caution since such programs' 3DS-format support may not be 100% compatible with Autodesk's format.

Although the 3DS-Import filter analyzes and converts much information in 3DS-objects for use in ArCon, there are nevertheless some limitations, for example, only one texture can be used for each area (in contrast, 3D-Studio MAX lets you place as many textures as desired above each other).

After creating the 3DS-objects, the conversion for use in ArCon takes place with the help of the 3DS-Import filter. This creates from the 3DS-objects ArCon objects (with the file extension .ACO) or ArCon groups (with the file extension .ACG), which can also be used directly by other ArCon users who do not have the 3DS-Import filter.

The 3DS-Import filter offers some options for optimizing objects to be imported (see the *Optimize* section), as well as a function to convert entire groups (lists) of 3DS-objects (see the *Time slider and related buttons* section). The latter function is especially important, if you have an existing library of 3DS-objects and want to convert them all for use in ArCon as quickly as possible.

Creating whole ArCon catalogs from the converted objects is essentially limited to

572

moving files with the help of the normal Windows 95 Explorer and creating the suitable sublists. What is shown in the ArCon Explorer is basically a directory structure. This is explained in greater detail in the section on creating catalogs (see *Creating object catalogs*).

16.1.1   *Versions*

3D-Studio files which were not created with 3D-Studio MAX 1.1 or 3D-Studio version 3.0 may be incorrect since they do not correspond 100% to the 3DS file format used in the program versions specified above.

16.2   INSTALLATION NOTES

You install the 3DS-Import filter in the same way as you install the regular version. Simply follow the installation instructions on the screen.

Besides the normal directories, which are created when installing ArCon, an additional directory named 3DS is created in the base path of your installation. Within this directory you will find some example objects which you can use while reviewing this section of the manual.

16.3   ARCON'S USE OF 3DS-OBJECT CHARACTERISTICS

The following section presumes that you are well versed with the use of 3D-Studio or 3D-Studio MAX. You should be able to define geometry and assign materials to areas with these programs. If in the following some terms are unclear to you, please consult the appropriate AutoDesk manuals.

16.3.1   *Fundamental information about 3DS files*

3D-Studio (up to version 3) saves the scene information in the so-called 3DS files. In PRJ files some additional adjustments are saved apart from this scene information. PRJ files are files that contain 3DS files as a subset.

3D-Studio MAX normally saves its scene information not in 3DS or PRJ files, but in a special format with the file extension .MAX. The information saved in MAX files, are

573

far more detailed than in 3DS files. 3D-Studio MAX additionally has, for compatibility reasons, the ability to export 3DS files. The information saved in MAX files, which cannot be saved in 3DS files, is not lost.

If you use 3D-Studio MAX, it is advisable to save objects only after they are completely modeled, and to save them in both 3DS and MAX formats.

Tip: If you use 3D-Studio MAX and are surprised at what ArCon makes from your objects, import the exported 3DS files directly into 3D-Studio MAX. Generally you'll then see what ArCon has to work with; the reason is simply that the 3DS file format perhaps cannot contain all information used when modeling your object.

An example of this is the 3D-Studio example project Tut17_2.max, which is on the 3D-Studio MAX CD. If you export this project as a 3DS file and then import directly back in (completely replacing the scene), you'll see objects that were not seen beforehand. This concerns intermediate data which 3D-Studio MAX exports with 3DS files.

The described, however, is generally the exception. Under normal circumstances the objects you create and export as 3DS files from 3D-Studio MAX are identical and are handled correctly in ArCon.

3DS files save the following information:

1. Geometry of the scene's objects (so-called Meshes)
2. Materials used in the scene
3. Hierarchy and movement information (key frame data)
4. Information about light sources
5. Information about the viewer's point of view, and background pictures.

Contrary to the points mentioned above, textures are not saved directly in 3DS files, but must be separately present.

From the 5 points mentioned, the 3DS-Import filter creates ArCon geometry, materials, light sources, hierarchy information and movements. The specifications regarding the point of view, background pictures, and other specifications is not analyzed or used.

16.3.2   Geometry used by the 3DS-Import filter

ArCon's 3DS-Import filter uses all of the geometry information of objects, which are saved, in the 3DS files. Additionally, on one hand you have the positions of corner points, and on the other-hand the roundness information (smoothing groups) and texture coordinates. For the latter two characteristics you have the possibility of generating additional information during the conversion in the import filter.

574

In principle, 3DS files can only contain objects that have fewer than 65,536 points. Since such objects in a 3DS file can contain multiple references, however, the total of all points in a 3DS file is in principle unlimited. When converting objects with more than 65,535 points total into ArCon objects, no problems will occur with the current version of ArCon, since the number of points for ArCon objects is unlimited.

This applies to ArCon versions 3.0 and higher. ArCon 1.0 and ArCon 2.0 have a limit of a maximum of 65,535 points per object. You might want to keep this in mind if you create large objects. Also, remember that such large objects will dramatically reduce ArCon's display rate. Regarding the practical complexity of geometry, you'll find additional notes in sections 11.7.

16.3.2.1 Units and object sizes

If you convert a 3D-Studio object 1:1 into an ArCon object without any modification in Design mode, it may happen that the object is too large or too small. The reason for this is that the 3D-Studio object was obviously designed in a different unit than that used by ArCon. 3D-Studio and 3D-Studio MAX does not offer in principle the possibility of defining the units in which one works. Additionally, the few programs that support the 3DS format correctly set the appropriate information in the 3DS file.

In order to avoid this problem, you can use a scaling factor when reading 3DS files into ArCon. For example, if a desk should have a height of 80 meters after loading (the sizes are displayed when importing), it is advisable to set the scaling factor to 0.01.

16.3.3 Materials

3D-Studio version 3 and 3D-Studio MAX offer almost infinite variety in the shapes of surface properties. Any surface property can have different surface properties combined, and each part can be changed, etc.

In ArCon the possibilities of surface properties are limited. The reason for this is that in ArCon the objects must be shown in real-time (comparable to the fast render in 3D-Studio MAX). Although the ArCon render is very fast, more complex material properties are not possible.

All the parameters, which ArCon uses for materials, have corresponding parameters in the material editor of 3D-Studio MAX or 3D-Studio version 3.0. All additional parameters, which are not supported by ArCon, are simply ignored during conversion.

575

From the multitude of material properties supported by 3D-Studio MAX (standard, two-sided, matte/shadow, multi/subobject, top/bottom, etc.), ArCon supports only the material type *Standard*. All other material types mentioned are so complex in their views that they are unsuitable for ArCon's real-time renderer. Using the extended material properties in the ArCon's raytracer is conceivable, but is not implemented in the current version of ArCon and neither in the 3DS-Import filter.

The following figure shows the 3D-Studio MAX material editor with some opened items (*roll outs*).
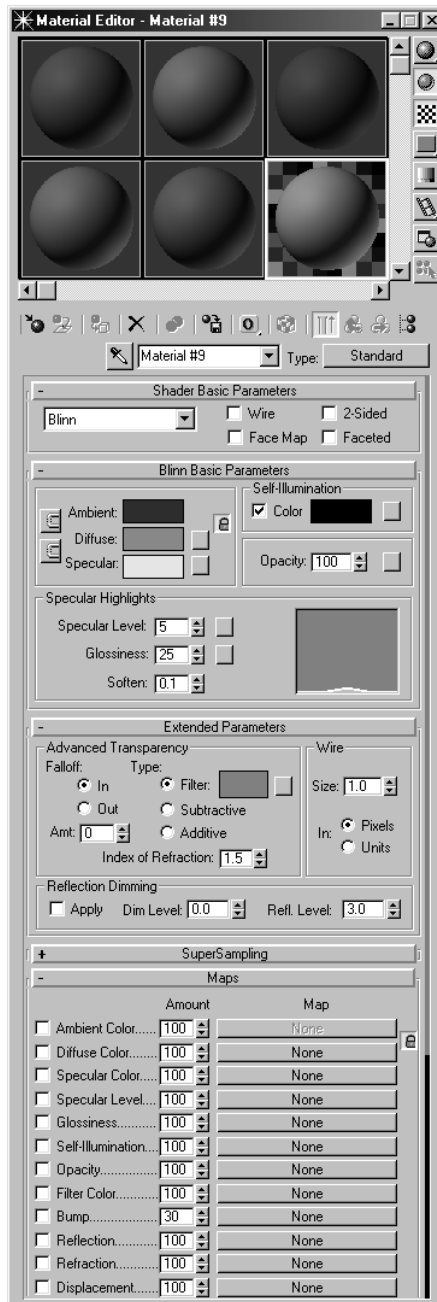
From this dialog box the following described parameters are used in ArCon.

16.3.3.1   Basic parameters
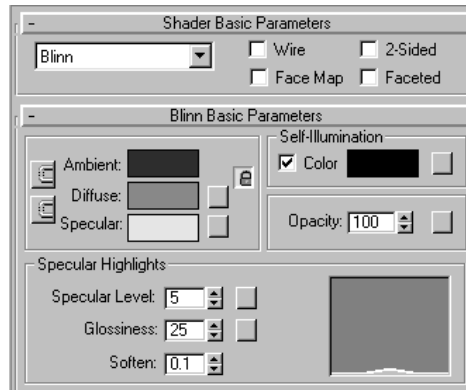
Shading:

Shading in ArCon is always *Phong*. It can be switched on and off in ArCon with the
 icons.

2-sided *check box*

This information is used in ArCon; note that it can be partially overwritten with the
help of optimizers (see *Optimize* section) when converting.

Note: You should use two-sided materials as rarely as possible, since they can cause the
display rate in ArCon to be reduced by half. two-sided materials are rendered for the
areas that can be seen, as well as areas that cannot (the opposite side of the seen areas).

Wire *check box*

ArCon ignores this characteristic. The type of view in ArCon can be used as a
substitute.

Face map *check box*
ArCon ignores this characteristic

Ambient, Diffuse, Specular, Filter *selection list*

578

Although ArCon uses all four effects when lighting, it differentiates only between two colors – the diffuse and the specular colors. For the filter and the ambient colors the values for *Diffuse* are always used. In order to achieve the same effects in 3D-Studio MAX and in ArCon, the values for *Filter* and *Ambient* must be set to the same values as *Diffuse*. This can be easily achieved for the ambient color with the 3D-Studio MAX icon ▣. The filter color, which is only used if the object is not 100% opaque, must be adjusted separately.

Glossiness input box

This value is used in ArCon with the same function.

Note that in the normal view modes of ArCon, shiny (or glossy) areas cannot be shown accurately. The higher you set the value for *Glossiness*, the more likely that you will not see the shiny (glossy) area. This does not apply, by the way, to the raytracer; there the glossy areas are created exactly the same as in the 3D-Studio renderer.

Specular level input box

This value is used in ArCon with the same function.

Self-Illumination input box

Like 3D-Studio, ArCon uses luminescent areas, in order to show, for example, light output from monitors. In ArCon it is not possible to set the proportion of this self-illumination. Self-illumination can only be switched on or off.

The 3DS-Import filter sets this self-illumination in ArCon on or off according to whether the value in 3D-Studio MAX is set to zero. If the value is zero, self-illumination is turned off in ArCon. If the value is higher than zero – no matter what the value actually is – self-illumination is switched on. In 3D-Studio MAX the same effect can be achieved as it's done in ArCon, setting the value to either 0 (no self-illumination) or to 80 (luminescent).

Opacity input box

This value is used in ArCon with the same function.

Soften input box

ArCon ignores this specification.

16.3.3.2   Extended parameters
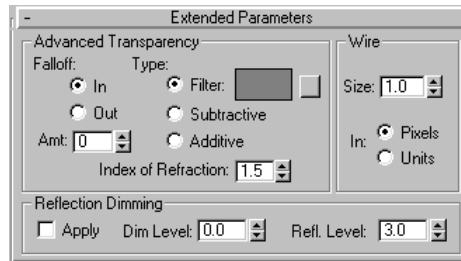
Advanced Transparency area

The inputs for Falloff: (In, Out, and Amount) are ignored. In ArCon the transparency of an area is not dependent upon the viewing angle. You can achieve the same effect in 3D-Studio MAX if you set the amount of the falloff to 0.

Type selection list

ArCon always uses the Filter type during the view of transparent areas.

Index of Refraction input box

For this, ArCon always uses the value 1.2 with the raytracer. In order to achieve the same effect in 3D-Studio, you should set this value accordingly.

Wire area

Since ArCon does not have a direct wire view, all values within this area are ignored.

16.3.3.3   Specifications in the map roll out
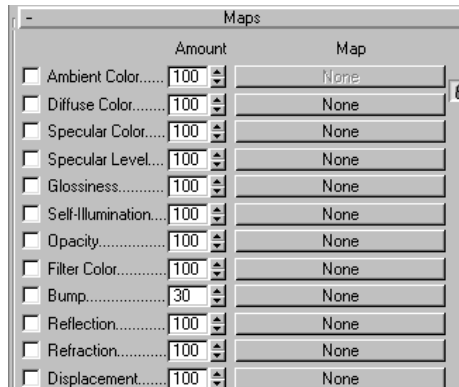
ArCon can show exactly one texture (map) per area. In contrast, 3D-Studio MAX allows up to eleven textures per standard material.

The only 3D-Studio MAX map types supported by ArCon are *Diffuse* and *Reflection*. All other maps are ignored by ArCon, but you can simulate special texture characteristics of ArCon, such as mask textures (see *Generating ArCon mask textures* section). For the map type *Diffuse* and *Reflection maps*, ArCon supports only the bitmap type of map. Other map types, such as *Checker*, *Flat mirror*, etc. are not supported by ArCon.

If you select the bitmap map type in the 3D-Studio MAX **Material editor,** the input box of the material editor changes its appearance:
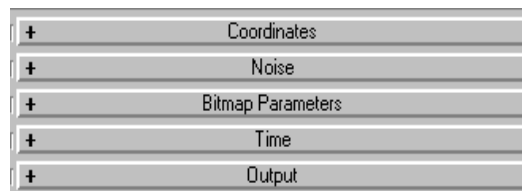
From the five roll outs for *Coordinates*, *Noise*, *Bitmap parameters*, *Time*, and *Output*, ArCon only uses the specifications from the *Coordinates* and *Bitmap parameters* roll outs. Manipulating the bitmap by means of *Noise* or changing the RGB values (with the *Output* roll out) is not possible.

The current version of ArCon does not support time-dependent (animated) textures. Accordingly, the specifications in the *Time* roll out are ignored.

581

16.3.3.3.1   Coordinates roll out
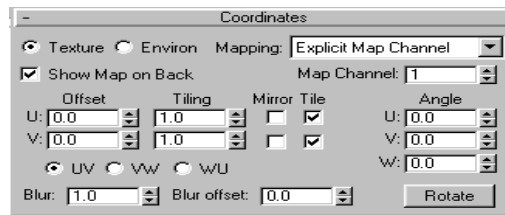
ArCon always uses the *Explicit* mapping with diffuse maps, i.e. the **Texture** switch must always be activated. This has the consequence that for texture objects, UV coordinates must be provided.

With reflection mapping, *Spherical environment* is always used. These are, by the way, the default specifications when you enable these two map types in 3D-Studio MAX.

The **Offset U and V** input boxes as well as **Tiling U and V** input boxes are used with the same meaning as in ArCon. ArCon ignores the check boxes for **Mirror U and V** and **Tiling U and V** – it is always tiled toward U and V.

If you want to place unmapped textures on an area, you must, if necessary, divide it into lower surfaces and use the texture once for a lower surface.

The **Angle** input box is used with the same meaning in ArCon. The **Blur fields** input and **Blur offset** are not used by ArCon. According to whether ArCon uses mipmaps for textures, a similar function is available there.

ArCon always uses the UV coordinates as texture coordinates, independent of whether the selection boxes UV, VW, or WU, are selected.

16.3.3.3.2   Bitmap parameters roll out
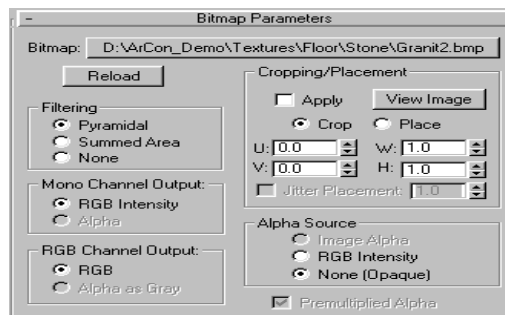
In this roll out you specify the name of the texture to be used, which ArCon will

likewise use. Note that ArCon does not support all of the texture formats that 3D-Studio MAX supports. If you convert a 3DS file, which uses an image file format that ArCon does not support, ArCon ignores the file extension of the filename and replaces it with *.bmp. You must, if necessary, convert the used textures to Windows BMP format with suitable picture editing programs (for example, Paint Shop Pro or Photoshop) in order to make it usable within ArCon. Additional information on the use of bitmaps can be found in the section 11.6.5.

The specifications within the other areas of the *bitmap parameters* roll out are ignored when converting into ArCon objects, since a suitable function is available in ArCon (i.e. the **Mono channel output** and **Alpha source** sections) or are not implemented differently in ArCon (i.e. the **Filtering** section)

ArCon always uses textures without filtering; this corresponds to selecting **None** within the **Filtering** section. Note that the type of filter is not lost when exporting as 3DS files; if you re import such an exported file, the filtering type is adjusted accordingly.

One exception concerning the texture filtering involves the ArCon VR version; depending upon the pixel resolution of the texture this uses either the **Summed area** type or **None** as filtering. In the VR version, textures that come from bitmaps with fewer than 16 x 16 pixels resolution appear without filtering; textures from bitmaps with higher resolution are filtered as **Summed areas**.

16.3.3.4   Example materials

After installing the program, you'll find a folder named MatDemo in the 3DS subfolder in the ArCon directory. In this directory there are some example objects, saved as 3D-Studio objects, 3D-Studio MAX projects, and ArCon objects. Additionally, you'll find all textures used by these objects in the same folder. You can use these examples as references for the use of materials. You'll find a list of the example objects at the end of this section of the manual.

16.3.3.5   Generating ArCon mask textures

ArCon uses so-called mask textures in order to show irregularly formed areas, for example, sections of trees, logos, and alike. These mask textures do not correspond directly to textures in 3D-Studio or 3D-Studio MAX, but can by means of opacity be approximately simulated in those programs.

583

16.3.3.5.1   How ArCon displays mask textures

The view of mask textures in ArCon is exactly the same as the view of normal textures – but with one exception. If the texture to be shown has the color value of absolute black (0,0,0), the area is not shown here and is perfectly transparent. In 3D-Studio this corresponds to an opaque texture, which consists only of black and white pixels, whereby in ArCon the same bitmap is used for the texture itself and the opacity. If the bitmap is not entirely black, its color is used; if it is entirely black, the texture is completely transparent.

16.3.3.5.2   Adjusting 3D-Studio to create mask textures

In order to create the function specified in the previous paragraph, you must use two identical textures in 3D-Studio or 3D-Studio MAX: one for *Diffuse* and one for *Opacity*. All further adjustments for *Opacity* are ignored; the fact that both bitmap names are identical is detected during the conversion, and ArCon knows that this concerns a mask texture.

Note: If the used bitmap file is not a black and white picture (texture), the effect shown will be different from 3D-Studio to ArCon, since 3D-Studio interprets the brightness values of the opacity texture as degrees of transparency. ArCon differentiates strictly between two values: *Perfectly transparent* and *Perfectly opaque*.

16.3.3.5.3   Combing texture and diffuse colors

3D-Studio uses the input boxes before the different map buttons in the *Map* roll out to set the mixture with other materials, for example, if a *Diffuse* value of 30 is specified for the map, this means that the texture influences the material by exactly 30%. The remaining 70% are usually the normal color for *Diffuse*.

The 3DS-Import filter ignores these values for *Diffuse* and *Reflection* under normal conditions, since ArCon does not support additive mixing of textures and object colors.

If the amount is less than 50, ArCon uses the color view during the view when set to **Combine color and texture**. With this type of view the diffuse color is multiplied by the texture color (filtered.)

Examples of these materials can be found in the folder *MatDemo* within the 3DS folder.

584

16.3.3.6   Materials and the ArCon raytracer

The ArCon raytracer uses genuine raytracing for display, in contrast to the 3D-Studio renderer. Reflections and refractions are simulated not with maps, but are calculated for each pixel. For this reason areas can also reflect upon other items and you'll see this reflection in ArCon, even without using a reflection map. The raytracer works with the assumption that areas assigned a material reflect ideally if the product of *Gloss intensity* and *Gloss color* is larger than 30 x 255 in any one of the RGB components. If you select, for example, a gloss color of absolute white (255, 255, 255) and a gloss intensity of 20, an area with this material will not reflect in the ArCon raytracer. If you select as gloss color the same white and a gloss intensity of 50, the material will reflect – whereby the proportion of reflection is proportional to the value of the gloss intensity.

In the *3DS\MatDemo* folder you will find two example materials, which reflect with the raytracer.

Note: The default material of 3D-Studio, which 3D-Studio uses if you do not assign a material, has very high gloss intensity. This has the consequence that 3DS objects for which no materials were assigned in 3D-Studio reflect when rendered with the raytracer in ArCon.

16.3.4   Light sources

Generally, the objects which you convert with the 3DS-Import filter will not require light sources, since these light sources are assigned in ArCon. If you want to design objects that produce light (for example, desk lamps), you can achieve this by using special light sources in 3D-Studio or 3D-Studio MAX.

From the many possible types of light sources in 3D-Studio or 3D-Studio MAX, the 3DS-Import filter uses only the target spotlight. With the many possible parameters for the target spotlight in 3D-Studio MAX, ArCon uses only the color specified in the *General parameters* roll out. All other parameters are not considered or used in ArCon. For example, whether a light source throws a shadow or not in ArCon depends not upon whether the **Throw shadow** box is checked in 3D-Studio (in the *Shadows parameters* roll out), but whether the box **Throw shadow** is checked in ArCon.

By adjusting the color of the target spotlight you can define the color of the spotlight in ArCon, as well as its intensity. For example, if you would like a dark light source, set the color to *gray*; whereas if you would like a bright light source, set the color to *white*.

585

The same applies to color light sources, whereby the color's intensity must be set accordingly.

These settings are only used for the geometrical characteristics of the target spotlight. ArCon does not consider the direction of the target spotlight, including the aperture angle of the *light cone*, for point lights, with the exception of *daylight*, where adjusted light sources are used for the sun.

Note: The reason for this is basically due to a very inaccurate view of light cones using the fast renderer. You can see this effect in 3D-Studio MAX – the light cones are usually displayed only if the range of receiving objects is quite small (which generally should be the case for reasons of performance). As a consequence the light cones appear more or less coincidentally. In order to bypass this effect, ArCon does not implement spotlights.

If you model lamps for use in ArCon, please pay attention to the following notes regarding the lamp bodies: The ArCon raytracer uses all areas of an object, which throw shadows during the calculation of shadows. When lighting bodies, it may be practical to exclude certain sections of the lit object from the shadow thrown by the light itself. So, for example, you can prevent a lampshade throwing shadows.

In both 3D-Studio and 3D-Studio MAX, you have the option to force certain objects to not throw a shadow. This information is in principle saved with the 3DS file and is interpreted by ArCon accordingly.

If you do not select an object to cast shadows in 3D-Studio, no shadows from the lamps in this object will be visible. Whether the other light sources cast a shadow or not in ArCon, doesn't depend on the adjustments in 3D-Studio, but only on the object settings in ArCon (see the **Object adjustments** dialog box, where you can check the box **Throw shadows with the raytracer**).

The above describes only the functions when saving 3DS files from 3D-Studio. If 3DS files are exported from 3D-Studio MAX, the object characteristic *throw shadows* is unfortunately lost due to an error in 3D-Studio MAX, i.e., this information is not saved in the 3DS file. You can reconstruct this, however, by re-importing an exported file again. In order to now use 3D-Studio MAX as a modeler for lamp bodies, which do not throw shadows, use the following in the 3DS-Import filter: If the name of an object starts with _NS_, the 3DS-Import filter assumes that this object does not throw shadows from the lamps of the object.

In the Modeldemo subfolder (within the 3DS folder) you will find the 3DS-file *Schatten.3DS*. If you import this file into ArCon and switch to *night vision*, you'll

receive – with the raytracer – the following picture:
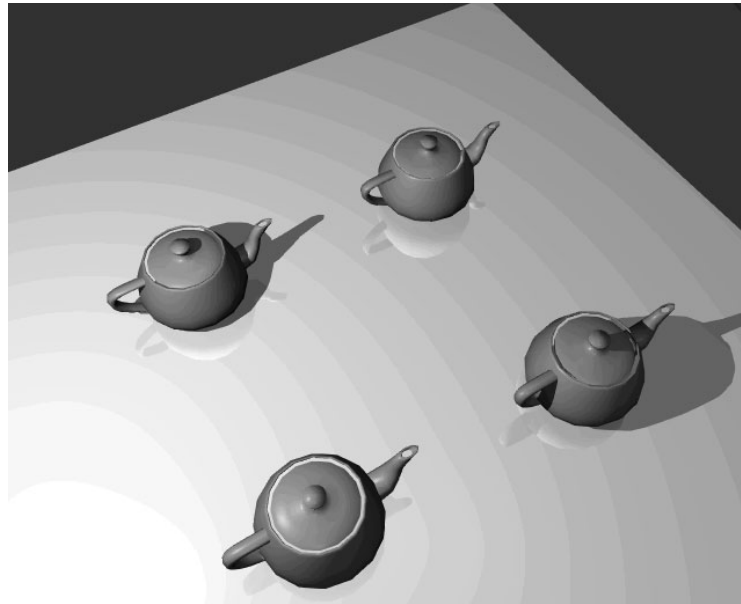
As you can detect by the hierarchy tree of the object, the names of the second and third teapot start with the character sequence **_NS_** and thus do not cast shadows.
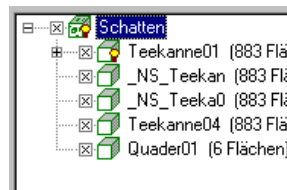
16.3.5   Using hierarchy and animation (key frame) data in the 3DS-Import filter

In 3D-Studio the key framer is used for two different functions: for the definition of hierarchies and for the definition of movement (animation). The 3DS-Import filter uses this information, as it is stored in the 3DS files. The following section addresses the use of hierarchy information. Using animation information is addressed in the section 11.3.6.

Hierarchy information is used in ArCon and therefore you should also use it accordingly, to dramatically reduce memory consumption for models and in turn maximize the display rate.

16.3.5.1   Copies, instances, references

In 3D-Studio MAX multiple sections of an object are sometimes required (for example, in accessing a cabinet), so you can reference instances or items (handles) easily as copies, instances, or references.

If you generate an object in 3D-Studio MAX as a reference to another, the actual object exists only once. These references store only additional information such as transformations and scaling. If you generate a 3D-Studio scene with such references as an ArCon group (see *Convert* section) ArCon also uses such references to save a substantial amount of memory which in turn accelerates the program and the display rate. If, for example, a cabinet object references 15 instances, only the 15 handles are stored and maintained. Note that this applies only if you load the 3D-Studio scene as an ArCon group.

Whether you define an object as a copy or as a reference in 3D-Studio, ArCon manages and draws the objects and links (handles) the same way.

Besides this object-linking information in a 3D-Studio scene, if necessary still, further object hierarchies (i.e. object A hangs onto object B; object B hangs onto object C, etc.) are used with the 3DS-Import filter, in order to form from these hierarchies grouping information for ArCon. Additional information about these hierarchies can be found in section 11.4.4.6.

16.3.6   3DS animation sequences

Starting with ArCon version 4.0 it is possible to provide objects with independent movements. These independent movements can be used to show different statuses for objects. So, for example, a folding sofa can be folded up or shown laid out. Also, any intermediate position is possible and can be displayed.

If you use the 3DS-Import filter, you can use animation, which is saved, in 3DS files in order to make these accessible as independent movements in ArCon. The 3DS-Import filter uses the movement information saved in the 3DS files.

Whether a 3DS file contains animation information or not can be identified when you

588

open a 3DS file with the 3DS-Import filter. In the **Convert 3DS object** dialog box's **Convert** tab you'll see a slider and controls to examine the animation of the selected object (see page 592).

If you move the time slider from left to right, you can see how the object moves in the preview window.

When modeling animated objects in 3D-Studio or 3D-Studio MAX, please take note of the following points:

3D-Studio MAX, in versions 1.0, 1.1, and 2.0, clearly has more animation possibilities and functions than 3D-Studio. Exporting these extended animation functions as 3DS files is therefore not always successful. Re-importing the 3DS file into 3D-Studio MAX can easily check whether animation information is successfully exported in 3DS files. Whatever animation is available in this file is what was successfully exported in the 3DS file. In 3DS files, only the so-called TB animations (tension, continuity, bias) are exported correctly. All other animation options, for example, bezier, are lost when saving as 3DS files. 3D-Studio does not have these functions so you don't have to worry about limitations when using that program version. **Note:** In 3D-Studio MAX you can subsequently convert animations into TB animations. The technique for doing this is explained in the 3D-Studio MAX manuals.

From the animation information saved in 3DS files, ArCon uses only the changes in size, position, and rotation of an object. The animation of light sources, material properties, textures, and morphing are not supported. This means that, for example, you can model an animated human, and it will be correctly loaded into ArCon, but if the skin changes (texture changes and/or morphing) that information is lost.

If you load an animated 3DS-object into ArCon, you can save different sections of the movement (animation) as separate and independent sub animations in your ArCon object. For this, a dialog box is available by clicking the **Animation** button (to the right of the time slider in the **Convert 3DS object** dialog box) (see page 592). For defining sub animations with this dialog box, see *Define subanimation dialog box* section.

16.4 LOADING 3DS OBJECTS INTO ARCON

16.4.1 Overview

The previous sections described the information that is used when importing 3D-Studio

objects into ArCon, whereby the description was limited only to using 3D-Studio, 3D-Studio MAX, or a similar modeler. This section now addresses importing 3DS files into ArCon. The following described procedures will require only minor adjustments at the end of the modeling phase.

ArCon in principle offers three possibilities for loading 3D-Studio objects. All three options are available from the **Objects** menu in Design mode. In detail these are:

Load object…

Here you have, in the 3DS-Import filter version, the option to load a 3D-Studio object directly.
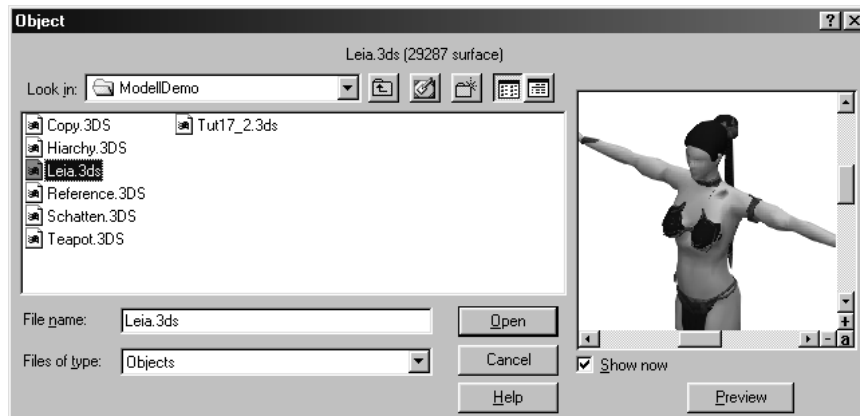
The second option is specifically loading and converting a 3DS object.

Load 3DS object…

Finally you can also select:

Convert list of 3DS objects…

which converts an entire list of 3DS objects.

16.4.2   Textures and loading 3DS objects

Independently of the type, just as you load 3DS objects (see previous paragraph), their assigned textures are likewise directly loaded. If any of the textures used in the designated 3DS object(s) can't be found, you'll be alerted with a dialog box.

Since 3DS files store no paths for the textures that are used, similarly, no path information can be used during the loading. ArCon therefore proceeds as follows when

loading the textures:

First, ArCon searches all subfolders of the texture path for textures. You enter this path in the **Program settings** dialog box. If the textures are not found there, the alternative texture paths are then searched, which likewise are specified in the same dialog box.

If the required textures are not found in either of these two (or more) paths, the current path is then searched for the textures. This current path is the folder where the 3DS object itself is located.

Tip: If you generate a new object catalog including the appropriate textures, you should organize these textures in such a way that even in the object catalog the textures can be located independently of the objects. Setting an alternative texture path in the **Program settings** dialog box and optionally storing the textures in that folder does this best. This way, ArCon will find the textures for the object catalog even if you have not yet created a matching texture catalog.

16.4.3   Loading 3DS objects directly

Besides the ArCon object format .ACO and the MicroFe .FEA files, the 3DS-Import filter version of ArCon lets you directly load 3D-Studio objects. In this case, these files are treated like normal ArCon objects – no file conversion takes place.

This type of loading 3D-Studio objects is the fastest, however it is less flexible. In detail, the following limitations apply:

When saving a project where 3D-Studio files were directly loaded in this manner, ArCon saves references to the 3D-Studio objects. If you then want to load such a project, this is only possible if you are loading the project into an ArCon installation with the 3DS-Import filter version of ArCon installed.

You do not have any options to control, alter, or edit the 3D-Studio object to be loaded. You cannot set the size, characteristics, etc.

With animated objects, only the entire animation can be played – you cannot edit the playback of the animation. Similarly, you cannot play back just a proportion of the total animation.

However, this menu item lets you easily access 3DS objects as well as save them as ArCon objects, with the menu item **Object – Save ArCon object (.ACO)**.

When you design a 3D-Studio object, you can use this menu item as follows: If you generate a scene and load it into ArCon, then later edit and process (and save) the 3D-Studio object, the scene is automatically updated in ArCon, since ArCon only links to

591

the 3D-Studio file.

Note: Loading 3DS objects takes more time than loading standard ArCon objects. Especially with complex scenes (with several thousand polygons) this can slow down the loading by several seconds.

16.4.4   Convert 3DS object dialog box

This menu option is basically the main function of the 3DS-Import filter in ArCon. If you select it, a standard Windows file selector dialog box appears first, where you can select the 3DS file to be loaded. Acknowledge your selection with **Open** and the following dialog box appears:
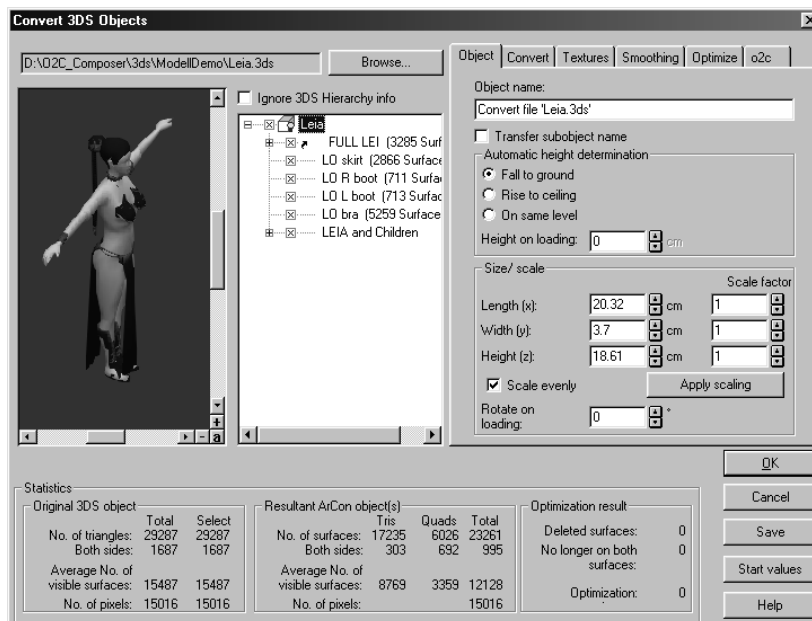
This dialog box is described in detail in the following sections.

Note: The pages available on the right side of the dialog box also appear in the **Convert list of 3DS objects** dialog box (see the *Time slider and related buttons* section).

The dialog box illustrated above consists of the following sections:

Input box for the file name of the 3DS file, including the appropriate **Browse…** button;

3D preview window;

Display of the hierarchy info for the loaded object;

Statistics section where pertinent information is displayed;

1. Slider control, plus appropriate buttons, if the loaded file contains animation information. This slider is displayed above the Statistics section.

2. The tabs **Object**, **Convert**, **Textures**, **Smoothing** and **Optimize** and the five buttons **OK**, **Cancel**, **Save**, **Start values** and **Help**.

You can use this dialog box in two different ways: first, to load and convert a single 3DS file; and second, to convert several 3DS files consecutively.

In the first case, you complete the settings in the dialog box for the selected object and acknowledge your choices with **OK**. In the second case, do not click after making adjustments on **OK**, but rather on **Save** – the conversion takes place, but the dialog box remains open so you can click the **Browse…** button to select another file to convert or load.

16.4.4.1   3D preview window

The 3D preview window is a standard ArCon preview window. In it you see the loaded 3DS file or what remains after any selection (see *The hierarchy tree* section) or optimization (see *Optimize* section) of it. Here you can check your adjustments and settings before you actually convert the object.

16.4.4.2   Ignore 3DS hierarchy info check box
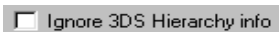
To the right of the 3D preview window, above the hierarchy tree, is the check box **Ignore 3DS hierarchy info.** If this is checked, the 3DS-Import filter does not read or use the hierarchy information stored in the file when the 3DS file is being read and processed.

In general, you should not check this box. To this rule, there is only one exception: if during loading an object appears as if it were exploded, checking this box can correct the problem. The reason for this *explosion* is commonly due to 3DS files, which were

not 100% correctly generated. This is sometimes the case with modelers that are not 100% compatible with the 3DS file format. Similarly, if you load such an object into 3D-Studio MAX, it will generally *explode* there, too.

The following figure shows such an object, with and without the box checked:
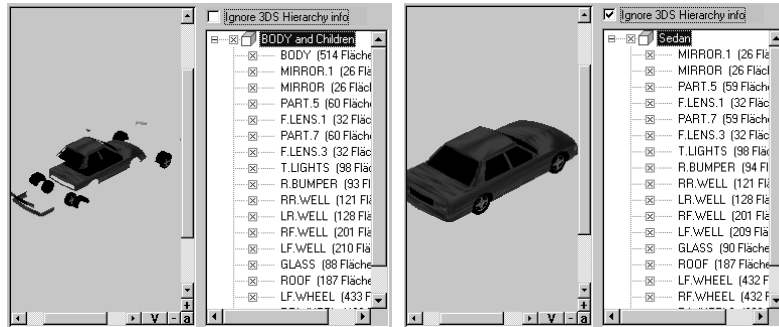
16.4.4.3   The hierarchy tree

To the right of the 3D preview you'll see the hierarchy tree for the loaded 3D-Studio file; the appearance of this tree strongly depends on the particular 3D-Studio file. It is similar to the hierarchy view of the track view in 3D-Studio MAX. All objects stored in the 3DS file are specified here.

If an object contains sub objects, this is identified in the tree with ⊞. If you click this symbol, it changes to ⊟ and the suitable hierarchy unfolds underneath. In the individual branches of the tree, the symbol ⊠ serves for selecting or deselecting objects or sections of hierarchy trees.

If you click ⊠, it changes to ☐ and the appropriate deselected object disappears in the 3D view.
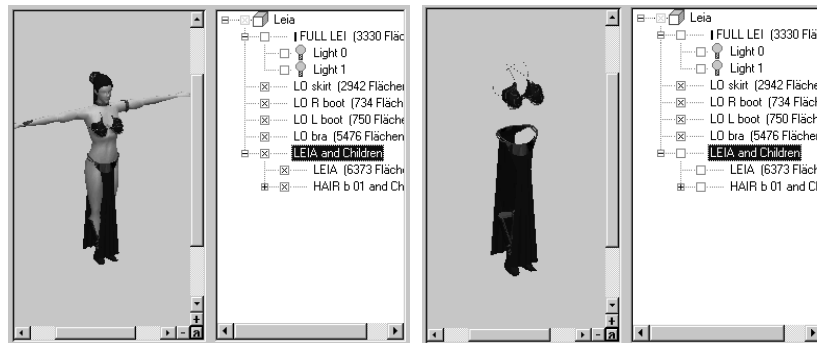
With this check box you have the option of excluding individual sections of the 3DS file from the conversion. You can use this function in various ways; for example, you can deselect a base plate for objects, which were modeled with a base plate, when you require only the object in ArCon. If the 3DS file is a cabinet that contains accessories, you can deselect the accessories in order to load only the cabinet.

If only some objects are selected in a tree, the next higher up item is shown in gray. If you check the gray box, all items are either selected or deselected. This way you can quickly and easily turn on and off all items in a hierarchy.

To the right of these check boxes the following icons may appear:

    Saved tree as group

    Saved tree as group and includes switched-on light sources

    Saved 3DS-object or tree as ArCon object

    Saved 3DS object or tree as an ArCon object and includes switched-on light sources

    Instance of a 3DS object, which is saved as an ArCon object

    Instance of a 3DS object, which is saved as an ArCon object and includes switched-on light sources

    The object or tree contains light sources and is saved as part of another object

    Instance of a 3DS object, which is not directly saved as an ArCon object

    Switched on light source which can be converted

    Switched off source

In other words: The symbols or appear when an a ArCon group (.ACG) is saved during conversion; the symbols , , , or appear when the items or tree are saved as an ArCon object (.ACO). A yellow bulb in the symbols suggests that the items contain lamps.

All deselected objects are saved when they're under a selected object that is saved, and

595

thus constituent of the ArCon object.

When an object is saved as an ArCon object, all objects in the underlying hierarchy are saved as part of the ArCon object, when necessary.
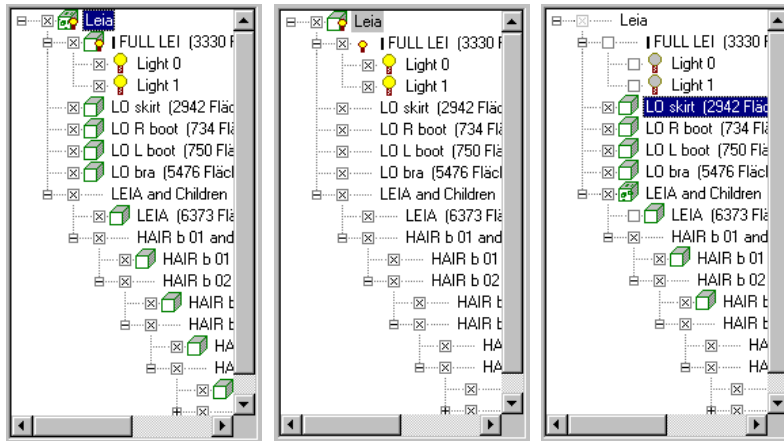
Whether the tree is converted to an ArCon object or group depends upon the settings in the **Convert** page (see *Convert* section).

Instances of 3DS-objects (identified by the symbols ▣, ▣, or ↗ in the hierarchy tree) can be saved when converting as ArCon objects. If you make the appropriate settings in the **Object** and **Convert** pages (see *Object* and *Convert* sections), these inputs are automatically used for all other instances of the same item.

16.4.4.3.1 Object name and number of areas

To the right of the symbols described above, is the original name of the 3DS object. Below the object's name are a listed of items in its hierarchy. You can select this item by clicking its name, in which case it will be marked in blue (see also *The hierarchy tree* section).

16.4.4.4 Convert 3DS object dialog box tab

At the upper right section of the **Convert 3DS object** dialog box there are five tabs:

596

Object, **Convert**, **Textures**, **Smoothing**, and **Optimize**. In each page you can make adjustments to convert your 3DS files.

Depending upon the objects selected in the hierarchy tree and the settings of their parent (higher-up) objects, certain sections of the page may be grayed out (disabled).

Entries in the pages for **Textures**, **Smoothing**, and **Optimize** always apply to all sections of the hierarchy tree; the settings in the **Object** and **Convert** pages apply only to the selected object in the hierarchy tree.

Exception: The **Size/position** section in the **Object** page applies to all objects in the hierarchy tree.

16.4.4.5   Object tab
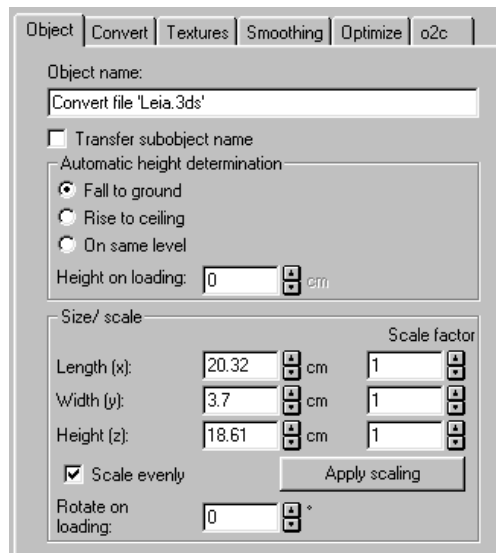
In this page you can specify the characteristics of the selected object in the hierarchy tree, as well as the size and position for all objects and their rotation during loading.

16.4.4.5.1   Object name

597

In this input box you can specify the name of the object or the group after conversion. The name appears in the ArCon Explorer as well as when you double-click the object itself or the symbol in the Explorer.

Princess Leia from
Star Wars
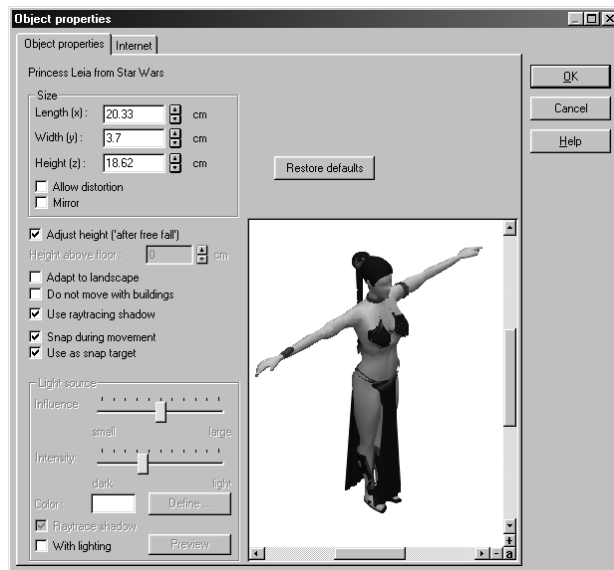
16.4.4.5.2   Subobject name check box

Select this box to save the names of the sub objects as well when saving an object. These names will then be displayed when using this object in ArCon or using o2c Player, when the mouse pointer is held over the corresponding subobject.

Note: This means it is a good idea to ensure that you use *meaningful* names for the sub objects when modeling 3DS objects. The ACO Translator (this program is found in the program directory for your ArCon Online installation) can still be used to change the transferred names at a later stage.

598

16.4.4.5.3   Automatically determine the height section

Here you can specify how an object behaves when it is loaded into ArCon – whether it drops to the floor; whether it rises to the ceiling; or whether it floats at a specific level. The **Height** input box indicates the height at which a floating object is placed when it is placed by means of drag-and-drop from the ArCon Explorer into a 2D view in ArCon.
Note: You have the possibility to change this setting for an object after converting it, with the help of the ArCon Explorer.

16.4.4.5.4   Size/position section

The input boxes within this section serve to adapt the size or position of the 3DS object. In the input boxes for **Length**, **Width**, and **Height** the present/total sizes of the selected 3DS files are displayed. Modifying one of the three numbers causes a proportional modification that affects the other two. Alternatively, changing the scaling factor will change the values for length, width, and height accordingly. Alternatively, the three input boxes underneath the **Scale factor** specification can also be used. If the **Scale evenly** box is not selected, changing one value will change the other values in proportion. In other words, the object is not distorted. If it is not selected, independent values can be set for x, y and z.

The purpose of these input boxes is to correct 3DS objects, which are modeled or saved in an incorrect unit. For example, for the woman model shown in the screenshots above a scaling factor of 10 would be correct, in order to change the height from 18.6 cm to 186 cm (note that changing the size affects all selected objects).

Note that the adjustments made within the **Size/position** section are not directly transferred to the preview window, but only if you click the **Apply scaling** button or if you click **OK** or **Save**.

Note: If you select **Cartesian coordinates** in the **Textures** page, when you change the object size in the **Object** page the texture coordinates are recalculated and the object size may be affected, since the texture size is absolute.

16.4.4.5.5   Rotate on loading input box

In this input box you can enter an angle by which the object is rotated as it is being loaded. This setting lets you affect the appearance of the object in ArCon, as well as the appearance of the bitmap preview in the ArCon Explorer. In general, you'll want to show an object from its best side.

599

Note that if an object was modeled in 3D-Studio in such a way that it is shown in the 3D preview window from the rear, you should adjust the rotation during loading to 180°.

The setting entered in this input box is likewise used in the 3D preview window; if you click **a** in the window, you'll see the object during loading as it would appear in the ArCon Explorer's bitmap preview.

Note: If the selected object is not in the hierarchy tree, the **Object name** input box as well as the **Automatic height determination** section are grayed out for this object, since it will not be converted.

16.4.4.6   Convert tab
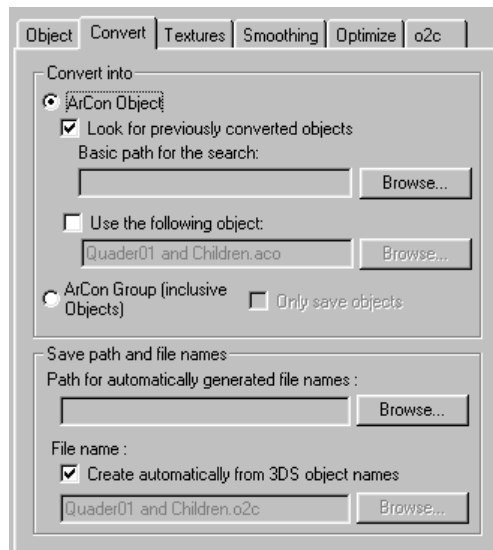
All inputs in the **Convert** tab refer to the objects selected in the hierarchy tree. If an object is not selected or if it is not loaded as an independent object (for example, in the hierarchy tree, parent objects are deselected or the object is part of another group) all input boxes of this page are grayed out, since the object is not converted and saved.

In other words, the sections in the **Convert** tab are available (not grayed out) only if the selected object in the hierarchy tree is provided with either ⬚ or ⬚.

The **Convert** tab consists of the two sections: **Changes into** and **Save path and**

filename. In the first section you can specify whether the selected 3D-Studio object or the object hierarchy is to be saved as an ArCon object or ArCon group (including objects in the group). Furthermore, you can select whether the actual object stored in the 3DS file is to be used, or another option.

This function was implemented for the following reasons: Imagine that you have generated a catalog of furniture, whereby all objects are stored in an additional subcategory. Now if different furnishings are subsequently converted, these will generally use the same objects. In order not to generate used objects again as objects for each furnishing, you have the option to look for objects previously converted. If you now specify the directory of the objects for the search path, this directory is searched when converting; if the appropriate object already exists in this directory, it is used instead of generating a new one.

With these in mind, the entries below the ArCon object selection box will become clear:

16.4.4.6.1 Look for previously converted objects check box
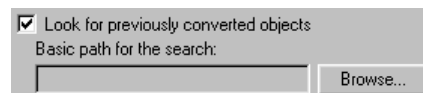
A search for converted objects occurs only if this box is checked. The basic path searched can be specified in the **Basic path for the search:** input box. If you click **Browse…** a dialog box appears where you can select the desired folder.

When converting an object an already converted object is used only if the following conditions are met:

A file with the correct name (see Save*Path and filename* section) must be defined in the folder specified for the search.

The existing object to be used with the converted object must be an identical match; i.e. up through transformations both must be identical.

16.4.4.6.2 Use the following object check box

If you check this box, the object you specify is used instead of the object selected in the hierarchy tree. This object is changed in size and position in such a way that its

601

environment cube is just as large as the *environment cube* of the selected object not used.

Note that **Look for previously converted objects** and **Basic path for the search:** are grayed out and unavailable if **Use the following object** is selected, since no search is made if an exchange object is to be used (which is specified with a unique name). If you click **Browse…** next to the input box for the exchange object, a file selector dialog box opens, with a 3D preview.

16.4.4.6.3   ArCon group (inclusive objects) selection
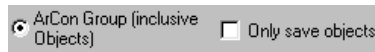
If you select this alternative, the selected section of the tree is saved as an ArCon group (.ACG). The selected objects are saved as objects (.ACO). If you check the **Only save objects** box, the child objects are not saved, saving only the group.

16.4.4.6.4   Save path and file names section
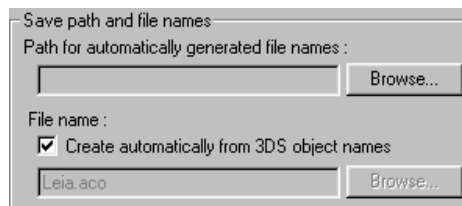
The converted object is saved according to the specification within this section as either an ArCon object or an ArCon group.

If you check the **Create automatically from 3DS object names** box, the filename of the object, which you can see in the hierarchy tree, is used along with the appropriate file extension (.ACO for objects; .ACG for groups). When this box is checked, the input box for the filename is grayed out; otherwise you can enter the filenames directly into this input box.

16.4.4.7   Textures tab
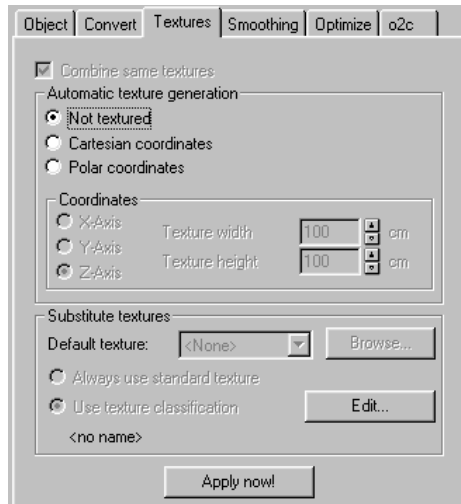
With this tab you can determine that identical textures in the 3DS object are made identical in the converted ArCon object files. You can also texture objects that have no textures. This is essentially practical if the 3DS object was not modeled directly in 3D-Studio, but rather was converted into this format, for example, if AutoCAD DXF files were originally created. Since such files generally possess no texture coordinates, the suitable objects cannot be textured. If this occurs, you can easily texture the object with the help of this tab. This texturing after this takes place fully automatically.

Generally such automatically created textures will not have the quality that you would have if the textures were assigned directly during the modeling. This should be clearly understood before you use this function.

The adjustments made in the **Textures** tab become visible in the 3D preview window only if you click **Apply now!** They are used in any case, if you load an object with **OK** or save it with **Save**.

16.4.4.7.1   Combine same textures check box

With the help of this check box, you can determine how identical textures are saved in the converted ArCon object files. If it is not checked, areas of different sections of the hierarchy tree can be separately textured, even if they originally use the same texture.

603

For example, if the 3DS file consists of two boxes which both use the texture **Wood0815.bmp**, you know the created ACO object in ArCon can subsequently be differently textured for both boxes by means of drag-and-drop.

If you have **Combine same textures** checked, texturing one box with drag-and-drop likewise modifies the texture of the other box.

16.4.4.7.2   Automatic texture generation section
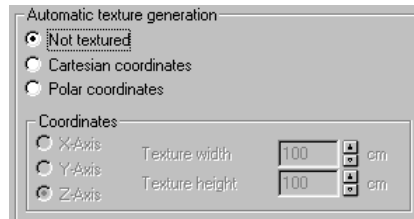
In this section you can indicate how to generate texture coordinates for un-textured areas of 3D Studio files. You can select between N**ot textured** (the objects remain intact and the ACO file contains no texture information), **Cartesian coordinates** (the textures are determined according to a single plane), and **Polar coordinates** (the texture coordinates are generated from the length and degrees of latitude regarding a sphere of sub objects).

In contrast to the first version, the second and third versions let you texture areas that are not textured after the conversion to ArCon objects. The textures that are used for the different materials depend on the adjustments within the third section of this tab.

16.4.4.7.2.1 Coordinates subsection

In this section you can specify, for the **Automatic texture generation**, which axis is to be used and the size of the textures. If you select **Automatic texture generation** using **Cartesian coordinates**, you can select to use the perpendicular to the plane along the X-, Y-, or Z-axis. If, for example, X-axis is selected, areas that are in the Y- and Z-planes, are correctly provided with a texture. Areas not on this plane – and even in extreme cases vertical to this – receive a texture that may be distorted. The same applies to the selection boxes Y-axis and Z-axis.

If you select automatic generation of a texture using Polar coordinates, the axis identifies the direction of the *North Pole* of the sphere. The degrees of longitude of the sphere correspond to the X-axis of the texture; the degrees of latitude to the Y-axis of

the texture.

If you have selected **Not textured**, the input boxes are grayed out in the **Automatic generation of texture** section.

16.4.4.7.3   Width and height of the texture input boxes

In these input boxes you can determine how large the textures to be used should be. If you enter here, for example, 1 meter for width and height, and if the object is 2 meters by 2 meters in size, the texture will appear exactly twice along the X-Y plane. If you select the Z-axis it's used as the coordinates plane and as the axis.

If you use spherical coordinates as coordinates, your textures are scaled in such a way that a texture with a size of 1 meter fits exactly once on a sphere of 1 meter; i.e., the degrees of longitude go for the X-direction of the texture from 0 to 360°, and the degrees of latitude for the Y-direction of the texture from -90° to +90°.

If you select different values here for width and height, you can achieve appropriate repetitions. If you enter 2 meters, for example, for the width of the texture, and 1 meter for the height of the texture, and spherical coordinates is selected, the texture is repeated around the equator exactly two times.

16.4.4.7.4   Substitute textures section
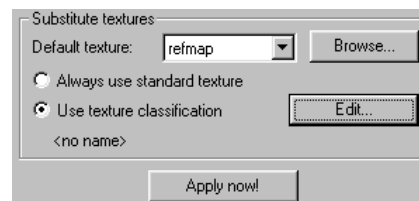
In the **Substitute textures** section you indicate which textures are to be used by the different materials in the object. Note the fact that this section is grayed out if you have activated the **Not texture**, since in this case the original information of the object is used.

If you have selected **Automatic texture generation** using **Cartesian coordinates** or **Polar coordinates**, the 3DS-Import filter creates texture coordinates for all areas of the object, including those areas that are actually already textured. You can determine within the **Substitute textures** section, which textures for these already textured areas are to be used. Additionally you can modify the texture itself with areas that are already

textured.

For using spare textures there are in principle two options: First you have **Always use standard texture**, and second, **Use texture classification**. In the first case, all materials which are not already textured in the original will be provided with the texture you select in the selection box, or select by clicking the **Browse…** button. If you select here **<none>** as the texture, it will un-texture areas of the object not already textured. Note that in ArCon you can assign a texture using drag-and-drop.

If you select **Use texture classification** not all materials in the original will be assigned the same texture, i.e. the standard texture is used but you can also indicate which texture should be used for each material in the original. For this you have a table of texture classifications, which you can edit by clicking **Edit…**. You can also use this table of texture classifications if you convert a list of 3DS objects (see *Time slider and related buttons*).

16.4.4.7.5   Material-texture classification
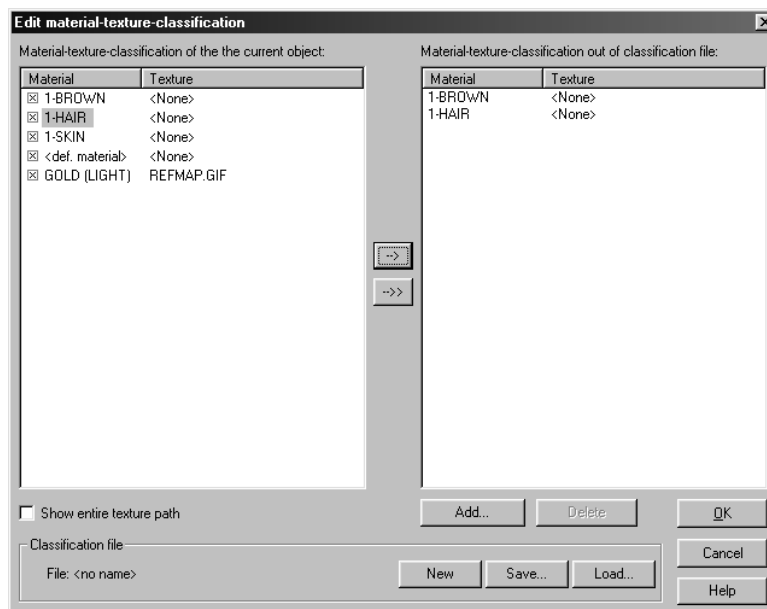
If you click the **Edit…** button within the **Substitute textures** section of the **Textures** tab, a dialog box is opened where you can indicate which textures should be used for which materials.

606

Note: The same dialog box also appears if you click the same button on the **Textures** tab in the dialog box **Convert list of 3DS-objects**. The dialog box there, however, is slightly different since you're working with a group of objects rather than a single object (which necessitates working with an allocation file).

The dialog box consists in principle of two table sections: The left table indicates for each case the material-texture allocation of the current object. To the right is the object-independent classification, which you can save in a file in order to, for example, use during the conversion of object lists. The individual lines of the tables consist of the name of the material (which is read from the 3D-Studio file) and the texture assigned to this material.

16.4.4.7.5.1 Working with object-specific tables of allocation

In the left table, a check box is available at far left of each line. If the line is selected with ⊠, the allocation of this line is used. If it is not selected, the allocation from the right table – as long as it is available – is used. If the material is not selected and if no suitable material exists in the right table, the standard texture is used.

Besides the ability to switch between the allocations with the check boxes, you can change the texture names in both tables. To do this, proceed as follows: click the texture name for the material to change. The table entry changes to:

You can select in the selection list that appears a texture that is already loaded, or load a new one by clicking **…**

Note: In the selection list there are two entries **<none>** and **<cannot be textured>**. If you select **<none>** as texture the converter does not texture the suitable material, but in ArCon using drag-and-drop can texture it. If you select **<cannot be textured>** the material is not textured and also cannot be textured in ArCon by using drag-and-drop.

16.4.4.7.5.2 Handling of object-spreading tables of classification

You can process the right table (which is the only table shown during the conversion of object lists) with the icons **-->**, and **-->>**, as well as the **Add…** and **Delete** buttons. The icons **-->**, and **-->>** serve to transfer material-texture classifications from the left table

to the right. Clicking **-->** transfers an classifications from the left table to the right. Clicking **-->>** transfers all classifications of the left table to the right.

Note: You can select items in the left table by clicking their term names terms and – as typical with Windows95/NT – press the **Ctrl** and **Shift** keys to select multiple items.

The **Add…** button serves for adding table entries in the right table, which are not available in the left table. If you click this button, the following dialog box appears:

In this dialog box you can indicate the material name and the appropriate texture. With this function you can add allocations to the exchange list, which are used during the conversion of object lists and link to existing textures which were used in the original modeling. For example, if you have a 3DS object with a material name that was automatically generated from DXF transparency names, you can follow the name of the materials since you already know the DXF transparency names.

If several entries are selected see

Working with object-specific tables of allocation section) by clicking the material names in the right table, you can delete the entries by clicking **Delete**.

16.4.4.7.5.3   Allocation file section

The specifications made in the right (or only) table can be saved in an allocation file in order to use the list when converting object lists. The **Load…** and **Save…** buttons are used to load and save such an allocation file. By clicking **New** you delete the current entries in the right table and a new allocation file is created.

16.4.4.8   Smoothing

Under normal circumstances smoothing information is available in 3D-Studio objects, which is used when converting them into ArCon objects. It can seem, however, when using modelers besides 3D-Studio or 3D-Studio MAX that this smoothing information is false or does not exist. In order to be able to load such objects correctly, the **Smoothing** tab is available.

In it you can switch between **Use 3DS smoothing info (Smoothing groups)** and **Automatic smoothing**. Under normal conditions you'll want to select **Use 3DS smoothing info (smoothing groups)**; only if, for example, all edges of your object appear smeared should you select **Automatic smoothing**.

If **Automatic smoothing** is activated, you can specify in the **Edge angle** input box the starting angle, where two areas meet together, from which the resulting edge should be a visible (sharp) edge. Edges between two areas whose angle is smaller than that of the edge angle, are shown in a *diffuse* way (approximately).

16.4.4.9   Optimize tab
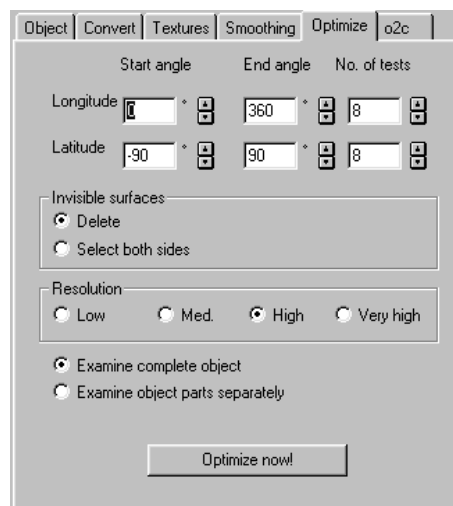
Behind the **Optimize** tab hides the *joker* of the 3DS-Import filter. Here you can on one hand remove invisible surfaces of the 3DS objects, and on the other rotate incorrectly oriented surfaces automatically.

16.4.4.9.1   Delete invisible surfaces

If you, for example, import a 3D-Studio object that consists of a cube within another cube, the inside cube will not be visible, since it is entirely enclosed by the outside cube. With the help of the ArCon optimizers, you can completely optimize away the invisible areas – in this example, the internal cube. The number of areas that can be shown as well as the display rate therefore increases.

16.4.4.9.2   Reorienting areas

When importing 3DS-files, which were not created with 3D-Studio or 3D-Studio MAX, it can occur that a majority of areas are not visible. The reason for this is that ArCon shows only such areas that are perpendicular to the viewe. Areas that are oriented the wrong way round, are not seen and therefore always appear only from the quasi- rear.

One possibility to avoid this problem is to use a two-sided material in 3D-Studio. This has the disadvantage that all areas are always seen from both sides, and the display rate suffers.

Another option is to use the optimizer: this can automatically decide whether an area is correctly oriented or not and if necessary turn them around. Areas which should be displayed on both sides (for example: a paper page, which was modeled from a square) are automatically selected as two-sided.

If the optimizer of the 3DS-Import filter is used, this optimization begins with the fact that no area is two-sided, since no material is two-sided (including those that were selected in 3D-Studio as two-sided). It sets areas (not materials) as two-sided, for areas where it is actually necessary.

16.4.4.9.3   Principle of the optimizers

The principle of the optimizers is simple and you can easily observe it yourself. Exactly the same as a human can simply regard an object from all sides in order to decide which area is oriented the wrong way, the optimizer proceeds. It draws the object from different positions, whereby the viewer position is changed each time, and decides for each picture which area is the front surface and which area should be seen as the back. At the end of the optimization, according to the surface proportions, it is decided whether an area is a back area, a front area, or whether it should be seen from both sides. Areas that are not seen during this optimization are considered invisible and are deleted accordingly or optionally identified as two-sided.

610

With the adjustments in the **Optimize** tab you can adjust the optimization process – in principle, its behavior during the above-described *virtual viewer*. The three input boxes: **Start angle, End angle,** and **No. of tests** determine in principle the *degrees of longitude* and *degrees of latitude* from where the object is to be seen. If you select, for example, for *degrees of longitude* a starting angle of 0°, when **End angle** is set to 360° and **No. of tests** 8, the *virtual viewer* will run once around the object and it will view the object from eight different positions. 0° corresponds to the X-axis; 90° to the Y-axis, etc.

For the degrees of latitude in principle the same applies; but it is not the horizontal position of the viewer, but rather the vertical position defined here. A **Start angle** of -90° corresponds to starting at the *South Pole*, and a **End angle** of 90° corresponds to ending at the *North Pole*. The number of tests indicates how many steps around are to be made. If you indicate, for example, 8 for longitude and latitude degrees as well as the number of tests in each case, the object is regarded by 8 x 8 = 64 different parts.

It can occur by opposite-acting coverage of the object, steeper angles may be too small and so some areas, which should not be seen, are seen, because the part of the object was not viewed easily from the suitable position. In this case you must increase the number of tests accordingly.

Because you can set the values for starting and final angles separately for longitude and latitude degrees, you can create interesting optimization versions. If you know, for example, that an object will never be seen from below (for example, a standing vase), you can select for the starting angle a latitude degree angle 0. The viewer would never look from below onto the standing vase and accordingly the lower areas would never be seen. The same applies to rear walls of hanging cabinets and alike. Here you must decide what is more important: the most compact view possible of the objects and a very fast rendering, or the most complete view possible of the objects with accordingly reduced display rate.

16.4.4.9.4 Invisible surfaces section
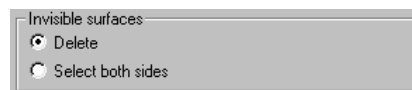
In the **Invisible surfaces** section you can indicate what is to occur with areas that are not visible during the optimization. You can select whether these are to be completely removed, or whether they are to be selected as two-sided. Since these areas are not

seen, it cannot be decided automatically whether their orientation is correct. For this reason the second option is provided.

The main reason not to remove invisible areas is as follows: with very finely faceted objects resolution is not sufficient to see an area at all with the renderer. These areas are quasi- invisible, because they are simply too small. Later, zoom in on this object in ArCon and these areas may very likely become visible. There are three ways to prevent this effect:

Method 1:

Use larger areas, which is generally best done with the modeler, since the performance also clearly rises, and visually hardly any differences can be seen.

Method 2:

Select the areas as two-sided within the **Invisible surfaces**. From a performance standpoint this is the worst option, but it guarantees accurate results, since for doubtful areas too much is better than too little.

Method 3:

Increase the resolution when testing areas (see the following paragraph).

16.4.4.9.5   Resolution section
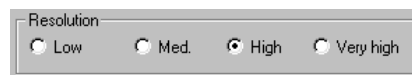
Here you can indicate with which resolution the objects are to be tested. As mentioned above, the objects are viewed by all sides and rendered in a so-called *Item Buffer*. The resolution of this *Item Buffer* is a measure of how finely the details are rendered, which can be still shown.

You can select within this section the resolution of low, medium, and high. For simple objects, low resolution is generally sufficient; for moderately complex objects medium resolution works best. Only for objects with very small detailed areas should you select **High**.

Note: You can observe the *Item Buffer* during the optimization).

16.4.4.9.6   What is optimized?

As described at the beginning of the paragraph about optimization, the objects are viewed from all sides when optimizing. You can decide here whether the selected objects are to be tested and optimized, or whether the entire object is optimized as a

612

whole.

The example given above involved two cubes. If both cubes are tested individually, the outside cube does not cover the inside cube, and areas that should be deleted are not deleted. Orientation however is adapted correctly for both the internal and outside cubes. If both cubes are tested simultaneous, the internal cube disappears (as it should).

With the selection box **Examine complete object** you run the second alternative; with the selection box **Examine object parts separately** the first alternative.

In the long run the adjustments made here only have an effect if you optimize by clicking the **Optimize now!** button.

16.4.4.9.7   Running the optimization

After clicking **Optimize now!** a window appears consisting of a progress meter as well as two buttons for **Cancel** and **<< Normal** and **Extended >>**. If the second button is **Extended >>**, you can open a display of the *Item Buffers* introduced above by clicking this button. You can quasi- observe how the object is viewed by all sides. Clicking the icon again removes the view of the *Item Buffers*. The optimization is somewhat faster with the *Item Buffers* hidden.

Note: The colors shown during the optimization of the object do not have anything to do with the material properties: from the front you will see green areas; from the rear you'll see red areas – these areas are candidates for reorientation.

If you click **Cancel** during the optimization, the optimization is halted and the result is discarded.

The number of areas discarded by the optimizer can sometimes be very large, particularly if the entire object is being tested, since the individual sectional objects interfere with other objects and so partial areas can be removed. You can observe this effect by first optimizing an object then deactivating a part of it in the hierarchy tree.

If you deselect, for example, the hair illustrated in the screenshots above after optimizing, you will see that most areas of the head are no longer available. Deselect the hair before optimizing, and the head will be completely closed.

16.4.4.10   o2c tab

If you are using the ArCon Online version or the o2c add-on module together with the *3DS-Import filter* add-on module, the **o2c** tab can be found on the right next to the **Optimization** tab. This tab can be used to convert imported 3D Studio objects directly into o2c objects. This means that all objects created by the converter are saved in o2c format rather than in ACO format. The specifications entered for the filenames on the **Convert** tab will therefore be changed to have the extension **.o2c**.

Unlike the other options for creating o2c objects in ArCon Online, the *3DS-Import filter* can be used in addition to the *Info URL* to specify a few other properties for the o2c object. With a few exceptions, these properties are the same as those, which can be defined using the *Internet Publisher* (this program can be found as *ACO Internet Publisher.exe* in the program directory for your ArCon Online Installation), for an o2c object.

16.4.4.10.1   Convert ArCon object to o2c format check box

This check box is basically the main switch for the entire tab. If this box is not checked, all the other input boxes will be displayed in gray and the *2DS-Import filter* will create ACO objects as normal. Selecting this box will save o2c files rather than ACO files.

16.4.4.10.2   Info URL input box

As with the o2c export options in ArCon Online and the o2c add-on, this input box allows you to specify the address of the website which is displayed on the **Internet** tab in the **Object settings** dialog box when double-clicking the object. Leaving this input box empty means that when double-clicking the object created, a default page is displayed which provides users with information on the options for using o2c objects.

16.4.4.10.3   Preview section

A preview bitmap can be saved at the start of the file for an o2c object, which is sent over the Internet first and therefore available quickly.

In the **Preview** section you can specify whether - and if so - what is used as the preview bitmap.

If you select **None**, no preview bitmap will be used. In other words, when opening the o2c object nothing will be displayed until the first part of the 3D geometry has been sent.

Selecting **From file** means that you can specify an image file to be used as the preview. This could be a photo of the actual object, for example. When choosing images, do check that the resolution of the image selected is not too big because it will be saved in that size, though compressed. For example, if the o2c object is displayed on your Internet site in an area of 200x200 pixels in size, a file should be selected where the resolution is also around 200x200 pixels.

Selecting the alternative **Generate, suitable for ArCon Explorer** will automatically generate a preview bitmap from the 3D object which is exactly the same size as the preview images in ArCon Explorer. This option is useful if you want to display o2c objects directly in the ArCon Explorer.

The final option **Create, with size of** also creates a bitmap from the 3D image, but in this case you can use the two input boxes **Width** and **Height** to specify the size of the bitmap to be created. For example, if you do not have a photo of the actual object to hand, unlike with the previous example, you would use the alternative **Create with size of width:** 200 **Pixels x Height:**200 **pixels**.

For all alternatives – except the first one – you can use the **Quality of Compression** input box to specify the quality level for the preview image generated. The image is saved as a compressed image in the o2c object. The compression process in this case is not without data loss. Small values create smaller files, but low quality images. A value

615

of 100% produces the best images, but the largest files. From experience, a value of 85% provides the best compromise between quality and size.

16.4.4.10.4 Compression quality for textures used input box

Just as the preview images are compressed when saved in the o2c object, textures saved in the o2c object are also compressed. The same basic principle applies: Smaller values produce smaller files, but low quality textures, larger values produce larger files, but better textures.

16.4.4.10.5 Background section

In a similar way to being able to use a background image in the 3D views in ArCon, this is also possible when displaying o2c objects in the o2c Player. This background image can, but does not have to be, saved in the o2c object. As the display in the o2c Player depends on the properties of the Player (which can be defined on an HTML page, for example), these properties can also be used to specify a background image for an object, which has not been saved with a background image. This could be the same file on HTML pages, for example, which are also used for the remainder of the site as a background image. However, if you want to use a background image specifically for that object, it can be saved in the object itself. If you do not then specify any details in the o2c Player for the properties of the background image, the background properties saved for the o2c object will be used. It is precisely these properties which are entered in the **Background** section.

The choice is between **Monochrome** and **Background pic**.

The above describing saving the background image in the object only applies if you have checked the **Save in object** box. Otherwise, the setting made here will only be used for creating preview images (see above). For example, you can create a preview image that represents a cloudy sky, in addition to the object itself.

If **Save in object** is checked, the quality of the compressed image can be set in a similar way to the preview image and the textures.

16.4.4.10.6 Combine materials check box

Selecting this box will combine similar materials for the object to be converted into one material. These materials can no longer be changed separately in ArCon. The combining process for similar materials may produce slightly smaller object files.

616

16.4.4.10.7 Transfer all button

If you have made settings for the 3DS object to be converted so that multiple ArCon objects are created, the settings made on the various tabs will only apply for the selected object. In order to use the settings made on the o2c tab for all objects to be generated, press this button.

16.4.4.11   Statistics section

Statistics								
Original 3DS object			Resultant ArCon object(s)				Optimization result	
	Total	Select		Tris	Quads	Total		
No. of triangles:	29287	29287	No. of surfaces:	13227	3991	17218	Deleted surfaces:	6044
Both sides:	1687	1687	Both sides:	50	3	53	No longer on both surfaces:	943
Average No. of visible surfaces:	15487	15487	Average No. of visible surfaces:	6638	1997	8635		
							Optimization:	29
No. of pixels:	15014	15014	No. of pixels:			13298		

Within the **Statistics** section, information is output for you to see and measure the complexity of the generated object. The section is split into three: **Original 3DS object**, **Resultant ArCon object(s)**, and **Optimization result**. In the following only those special features of this output are covered – most output information should be self-explanatory.

16.4.4.11.1   Special features within the original 3DS object section

The separate output of triangles designated as double sided should be considered noting the fact that showing these double sided triangles takes more time. The lower the number, the better the display rate performance.

The specification for the average visible areas is based on the notion that, except for areas designated as two-sided; you'll see approximately 50% of all surfaces. The number of average visible areas is a direct measure of the complexity when showing the object. The same applies to the number of points.

16.4.4.11.2   Special features within the resulting ArCon object(s) section

ArCon detects both triangles and squares, contrary to 3DS-files, as polygons both use the same amount of storage space.

The specification given within this section also refers to the optimization result, i.e.

617

areas which were switched by optimization, for example, from two-sided to single-sided, are considered here.

16.4.4.11.3 Special features within the optimization result section

In this subregion the results of the optimization are shown, including the number of surfaces deleted during the optimization because they would not be visible. The number refers to the specification of ArCon surfaces, including both triangles and squares. The next number outputs the number of surfaces, which are no longer selected as two-sided. Finally the optimization degree indicates the relative proportion of the average visible areas following the optimization compared to the average visible areas before the optimization.

Note: All specifications within the **Optimization result** section can be negative. The reason is as follows:

Deleted surfaces

Before optimization, if some areas are selected as two-sided, which weren't two-sided before, and no surfaces were deleted, the end result is that areas were added, thus a negative result is output.

No longer on both surfaces

If too few areas are selected as two-sided, during optimizing some additional areas are so selected and thus the number of areas rises. Accordingly the number of no longer two-sided areas is negative.

Optimization

This becomes negative just as explained above in the paragraph on the number of average visible surfaces, when the number of average visible areas rises.

These negative values are not an error in the program but in general a product for converting objects, which were poorly modeled beforehand.

16.4.4.12   OK, Cancel, Save, Start values, and Help buttons

The **OK** button converts the currently loaded object with the current settings and then loads it as an ArCon object into the current ArCon scene. **Cancel** aborts the entire process; no object is converted or loaded. **Save** only converts the object; the dialog box is closed but the object is not loaded.

Note: With **Save** and the input box in the upper left of the dialog box you can convert multiple objects in sequence, without loading them individually into ArCon.

618

You can use the **Start values** button to reset the settings in the pages to their default values. Generally, the settings made in the pages are preserved throughout a project; if you open the dialog box again at a later point in time you'll see the same values.

Finally, **Help** opens the help text for this dialog box.

16.4.4.13   Time slider and related buttons

Depending on whether you loaded an animated 3DS file or not, just above the **Statistics** section a time slider which controls the animation information appears, along with the appropriate buttons.

If you move this slider, you can observe how the animated object moves in the preview window. You can also let the animation run continuously by clicking ▸ Click ‖ to stop the continuous movement. Click ◄◄ or ►► to reposition the slider all the way to the start or end. Finally, if you click **Animation** the **Convert 3DS object** dialog box changes to the **Define subanimation** dialog box.

16.4.4.14   Define subanimation dialog box

You open this dialog box by clicking the **Animation** button in the **Convert 3DS object** dialog box.

Note: The **Animation** button is shown in the **Convert 3DS object** dialog box only if you have loaded an animated 3DS object. Additionally, this button is grayed out if you have selected an item without animation in the hierarchy tree, even if the overall object is animated.
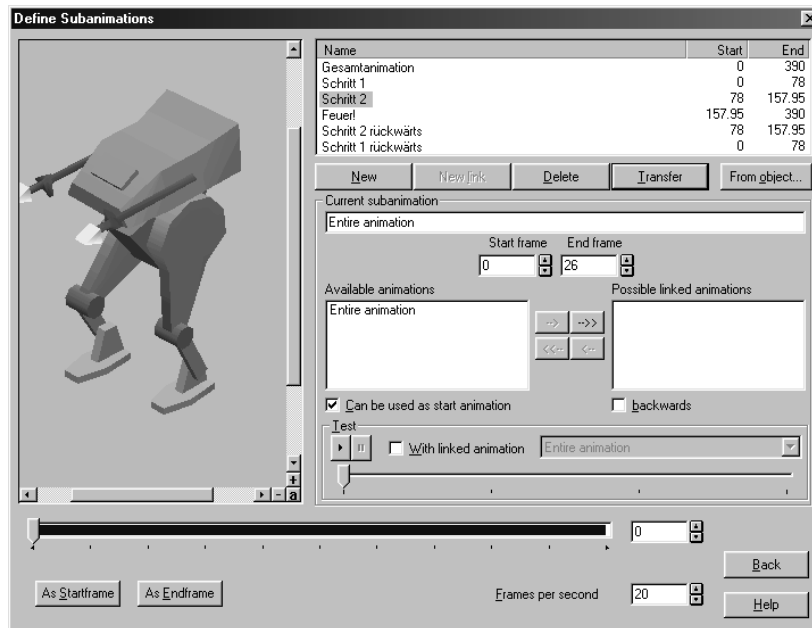
The **Define subanimation** dialog box serves to define different movements of just a part of the 3DS object. These different movements of a part can be used separately for an object in ArCon.

For example, imagine you have modeled in 3D-Studio a human and have animated it to get up and get a newspaper to read it. You can now define this complete animation of the human into its different sections with the help of **Define subanimation** dialog box.

For these different sections, you can still specify whether they may take place only following other sections of the movement. So, for example, the section *read newspaper* should only be possible after the section *pick up newspaper* has been executed. Otherwise the animated person could be jerky in ArCon, depending on the object's status.

The **Define subanimation** dialog box is basically divided into three sections: the preview window on the left side, the defined sub animations in the upper right section of the dialog box are **New, New link, Delete, Transfer, From object...** and **Current subanimation** buttons, where you can make adjustments for the selected subanimation. Below these sections is another global time slider and related input box, where you can numerically adjust the time (or rather, the list of key frames), as well as the icons to set a certain position **Start frame** and **End frame,** with which you can define for the

620

current subanimation (see below) the position of the slider as **Start frame** or **End frame**.

Finally, you can adjust the frames per second playback speed in the lower right input box of the dialog box, which controls how many frames should be played per second.

By clicking the **Back** button you arrive again into the *normal* **Convert 3DS object** dialog box. Any adjustments you made in the **Define subanimation** dialog box are saved here and when saving the 3DS objects as ACO files.

16.4.4.14.1   List of subanimations

In this list all defined sub animations of the object are specified. Apart from the name of a subanimation, you will likewise find the key frame numbers for the start and end of the subanimation in the list. The **New** and **New link** buttons, which are under the list, serve to redefine sub animations. If you click **New,** a new subanimation is defined. If you click **New link,** a new subanimation is defined, whereby the start frame of this linked animation is the end frame when you clicked **New link.** Note that **New link** is grayed out if the selected subanimation uses the end frame of the entire animation as its end frame.

In order to delete a subanimation, you must select it in the list and click **Delete.**

The **Transfer** button transfers the values from the **Current subanimation** section to the list of the sub animations. **Transfer** is like the **OK** button for the **Current subanimation** section.

With the **From object...** button you have the possibility of loading defined subanimation settings from an ACO file. The list of sub animations is replaced by the list of the sub animations, which is stored in the selected ACO object. Here the adjustments for the sub animations (name, start frame, end frame...) are loaded, and not the actual movement!

Note: Already defined sub animations are deleted when you load subanimation settings from an ACO object.

621

You can use this data as follows after loading sub animations settings from an ACO object:

After converting a 3DS object into an ACO object, the inclusive defined sub animations in the 3DS object is changed. In order to not have to define the sub animations all over again, you can use the sub animations of the ACO object already defined by clicking **From object…**. This will make sense only if any alterations involve only the geometry and materials, and not the animation data.

If you want to use several homogeneous animations for different objects (for example, you can have movement for a man, and copy it for movement for a woman) define the sub animations for one of the objects and for the other objects click **From object...** and select **Use the reference object**.

16.4.4.14.2 Current subanimation section
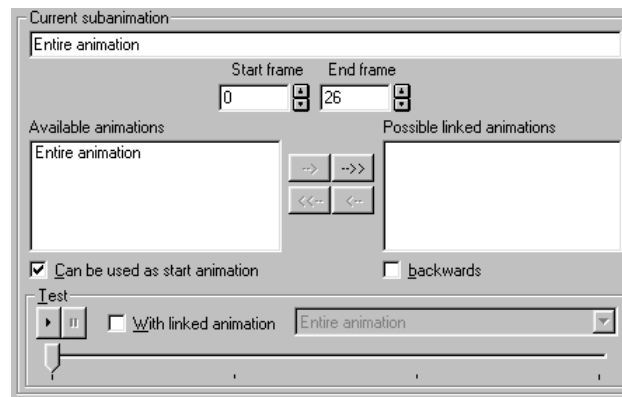
Within this section you can make adjustments for the subanimation that is selected in the list of sub animations. In the upper input box of the section you can define the name of the subanimation. In the input boxes under **Start frame** and **End frame** you define the starting key frame as well as the ending key frame of the subanimation. You can also use the two buttons at the bottom left-hand corner of the dialog box for the definition of **Start frame** and **End frame**. If you click one of these two buttons, the position of the lower time slider (corresponding to the input box to the right beside the time slider) is used as the **Start frame** or **End frame**.

Note: You can detect the position of the current subanimation in the lower time slider. It is shown in blue. For the **Other subanimation** sections in the total animation are

shown in white.

The two list boxes within the **Current subanimation** section, i.e. **Available animations** and **Possible link animations** as well as the icons `-->` , `-->>` , `<--` and `<<--` serve for the definition of possible linked animations for the current subanimation. In the left box all the sub animations already defined are listed, which are not yet linked animations to the current subanimation. In the right box are the sub animations, which can be linked movements for the selected subanimation. You can now shift a particular or several sub animations from one list box into the other with the help of the icons `-->` and `-->>` or `<--` and `<<--`. For shifting individual sub animations you should select these in the list (possibly with the use of the **Shift** key) and click `-->` or `<--`. For shifting all sub animations of the list, use `-->>` or `<<--`.

These linked animations appear in ArCon when right-clicking an animated object, if the subanimation was executed.

16.4.4.14.2.1 Can be animation start check box

Underneath the list of **Available animations** is the **Can be used as start animation** check box. Check this box if the current subanimation should load directly with the object, before any animation was possibly executed. Under normal conditions such sub animations will be start animations, which start with the first key frame of the entire animation, and whose starting frame has the value 0. Quite different sub animations can be start animations, if their start frame is in principle identical to the start frame of the total animation.

16.4.4.14.2.2 Backwards check box

Below the list of **With linked animation** is the **Backwards** check box. If you check it the current subanimation is executed in reverse. For example, imagine you've modeled a ball, which contains 100 keys of continuous animation. At the start of the animation, the ball is at the height of 0, and at the end of the animation the ball is at the height of 1 meter.

You can now define, two part movements. Define the first movement *ball bounce upwards* and define as **Start frame** 0 and as **End frame** 99. Next, define a new subanimation and input as the **Start frame** and **End frames** the same values, but select the **Backwards** switch. The ball will now move up and down without having to define

623

separate animations. You can define such reciprocal sub animations as linked animations. Another practical example of selecting the **Backwards** switch is opening and closing cabinet doors. Closing the cabinet door doesn't have to be animated in the 3DS file.

16.4.4.14.2.3 Text subregion
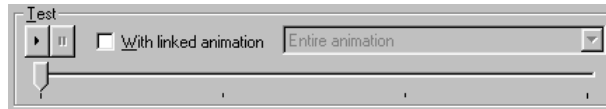
In the lower part of the **Available subanimation** section is the subregion **Test,** which consists of the icons ▶ and ▮▮ as well as the **With linked animation** check box plus the appropriate selection list of link animations and a time slider.

This section lets you test the current subanimation. If you move the time slider, the current subanimation is executed in the preview window. Note that only in the middle third of the time slider is the actual subanimation executed. In the first third no movement takes place in order to be able to check the start of the current subanimation at the transition between the first and second thirds.

In the last third movement takes place only if the check box **With linked animation** is checked. In the last third the selected linked animation (in the selection list to the right beside the check box) is used. In the list box of link animations all defined sub animations are listed, including those which have not been transferred to the list of possible link animations in order to test whether these too work as link animations. During the transition between the middle third and the last third *impossible* link animations will lead to precipitous position modifications of the animated object in the preview window. Use ▶ in the subregion **Test** if you would like to move the current subanimation by testing it continuously. ▮▮ terminates this continuous movement.

Note: If, while a continuous test movement runs, you click into the lower time slider of the dialog box, the test movement is likewise terminated and the keys of the lower slider in the preview window are installed.

16.4.4.14.3   Items below the preview section

The slider shown below the preview corresponds in principle to the time slider in the **Convert 3DS object** dialog box. If you move it, the position of the objects according to the adjusted key is shown in the preview window. You can also define this key numerically in the input box to the right beside the slider. Besides the definition of the point in time in the slider, the current subanimation is marked in blue.

If you would like to use the adjusted frame as the start or end frame for the current subanimation, you can use the two buttons As **Start frame** or As **End frame**. The values are transferred to the appropriate input boxes in the **Current subanimation** section.

If animations from 3DS files are imported, the 3DS-Import filter uses the key frames for the definition of the animation. At which point in time, this key frame applies depends on how many key frames per second are defined. For example, if you import an animation with 100 key frames, and **Frames per second** is set to 20 in the input box, the entire animation will take 5 seconds in ArCon. If you set it to 10, the animation will take 10 seconds.

Note: When playing animations in ArCon it's possible that not all defined key frames are used, since it is possible that the necessary number of pictures cannot be calculated in the required amount of time. For this reason ArCon calculates the actual key frame number for each picture. If the point in time is situated between two key frames, the suitable values are interpolated, as in 3D-Studio.

By clicking **Back** takes you back to the **Convert 3DS object** dialog box. All adjustments made in the **Define sub animations** are saved. If you now save the object as an ArCon object, by clicking **OK** or **Save**, the sub animations are saved in the ACO object.

16.4.5   Convert list of 3DS objects

With the 3DS-Import filter you have the possibility of automatically converting a group (list) of 3DS objects. This can occur, for example, overnight, so that in the next morning several hundred converted objects are available.

625

In order to convert a list of 3DS objects, a special dialog box is available, which you can access with the **Objects – Convert list of 3DS objects** menu.
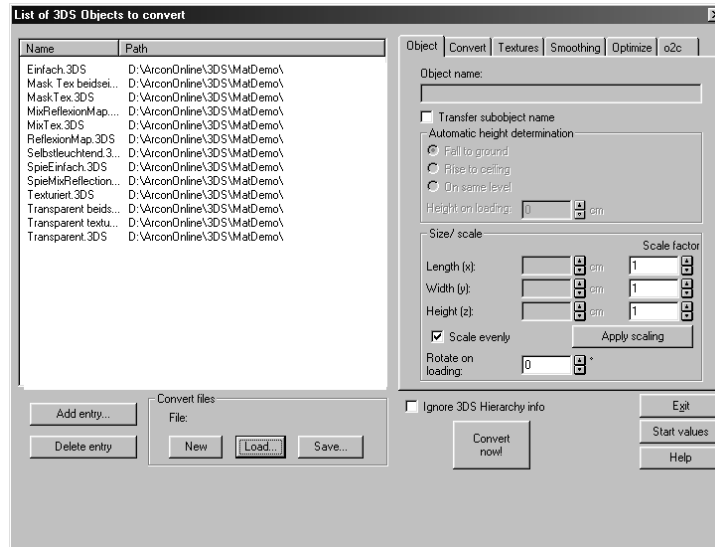
The six tabs in the right part of the dialog box are, with a few exceptions identical to the six tabs of the **Convert 3DS object** dialog box.

The exceptions concern mainly a few icons that affect only the preview window, which is not available when you're converting a list of objects. The one exception to this rule is that on the **Optimize** tab there isn't an **Optimize now!** button. It is replaced by an **Optimize object** check box. If this box is checked, the object is optimized during conversion; if it is not checked, no optimization occurs.

In the left of the dialog box you'll see a table which is divided into **Name** and **Path** columns. In this table all 3DS objects to be converted are shown by name and path. You can add individual 3DS files or even entire folders of 3DS files to this table by clicking the **Add entry…** button.

Since converting whole series of objects may require multiple conversions for some objects (for example, when reworking objects or when adapting for use in specific countries), you can control the adjustments made in this dialog box by saving them. For this the three buttons for **New, Load…** and **Save…** are available in the **Convert file** section. After necessary adjustments are made you can begin converting the entire list by clicking **Convert now!** Click the **Exit** button to exit the dialog, and **Help** opens the relevant help file.

626

16.4.5.1   Components of the dialog box

16.4.5.1.1   File list

In the left of the dialog box is a list of the files to be converted. If you click the **Add entry…** button a standard Windows file selector dialog box opens where you can select one or more objects to be converted.

Note: You can select multiple objects, as usual in Windows95/NT, by pressing the **Shift** or **Ctrl** keys while clicking filenames.

Another method of adding files is pulling files with drag-and-drop from the file selector dialog box into the table area of the conversion dialog box. In this way you can easily add in entire directories to the conversion dialog box. In this way, all .3DS and .PRJ files within the selected folder, as well as all subfolders, are loaded into the list.

Note: Drag-and-drop is the only way to copy whole directories to the conversion list table.

If you would like to delete an entry, select it within the table area and click **Delete entry.**

16.4.5.1.1.1   Adjustments for the individual files in the table

You can make adjustments for each file in the table with the help of the various pages. If a file is loaded a second time into the table, the adjusted values in the pages are saved and will also apply to the second instance of the loaded file; it can then be separately modified.

Generally, you will only need to set the object name and if necessary the automatic height settings for each object in the **Object** tab. All other adjustments in the other tabs will generally be the same for all objects. You can additionally adjust these separately.

Note: Within the **Size/position** section the length, width, and height are not used; rather the value, which is entered for the scaling factor, is used.

After you have made all adjustments, you can begin the conversion by clicking **Convert now!**. If you did not yet save the adjustments you've made in a conversion file, you are warned and can save the conversion file.

A file is created in which all adjustments for the individual files within the table area are saved. The adjustments of the various pages are likewise saved in this file.

Besides saving a conversion file, you can also load an existing conversion file by clicking the **Load…** button and optionally convert the list again. The **New** button within

627

the **Convert files** section deletes all files from the table and creates a new conversion file, which if necessary you must save separately.

If errors should occur during the conversion, the conversion is not aborted, but the errors are saved in an error file. At the end of the conversion the 3DS-Import filter will tell you if this is the case and such a file was created. You can then read the error file. The name of the error file is the same as that of the conversion file, but the file extension is .LOG.

16.4.5.1.1.2 Possible errors during conversion

The reason for an error during the conversion is most likely one the following:

The object to be converted is incorrect i.e. the format does not correspond correctly to the 3DS format.

1) Not all textures of the object to be converted can be found. In this case, the object is converted correctly, but in the preview bitmap for this object these textures are missing.

2) You can apply the textures subsequently to the correct surface, so they are also found when using the object. Generally it is better to start the conversion again after moving or generating the textures.

16.4.5.1.2 Object hierarchies when converting file lists

In contrast to converting individual 3DS files you don't have so much control over the object hierarchies. Rather, the following rule applies: If converting into an ArCon object (set in the **Convert** tab), the entire object and all its subordinate objects are converted together into an ArCon object.

If **ArCon group (inclusive objects)** is selected, the base object of the 3D-Studio file is saved as a group and all objects in the hierarchic tree directly under it are saved as individual ArCon objects. With ArCon objects and groups for converted objects, existing objects will be searched for if this option is selected (see *Convert* section).

The alternative loading of different objects, as described above, is not possible during the conversion of file lists.

16.5   SAVE ARCON OBJECT (.ACO)

Besides the main function of the 3DS-Import filter – to load and convert your files – this

special version of ArCon also lets you save selected objects as ArCon objects.

The objects, which can be saved, can be ACO files, which come from the ArCon Explorer, or MicroFe FEA files which you load with the **Object – Load object…** menu. All are saved together as ACO files. Here all characteristics that the object currently has – at the moment you save it – are saved. This includes textures as well as exchanged materials, changed sizes and assignments of textures etc. Even the orientation and mirroring of an object are saved in the file. So you can, for example, load a shoe, mirror it, and save it as an ACO file; you then have a left and a right shoe. When saving ArCon objects the object is always positioned in such a way that the focal point is in the center of the object – independent of where the object is.

If you have selected more than one object and select **Save ArCon object (.ACO)…** all selected objects are saved simultaneously as a single ArCon object. For example, if you have selected a desk with four chairs, after saving you'll have only one ArCon object, which consists of the desk and the four chairs.

Note: It is better in most cases to save such groups as a group rather than a single object since you can then subsequently resolve and modify this group and its group characteristics. Additionally, memory requirements are lower, since a chair is saved only once and the remaining chairs are basically references to the first.

With the ability to load 3DS objects (**Object – Load 3DS object**) and save ACO objects (**Object – Save ArCon object**) you have a quasi- small converter. You can reload a 3DS object, texture it if necessary, adjust its size, and save it back as an ArCon (**.ACO**) file.

Saving ArCon groups on the basis of 3DS objects is not possible, since **Object – Load object…** only loads one object at a time.

If you save an o2c object as an ArCon object (**.ACO**), all textures used by the object need to be available in a file to be able to load the ACO object correctly. However, if you are using an o2c object, the textures for that object does not even have to be located on the hard drive because they are saved in the o2c object itself. When ArCon detects a situation like this during the save process, it will display a dialog box which is identical in content to the dialog opened when selecting **Options/Program/o2c objects**….

16.5.1   *Saving selected objects in ACO and o2c format*

Note: This is an additional function of ArCon Online or the o2c add-on package

If you have selected one or more objects in Design mode, these can be saved as ACO or

o2c objects using the **Objects Save ArCon object...** menu or **Object Save o2c object...**. Alternatively, you can also use the ▣ icon to save the object as an o2c object. In this case, all changes made to the objects (changed textures and materials, rotate, mirror and resizing) are saved for the new object.

Note: If you have selected more than one animated object, the animation for the objects is lost during the save process.

After selecting this menu, a **Save o2c object** dialog box is displayed.

16.5.2   Options for o2c objects
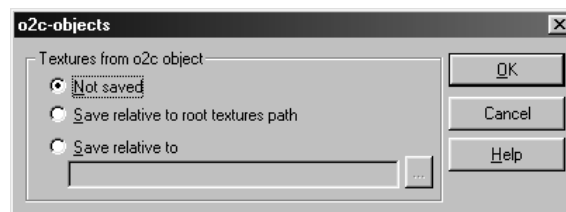
This dialog box is opened using the **Options/Program/o2c Object…** menu.

This option can be used to set what happens to textures saved in o2c objects. As textures can normally be loaded from the hard drive in ArCon, different objects can also use them together. This requires less memory. The textures themselves are saved in o2c objects, however. In order to enable these textures to be used for other objects (and for other o2c objects), there is the option of saving textures for o2c objects as separate files on the hard drive when loading those objects. It is not actually the textures themselves that are saved in the o2c object, but rather their *history of origin*, in other words, their filename including the path relative to the basic default path. If an o2c object finds this file during loading, the texture of the file will be used, which means that other o2c objects can also use the same textures in ArCon. If you select **Do not save**, the o2c object textures are not saved when loading o2c objects. The alternative **Save relative to root texture path** saves the texture relative to the path entered in the **Program settings** dialog box in the **Path for textures** section. The **Save relative to** alternative provides you with an option for specifying a separate path. The textures are then saved relative to this path. This last alternative can be used to prevent the *normal* texture directory becoming *overloaded* with textures, particularly when using many o2c objects.

16.6   CREATING OBJECT CATALOGS

In the previous sections we've described how you can convert, with the help of the 3DS-Import filter, objects into a format usable in ArCon. This section now concerns the generation of whole object catalogs, by arranging objects you've already converted so that they form a practical unit in the ArCon Explorer.

For generating object catalogs only a few special functions are required by ArCon. Essentially, generating catalogs is limited to copying the objects, with the help of the Windows95/NT Explorer or similar program, to the correct part of a sub folder.

16.6.1   Construction of an ArCon catalog

If you use the ArCon Explorer for showing object catalogs, this in principle is no different from similar views in Windows Explorer to view files on your hard disk or a CD. A file symbol in the ArCon Explorer corresponds to a sub folder, where preview bitmaps of the individual objects correspond to object (**.ACO**) and group (**.ACG**) files, or to texture bitmap files (*.**bmp**).

After starting ArCon and the ArCon Explorer the normal way, the directories and objects are shown, which are in the base path for objects. You input this base path in the menu **Option – Program – Program settings…**. You can also make subfolders or enter a completely different path for your own or alternative objects in the same dialog box.

The disadvantage of the second method is that the user of the catalog you've generated must similarly adjust the program settings in his or her installation to access the suitable directories of the catalog.

16.6.2   Subfolders in the ArCon Explorer

The ArCon Explorer has two different means of selecting a subfolder: On one hand you can default to a folder symbol and on the other-hand you can use a bitmap which contains a folder symbol in the lower left corner.

Objects

You can create this bitmap, which is not a Windows compatible bitmap, with the 3DS-Import filter version of ArCon itself. The file itself always has the ending .DIR, and must in the parent directory (the same folder that contains the actual folder). The name must be identical to the name of the child folder, and each folder must have a directory file. For example, if the parent directory V1 has a V1.DIR file and in this directory a subfolder V2 exists, a file V2.DIR must also exist before the V2 catalog will show up in the ArCon Explorer.

To generate these DIR files proceed as follows: In Design mode you'll find the icon at the far right of the lower horizontal toolbar. When you click this icon a directory selection dialog box appears where you can select the directory where the DIR file will be created. In the above example you would select V2.

After acknowledging with **OK** a second dialog box appears where you indicate the *logical name* of this directory; this is the name which appears under the bitmap symbol in the Explorer.

When you acknowledge this dialog box with **OK,** the present scene is created as a bitmap, which is used as the picture for the Explorer. You'll see in the Explorer exactly what you see in the active window. Here the following limitations apply:

The background color for the bitmap is always the constant color of the current *time of day* setting (day view/night view, variable time of day view). The pale yellow of the directory bitmaps that ArCon uses for the default directories has, by the way, the color values R=255, G=255 and B= 208.

If, when saving, the current view is not a 3D view, the directory bitmap is also not a 3D view, but, for example, a plan view. The type of view is always *textured, high quality* .

Note: If no DIR file exists, the directory name itself is always used for the name.

In order to avoid problems with older file systems (for example, on Novell servers), you can specify a directory name with eight letters or fewer and enter the logical name with an arbitrary length. The logical name is saved in the DIR file itself.

Note: The above description is easily understood, but is not technically correct: the DIR files are actually Windows bitmap (*.**bmp**) files. Directly at the end of this file the logical name is saved followed by a pound sign (#). You can create these DIR files yourself with other tools (i.e. character-based programs) by using the command line *echo*. You should use a High color picture of 64 x 64 pixels resolution for the BMP file to be used.

632

Example:
```
Echo that is a logical Name# > > MyPic.bmp
Ren MyPic.bmp V2.dir
```

This technique, among other things, helps with the internationalization of object catalogs.

16.6.3   Setting object characteristics with the Explorer

As described in earlier, you now know that certain object characteristics – such as the height of a placed object – can be predetermined. You can now change these characteristics. To do so proceed as follows:

Double-click the object to be modified and select in the dialog box that appears the **Data** tab.

Here you can change the settings as well as modify other characteristics that are described elsewhere in this manual.

16.6.4   Modifying folder names

Just as you can change object data you can subsequently change the folder names that show up in the ArCon Explorer. To do so, press and hold down the **Ctrl** key and double-click the desired folder icon with the right mouse button. The following dialog box appears:
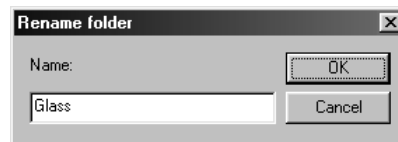
You can now change the logical name (see *Use subobject name check box* section).

Select this box to save the names of the sub objects as well when saving an object. These names will then be displayed when using this object in ArCon or using o2c Player, when the mouse pointer is held over the corresponding subobject.

Note: This means it is a good idea to ensure that you use *meaningful* names for the sub objects when modeling 3DS objects. The ACO Translator (this program is found in the program directory for your ArCon Online installation) can still be used to change the transferred names at a later stage.

633

16.6.5   Adding textures into the catalog

If you create entire object catalogs with the 3DS-Import filter of ArCon, you will also use new textures and want to add them to the catalog and sort them.

You can create the directory structure for textures exactly the same as the directory structure for objects. For displaying the directory structure for textures, the ArCon Explorer accurately uses the same mechanism as with objects; i.e., DIR files must be likewise created. You can use the same function here as for objects.

Tip: Use as an example an object that can be textured and adjust the view – before creating the bitmap and texture it, as you like.

Another option is creating a large bitmap of 64 x 64 pixels with a painting program and attaching the logical name with the use of the **Echo** command (see previous section).

Note: If the attached logical name is absent in the DIR file, the actual name of the directory is used as the logical name.

16.6.5.1   Logical size of textures

In ArCon you have the possibility to use the logical size of a texture for the view of design features, for example, walls. For this, the logical size of the texture must be evident. This is saved in the bitmap itself; the Windows bitmap format allows this possibility. Many paint programs enter unreasonable values for this data or set it all to zeros.

In order to modify these values subsequently, you can simply double-click a texture in the Explorer, then select the **Resolution** tab. The following dialog box appears:
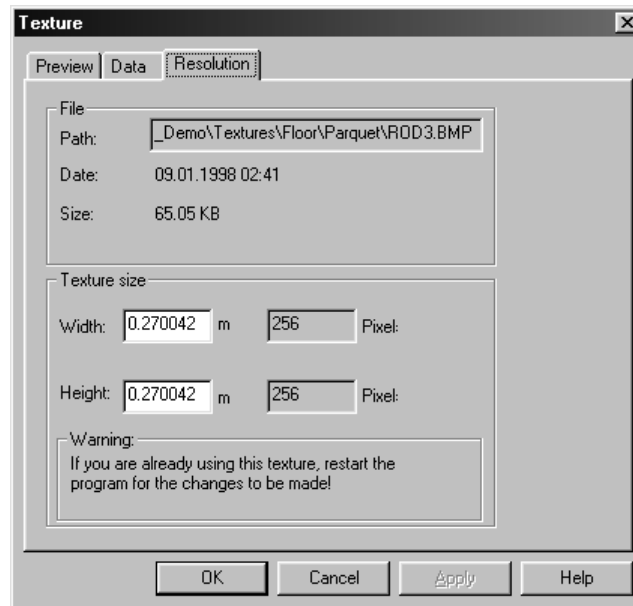
Here you can enter the logical size, which should be used in ArCon.

Note: In ArCon, entering the logical size is only applicable for BMP files, and is not possible for other display formats (TIFF, JPEG, etc.).

16.7   EXPORT PROJECT AS ACO OBJECT AND AS O2C OBJECT

Note: The Export Project as an ACO function is only possible using the 3DS-Import filter add-on module and using ArCon Online. The project export as o2c function is only possible using the o2c add-on module or ArCon Online.

This export option can be used to export entire ArCon projects as an ArCon object. This object can then be used in other ArCon projects. This means it is possible to save an entire building as an object, so that several of these objects can be used to construct an estate, for example.

This export as ACO or o2c object function is accessed in Construction mode using the menu **File/Export as/ArCon object** or **File/Export as/o2c object** and in Design mode using the menu **File/Export 3D information as/ArCon object...** or **File/Export 3D information as/o2c object...**.

In the export as ACO or o2c object process, only the parts switched to visible in the plan, are exported (in other words, those you can see in Design mode during a walkthrough). This means you can switch specific parts on and off to specify what is displayed in the ACO or o2c object being exported, for example, house without roof, one floor only, no north arrow.

Do bear in mind that plans exported in full can be very large in scope. If possible, the complexity of your plan should be reduced with regard to the 3D display before exporting. The furnishing objects in houses can normally be deleted, for example. The wooden structure is not usually of much interest in the plan for an estate, either.

Selecting these menu options will open the following dialog box:
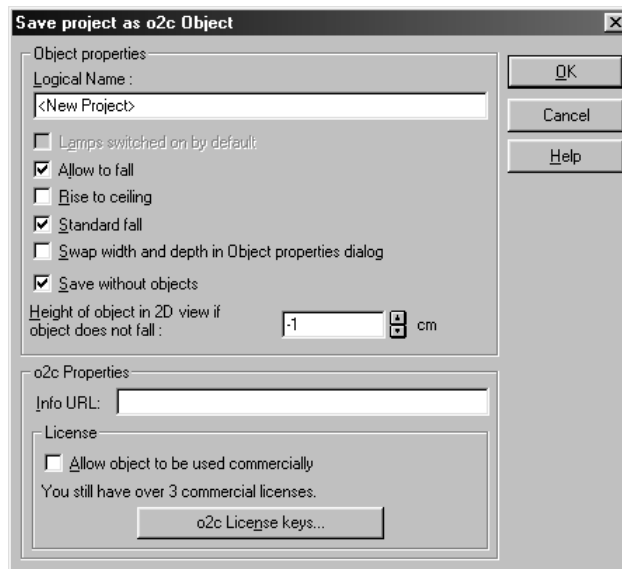
The individual elements in this dialog have the following meanings:

Logical Name: Enter the name to be displayed in the ArCon Explorer underneath the preview windows for an object, for example. This name will be displayed in ArCon when the mouse points at the object in Design mode, assuming no other name information is available for the object. For example, if you are exporting a floor as an ACO or o2c object, the rooms will be displayed with their names, and the exterior walls will be shown with the logical names entered here.

Lamps switched on by default: This check box is gray and inactive if the project to be saved does not contain any lamps. If it does, you can specify here whether or not the

lamps in the project are switched on or off by default when opening the new object in the night view. You can switch over to this view after loading using the ◎ icon.

Allow to fall: Check this box to allow the object to drop into an ArCon plan after loading. Otherwise, it will be set at the height at which you dragged it into the plan.

'Rise to ceiling: Check this box for suspended lights, for example, objects that normally hang from the ceiling. The box is gray and inactive if **Allow to fall** is not selected.

Standard fall: Select this box if you normally want objects to drop. Otherwise, they will fall once loaded in ArCon after double-clicking the object in the **Object settings** dialog box only if the **Calculate height ('after free fall')** box is checked. The **Standard fall** box will also be gray and inactive if **Allow to fall** is not selected.

Swap width and depth in the **Object properties** dialog box: Under normal circumstances it is assumed that the width of objects will be measured in the x direction (from west to east with the north arrow not rotated) and that the depth will be measured in the y direction (from south to north).

However, if objects are saved which are rotated such that the top is displayed when looking in the direction of north, the specifications for the width and depth would be reversed. Check this box to swap both specifications in the **Object settings** dialog box to undo this effect.

Combine matching textures: If you are saving a project where various parts use the same textures, this check box can be used to control whether all the matching textures are changed together or separately as before, when retexturing an object created in this way. For example, if you are saving a project consisting of two matching wooden boxes and you load the object created in this way, both boxes can only be changed into marble boxes together later on when this box is checked. Otherwise, they will need to be changed separately.

Note: The combining of matching textures produces more compact objects.

Height for loading in 2D view if object does not fall: This input box is used to specify the height above the floor of the current floor at which an object is loaded when it is dragged into the 2D view of Design mode ⊠, and does not drop. This specification is useful for wall-mounted toilets and sinks, for example.

In anything other than the 2D view, the height is determined interactively using the 3D cursor and the right mouse button on loading.

637

16.7.1 o2c Properties section

Note: This section is only displayed when exporting projects in o2c format.

The **Info URL** input box: This box is used to specify the Internet address (the URL) which is loaded in the **Internet** tab in the **Object settings** dialog box. This method can be used to create a direct link from an o2c object used in ArCon Online to the manufacturer of the real-life object, for example.

Note: Of the various additional settings possible for o2c objects, only the Info URL can be entered in ArCon Online during the export process. If you want to use the advanced settings (type of background image, compression rate for textures) save the project as an ACO object and use the external tools described in the ArCon Online manual.

16.8   TIPS ON CREATING OBJECTS

An important feature of ArCon is the ability to move furnishings in real-time in Design mode. This is dependent upon these furnishings being modeled not so complex that they can be moved only jerkily in the display.

Generally the display rate which is achieved during the movement, depends upon the number of pixels which can be set and of the number of surfaces which can be drawn. Regarding the number of pixels that can be set you generally have little control in the modeler, since the objects you design can be zoomed from *stamp size* to filling the display.

Regarding the number of surfaces you have great control, which in turn has a crucial effect. If you model an object with 20,000 areas, ArCon is able to show this and with many pictures per second. But if you model a whole room with such objects, the room can easily have several thousand to several hundred thousand polygons and walking through this room becomes a laborious process.

For this reason you should pay attention to not unnecessarily use a wasteful number of polygons while modeling. It is generally sufficient to approximate pipes with octagons – visually you will hardly see any difference. Areas, which will never be seen in the finished object, need not be modeled at all, or you can use the optimizer of the 3DS-Import filter to delete these areas.

The view of textured areas is clearly more complex than the view of un-textured areas. If you use textured areas, you may be able to do without details. In principle ArCon shows textured areas with the maximum number of colors as in the original texture, and

they are never over-brightened. But with un-textured areas it is different: if these are overly lit, they gradually become white. If you now use textured areas directly beside un-textured areas and over light such an object, strange effects may take place.

When modeling details, do not use the same number of polygons as the rest of the object. It makes, for example, little sense to model a cabinet with which half of the polygons is used for the modeling of the cabinet keys. The smaller the sectional objects the fewer polygons you should use in your modeling.

This applies also to sections of objects: if you want to model, for example, a hula-hoop shaped tire, it makes little sense to facet the cross section of the tire with the same resolution as the entire tire. Select, for example, for the total tire 64 sections, in order to make it look very round, and realistic; for the cross section you can surely use octagons without visual penalties.

These suggestions may sound banal, when modeling often suggests the same. But it is important to remember, especially since each object will ultimately be one of many in a room, which you want to manipulate and walk through without display rate trouble.

Be inclined to exaggerate! If an item does not strictly depend on an accurate size of your model, it is often more favorable to exaggerate details in its size so that the details are always seen.

The same applies to textures: if you stick textures onto objects at their actual size, it may be good for the texture, but not for you or your project. Remember to adjust textures so the objects are recognizable, and keep it simple where you can so you don't unnecessarily spoil the display rate.

Finally, avoid double-sided materials! Objects whose areas are to be seen by suitable materials from both sides are twice as complex in their display. Such objects are rare – remember to limit the model and sides single-sided surfaces when you can.

16.9   3DS-IMPORT FILTER: FREQUENTLY ASKED QUESTIONS

Question:
When loading 3DS objects, the textures I used are not found. What mistake did I make?
Answer:
Copy all textures into the same directory as the object or into a special texture directory, which path you specify to ArCon with the menu item **Options – Program – Program settings…** in the **Textures** section.

Question:

I converted and would like to use objects in ArCon in the DWG format with the 3DS format. The objects are not at all textured. Can I texture them without having to process each particular surface in 3D-Studio?

Answer:

For this the **Textures** tab from the dialog box **Convert 3DS object** or **Convert list of 3DS objects** will suffice (see *Textures* section)

Question:

I do not have the demo objects in the directory **3DS\MatDemo** located so I can use these materials in 3D-Studio or 3D-Studio MAX.

Answer:

In the specified directory there is a file with the name **ArConMat.mat**. You can load this material library into 3D-Studio MAX and receive all the materials used in the examples. One option is to load the objects (*.3DS) into 3D-Studio and examine the suitable materials. Additional information can be found in section 11.3.3.

Question:

In the section 11.3.3 describes how I must adjust the materials in 3D-Studio in order to mix the material and texture color. The results in 3D-Studio are quite different in ArCon. What mistake did I make?

Answer:

None. Mixing material and texture colors takes place in 3D-Studio as Additive (α* material $+ (1-)$* αtexture); whereas in ArCon it is multiplicative (material * texture).

Question:

I modeled my first object and had at the end the object with 20,000 polygons. Is this OK?

Answer:

Presumably not – that is, you modeled human forms or similarly complex items. Generally, high numbers result from too finely facetted roundness. Faceting should – in most cases– result in a low number of polygons.

Question:

I have a lighting design and also lights up in ArCon, but I do not see the light cones that I see in 3D-Studio. What mistake did I make?

Answer:

None. ArCon does not only use spot light sources, but point light sources are used differently from 3D-Studio.

640

Question:

I selected for lit bodies in 3D-Studio MAX that they do not throw shadows; nevertheless I do not see anything with the raytracer in ArCon from my light source, since the lamp body throws shadows everywhere. What mistake did I make?

Answer:

The 3DS Export function in 3D-Studio MAX does not export the characteristic *Object throws no shadows*. Therefore name the object in question with the prefix **_NS_**

Question:

I designed a cube in 3D-Studio MAX and in its *Parameters* roll out *Generate mapping coordinates* is selected. If I import this cube into ArCon, the texture coordinates are no longer correct. What mistake did I make?

Answer:

None. If you re import the exported 3D-Studio object you will see that this is incorrectly textured. The reason is that the 3DS format, in contrast to the MAX format, only one texture coordinate is assigned a point, which is not sufficient with a heavily textured cube.

Question:

How can I show a reasonably textured cube?

Answer:

You must model and texture the six individual textured surfaces separately. You can modify the resulting cube separately one side at a time.

Question:

When modeling in 3D-Studio MAX, I use hierarchies. Can I use this hierarchy information when importing into ArCon?

Answer:

Yes, you can generate groups when importing into ArCon. These groups recognize your hierarchy information (see *Convert* section).

Question:

I don't use 3D-Studio MAX, but 3D-Studio. There I cannot create hierarchies in the normal editor. How do I do this in 3D-Studio?

Answer:

Use the 3D-Studio key framer.

Question:

The texture coordinates I generated in 3D-Studio MAX show up incomplete in ArCon. What mistake did I make?

641

Answer:

Presumably you're using an earlier version of 3D-Studio MAX that exports UV coordinates. Use 3D-Studio MAX version 1.1 or later.

Question:

I have object libraries I would like to make usable in ArCon, but these are not available in the 3DS format. Can I use these anyway?

Answer:

You must convert the libraries into the 3DS format; for this suitable Public Domain software programs exist, and can be found on the Internet. If you should have very large libraries in the Calgary True space format (with the file extension .COB), please contact Eleco Software GmbH, since this data can be converted directly into ArCon objects.

Question:

I have read in the manual that 3D-Studio MAX object references are better as object copies. I have tested both methods and found ArCon objects of equal size. What mistake did I make?

Answer:

In ArCon objects, no hierarchy information is stored; only in ArCon groups. Accordingly, references can only be fully used in ArCon groups. Convert the object as a group – the particular reference objects are saved as ArCon objects – whereby reference objects are only identified in the object file.

Question:

And this brings me what?

Answer:

On one hand you can resolve the group in ArCon and process its the component parts; on the other-hand reference objects are only help once in memory and therefore require little storage space. The display rate is not affected by the use of references.

Question:

I would like to animate objects in ArCon as I can in 3D-Studio MAX. Can this be done?

Answer:

With the current version of ArCon this is not possible; these are dramatically different types of programs, even though both use the final models.

Question:

I converted and would like to import a list of objects in the 3DS format into ArCon. If I look at my objects during importing, half of the areas are missing. What mistake did I make?

Answer:

None. Probably, the orientation of areas is in disorder – organized incorrectly when converting into the 3DS format. Use the optimizer (see *Optimize* section) to correct these areas automatically in their orientation.

Question:

Is there a limitation in the number of areas in ArCon objects?

Answer:

Yes and no. ArCon starting from version 3.0 is practically unlimited in the number of areas; ArCon 1,0 and 2,0 can display a maximum of 65,535 areas per object.

Question:

How many areas should an object have?

Answer:

That depends on the object; for a complex living room cabinet or an automobile a few thousand areas may be necessary. If you require 20,000 areas for a computer keyboard, however, you should ask yourself whether you could have saved yourself some work on the modeling of the individual keys. A texture generally serves the same purpose.

16.10 EXAMPLE MATERIALS

In the following pages you will find figures of the objects defined in the folder **3DS/MatDemo**. The material adjustments in 3D-Studio MAX corresponding in each case to what are shown on the right page. The pictures on the left side were created with the ArCon raytracer, with **Shadow, Reflections,** and **Refractions** switched on.

All materials in the following examples are from AurConMat.mat

16.10.1 *Material simple*

(object name *Simple.aco*, 3DS-MAX material *simple*)
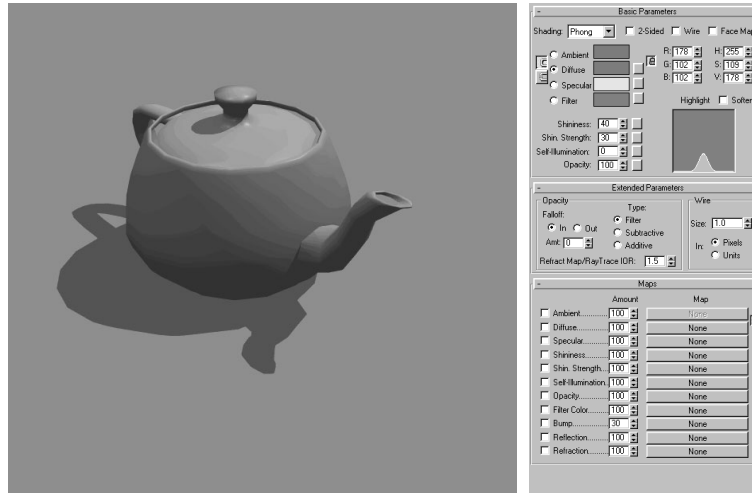
16.10.2 *Material simply textured*

(object name *Textured.aco*, 3DS-MAX material *textured*)
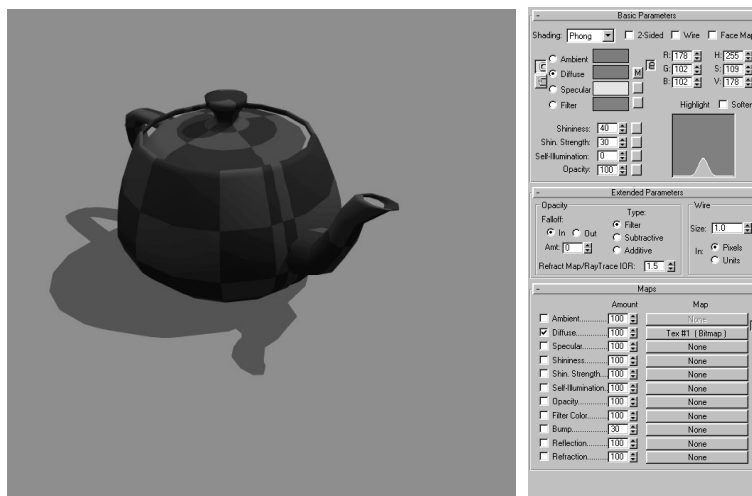
16.10.3 Material reflection map

(object name *ReflectionMap.aco*, 3DS-MAX material *ReflectionMap*)
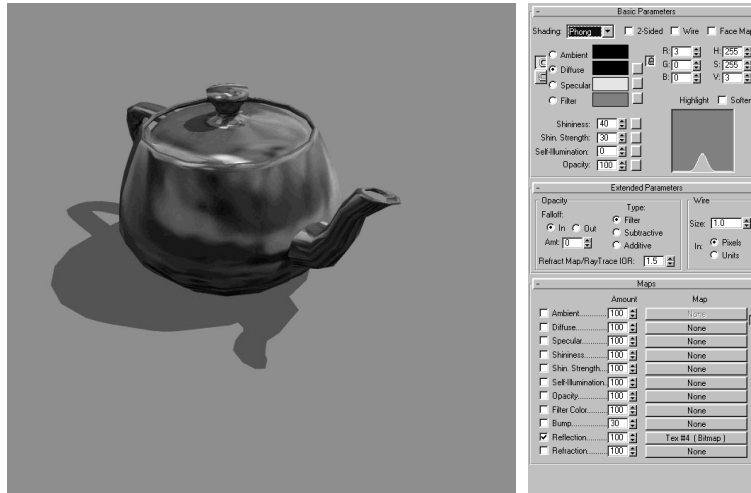
16.10.4 Material transparency

(object name *Transparent.aco*, 3DS-MAX material *transparency*)
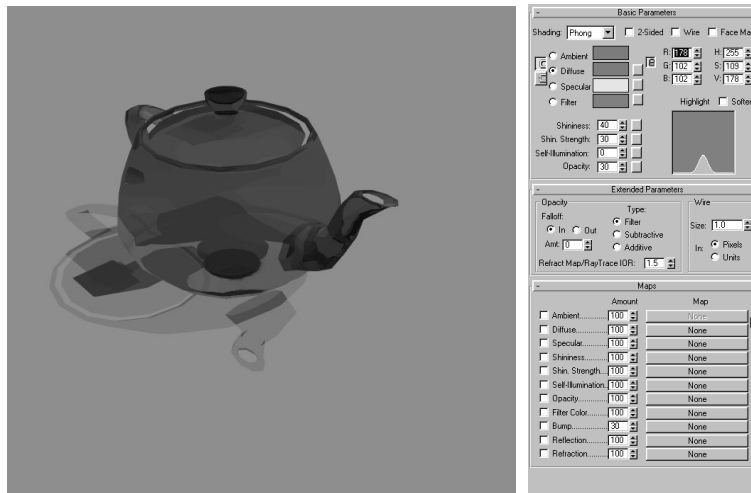
16.10.5 Material luminescent

(object: *Selfillumination.aco*, 3DS-MAX Material *luminescent*)
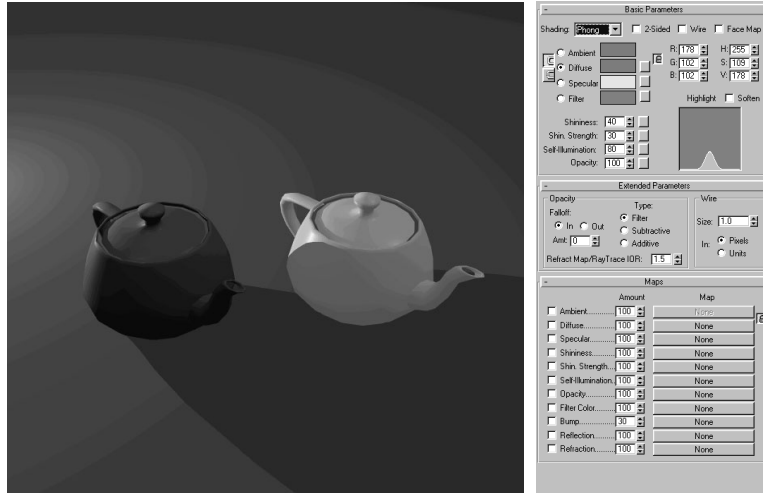
16.10.6 Material mask texture

(object name *MaskTex.aco*, 3DS-MAX material *MaskTex*)
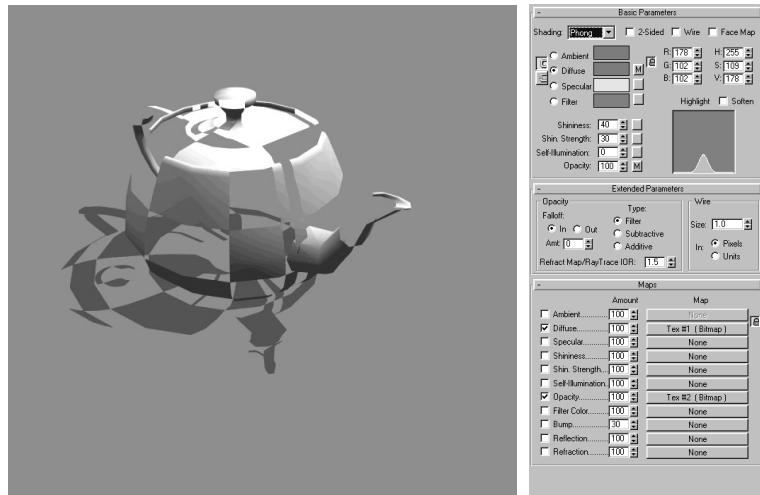
16.10.7 Material reflection map with object color mixed

(object name *MixReflectionMap.aco*, 3DS-MAX material *mix reflection map*)
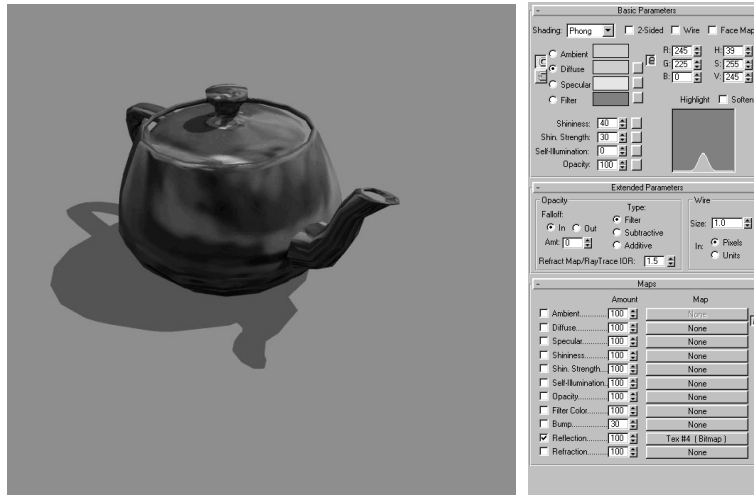
16.10.8 Material texture with object color mixed

(object name *MixTex.aco*, 3DS-MAX material *MixTex*)

647
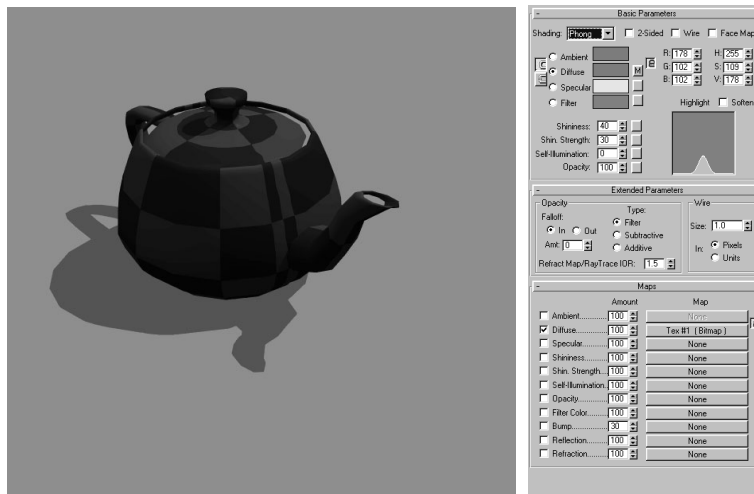
16.10.9 Material transparency reciprocally

(object name *transparency beidseitig.aco*, 3DS-MAX material *transparency reciprocal*)
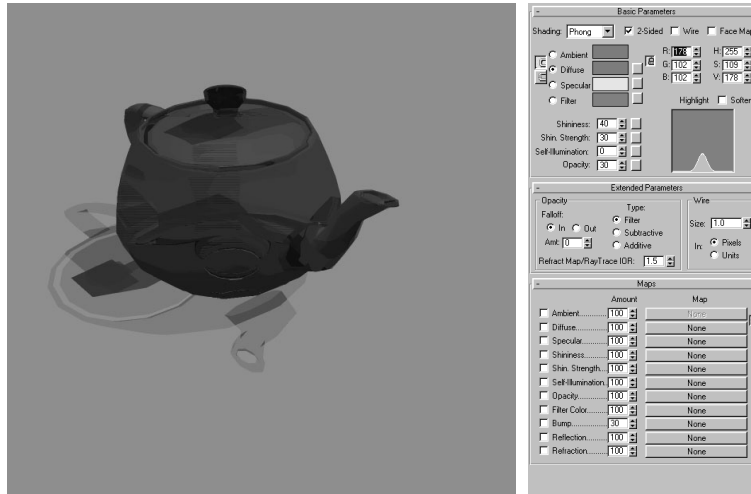
16.10.10 Material mask texture reciprocally

(object name *MASK Tex beidseitig.aco*, 3DS-MAX material *MaskTex reciprocally*)
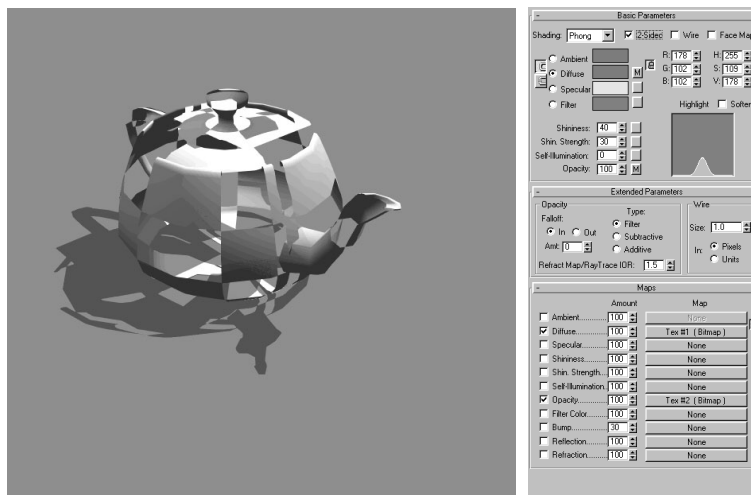
16.10.11 Material transparency textured

(object name *transparency textured.aco*, 3DS-MAX material *transparency textured*)
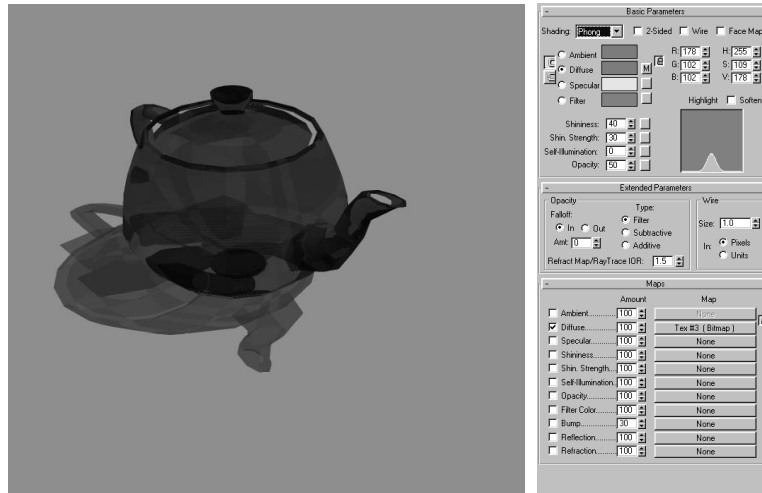
16.10.12 Material simple, in the raytrace reflection

(object name *Mirrsimple.aco*, 3DS-MAX material *SpieEinfach*)
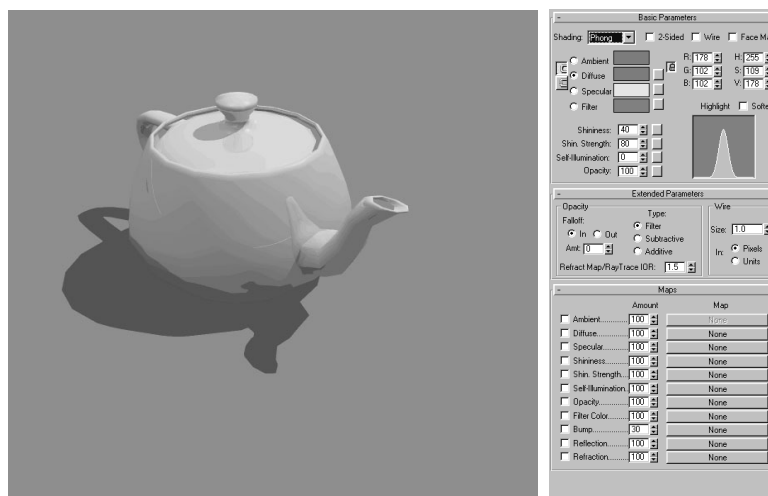
16.10.13 Material reflection map with color mixed, raytrace
reflection

(object name Mir*MixReflectionMap.aco*, 3DS-MAX material *SpieMixReflectionMap*
)
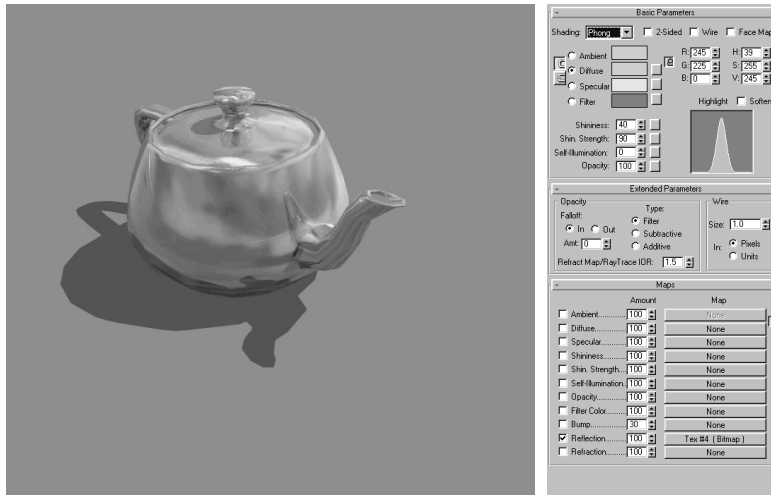
17 ArCon VR add-on module

Eleco Software GmbH is pleased to be able to provide you with not only an ArCon program add-on with exceptional functions, but also one that will display your plan with rapid speed.

Thanks to the use of the latest software and hardware technology, ArCon VR provides you with the option of walking through your plan interactively. This means you can walk through the various virtual rooms in your plan with minimum jerkiness depending on the complexity and location, and therefore gain an accurate impression of how your future house will look, even before the building work has been started.

ArCon VR (Virtual Reality) also provides you with a feeling of having experienced the building, in addition to the advantages already delivered by ArCon and ArCon+.

Even though the installation process for ArCon VR is extremely simple to carry out, (open up the computer, install graphics card, close the computer again, install ArCon VR, start) you should still read through the following few pages in order to make optimum use of ArCon VR.

Although ArCon VR is available in different versions (with or without graphics card, with or without joystick), the following description assumes that you have bought the *complete package*, in other words ArCon VR incl. graphics card and joystick. If this is not the case, you will need to be a little flexible: simply replace the description with the description of the hardware you are actually using.

17.1 WHAT IS ArCon VR?

As mentioned in the introduction, ArCon VR is an add-on for the ArCon+ version (there are no add-ons for ArCon (without +)). In practice, this means that all the functions, which can be used in ArCon+, can also be used with ArCon VR. In addition there are functions which permit the more rapid display of 3D scenes. So if you are already familiar with ArCon+, you really won't find it hard to start using ArCon VR.

ArCon VR is aimed at people who require the most realistic possible visualization of your plan. This may include construction firms, as well as ambitious architects who want to provide building firms with as accurate a picture as possible of the future house in the early planning phases.

651

Thanks to the technologies used in ArCon VR the display speed in the interior of a building bears virtually no relevance to the complexity of the building. So whether you are in a room in a ten-floor building, or if the room is the only room in your entire plan, the display speed will not normally vary (this also applies to ArCon and ArCon+ without VR). However, there are a few exceptions to this rule, which are described in more detail in the *Hints and Tips* section (see page 661).

Unlike ArCon and ArCon+, the ArCon VR add-on can be used to work with two monitors or even one monitor and a projector. In this case, one of the monitors is used as a *normal* PC monitor where you can view and carry out user inputs, and the other monitor is used simply to output 3D scenes. Of course it is also possible to work with just one monitor. When displaying the VR scenes you can then simply toggle between the two screens. More information on the one and two-monitor solutions can be found in the *Hardware* section (see page 657).

17.2 INSTALLING THE HARDWARE

As you will probably have noticed on the packaging, ArCon VR consists of the following components:

- Software on the relevant data medium
- Graphics accelerator card (optional)
- Joystick (Microsoft SideWinder 3D Pro, optional) and
- ArCon(+) manual.

The text below describes how all these components can be usefully combined to produce the first visible results as quickly as possible.

The optional hardware components in ArCon VR comprise the two components PCI accelerator card and a Microsoft SideWinder joystick. Both need to be connected to your computer and correctly installed.

17.2.1   Installing the graphics card

Installing the graphics card is very simple thanks to its plug & play function. Follow the instructions on the relevant pages of the manual for the hardware installation.

If you are an experienced PC user, you can also simply unscrew your computer case (but switch off the PC first and unplug it from the mains), insert the PCI card and close the computer back up. It is not necessary to carry out any other hardware settings, such as

the jumpers, etc.

But do make sure that you leave the existing VGA card in your computer. The accelerator card is only an add-on card and is not a replacement for your VGA card.

17.2.1.1 Connecting the monitor to the accelerator card

Once you have slotted the accelerator card into the computer and closed the case back up, all you need to do now is connect the monitor to the accelerator card. The short description below assumes that you are working with just one monitor. If you intend to work with two monitors, see section 17.3.2.

The accelerator card you have installed is an additional card i.e. it does not provide normal graphics card function and runs only in addition to the existing graphics card. So that you can still view both the images from the normal graphics card as well, both the cards need to be interconnected. For this purpose, the graphics card includes what is known as a VGA pass-through cable which *loops* the signals from your normal VGA card to the accelerator card. On the accelerator card is a type of switch, which either forwards the *incoming* VGA images to the output, or the images you have *created*.

Note: This switch is actually audible; it is recognized using a relay.

Please see the diagram below for more information on how to connect the VGA card to the accelerator card, and how to connect the card to the monitor:

to monitor

VGA   accelerator card
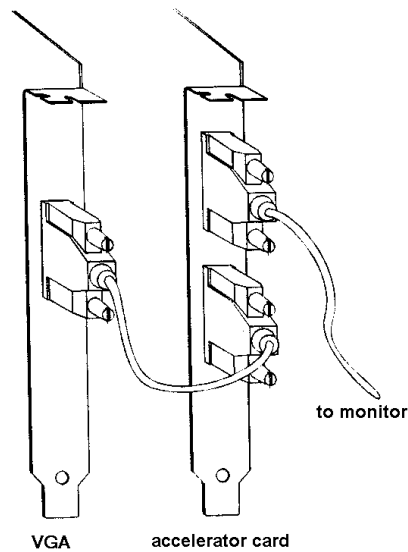
The VGA and accelerator card, and the monitor and the accelerator card, should only be connected *after* installing the accelerator card and *before* restarting the computer because otherwise there will be no image even though the computer is functioning perfectly.

An alternative installation procedure for a second monitor, along with the monitor requirements, is described in more detail in section 17.3.2.

Once you have inserted the card, closed the computer case back up, and connected the monitor as described, start Windows 95/NT. Windows 95/NT will detect that you have connected a new device to your computer and will initiate the standard setup procedure for these situations. There are two alternatives:

You follow the instructions given in Windows 95/NT and insert the driver CDs supplied with the graphics card or

You can continue the installation process for the graphics card.

Both options have the following:

Option 1:

You install the software supplied with the graphics card. In this case, all the software tools available for the graphics card will be installed. This includes a dialog box, for example, which you will find as an additional tab in the screen settings in Windows 95/NT, as well as the installation process for a Direct3D driver.

These additional installations may be required, for example, in order to be able to use

654

the function of the graphics card for other programs; but this can also cause problems because in some circumstances the software already installed on your computer may no longer run satisfactorily. The reason for this may be that a piece of software already on your computer may not work correctly with the Direct3D driver software for the accelerator card, for example.

Option 2:

If you want to avoid these conflicts, select the option **Do not install driver** (no installation prompts) in the dialog box displayed.

Once you have circumvented the automatic installation of the new hardware, as described above, you can install ArCon VR. To do this, please follow the installation instructions for the ArCon VR setup program.

During the installation process for ArCon VR, all the software required to use the accelerator card with ArCon, is also installed, which means that the entire driver function for ArCon is available after restarting the computer as required.

Note: With this installation option, no Direct3D drivers, etc. are installed, which means that other programs do not use the graphics card.

If you have followed the instructions in Windows 95/NT and you have installed the graphics card with the software for the card (option 1), you can also test its function following the necessary restart, as described in the original manual for the graphics card. After installing the graphics card, ArCon VR now needs to be installed. Just as for the second option, please follow the setup instructions for ArCon VR. It may not be necessary to restart the computer, but to be absolutely sure; you should wait for an additional two minutes in any case.

Note: If you have not purchased the optional graphics card, you will need a graphics card with a VooDoo or VooDoo2 chipset and the Glide 2.5 driver or later installed. Before using graphics cards with the VooDoo Rush chipset, please be warned that the drivers are not ideal for such usage.

17.2.2   *Installing the joystick*

For installing the joystick, the manual from Microsoft can be used as a guide, but if you are an experienced PC user, you can also shorten the entire procedure.

The joystick is connected to what is known as the joystick port on your computer. This is normally located on the sound card. If you do not have a sound card, it may be that there is no plug available for the joystick. In this case, there are basically two options:

655

You purchase a suitable sound card from your computer dealer or even a suitable joystick port card

You contact Eleco Software GmbH. We will help you to solve your joystick problems.

Once you have connected the joystick to the relevant port, the software needs to be installed. To do this, please use the original disks for the joystick and follow the instructions given in the manual.

After the joystick software has been installed, the joystick now needs to be calibrated. The procedure for this is also described in the original manuals for the joystick. It may also be necessary to carry out this calibration process at a later stage. If you release the joystick in the VR mode for ArCon VR, and you still don't get a stationary image (in other words, it rotates to the left or right, etc.), this is a clear indication that the joystick needs recalibrating.

Important note: The joystick switch, which is located on the bottom front end of the SideWinder (see diagram), should be set to position 2, because it is only in this switch position that multiple keys held down simultaneously can be detected, and this is a requirement for resetting the viewer position in ArCon.
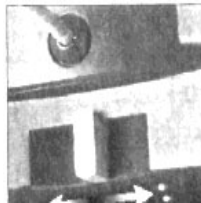
17.3   ABOUT THE HARDWARE

17.3.1   The graphics card

ArCon VR is able to deliver the high speed thanks to the optimum combination of the software and the graphics accelerator card. Although in principle it would be possible to use various graphics accelerator cards with ArCon VR, Eleco Software GmbH decided in favor of the supplied card following a thorough selection process. The three main reasons why this choice was made are as follows:

The extremely fast display speed of the graphics card while providing a high level of

quality (texture filtering, mipmapping, 16-bit color dithering, etc.)

The accelerator card is an add-on card and does not affect the functions of the VGA card already installed. For this reason there are no problems caused by VGA drivers either, as these are not altered by the accelerator card.

The accelerator card is really not particularly taxing in terms of its demands on the computer. Problems caused by the combination of different hardware components are therefore minimal.

17.3.2   Working with one or two monitors

ArCon VR can work with either one – or preferably – with two monitors. The one monitor solution has already been described. This is more cost-effective than the two-monitor solution, but has the disadvantage that you cannot see the VR image at the same time as making user inputs.

This is different when you are using a second monitor: the normal Windows interface is *always* displayed on one monitor, and the other monitor is used solely for the images displayed by ArCon VR. The inputs you make on one monitor are hidden from the viewer of the second monitor. This can be especially useful for presentations.

In order to use two monitors in ArCon VR, no VGA pass-through cable is required. One of the monitors is connected to your normal VGA card, and the other is connected to the output on the accelerator card.
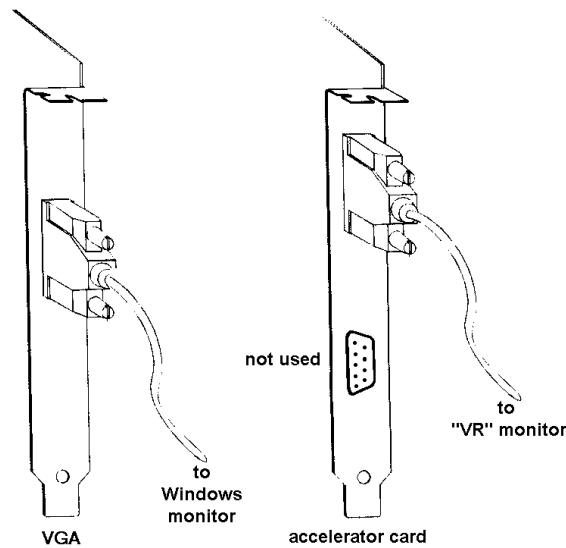
To prevent the second monitor turning black after using the VR mode (see section 17.4.1), there is a relevant dialog box in ArCon VR, which is described in more detail on page 660.

No special demands are made on the second monitor because the resolution of the accelerator card is relatively low (640 x 480) and the screen refresh rate is also quite moderate. For this reason there should be no problems when connecting modern VGA overhead projectors or any other projector systems to the accelerator card.

Note: The larger the screen for the VR output, the more realistic the impression. A walkthrough on a 15" monitor is considerably less impressive than a walkthrough on a 21" monitor or even on a video projector. This depends primarily on the way in which people receive visual information: the more closely the dimensions displayed reflect reality, the more believable the display will be.

17.4   WORKING WITH THE VR ADD-ON

Although ArCon VR with ArCon+ provides significant added features for getting the best use from the accelerator graphics card, the differences between using ArCon VR and the ArCon version are minimal. In practice, it means that in Design mode only two new icons ![icon] and ![icon], a dialog box (see page 660) and in all preview windows an ![V]

icon is added.

Otherwise, ArCon VR is exactly the same in use as ArCon+. Exactly the same functions in ArCon+ are available in ArCon VR.

17.4.1 A Walkthrough (VR)

This icon is always available in Design mode if the active view is a perspective view. It is basically the equivalent of the icon, which is used in ArCon, as well as in ArCon VR to walk through the house normally.

operates in more or less the same way, except that the output is sent to the accelerator card and not to the normal VGA card. If you are working on a monitor, clicking the icon will switch directly to the accelerator card. Appropriately, with the two-monitor solution the accelerator card is activated, i.e. any visible image changes according to the current image. From this point you can move around in your plan in VR mode.

To do this you can either use the normal mouse, or if switched on, use the joystick.

The operation of the mouse during a walkthrough is exactly the same in VR mode as in normal Walkthrough mode. The only difference is that you do not see the mouse cursor with one monitor mode and with the two-monitor mode you can only see it on the normal VGA card. A change of direction, rotation, accelerated walking speed, use of the cursor keys and the number pad - all this can also be carried out in VR mode.

If you use the joystick during a walkthrough, the joystick replaces the function of the mouse. The movements in your plan, which correspond to the movements of the joystick, can be found in the relevant section on the use of the joystick. It is not possible to use the keyboard in this process (except for the **Ctrl**, **Shift** and the **Esc** key).

If you want to end the walkthrough in the VR, press the **Esc** key. ArCon VR then assumes the current position of the VR mode to be the position of the current window and displays it there as well. You can then continue working normally, as in ArCon+. If you want to walk through the house again, click the VR button and repeat the procedure as described.

17.4.2 VR mode for recording/playing movements

Just as the cassette recorder icons can be used to record walkthroughs in ArCon+, VR mode can also be used for this purpose. All movements carried out with the icon

659

activated are also recorded and can also be played back. It is also possible to save the movement as a video.

After the movements have been recorded, they can even be played back in VR mode. To do this there is the second additional icon in ArCon VR next to the cassette recorder icons . Clicking this icon will switch ArCon to VR mode and play back the recorded movement from there. It will then switch back to normal display mode.

Remember that the playback in VR is significantly faster than playback in a normal window. This means therefore, that your movements are also completed more quickly. On the other-hand, when recording walkthroughs in VR correspondingly more pictures are recorded which means that walkthroughs which have been recorded in the VR are reproduced at the same speed during playback in the VR.

17.4.3   Setting for the VR add-on

Right-clicking the mouse on the Walkthrough (VR) icon , will display the following dialog box:
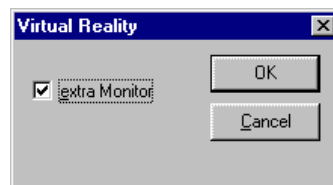
This dialog box is the only additional dialog box, which distinguishes ArCon VR from ArCon+.

As described in the *Hardware* section, ArCon VR can be used with either one or two monitors. If you are using ArCon with two monitors, the **Extra monitor** box should be checked. This prevents the accelerator card being switched to the VGA pass-through after each walkthrough or playback in the VR. As with two-monitor mode you will not have connected the VGA card output to the input of the accelerator card – which means that there is no input signal – the second monitor would display only a black screen during this switchover. Selecting **Extra monitor** prevents the accelerator card from switching over; and you will still see the last image displayed following the walkthrough.

17.4.4 Preview window in ArCon VR

All the preview windows have an additional **V** icon when the VR add-on has been installed. This icon is located to the right of the arrow of the bottom scroll bar in a preview window.

Clicking this icon will display the preview window in VR mode and the objects or groups can then be viewed from all sides at maximum speed. In this process, the rotation and the size of the object displayed is controlled in exactly the same way as in ArCon+: when moving the mouse to the left or right with the left mouse button held down, the object rotates either to the right or left. Accordingly, moving the mouse up and down with the left mouse button held down will rotate the object around the relevant axis. Moving the mouse with the right mouse button held down as well reduces or enlarges the object. The use of the preview window in VR mode is ended using the **Esc** key.

Note: When using the VR option in the preview window, the left mouse button should always be held down, unless you are using the two-monitor solution. This means, for example, that with the mouse button held down the normal mouse pointer cannot be moved along the preview window slider to move the object.

In one monitor mode this would still be possible in theory, but because you can't see what you are doing, you will not normally be able to target the slider, which means that you might not produce the results you wanted.

17.5 NOTES FOR USING THE VR ADD-ON

Although it is very easy to use the VR add-on, this section includes a few hints and tips for achieving the optimum performance. In addition, this chapter also contains a number of frequently asked questions, which may be of assistance for solving any problems with ArCon VR.

17.5.1 Modifying the scene for optimum performance

If you are concerned with achieving the fastest speed, take note of the following:
Use objects with as few polygons as possible. The number of polygons in an object can be obtained from the top line of the dialog box opened when you select an object in Design mode using the menu option **Furnishing - Load object…**.
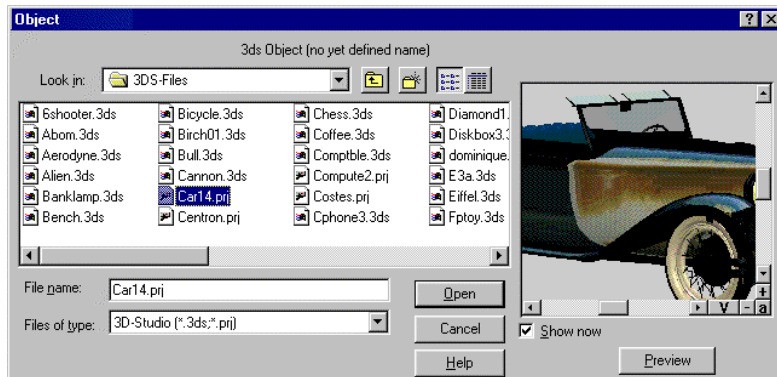
The view of a house from inside is several times faster than from outside. So if possible, move around inside rooms.

Close the doors. With open doors ArCon VR also has to depict whatever can be seen through the door. If the doors are completely closed, and not fitted with a glass panel, this display is not necessary and the speed increases accordingly.

Avoid rooms with a large number of windows. If you are in a room and are looking through a window towards the outside, ArCon VR also has to depict the entire outside world, which may reduce the display speed.

So that you don't need to move through the house unnecessarily long in the VR, a suitable starting point should be selected before switching to the VR. To do this, it is best to use the zoom function in Design mode and set the start position so that you are standing immediately in front of the front door, for example.

If you observe the rules given above, the display speed in ArCon VR will be optimal.

Note: Unlike ArCon+, the display speed in VR bears virtually no relation to the display quality. Whether you select **Color** ⬜ or **Color and texture (high quality)** ⬜ as the display type, this will be almost unnoticeable in terms of the display speed. ArCon VR does not support the display types **Wire model** ⬜, **Wire model with covered surfaces** ⬜ or **Wire model with hidden edges** ⬜. If you have selected any of these display types ArCon VR automatically switches over to the **Color** display type in VR during the switchover.

17.5.2 *Frequently asked questions on VR*

Question: I've switched to VR mode but can't enter any changes to the position with the mouse. What am I doing wrong?

Answer:	You have probably selected the joystick as the input type. Switch to **Input using the mouse** (see section 17.4.3) or use the joystick to carry out movements.
Question:	I am working with the one monitor solution and am in the VR display mode. But I can't make any entries at all. How do I get back to the Windows 95/NT screen?
Answer:	Press **Ctrl+Alt+Del** simultaneously. Windows 95/NT will then switch to the normal screen mode and display the relevant dialog box. Then decide what you want to do.
Question:	I am working with one monitor and have switched to the VR display, but I am still seeing the same image. What am I doing wrong?
Answer:	You may have ArCon configured for two-monitor mode. Right-click to select the relevant dialog box and deselect **Extra monitor** from there.
Question:	I've installed ArCon VR and can't see the icon (House walkthrough (VR)) or the icon (playback in VR). What am I doing wrong?
Answer:	The graphics accelerator card is not correctly installed. Repeat the installation, as necessary.
Question:	I also want to use ArCon VR on a computer without an accelerator card. Can I do that?
Answer:	Yes. ArCon will automatically detect the presence of the accelerator card. If it is missing, or if the installation is incorrect (Glide V2.5 or later incorrectly installed), the VR function for ArCon VR will also be missing. But you can still use ArCon VR as the normal ArCon+ version (see also previous question).
Question:	In VR mode the graphics output is much brighter than in the normal mode. Is the accelerator card faulty?
Answer:	No. The accelerator card uses what is known as dithering for the color display to avoid jagged color progressions being output in high color mode. What is known as gamma correction is required for this, which produces a paler image. In two-monitor mode you can simply set the VR monitor to be darker; in one monitor mode you may need to adjust the brightness level on your monitor as necessary after switching over in VR.
Question:	I have created my own texture and am using it in ArCon VR. With a normal display the texture is used correctly; with the VR display mode,

663

however, it is very blurred. Why is this?

Answer: The graphics accelerator card uses what is known as *bilinear filtering* when displaying textures to reduce the pixel effects of the texture. This filtering is normally a good idea, because it improves the quality of the display considerably.

However, if you are using a texture where this pixel display is important (for example, a chessboard), this filtering process is not recommended. For this reason, textures with a resolution of less than 16 x 16 pixels are automatically *not* filtered in ArCon VR. So, for example, if you want to display a chess board as a texture and avoid the filtering, use the texture size 2 x 2 pixels where the top left and the bottom right pixel is set to *white* and the top right and the bottom left is set to *black*. If you were to create the same texture in a different resolution, for example, a resolution of 128 x 128 pixels (the texture would then include 4 fields of 64 x 64 pixels each, with the same color), ArCon VR would filter this texture.

The 2 x 2 pixel solution is also better because it uses up less memory.

Question: The joystick supplied with ArCon VR also supports the rotation of the control stick and also has a slider to the left of the stick. Are these functions used in ArCon?

Answer: In this version, these functions are not used; the corresponding add-on is in preparation.

18 JOYSTICK

18.1 OVERVIEW

If you use a joystick when walking through the apartment, the following figure shows how it is controlled:
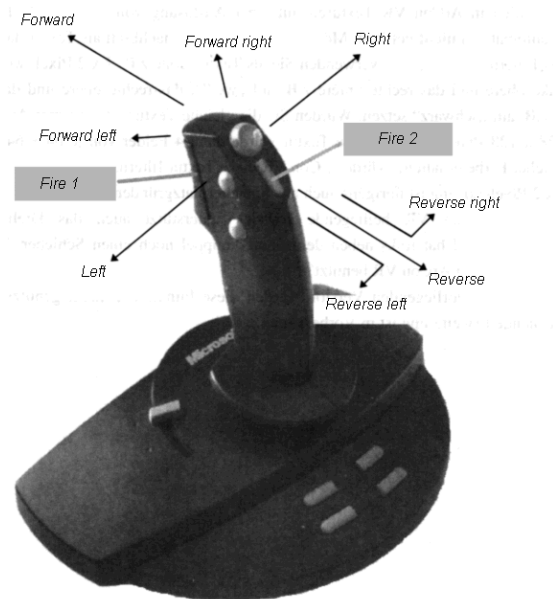
Besides the actual control stick the two selected keys are the only ones used in ArCon. **Fire 1** lets you move upward and downward, and **Fire 2** sets the heading.

18.2 MOVE UP AND DOWN

If you keep **Fire 1** held down and press forward, you'll move downwards – pull on the control stick itself to move upward.

18.3   HEADING

If you keep **Fire 2** held down and move the joystick forward, this corresponds to moving your head downwards – pulling the joystick while pressing **Fire 2** corresponds to moving your head upwards.

18.4   SHOW ALL WITH THE JOYSTICK

If you press **Fire 1** and **2** on the joystick simultaneously, this corresponds to the function **Show all** (see page 127.).

19 SPACEMOUSE IN ARCON

19.1 OVERVIEW

The Spacemouse from the firm SpaceControl is the descendant of a control element from space travel technology, which was used to remotely control a robot in space from the space shuttle Columbia in the year 1993.

As a result of the consistent advancements of the control sphere, SpaceControl introduced the Spacemouse (also known as Magellan in the United States and Asia).
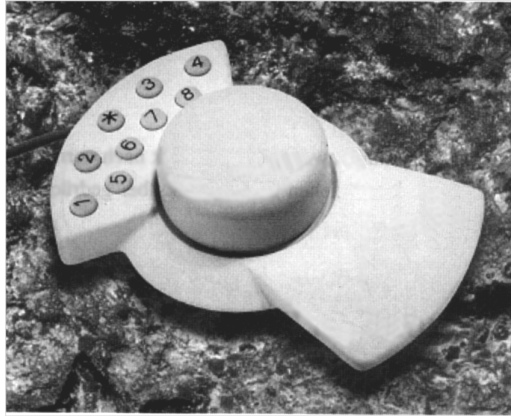
Since the intuitive and trouble-free control with the Spacemouse is very convenient to the fastidious user, ArCon supports the Spacemouse (beginning with ArCon version 3.1) in both the standard and plus versions, as well as the VR mode for walking through a project, so you can use either the mouse, joystick, or Spacemouse.

19.2 APPLICATIONS

Starting with version 3.1, ArCon, along with ArCon+ and ArCon VR, supports the Spacemouse for walking through, along with the mouse and joystick. Walking through in VR mode is of course only possible with ArCon VR.

667

19.2.1 Benefits

With the Spacemouse you can control the 3D movement in all 6 degrees of motion simultaneously. With intuitive handling the work you need to do to control your movement and position is reduced to a minimum – the Spacemouse obeys each movement.

19.3 INSTALLATION

The Spacemouse is connected to the COM1 Port of the PC; the installation of a driver is not necessary. ArCon possesses its own driver, which is installed automatically with the program. When the computer is switched on, the mouse announces itself during the boot up with two beep tones. When starting ArCon, it signals its readiness with another tone.

19.4 BINDING IN ARCON

By right-clicking you open in Design mode a dialog box where you can set the control mode for walking through. By selecting **With the spacemouse** this is used on your next walkthrough. As with using a joystick, you end the walkthrough by pressing the **Esc** key.

19.5 OPERATION

If you access the large manual button of the Spacemouse, you can move, turn, tilt, or pull it in the desired direction. Observe how the movement of the Spacemouse is transferred to ArCon. Execute the movement with the button with varying degrees of force to receive in ArCon a small or large modification of your position. The following directions of movement are possible:

1.	The button can be shifted into all directions:
	The viewer moves in ArCon in straight lines in the desired direction, fo
	example, forward, back, to the side or diagonally forward or back.
2.	The button can be rotated:
	The viewer turns to the left or to the right around his or her
	perpendicular axis.
3.	The button can be tilted forward or back:
	The viewer twists the view upward or downward.
4.	The button can be pressed or pulled:
	The viewer moves either downward or upward.

All 4 directions of movement can be executed with the button at the same time. That is a substantial advantage over the normal mouse or the joystick, because now *flying* movements are possible around the building.

Often one would like to move only horizontally, without changing his height or inclination. With the help of the keys on the Spacemouse, you can *lock in* directions of movement.

19.6   KEY ALLOCATION

1.	Vertical moving in/out
2.	Moves in/out
3.	Field of view closer
4.	Field of view farther
5.	Automatic placing
6.	Elevator downward
7.	Elevator upward
8.	Show everything

19.7   CONFIGURATION

Normally it is not necessary to change the adjustments. However, if you so desire, you can set the sensitivity in the ArCon.INI file. Open the Windows Explorer and look in the directory **ArCon\Program**. Find the file **ArCon.INI** and load it into a text editor. Find the line **[Spacemouse]**. Under **Global Factor** you can change the sensitivity overall for all directions, while the following six entries let you make non-standard

669

adjustments for each direction individually. Here the first value defines the initial value for a movement, while the second and third values determine the scope.

[Spacemouse]
Global Factor=1.00000
ValueX=0.05000,0.00000,1.00000
ValueY=0.05000,0.00000,1.00000
ValueZ=0.05000,0.00000,1.00000
ValueA=0.05000,0.00000,1.00000
ValueB=0.05000,0.00000,1.00000
ValueC=0.05000,0.00000,1.00000

20 SPECIAL

In the following paragraphs two of ArCon's features are described. These features are dependent upon your computer's hardware capabilities and configuration.

One feature is dispatching ArCon projects by e-mail with the mb Mail Assistant; the other involves using processors with MMX technology. Even if you do not use e-mail yet, it's an important feature you should be aware of. With the help of the mb Mail Assistant integrated directly in ArCon, you can send ArCon projects anywhere in the whole world, for example, to your architect, if you are the owner, or to a potential customer if you are a broker.

20.1　MB MAIL ASSISTANT

This assistant helps you to send your ArCon projects by email. A prerequisite for sending projects by email is an Internet connection and the proper installation of Microsoft Exchange on your computer. You open the mb Mail assistant by selecting the menu **File – Send** in ArCon. Besides your current project, you can also attach an accompanying letter to your email, be it an existing letter or a new one (which ArCon will give you a chance to create). If you want to use this function, Microsoft Word for Windows 7.0 (or higher) should be installed on your system. The Mail assistant itself is described in the following five steps.

20.1.1　Step 1 of 5

This is only an initialization window, in which no additional inputs can be made. Click **Next** to continue onto step 2 of 5, or click **Cancel** to exit.

20.1.2　Step 2 of 5

Select here whether you want to add an accompanying letter to your project. If this is the case, activate the **Attach accompanying letter** check box and select the appropriate option. If you do not want to attach a letter, leave the switch unchecked and click **Next**

671

to continue, or click **Cancel** to exit.

20.1.2.1 Attach existing file

If you select this option, you must specify a valid document name in the input box before you can continue. You can enter a name directly or search for it by clicking the **Browse…** button. If you select to search for it, a standard Windows file selector dialog box will open. After you've selected the file, click **Next** to continue to step 5.5.

20.1.2.2 Create new file

If you select this option, you arrive at step 3. Please note that this option is only possible if Microsoft Word for Windows 7.0 or higher is installed on your system.

20.1.3 Step 3 of 5

First select a document template with which Word for Windows is to be started. You can select between the standard Word template and five mb templates. Additionally you can name the new file here. You can enter the name directly into the input box or click **Change** to open a file selector.
Please note that you cannot save your accompanying letter in Word for Windows under another document name, since then the Mail assistant cannot find the file.

20.1.4 Step 4 of 5

In this step, no inputs are necessary. A note is displayed which briefly describes the operational sequence. After you've read the note, click **Next** and Word is automatically started. Once you have created your accompanying letter and saved it, close Word for Windows and you'll arrive at step 5 of 5. In order to correct your previous inputs, you can click the **Back** button and arrive again at step 3. With **Cancel** you can abort the entire process and return to ArCon.

20.1.5 Step 5 of 5

In this step the files which are to be mailed are identified to you. This includes the name of your project file and, if you attached an accompanying letter, the name of the letter document. If these specifications correspond to the files you want to send, click **Send**. Microsoft Exchange will then be started and the displayed documents are automatically emailed. The last thing for you to enter is the desired email address of the recipient, and send the files from Exchange.

20.2 MMX TECHNOLOGY

ArCon supports processors with the MMX (Multi Media Extension) instruction set. If you installed a processor with MMX support in your computer, ArCon automatically uses it.

Please note that the MMX ability of your processor is used only if you calculate the pictures in the High Color mode. If you use 32 bits per pixel, ArCon does not use any MMX support.

Also note that when using MMX, the smaller the pictures when you're walking through a project, the faster the screen display. In contrast to the screen layout without MMX it is inconsequential whether you use ▣ as the type of view or ▣ as the type of view. Since ▣ gives you better results, you should always select this when using MMX processors.

21 KEY BOARD ASSIGNMENTS

Besides the keys mentioned in the following table you can additionally use the keys for menus, which are identified in the menus themselves.

21.1 UNDO/REDO

Ctrl+Z or **Alt+Backspace** Undo
Ctrl+Y or **Alt+Shift+Backspace** Redo

21.2 FUNCTION KEYS

F1   Help

F3   In Construction mode, temporarily switches off snapping, up to next mouse
      click (see Ctrl+R)

F5   In Construction mode, with the ruler switched on: Switches between lifted
      and lowered ruler

F6   In Construction mode with the ruler switched on: Switches between the
      ruler edge facing down and the ruler edge facing up

F7   In Construction mode with the ruler switched on: Move the ruler parallel

F8   In Construction mode with the ruler switched on: Rotate the ruler around a
      relative angle

F9   In Construction mode with the ruler switched on: Rotate the ruler vertically
      to the current direction

F10   In Construction mode with the ruler switched on: Align the ruler
      horizontally

F12   Switch between Construction and Design mode.

21.3 ADDITIONAL FUNCTION KEYS IN ARCON+

F2   In Construction mode for the selected tool of the selected element: Switch
      between numerical input and input with the mouse.

F4   In Construction mode during the input of an element with numerical input
      switched on: Switch between input with the mouse and input with the
      keyboard for the current area.

F11   In Construction mode: selects the room under the mouse pointer and opens
      the Room data dialog box.

21.4 ZOOM AND MOVE SCREEN

The following keys are in the numeric keypad (NumLock must be switched on!)

Key 0 corresponds to the function Show all

Key 1 Move the screen window downward and left

Key 2 Move the screen window downward

Key 3 Move the screen window downward and right

Key 4   Move the screen window to the left

Key 6   Move the screen window to the right

Key 7   Move the screen window upward and left

Key 8   Move the screen window upward

Key 9   Move the screen window upward and right

Key +   Screen view is zoomed in from center

Key -   Screen view is zoomed out from center

Key *   Screen view is zoomed in from cursor

Key /   Screen window is zoomed out from cursor

Besides these keys in the numeric keypad, the key combination **Ctrl+: +,** - , *, / (with + , - , *, and / on the normal keyboard) has the same meaning as +, - , *, and / in the numeric keypad.

21.5   INCREMENT / DECREMENT KEYS

In the dialog input boxes you can increase or decrease numeric values. These can also be incremented or decremented using the keyboard:

Arrow up	Increase by 1
Arrow down	Decrease by 1
Page up	Increase by 10
Page down	Decrease by 10

In all views, both in Construction mode and Design mode, except in Perspective view, the pointer keys have the same function as the keys 4, 8, 2 and 6 on the numeric keypad In Perspective view the pointer keys correspond to the four directional arrows on the ✛ icon.

21.6   SPECIAL KEYS IN CONSTRUCTION MODE

Ctrl+W   Switch from points of reference of elements or switch wall axis input.
                When drawing polygons: Connect the different corner points of the polygons under the mouse.

677

Ctrl+Q	Switch between wall axis on the left or right at the beginning of a placed wall.
	When shifting polygons: Connect the different corner points of the polygons under the mouse.
Ctrl+E	like Ctrl+Q, for end of the placed wall.
	When shifting polygons: Connect through the corner points of the polygons under the mouse.
Ctrl+F	Select the next possible snap point.
Ctrl+R	In Construction mode, temporarily switches off the angle grid until the next mouse click.
Ctrl+Spacebar	The dialog box for snap and select is activated.

21.7 SPECIAL MEANINGS OF THE CTRL AND SHIFT KEYS

Ctrl

Prevent dialog boxes from opening during input in Construction mode

Extended input when placing walls

When placing objects in Design mode, switches on Collision control

When walking through in Design mode: Accelerate by a factor of 4

Shift

When placing elements in Construction mode: extended input

When walking through in Design mode: Accelerate by a factor of 4

Select multiple objects

Ctrl+Shift

When walking through in Design mode: Accelerate by a factor of 16

21.8 SHOW/HIDE KEYS

In ArCon+ , for both Construction mode and Design mode, you can change the whether floors, buildings, and apartments are visible with the help of the following keys:

| **Ctrl+G** | Visibility of floors: Switch between Current floor, All floors and Current floor/selected floors. |

Ctrl+B   Visibility of buildings: Switch between Current building, All buildings and Current building/selected buildings (see also page 143).

Ctrl+U   Visibility of apartments: Switch between Current apartment, All apartments and Current apartment/selected apartments (see also page 153).

For the three versions mentioned, pressing **Alt** while also pressing the key combination causes the **Current floor**, **Current building**, or **Current apartment** to be switched if ArCon+ is already in this visibility mode, so those then become the next current floor/building/apartment.

22 FREQUENTLY ASKED QUESTIONS

Question: When placing walls I can position the wall axis by clicking. Can I also position wall sides?

Answer: After the first click when placing a wall, press Ctrl+W to switch between the wall axes: left side wall and right side wall. Press Ctrl+Q only at the beginning of the wall to change between the wall axis and the two wall sides; press Ctrl+E at the end of the wall to change between the three possibilities.

Question: In Design mode the whole room is always colored or textured. Can I also color or texture individual walls?

Answer: Change into Construction mode and double-click the suitable wall to select a color or texture for the individual wall.

Question: When walking through a complete house the screen display is relatively slow. What can I do?

Answer: There are several possibilities to accelerate the output.

Reduce the number of areas shown when walking through by limiting the number of polygons, for example, 2000 in the **General options** dialog box.

Reduce the picture in which you move. The smaller the picture, the faster the display rate.

Use for the view ArCon's High Color mode. You can change this with the menu **Options – Program – Program options**. Also remember to change the setting in Windows.

Reduce the view quality, for example, by switching the view type to wire frame ⬚.

Finally there is the possibility of using an MMX processor in conjunction with High color mode (see page 673)

Question: Loading the example projects takes a very long time on my computer.

What can I do?

Answer: Presumably your computer has less than 16 MB of memory or you are loading a very large project. Under these extreme circumstances, Windows 95 will move parts of memory to your hard disk, which slows down the entire operating system.

Question: I would like to design a complex plan. This requires lots and lots of simply clicking the mouse button, even if I use the grid. Is there another way?

Answer: Use guidelines (page 184) and the ruler (page 167).

Question: I would like to create a plan with windows like mine; the windows are the correct size but I would like to have plastic windows instead of wood windows. Do I have to click each window after placing it, in order to change the textures accordingly?

Answer: No. Click before placing the first window, right-click the window icon and adjust the textures as you desire. The desired textures are then used automatically for newly placed windows.

Question: I know that I can design corner windows by using one of the two freely-construct able windows and check **Miter left** or **Miter right** in the suitable dialog box. I would now like a trapezoidal porch with windows in such a way to disguise the fact that all the windows are pushed directly together. From where do I learn how long the window of the medium side of the porch should be, so that it fills out the whole side?

Answer: Use as the default window width a dimension which is longer than the wall, and check both **Miter left** and **Miter right**. If you now position the mouse into the relevant wall, the window is automatically set to the correct length.

Question: I would like to use plastic windows instead of wooden windows, and use them for future projects. Do I have to make these adjustments for each new project?

Answer: No, simply right-click the suitable window and make your adjustments. Click the **As default** button and from now on each new project will have these settings automatically.

Question: I designed several floors in Construction mode.
The current floor is shown in black but the other floors are also shown – in gray. I want to see only my floor. How do I do that?

Answer: Select the menu **Floor – Visible floors...** and select **Current floor** in the dialog box.

Question: I designed and ultimately adjusted my finished ground floor so that the floor height is insufficient. Can I change it later?

Answer: Select the floor whose height you want to change, then select the menu **Floor – Edit current floor…** You can then enter the new floor height in the dialog box that appears.

Question: I would like to modify the scale of my project, which is already nearly done. Can that be done?

Answer: Right-click the ▢ icon (see page 110) and enter the new scale.

Question: After I modified the scale, my project does no longer fits on the paper page. What do I have to do?

Answer: Right-click the ▢ icon and accordingly enter a larger paper format.

Question: My printer cannot handle this paper format – the format is larger than my printer can handle. What do I have to do?

Answer: You can print the project as a tiled printout. ArCon automatically generates a number of printed pages, each with markings so the printed pages can be stuck together to recreate the larger paper format.

Question: From time to time it happens that objects I place in Design mode do not land where I expected them to. What did I do wrong?

Answer: In principle, ArCon cannot set objects where you want them 100% of the time. **Collision control** helps, but it's still not perfect. Nevertheless, in order to position the object correctly, proceed as follows: Double-click the object in the dialog box that appears, deselect **Adjust height ('after free fall')**. Finally, fine-tune the position manually.

Question: Although I designed everything correctly, I see only a dark picture in Design mode. What did I do wrong?

Answer: You are probably in ArCon's night view, i.e. you selected the night view with the multi-function icon ▦ (see page 396) and positioned no lamps in your project. Change into the day view by clicking the ▦ icon (see page 396) and optionally set some lamps. After repeatedly switching into the night view the problem should go away.

Question: I positioned lamps accordingly and have some vision in the night view. Nevertheless my scene is still very dark. What do I have to do?

Answer: Right-click the ▦ icon (see page 397) and move the slider

683

control to the right. When clicking **Preview** you will see how your scene becomes brighter. If you are content with your results, acknowledge with **OK**.

Question: With the raytracer, my picture looks good but I can't see any shadows. What do I have to do?

Answer: The scene is over lit. Right-click the icon (see page 397) and move the slider control to the left until all areas of your scene begin to darken. To check this, occasionally click the **Preview** button. When it looks better, start the raytracer again.

Also, sometimes you may have disabled the option to cast shadows in the raytracer. Check it by right-clicking the icon (see page 390) and check the suitable specification.

Question: Can I input round walls in ArCon?

Answer: No, not directly. You can simulate them by joining short pieces of walls. For this you can use the ruler which is very helpful for such an operation.

Question: I would like to use different room heights in a floor. Can that be done?

Answer: No, only by workarounds. For example, you can scale an object to the size of the room and position it under the ceiling at the desired height.

Question: I designed an attachment to my house; with this attachment the wall of the house is not correctly shown. What can I do?

Answer: If you design an attachment to a wall, the problem is that a part of the wall side of the external wall is simultaneously the inner wall for the attachment. ArCon knows only one status for each wall. You would have to design the attachment separately and leave a very small gap between the attachment and the house. This gap should be large enough that the house's roof edges are not over the walls of the attachment, and vice versa.

Question: Can I also place chimneys in ArCon?

Answer: Yes, by using the icon (see page 280).

Question: How do I achieve that the chimney pushes through the roof with a certain height?

Answer: Position a chimney in the attic and adjust the height by double-clicking the chimney and making your inputs in the suitable dialog box.

Question: When saving pictures from time to time a small level of color shifting is

	seen on the individual walls and furnishings. What can I do?
Answer:	There are two possible causes of this: 1. Your graphics card is operating in the **High color** mode; in this mode sufficient colors are not available to show a really smooth color transition. 2. ArCon is operating in the **High color** and not in the **True color** mode. Select the menu **Options – Program – Program options...** and select **True color** in the dialog box that appears. **Note:** Afterwards you must start ArCon again, since the adjustments aren't effective until you restart the program.
Question:	If I pull textures from the texture catalog onto furnishings, these textures are not used everywhere. What do I have to do?
Answer:	Nothing. Not all objects in ArCon can take textures, since the suitable information is not available. If a texture is to be stuck onto an object, each area of the object must have certain information about how textures are applied to it. With some objects, or even sections of an object, this information may not exist.
Question:	I found the bath tub object in the catalog. I would rather not have it brown – nevertheless brown is the only color the tub is available in. What can I do?
Answer:	Select a suitable material in the catalog by clicking the icon and pulling it onto the bath tub. **Note:** If you use several of these bath tubs in your project, all change their color simultaneously.
Question:	Can I modify this?
Answer:	Not directly. The only way to modify this is to create a copy of the bath tub in the Windows 95 Explorer and use both the original and copy in ArCon. Then you can change the materials for one tub without affecting the other.
Question:	If I pull textures onto an object, not all homogeneous objects in my project change. What is the difference?
Answer:	The lists of used textures are stored separately for each object. Materials change all (the same) objects simultaneously. The reason is basically a practical one – it results in a higher display rate and lower memory consumption.
Question:	During input in Construction mode, I do not want to snap on the correct point. What can I do?
Answer:	Press **Ctrl+F** until the red marking on the desired point snaps.

Question: If I place a window with the icon (see page 228), which I would like to set one meter from the corner of a room, ArCon always uses the focal point of the window in order to shift it a meter. I would like to have the left-hand side of the window a meter from the corner. What can I do?

Answer: By pressing **Ctrl+W** during the shifting you can determine whether the left or right side, or the center of the window, is positioned. The same applies also to doors.

Question: I would like to position two windows on the same side of the same wall of a room, so that the central shafts of the windows divide the wall into three equal thirds. How can I do this easily?

Answer: If you use the icon (see page 229) for placing, first click in each case on the icon and enter a division ratio of 33.33%. Click only into the left corner and the right corner of the wall, and set the first window; subsequently, you only have to click into the right corner, then into the left corner of the wall to position the second window.

Question: I designed an L-shaped room and would like to position a door on the long side of the room, positioned in such a way that the door is exactly centered in relation to the short side of the room. How can I do this easily?

Answer: Here there are two methods: Design a guideline, which is perpendicular to the short wall and divides it in the center. To do this use the icon (see page 187). Now set the door by positioning it freely, but snap on the suitable part of the guideline on the long wall.

Input the door with the icon (see page 229) in such a way as if you wanted to set it centrally into the short wall. When you click the second point, press the **Shift** key – afterwards you can shift the door along the perpendicular to the straight line. Position the door into the desired wall and click a third time to set it.

Question: I clicked the icon (see page 118), to print out a picture, but I've been waiting half an hour already and nothing has happened. What did I do wrong?

Answer: You probably chose to calculate a raytraced picture in very high resolution, which is then printed out. If you press the **Esc** key during the calculation to cancel it, right-click the icon (see page 121) and check your adjustments. Very high resolutions, for example, 1500 x 1000,

combined with quadruple or even higher over sampling, as well as raytracing, can drive up the calculation time required for the picture to be printed out. It can go way up, in fact. The same also applies if you select **Save picture**.

Question: Positioning furnishings is very difficult. Is there a simple solution?

Answer: It is often simpler to position elements in Plan view (color) rather than Perspective view. If necessary, you can open two views – one with a Plan view (color) and another with a Perspective view.

Question: I would like to design a stairway. If I place stairs in the ground floor into the suitable room, a cutout is automatically created, but it is too small. What can I do?

Answer: After you have placed the stairs, you can delete the automatically created cutout and enter a new one manually with the icon (see page 270).

Question: I designed a multi-floor house and would like a texture for the first upper floor that is different from the texture of the ground floor. Can this be done?

Answer: Yes. Under normal conditions, floors' external walls use the same texture as the external walls of the underlying floor. You can prevent this by double-clicking the wall in Construction mode and the **Use lower wall texture** box is unchecked. Subsequently, you can assign each wall its own texture.

Question: What is MMX?

Answer: MMX a development by the firm Intel, is a chipset feature to accelerate multimedia applications. MMX is included in some Pentium processors and all newer Intel processors. ArCon supports these processors already; the output rate when walking through rooms is clearly accelerated by MMX.

Question: I designed a multi-floor house and placed a chimney in the ground floor, which is tall enough to go above the roof. If I now texture this chimney, the texture modifies all the floors. What did I do wrong?

Answer: Input a chimney for each floor, whereby you use the position of the underlying chimney as a reference point. These chimneys can then be separately textured.

Question: I designed and set a cutout in the ceiling, but it isn't visible in

687

Perspective view. What did I do wrong?

Answer: If you look from above into a floor, you don't see its ceiling. You therefore cannot see the cutout. Look at suitable floor from below – you'll see the ceiling and the cutout therein.

Question: In principle it is okay that I can look from above into my setting. Normally a ceiling is on a floor; how can I adjust it so I see this ceiling?

Answer: The ceiling of the highest floor is never shown from above. If you want to make it so you see a ceiling for the visible floor, you must simply define yet another floor over it. If you do not input anything for this floor – including no walls – you'll see the ceiling and cutouts when viewed from above.

Question: I designed a multi-floor house, where the first upper floor does not have the same plan as the ground floor. The ceiling of the ground floor is to be used in the first upper floor partly as a terrace. How can I input the texture for this terrace?

Answer: Unlike ceilings and floors of rooms, you can texture the top of a ceiling, which in principle is the floor of the terrace, by means of drag-and-drop. You can't give additional specifications to these textures as you can with ceilings and floors.

Question: I would like to use my own pictures as textures. Can that be done?

Answer: You can change with the help of the catalog into any folders on your hard disk and use the bitmap image files.

Question: I used my own bitmap file as a floor texture. The tiling is much too fine. What can I do?

Answer: When bitmaps are used, a size is stored which does not correspond to its reality. In Construction mode, click the respective floor and deselect the option **Original size**. Enter into the two input boxes by it the actual size of your texture.

Question: Even after examining the entire object catalog, I could not find a suitable cabinet. Can I assemble one myself?

Answer: You can by using the additional module **3DS-Import filter**, which lets you model objects in 3D-Studio and load them into ArCon in their native 3DS-file format. The read-in objects are treated like normal ArCon objects. 3D objects that are stored in other formats, for example, DWF, DXF, GARB, AMK must first be converted into 3DS-format.

ArCon does not execute this conversion.

Question: I placed a vase into a glass showcase and now want to move the vase to another part. I do not want to select the vase – each time I click the vase the showcase is selected. What do I have to do?

Answer: Even if you see the vase, this doesn't mean that nothing is in front of it – in this case, the glass of the showcase is in front. You can select it by pressing the **Ctrl** key while clicking it.

Question: I am walking through my house. I start relatively far from the house and it takes an eternity to reach the entry door. How can I accelerate this?

Answer: Press while walking through the **Ctrl** key and/or the **Shift** key. Pressing one of the two keys accelerates a walkthrough by a factor of 4; pressing both keys accelerates it by a factor of 16.

Question: The specification in the **Info block**, which ArCon creates automatically, is not sufficient for my purposes. Can I change the **Info block**?

Answer: Not in the standard ArCon version. In ArCon+ you have the possibility of selecting different **Info block** types of varying complexity. For this, you must double-click the **Info block**. In the dialog box that appears you can select a type of signature field and adapt it to your non-standard needs.

You can also merge logos. The logos used in the individual signature field types are stored as bitmap file in their own directory STANDARD\\LOGOS. Note that the file names of the individual logos are assigned to a certain type of signature field. If you want to merge a new logo, the file must be located in the directory mentioned and have the name adequate for the type of signature field, for example, the logo LOGO1.BMP is assigned to the type of signature field1.

Question: I would like to make a printout of Perspective view for A0 size. Is there any boundary for the size of this view?

Answer: Yes. The maximum width of a picture that can be printed or saved is 8192 pixels including over sampling. If, for example, 16-times over sampling selected, the picture is internally increased in each direction by a factor of 4, so the maximum resolution is then only 2048 pixels.

23 TECHNICAL SUPPORT

For help and advice concerning ArCon and other ArCon products visit our website:

www.3darchitect.co.uk

Project Presentations

You can send us your best projects any time. We would be pleased to include you in our ArCon Project Library. If you are a professional architect or interior designer using ArCon, then examples of your work can be presented to potential new clients from either our web site or our distribution CD's.

Service team

If you require help while creating your project with ArCon, the support team for ArCon is there for you. The support team can support you in the following areas:

- Create complete ArCon projects from your architectural plans.
- Create and print presentation pictures (in all sizes and all formats).
- Create videos, which are provided when desired with text. Our *film studio* is in a position to create AVI files and video presentations from video sequences, photos, and ArCon pictures.
- Convert your 3D objects, into the ArCon Object format (ACO format) or o2c object format.
- Design new objects for you, for example, fair buildings, etc.
- Create textures and scan photos, for wallpapers etc.
- Supply complete presentations of your real estate requirements to you. All can be taken from your data (plans, views, photos, or even video taken with a video camera) and made ready for presentations.
- We can manufacture advertising presentations for you, in which you present yourself and your products or services.
- Creation of specilist macros based solutions for specific requitements (As used in Tile Planner).

Training courses

The training courses take place in our offices or locally in your office. The content of the training courses can be co-tailored to your personal needs. Full details are available on our web sites.

24 REGISTRATION

In order to receive information about updates, new releases and special offers, please register your product at:

http://www.online-warehouse.co.uk/register

25 TOPIC NOT DOCUMENTED

This topic is not documented in this help file.

Please use the Find tab to search for similar functions in this help file.

Index