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A.1 Bin Temperature Weather Data

ASEAM3.0 can use three different sources for bin weather data:

ASHRAE - six, four-hour blocks (file extension .AWD)
BATTELLE - eight, three-hour blocks (file extension .BWD)
DOD/AF88 - three, eight-hour blocks (file extension .DWD)

(Note `DOD' stands for Department of Defense, and `AF88' stands for Air Force Manual AFM88-29)

See Appendix F for the appropriate references that contain the bin temperature data in the above formats.

The type of weather data you use will be determined by availability of the site you require (not all stations are available in all formats). If you have access to the documents (see Appendix F) that contain the bin temperature data, you may enter new stations if desired (see section A.1.2). Since the bin temperature data comes from different sources, you should expect different results from each format. In brief, the following sources are used for each format:

ASHRAE format - bin data is derived from the "WYEC" (Weather Year for Energy Calculations) weather data. The hourly data (8,760 records per year) is a composite of typical monthly weather data taken from different years. There are forty-six stations included in ASEAM3.0 in this format (see section A.3). Hourly temperature data is apportioned in six, four hour time blocks per month.

Battelle format - bin data is derived from two hourly weather data sources: "WYEC" (described above) and "TRY" (Test Reference Year). The hourly TRY weather data is a given years actual hourly data - not a composite as in the WYEC data. Statistical procedures were used to eliminate those years for a given weather station that have extreme weather data - leaving one year as the test reference year. Hourly temperature data is apportioned in eight, three hour time blocks per month.

DOD format - the bin data for this format is "averaged" over several years worth of hourly data. Hourly temperature data is apportioned in three, eight hour time blocks per month.

In determining which weather data station and format to use, you should consider not only the source of data but also the coincidence of the operating hours of the building and the bin divisions. More accurate results will be obtained when the first hour of building operation corresponds to the first hour of a bin and the last hour of building operation corresponds to the last hour of a bin. If such a match is not made exactly, the bins will be subdivided to determine the number of hours in the occupied and unoccupied periods. For example, if your building is operated from 8 a.m. to 4 p.m., the DOD/AF88 data may yield the more accurate results since this time period matches the second time bin exactly. If you were to model this building using the Battelle weather data set, one-third of the hours in the third (6 a.m. to 9 a.m.) and one-third of the hours in the sixth (3 p.m. to 6 p.m.) time bins would be apportioned to occupied times and the remaining hours would be apportioned to unoccupied times.

Since the bin method calculates using diversified occupied and unoccupied period loads, the calculation time for an ASEAM3.0 analysis is not affected by the type of format you use.

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A.1.1 Bin Temperature File Format

Printed below is a portion of a sample weather file (in this case, Chicago, Illinois, in ASHRAE format of six, four-hour blocks).

Note that the first sixteen lines of data have the same meaning regardless of the file format.

File Contents	See Description Below
	Line Number (not in file)
CHICGOIL	1
89,-4,92.5,-2.5,130,42,87.83,29.92	2
Monthly Weather Data	3
42.5,9,1,31	4
57.5,13,10,28	5
67.5,11,23,31	6
87.5,13,34,30	7
87.5,11,47,31	8
92.5,10,58,30	9
92.5,9,68,31	10
92.5,9,77,31	11
92.5,11,86,30	12
82.5,11,97,31	13
62.5,11,108,30	14
57.5,12,119,31	15
Bin Data	16
1,1,42.5,0,0,0,2,0,0,.00257,35	17
1,2,37.5,5,2,13,25,19,5,.00291,33	18
1,3,32.5,45,40,51,53,44,54,.0033,31	19
1,4,27.5,20,30,20,22,25,19,.00255,26	20
1,5,22.5,12,4,15,7,13,12,.00195,21	21
1,6,17.5,30,28,9,7,12,21,.00146,16	22
1,7,12.5,4,12,14,8,6,6,.00107,11	23
1,8,7.5,4,4,1,0,5,7,.00102,7	24
1,9,2.5,4,4,1,0,0,0,.00077,2	25
2,10,57.5,2,0,0,3,1,1,.00696,52	26

et cetera

The information contained in this file is as follows:

Line 1 - Weather Station Name

Line 2 - A,B,C,D,E,F,G,H (8 values, separated by commas)
where

- A = Design Summer Temperature, 2.5% (from ASHRAE)
- B = Design Winter Temperature, 97.5% (from ASHRAE)
- C = Maximum Bin Temperature (from weather file)
- D = Minimum Bin Temperature (from weather file)
- E = Number of Temperature Bins (total for year)
- F = Weather Station Latitude (degrees North)
- G = Weather Station Longitude (degrees West)
- H = Weather Station Barometric Pressure (inches Hg)

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Line 3 - "Monthly Weather Data" - a delimiter line (ignored)

Line 4 - A,B,C,D (4 values, separated by commas)

where

A = Maximum Bin Temperature, January

B = Number of Temperature Bins, January

C = Bin Pointer (line number of first bin, January)

D = Number of Days, January

Lines 5 through 15 - same as Line 4, one line for each month, February to December

Line 16 - "Bin Data" - a delimiter line (ignored)

A.1.1.1 ASHRAE Format

Beginning on line 17, through the end of the file, the ASHRAE weather data has the following format:

Line 17 - A,B,C,D,E,F,G,H,I,J,K (11 values, separated by commas)

where

A = Month Number

B = Bin Number (sequentially)

C = Bin Temperature (taken at midpoint of five-degree range)

D = Number of Hours in Bin 1 (0-4 a.m.)

E = Number of Hours in Bin 2 (4-8 a.m.)

F = Number of Hours in Bin 3 (8-12 noon)

G = Number of Hours in Bin 4 (12-4 p.m.)

H = Number of Hours in Bin 5 (4-8 p.m.)

I = Number of Hours in Bin 6 (8-12 midnight)

J = Average Humidity Ratio, this Bin (lbs/lbs)

K = Mean Coincident wet bulb temp, this bin

Lines 18 through the end of the weather file have the same format as Line 17. The data is stored in order from January through December, from the highest temperature bin of each month to the lowest temperature bin of each month. Note that the bin number of the final bin should be equal to item "E" in Line 2.

A.1.1.2 Battelle Format

Beginning on line 17, through the end of the file, the Battelle weather data has the following format:

Line 17 - A,B,C,D,E,F,G,H,I,J,K,L,M (13 values, separated by commas)

where

A = Month Number

B = Bin Number

C = Bin Temperature (taken at midpoint of five-degree range)

D = Number of Hours in Bin 1 (0-3 a.m.)

E = Number of Hours in Bin 2 (3-6 a.m.)

F = Number of Hours in Bin 3 (6-9 a.m.)

G = Number of Hours in Bin 4 (9-12 noon)

H = Number of Hours in Bin 5 (12-3 p.m.)

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- I = Number of Hours in Bin 6 (3-6 p.m.)
- J = Number of Hours in Bin 7 (6-9 p.m.)
- K = Number of Hours in Bin 8 (9-12 midnight)
- L = Average Humidity Ratio, this Bin (lbs/lbs)
- M = Mean Coincident wet bulb temp, this bin

Lines 18 through the end of the weather file have the same format as Line 17. The data is stored in order from January through December, from the highest temperature bin of each month to the lowest temperature bin of each month. Note that the bin number of the final bin should be equal to item "E" in Line 2.

A.1.1.3 DOD Format

Beginning on line 17, through the end of the file, the DOD weather data has the following format:

Line 17 - A,B,C,D,E,F,G,H (8 values, separated by commas)
where

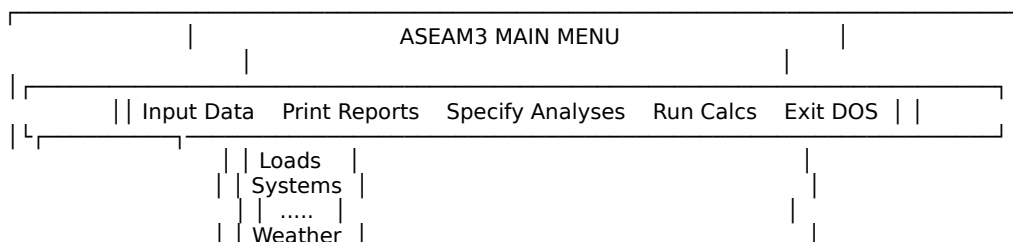
- A = Month Number
- B = Bin Number
- C = Bin Temperature (taken at midpoint of five-degree range)
- D = Number of Hours in Bin 1 (0-8 a.m.)
- E = Number of Hours in Bin 2 (8 a.m.-4 p.m.)
- F = Number of Hours in Bin 3 (4-12 midnight)
- G = Average Humidity Ratio, this Bin (lbs/lbs)
- H = Mean Coincident wet bulb temp, this bin

Lines 18 through the end of the weather file have the same format as Line 17. The data is stored in order from January through December, from the highest temperature bin of each month to the lowest temperature bin of each month. Note that the bin number of the final bin should be equal to item "E" in Line 2.

A.1.2 Entering Bin Temperature Weather Data

It is possible to generate your own weather data files, should the locations you wish to model not be included in the weather library disk. You will need weather data in one of the three bin formats described above. The ASEAM3.0 Weather Data Input Program will take this data (which you must enter) and write it out in the correct file format.

You may access the Weather Data Input Program when exiting any ASEAM3.0 program, or by marking "Input Data" from the Main Menu and "Weather" from the pull-down menu (shown below).



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| | Exit | |

When entering the weather data input program, the first screen which appears is the ASEAM3.0 Weather Menu. To generate new weather data files, mark the "Enter/Store Weather Bins" from the top bar menu. A lower bar menu will appear on the screen. Indicate the desired format for the bin data:

- ASHRAE - six, four-hour bins
- Battelle - eight, three-hour bins
- DOD - three, eight-hour bins

```

|-----|
|               ASEAM3 WEATHER MENU               |
|-----|
| | Enter/Store Weather Bins  Enter/Store Solar Bins  Exit | |
|-----|
| | ASHRAE Format  Battelle Format  DOD Format  Exit | |
|-----|
  
```

The first input screen to appear requires general site data, some of which can be found in the ASHRAE Handbook of Fundamentals.

```

|-----|
| GENERAL WEATHER BIN DATA                       |
|-----|
| Weather File Name                               |
| ASHRAE Design Summer Temperature (2.5%)         |
| ASHRAE Design Winter Temperature (97.5%)        |
| Weather Station North Latitude (deg) (Use '-' for South Lat) |
| Weather Station West Longitude (deg) (Use '-' for East Long) |
| Average Annual Barometric Pressure (in Hg)      |
|-----|
| Month      Maximum Bin      Number of      |
|            Temp (eg 97.5)    Monthly Bins     |
|-----|
| January    _____      _____          |
| February   _____      _____          |
| March      _____      _____          |
| April      _____      _____          |
| May        _____      _____          |
| June       _____      _____          |
| July       _____      _____          |
| August     _____      _____          |
| September  _____      _____          |
| October    _____      _____          |
| November   _____      _____          |
| December  _____      _____          |
|-----|
  
```

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Weather File Name - this is the name of the file the weather station will be stored with. Be sure to use only valid characters (consult your DOS manual if necessary). The weather files included with ASEAM3.0 use the last two characters of the file name for the state abbreviation, but you may choose any file name you wish.

ASHRAE Design Summer Temperature (2.5%) - self-explanatory

ASHRAE Design Winter Temperature (97.5%) - self-explanatory

Weather Station North Latitude (degrees) - use decimal degrees. For example, a station with a north latitude of 35 degrees, 30 minutes would be entered as 35.5. For south latitudes, use a negative decimal number.

Weather Station West Longitude (degrees) - use decimal degrees (see above). For east longitudes, use a negative decimal number

Average Annual Barometric Pressure (inches Hg) - IMPORTANT !! This data item is used throughout the calculations in the psychrometric routines. If your station is located at higher elevations and you use the default value (29.92 for sea level), you will get erroneous results from the calculations. To correct for altitude, see Table 3, page 6.12 of the 1985 ASHRAE Handbook of Fundamentals. The following equation was used in ASEAM3.0 to generate this value for the included weather stations:

$$WSBP = 29.921 * \exp(-alt/27362.2)$$

where

WSBP = weather station barometric pressure (inches Hg)

alt = altitude of weather station (ft)

Maximum Bin Temperature (monthly values) - use the midpoint of the highest bin temperature (that has any hours) for the month. For example, a bin from 65 to 70 degrees would be entered as 67.5 degrees. All bins cover a five degree F range. The maximum bin temperature MUST be entered correctly for each month; all other bin temperatures are calculated by subtracting, in 5 degree increments, from the maximum temperature.

Number of Monthly Bins (monthly values) - enter the total number of temperature bins (5 degree F increments) for the month, counting the highest temperature bin for the month (that has any hours) through the lowest temperature bin for the month (that has any hours).

IMPORTANT - Before you exit this screen, insure all of your data is correct! The data you enter on this input screen is used for the monthly bin data entry. If you make erroneous entries in this screen, you will have to start over at the beginning. There is no editing feature of this program!

After you have completed the above screen of general data, twelve input screens will appear in succession, one per month. The time increments, across the top of the screen, correspond to the hourly bins for the weather data format you chose. The temperature increments, down the left side of the screen, correspond to the number of temperature bins for the month, beginning with the highest bin temperature specified in the first input screen and ending with the lowest bin temperature for the month. Type in values for each temperature bin and time period for each month.

In the following example, the ASHRAE format was selected. The Battelle and DOD format

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will have different column headers corresponding to the time blocks used for their format.

Monthly Bin Data for January								
Bin Temperature Range	Mid 4AM	4AM 8AM	8AM Noon	Noon 4PM	4PM 8PM	8PM Mid	MCWB	deg F
55 to 60	—	—	—	—	—	—	—	—
50 to 55	—	—	—	—	—	—	—	—
45 to 50	—	—	—	—	—	—	—	—
40 to 45	—	—	—	—	—	—	—	—
35 to 40	—	—	—	—	—	—	—	—
30 to 35	—	—	—	—	—	—	—	—
25 to 30	—	—	—	—	—	—	—	—
20 to 25	—	—	—	—	—	—	—	—
15 to 20	—	—	—	—	—	—	—	—
10 to 15	—	—	—	—	—	—	—	—
5 to 10	—	—	—	—	—	—	—	—
0 to 5	—	—	—	—	—	—	—	—
-5 to 0	—	—	—	—	—	—	—	—
-10 to -5	—	—	—	—	—	—	—	—
-15 to -10	—	—	—	—	—	—	—	—

When entering data, you may wish to use the "Num Lock" key and enter data with the numeric keypad. After pressing this key, enter the number of bin hours with the numeric keypad and complete the entry with the "enter" key - ASEAM3.0 will automatically take you to the next entry leaving you in the "Num Lock" mode. If you make mistakes during entry, you should use the backspace key or delete entry key (F3) to correct your entry - the cursor keys will type additional numbers in the "Num Lock" mode.

After you have completed each monthly input screen, a new screen will appear that summarizes the data you have just entered. Hourly data for columns and rows will be totaled so you can quickly spot any errors in your data. If your data is correctly entered, enter "Y" to the prompt, and a new input screen will appear for the next month. If your data has errors, indicate "N" to the prompt and you will be returned to the data screen just entered (the data will still be there) and correct the erroneous entries.

NOTE - The DOD bin weather data, as published, does not always "add" up to the proper number of hours in each time block! The authors recommend that you adjust the bin with the most hours (adding or subtracting the appropriate number of hours) to correct this deficiency.

After you have completed the last input screen for December and verified the entries, the weather data file will automatically be generated and stored on the data subdirectory. The filename will be whatever you entered on the first data item of the first screen with one of the following extensions:

- .AWD - ASHRAE format
- .BWD - Battelle format
- .DWD - DOD format

The ASEAM3.0 Weather Menu will then appear again on the screen. If you do not want to create any additional weather or solar files, mark "Exit." If you wish to create another weather data file, follow the directions above again. If you wish to create a solar data file, mark "Enter/Store Solar Bins."

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A.1.3 Modifying Weather Data File

You may change the weather data if desired. By knowing the file format for the weather bins (see section A.1.1) and using a text editor, it is possible to "shift" the bins up or down easily. For example, suppose you want to simulate that January is two degrees colder and February is three degrees warmer than the data contained in the weather file. To simulate these changes, follow these steps:

- 1) Preserve the original weather data by copying the ORIGINAL weather data file to a new file name. You MUST use the same extension!

(e.g., `copy b:chicgoil.awd b:chicnewd.awd" (CR))

- 2) Enter your text editor (or word processor) and retrieve the new file. The EDLIN program on your DOS diskette will work just fine. Note that this file is in ASCII format - a DOS text file! Since many data files in ASEAM3.0 have lines extending beyond the normal 80 column right margins, you may have to set your right margins to 254 before retrieving the file, otherwise some word processors may automatically reformat the file.

- 3) Edit only the Maximum Bin Temperature for the Month to reflect the changes. In the above example, using the Chicago ASHRAE data format in section A.1.1), the following changes would be made:

Original File Contents	line #	
CHICGOIL	1	
89,-4,92.5,-2.5,130,42,87.83,29.92		2
Monthly Weather Data		3
42.5,9,1,31	4	
57.5,13,10,28	5	
etc.		

NEW FILE CONTENTS	line #	NOTE
CHICGOIL	1	(same)
89,-4,92.5,-2.5,130,42,87.83,29.92	2	(same)
Monthly Weather Data	3	(same)
40.5,9,1,31	4	42.5 to 40.5
60.5,13,10,28	5	57.5 to 60.5
etc.		

It is not necessary to change any other data - ASEAM3.0 calculates the actual bin temperature by subtracting, in 5 degree increments, from the maximum bin temperature for each month. The bin temperature in lines 17 through the end of file are not used in the calculations. (They are useful, however, if you want to "import" the weather file into LOTUS (tm). You must first copy the file to another file with a ".prn" file name extension before importing.)

- 4) After all the changes have been made with your text editor, save the file. Be sure to save the file as a DOS text file!

BEWARE - Many word processors have their own format for saving text

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and data files - complete with margin settings, page control keys, etc. It is ABSOLUTELY NECESSARY that all ASEAM3.0 editing done on ASCII files be saved in an ASCII or DOS TEXT file format. ASEAM3.0 will abort if you fail to do this since the file format will be different.

- 5) Exit your text editor. You may print the new file, if desired, using the Weather Data Report Program in ASEAM3.0.

You may check to see if the file was saved in the proper format by "typing" the file (e.g., `type b:chicnewd.awd' (CR)). If non-ASCII characters (symbols - not numbers or characters) are displayed on your screen, you have NOT saved the file in the proper format!

If you run the calculations using the newly created weather file, you will note that the outside air bin temperatures used for the calculations will start at the new values (e.g., 40.5, 35.5, 30.5, etc - instead of the normal 42.5, 37.5, 32.5 etc.)

BEWARE - There is one limitation that you must be aware of when changing weather data in this manner - only the outside air dry bulb temperature bin has been changed for each bin calculation. The outside air humidity level remains the same! That is, the data for the bin humidity ratio and mean coincident wet bulb temperature is not changed by this method (the last two data items in lines 17 through the end of file for each weather format). The errors this introduces into the energy calculations are dependent on the amount of outside air entering the building (through infiltration and ventilation) and also the amount of "shifting" you do. Larger infiltration and ventilation requirements (latent cooling and humidification), combined with larger "shifts" will obviously result in larger errors.

A.1.4 Custom Weather Data

The authors have in the past converted hourly weather data for specific sites and years into bin format for ASEAM3.0 use. Unfortunately, the hourly data nearly always comes to us in different "shapes and sizes". As an example, we have received temperature data in degrees Celsius and Fahrenheit, on floppy disks or magnetic tape, in WBAN three hour formats or hourly TRY formats, etc. It is impossible to distribute a program to you that covers all cases that you could use without modification.

The National Climatic Data Center in Asheville, North Carolina, has in their archive storage, hourly (or three hourly) weather data for numerous stations throughout the world. For a nominal fee, they will distribute to you on floppy diskettes actual hourly weather data for a given year and site. They have been extremely helpful to us in the past. If you wish to contact them, write to:

National Climatic Data Center
Federal Building
Asheville, North Carolina 28801-2696

They will take telephone orders at (704) 259-0682.

If you wish to create custom bin temperature files for use with ASEAM3.0, please contact the

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authors.

A.2 Solar Weather Data

ASEAM3.0 uses solar data files to retrieve calculation parameters during the execution of the loads calculations. The file format is described below along with using the weather data input program to generate additional solar data files.

Although the equations used to calculate sunrise time, solar altitude, etc. are straightforward and could have been placed in the loads calculations, the authors have chosen instead to store the needed calculation parameters in a solar data file. If you perform numerous ASEAM3.0 calculations with the parametric processor, for example, the calculation time required would be substantially less if these variables are retrieved instead of calculated for each run.

You can create and use a solar data file for your specific location and use any bin temperature file - the file names for the solar and bin temperature files do not have to be the same.

A.2.1 Solar Data File Format

The solar file contains data for the solar dependent loads calculations only. Included in the data are the solar altitude and azimuth angles (for exterior window shading), and the footcandles incident on vertical surfaces facing the eight directions (N,NE,E,SE,S,SW,W,NW) due to the direct (sun) and sky (clear) components. Other data required for the daylighting and exterior shading calculations are calculated within the loads segment of ASEAM3.0 and are not stored in the solar file.

The calculation parameters for the solar data files are calculated for the 15th of each month, using local time instead of solar time. Daylight savings time has been included. Solar azimuth has been stored in degrees clockwise from north. If you attempt to verify this data against ASHRAE tables, for example, you will find discrepancies since most of the ASHRAE tables use the 21st of each month and solar time instead of local time.

Like the bin temperature file, you may import the solar data into LOTUS (tm) - but first copy the original file to another file with the required '.prn' extension for LOTUS (tm).

A portion of a solar data file, in this case Chicago, Illinois, is shown below. The extension for all solar files is ".NSD". For consistency, the bin temperature file names have the same first eight characters as their corresponding solar data files. Again, you may select different weather files (both temperature and solar) when you "specify analysis" for the calculations.

File Contents	See Description Below
	Line Number
CHICGOIL	1
143,42,87.83	2
Monthly Solar/Load Data	3
11.3,.44,7.35,16.65,9,1	4
12,.47,6.87,17.31,11,10	5
11.9,.51,6.13,17.88,11,21	6
11.6,.54,5.24,18.46,13,32	7
10.3,.61,4.58,18.99,14,45	8

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9.4,.67,4.34,19.37,15,59	9	
8.6,.7,4.57,19.33,15,74	10	
8,.68,5.05,18.8,13,89	11	
9.2,.63,5.59,17.94,12,102	12	
10,.61,6.14,17.07,11,114	13	
11.1,.41,6.78,16.42,10,125	14	
11,.38,7.29,16.27,9,135	15	
Hourly Solar Data	16	
Lines 17 through the end of file		additional data
1,8,6,125.5,144,207,534,623,375,165,133,124,0,266,1621,1889,....,1		
1,9,14.4,136.9,234,315,772,965,819,333,238,216,0,0,2744,4006,....,2		
1,10,21,149.8,261,351,702,1055,1000,533,310,253,0,0,2473,4850,....,3		
...		
2,7,1.2,108.5,38,68,150,142,56,37,31,32,0,184,398,381,120,0,0,0,10		

et cetera

The information contained in this file is as follows:

Line 1 - Solar Station Name

Line 2 - A,B,C (three values, separated by commas)

where

A = Number of Annual Solar Bins (i.e.: sum of monthly hours)

B = Solar Station (or actual site) Latitude (degrees North)

C = Solar Station (or actual site) Longitude (degrees West)

Line 3 - "Monthly Solar/Load Data" - a delimiter line (ignored)

Line 4 - A,B,C,D,E,F (six values, separated by commas)

where

A = Average Monthly Wind Speed, January (miles per hour)

B = Fraction Percent Sunshine (decimal), January

C = Local Sunrise Time (decimal hours), January

D = Local Sunset Time (decimal hours), January

E = Integer Number of Hours Sun is Up, January

F = Pointer, Line Number for First Hour of January

Line 5-15 - same as Line 4, one line for each month, February to December.

Line 16 - "Hourly Solar Data" - a delimiter line (ignored)

Line 17 - A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U (twenty one values)

where

A = Month Number

B = Local Hour Number (hour beginning at this time)

C = Solar Altitude for this hour (degrees from horizontal)

D = Solar Azimuth for hour (degrees clockwise from North)

E-L = Vertical Illuminance from Clear Sky (footcandles)

on N,NE,E,SE,S,SW,W,NW surfaces, respectively

N-T = Vertical Illuminance from the direct Sun (footcandles)

on N,NE,E,SE,S,SW,W,NW surfaces, respectively

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U = Bin Number (begins at 1 for first line of hourly data)

Lines 18-... - same as Line 17, one line for each hour that the sun is up. The sequence of lines is from sunrise to sunset hour for January, then February, on through December. Note that the number of the last solar bin (item "T" in the last line) should be equal to item "A" in line 2.

A.2.2 Entering Solar Data

There is only one screen of data to input for the generation of a solar data file. After you have entered the last value, calculations will be performed and a solar data file will be generated. The ASEAM3.0 Weather Menu will then reappear on the screen. The file will automatically be saved in the data subdirectory and will have the same name you specify on the first data entry of the screen plus the extension ".NSD".

(Note: it is normal for the program to take a few minutes to do the calculations for this file. The screen will be updated during the calculations).

```

+-----+
| GENERAL SOLAR DATA |
+-----+
| Solar File Name _____ |
| Solar Station North Latitude (deg) (Use '-' for South Lat) _____ |
| Solar Station West Longitude (deg) (Use '-' for East Long) _____ |
| Time Zone Number _____ |
| 4=Atlantic 5=Eastern 6=Central 7=Mountain 8=Pacific _____ |
| Daylight Savings Time (Y/N) _____ |
|
| Month      Wind Speed      Fraction %
|            (MPH)           Sunshine
|
| January    _____    _____
| February   _____    _____
| March      _____    _____
| April      _____    _____
| May        _____    _____
| June       _____    _____
| July       _____    _____
| August     _____    _____
| September  _____    _____
| October    _____    _____
| November   _____    _____
| December  _____    _____
+-----+

```

Solar File Name - this is the name of the file the solar data will be stored with. Be sure to use only valid characters (consult your DOS manual if necessary). The solar files included with ASEAM3.0 use the last two characters of the file name for the state abbreviation, but you may choose any file name you wish.

Solar Station North Latitude (degrees) - use decimal degrees. For example, a station with a north latitude of 35 degrees, 30 minutes would be entered as 35.5. For south latitudes, use a negative decimal number.

Solar Station West Longitude (degrees) - use decimal degrees (see above). For east longitudes, use a negative decimal number

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Time Zone Number - enter the time zone number for your solar data file. If your station is not in one of the listed time zones, or your station is in east longitudes, use the following table as a general guide:

Degrees West Longitude	Time Zone Number
0 to 15	0
15 to 30	1
30 to 45	2
45 to 60	3
60 to 75	4
75 to 90	5
90 to 105	6
105 to 120	7
120 to 135	8
135 to 150	9
150 to 165	10
165 to 180	11

Degrees East Longitude	Time Zone Number
0 to 15	23
15 to 30	22
30 to 45	21
45 to 60	20
60 to 75	19
75 to 90	18
90 to 105	17
105 to 120	16
120 to 135	15
135 to 150	14
150 to 165	13
165 to 180	12

Daylight Savings Time (Y/N) - enter either a 'Y' or 'N'. ASEAM3.0 will automatically adjust the local hour if daylight savings is used at your location.

Wind Speed (MPH) - monthly values. Enter the average wind speed for each month in miles per hour. This data is used in the infiltration calculations. You should be able to obtain this information from any climatic atlas, or possibly from the local weather bureau.

Fraction Percent Sunshine (monthly values) - enter in percent (not decimal). This data is used to determine the diversified solar loads. Section A.2.2.1 below contains these values for several stations across the United States.

After you have completed all of the above input data items, the solar calculations will be performed, the solar file will be stored in the data subdirectory and you will be returned to the ASEAM3.0 Weather Menu.

A.2.2.1 Fraction Percent Sunshine Data

Printed below are the fraction percent sunshine values for several U.S. stations. These

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monthly values are also available from the Local Climatological Data Annual Summary for each station (under the column heading "Percent of Possible Sunshine"). This document is available from NCDC (see section A.1.4 above for address). Since local meteorological stations, generally airports, are used to supply this information to NCDC, you may be able to get this information locally also.

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Mean Percentage of Possible Sunshine for Selected Locations

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
AL, Birmingham	43	49	58	63	66	67	62	65	66	67	58	44	59
Montgomery	51	53	61	69	73	72	66	69	69	71	64	48	64
AK, Anchorage	39	46	56	58	50	51	45	39	35	32	33	29	45
Fairbanks	34	50	61	68	55	53	45	35	31	28	38	29	44
Juneau	30	32	39	37	34	35	28	30	25	18	21	18	30
Nome	44	46	48	53	51	48	32	26	34	35	36	30	41
AZ, Phoenix	76	79	83	88	93	94	84	84	89	88	84	77	85
Yuma	83	87	91	94	97	98	92	91	93	93	90	83	81
AR, Little Rock	44	53	57	62	67	72	71	73	71	74	58	47	62
CA, Eureka	40	44	50	53	54	56	51	46	52	48	42	39	49
Fresno	46	63	72	83	89	94	97	97	93	87	73	47	78
Los Angeles	70	69	70	67	68	69	80	81	80	76	79	72	73
Red Bluff	50	60	65	75	79	86	95	94	89	77	64	50	75
Sacramento	44	57	67	76	82	90	96	95	92	82	65	44	77
San Diego	68	67	68	66	60	60	67	70	70	70	76	77	68
San Francisco	53	57	63	69	70	75	68	63	70	70	62	54	66
CO, Denver	67	67	65	63	61	69	68	68	71	71	67	65	67
Grand Junction	58	62	64	67	71	79	78	72	77	74	67	58	69
CT, Hartford	46	55	56	54	57	60	62	60	57	55	46	46	58
D.C., Washington	46	53	56	57	61	64	64	62	62	61	54	47	58
FL, Apalachicola	59	62	62	71	77	70	64	63	62	74	66	53	66
Jacksonville	58	59	66	71	71	63	62	63	58	58	61	53	62
Key West	68	75	78	78	76	70	69	71	65	65	69	66	71
Miami Beach	66	72	73	73	68	62	65	67	62	62	65	65	67
Tampa	63	67	71	74	75	66	61	64	64	67	67	61	68
GA, Atlanta	48	53	57	65	68	68	62	63	65	67	60	47	60
HI, Hilo	48	42	41	34	31	41	44	38	42	41	34	36	38
Honolulu	62	64	60	62	64	68	67	70	70	68	63	60	65
Lihue	48	48	48	46	51	60	58	59	67	58	51	49	54
ID, Boise	40	48	59	67	68	75	89	86	81	66	46	37	66
Pocatello	37	47	58	64	66	72	82	81	78	68	48	36	64
IL, Cairo	46	53	59	65	71	77	82	79	75	73	56	46	65
Chicago	44	49	53	56	63	69	73	70	65	61	47	41	59
Springfield	47	51	54	58	64	69	76	72	73	64	53	46	60
IN, Evansville	42	49	55	61	67	73	78	76	73	67	52	42	64
Ft. Wayne	38	44	51	55	62	69	74	69	64	58	41	38	57
Indianapolis	41	47	49	55	62	68	74	70	65	64	48	38	59
IA, Des, Moines	56	56	56	59	62	66	75	70	64	64	53	48	62
Dubuque	48	52	52	58	60	63	73	67	61	55	44	40	57
Sioux City	55	58	58	59	63	67	75	72	67	65	53	50	63

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KS, Concordia	60	60	62	63	65	73	79	76	72	70	64	58	67
Dodge City	67	66	68	68	68	74	78	78	76	75	70	67	71
Wichita	61	63	64	64	68	73	80	77	73	69	67	59	69
KY, Louisville	41	57	52	57	64	68	72	69	68	64	51	58	59
LA, New Orleans	49	50	57	63	68	64	58	60	64	70	60	46	58
Shreveport	48	54	58	60	60	78	79	80	79	77	65	60	69
Eastport	45	51	52	52	51	53	55	57	54	50	37	40	50
MA, Boston	47	56	57	56	59	62	64	63	61	58	48	48	57
MI, Alpena	29	43	52	56	59	64	70	64	52	44	24	22	51
Detroit	34	42	48	52	58	65	69	66	61	54	35	29	53
Grand Rapids	26	37	48	54	60	66	72	67	58	50	31	22	48
Marquette	31	40	47	52	53	56	63	57	47	38	24	24	47
S. St. Marie	28	44	50	54	54	59	63	58	45	36	21	22	47
MN, Duluth	47	55	60	58	58	60	68	63	53	47	36	40	55
Minneapolis	49	54	55	57	60	64	72	69	60	54	40	40	56
MS, Vicksburg	46	50	57	64	69	73	69	72	74	71	60	45	64
MO, Kansas City	55	57	59	60	64	70	76	73	70	67	59	52	65
St. Louis	48	49	58	59	64	68	72	68	67	65	54	44	61
Springfield	48	54	57	60	63	69	77	72	71	65	58	48	63
MT, Havre	49	58	61	63	63	65	78	75	64	57	48	46	62
Helena	46	55	58	60	59	63	77	74	63	57	48	43	60
Kalispell	28	40	49	57	58	60	77	73	61	50	28	20	53
NE, Lincoln	57	59	60	60	63	69	75	71	67	66	59	55	64
North Platte	63	63	64	62	64	72	78	74	72	70	62	58	68
NV, Ely	61	64	68	65	67	79	79	81	81	73	67	62	72
Las Vegas	74	77	78	81	85	91	84	86	92	84	83	75	82
Reno	59	64	69	75	77	82	90	89	86	76	68	58	78
Winnemucca	52	60	64	70	78	83	90	90	86	75	62	53	74
NH, Concord	48	53	55	53	51	58	57	58	55	50	43	43	52
NJ, Atlantic City	51	57	58	59	62	65	67	68	65	54	58	52	60
NM, Albuquerque	70	72	72	78	79	84	76	75	81	80	79	70	76
Roswell	69	72	75	77	76	80	76	75	74	74	74	69	74
NY, Albany	43	51	53	53	57	62	63	61	58	54	39	38	53
Binghamton	31	39	41	44	50	56	54	51	47	43	29	26	44
Buffalo	32	41	49	51	59	67	70	67	60	51	31	28	53
Canton	37	47	50	48	54	61	63	61	54	45	30	31	49
New York	49	56	57	59	62	65	66	64	64	61	53	50	59
Syracuse	31	38	45	50	58	64	67	63	56	47	29	26	50
NC, Asheville	48	53	56	61	64	63	59	59	62	64	59	48	58
Raleigh	50	56	59	64	67	65	62	62	63	64	62	52	61
ND, Bismark	52	58	56	57	58	61	73	69	62	59	49	48	59
Devils Lake	53	60	59	60	59	62	71	67	59	56	44	45	58

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Fargo	47	55	56	58	62	63	73	69	60	57	39	46	59
Williston	51	59	60	63	66	66	78	75	65	60	48	48	63
OH, Cincinnati	41	46	52	56	62	69	72	66	68	60	46	39	57
Cleveland	29	36	45	52	61	67	71	68	62	54	32	25	50
Columbus	36	44	49	54	63	68	71	68	66	60	44	35	55
OK, Okla. City	57	60	63	64	65	74	76	78	74	68	64	57	68
OR, Baker	41	49	56	81	63	67	83	81	74	62	46	37	60
Portland	27	34	41	49	52	56	70	65	55	42	28	23	48
Roseburg	24	32	40	51	57	59	79	77	68	42	28	18	51
PA, Harrisburg	43	52	55	57	61	65	68	63	62	58	47	43	57
Philadelphia	45	56	57	58	61	62	64	61	62	51	53	49	57
Pittsburgh	32	36	45	50	57	62	64	61	62	54	39	30	51
RI, Block Island	45	54	57	56	58	60	62	62	60	59	50	44	56
SC, Charleston	58	60	65	72	73	70	66	66	67	68	68	57	66
Columbia	53	57	62	68	69	68	63	65	64	68	64	51	63
SD, Huron	55	62	60	62	65	68	76	72	66	61	52	49	63
Rapid City	58	62	63	62	61	66	73	73	69	66	58	54	64
TN, Knoxville	42	49	53	59	64	66	64	59	64	64	53	41	57
Memphis	44	51	57	64	68	74	73	74	70	69	56	45	64
Nashville	42	47	54	60	65	69	69	68	69	65	55	42	59
TX, Abilene	64	68	73	66	73	86	83	85	73	71	72	66	73
Amarillo	71	71	75	75	75	82	81	81	79	76	75	70	76
Austin	46	50	57	60	62	72	76	79	70	70	57	49	63
Brownsville	44	49	51	57	65	73	78	78	67	70	54	44	61
Del Rio	53	55	61	63	60	66	75	80	89	65	58	52	63
El Paso	74	77	81	85	87	87	78	78	80	82	80	73	80
Ft. Worth	56	57	66	66	67	75	78	78	74	70	63	58	68
Galveston	50	50	55	61	69	76	72	71	70	74	62	49	63
San Antonio	48	51	56	58	60	69	74	75	69	67	55	49	62
UT, Salt Lk City	48	53	61	68	73	78	82	82	84	73	56	49	69
VT, Burlington	34	43	48	47	53	59	62	59	51	43	25	24	48
VA, Norfolk	50	57	60	63	67	66	66	64	63	64	60	51	62
Richmond	49	55	59	63	67	66	65	62	63	64	58	50	61
WA, North Head	28	37	42	48	48	48	50	46	48	41	31	27	41
Seattle	27	34	42	48	53	48	62	58	53	36	28	24	43
Spokane	28	47	53	63	64	68	82	79	68	53	28	22	54
Tatoosh Island	28	36	39	45	47	46	48	44	44	38	26	23	41
Walla Walla	24	35	51	63	67	72	86	84	72	59	33	20	56
Yakima	34	49	62	70	72	74	86	86	74	61	38	29	61
WV, Elkins	33	37	42	47	55	55	56	53	55	51	41	33	47
Parkersburg	30	36	42	49	56	60	63	60	60	53	37	29	48
WS, Green Bay	44	51	55	56	58	64	70	65	58	52	40	40	54

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Madison	44	48	52	53	58	64	70	66	60	56	41	38	54
Milwaukee	44	48	53	58	60	65	73	67	62	56	44	39	56
WY, Cheyenne	65	66	64	61	59	68	70	68	69	69	65	63	66
Lander	66	70	71	66	65	74	76	75	72	67	61	62	69
Sheridan	56	61	62	61	51	67	76	74	67	60	53	52	68
Yellowstone Park	36	51	55	57	56	63	73	71	65	57	45	38	54
PR, San Juan	64	69	71	68	59	62	65	67	61	63	63	65	65

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A.3 Available Bin Temperature Weather Stations

On the following pages you will find an alphabetical listing by state of the U.S. bin temperature weather stations available (at this printing) in all three formats. See Appendix F (Suggested References) for the official document names containing this data. Only the ASHRAE format files are included in the ASEAM3.0 distribution. You will have to enter the bin weather data for any other station. There is no known source (the authors have looked) that have this data on any type of computer media.

You may notice that the data may differ widely when comparing heating degree days, for example, for the same station stored in different formats. The reasons are that the data base items were taken from different sources of bin data: WYEC versus TRY hourly data or DOD average data:

Data base items (e.g., heating degree days) for files stored in the DOD format were taken from the DOD AFM88-29 manual (not ASHRAE).

Data base items using the ASHRAE format or Battelle format (WYEC data) were taken from the ASHRAE Handbooks.

Data base items for files in the Battelle TRY format were taken from weather data summaries produced by the DOE program using these hourly TRY data files.

The headings for most of the columns are self-explanatory. Some columns in this printout need further explanation:

Weather Station Name - many of the DOD stations have military abbreviations (e.g., AFB - Air Force Base, NAS - Naval Air Station)

Weather Type - the following abbreviations are used:

DOD - defense weather data - available in three, eight hour periods

AWD - ASHRAE weather data - available in six, four hour periods

BWD-WYEC - Battelle weather data using WYEC hourly data - available in eight, three hour time periods

BWD-TRY - Battelle weather data using TRY hourly data - available in eight, three hour time periods

Alt (ft) - the altitude or elevation of the station (in feet)

MCWB - mean coincident wet bulb temperature in degrees F. This value is coincident with the design summer temperature in the previous column.

Cooling Degree Days - this data, for consistency and completeness, was taken from the DOD AFM88-29 manual for all bin weather formats.

Weather Filename - if there anything printed in this column, this station's solar and bin temperature data files are included in the ASEAM3.0 weather data disk and are stored with this file name.

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Weather Station	State	Weather	N Lat	W Long	Alt	Max Bin	Min Bin	Winter	Heating	Summer	MCWB	Cooling	Days	Design	Deg	Days	Design	(2.5%)	Deg
Name	Type	Deg.Min	Deg.Min	(ft)	deg F	deg F	(97.5%)	base 65	(2.5%)	deg F	base 65								
Filename																			
=====																			
=====																			
Adak NAVSTA/Mitchell Field	AK	DOD	51.53	176.39	19	72.5	7.5	23	8,825	59	56	0							
Barrow	AK	DOD	71.18	156.47	31	67.5	-52.5	-41	20,265	53	50	0							
Eielson AFB/Fairbanks	AK	DOD	64.40	147.06	545	87.5	-57.5	-48	14,498	77	59	30							
Elmendorf AFB/Anchorage	AK	DOD	61.15	148.48	212	82.5	-32.5	-16	10,722	68	57	8							
Juneau MAP	AK	DOD	58.22	134.35	12	82.5	-12.5	1	9,007	70	58	0							
Kodiak	AK	DOD	57.45	152.29	73	77.5	2.5	13	8,860	65	56	0							
Nome MAP	AK	DOD	64.30	165.26	13	77.5	-37.5	-27	14,325	62	55	0							
Birmingham	AL	BWD-TRY	33.36	86.54	610	97.5	12.5	21	3,020	89	77	1,928							
Birmingham	AL	AWD	33.30	86.50	610	97.5	12.5	21	2,551	94	75	1,928							
BIRMHMAL																			
Birmingham MAP	AL	DOD	33.34	86.45	620	102.5	2.5	21	2,844	94	75	1,928							
Fort Rucker/Cairns AAF	AL	DOD	31.16	85.43	305	97.5	12.5	27	1,968	92	76	2,386							
Huntsville	AL	DOD	34.42	86.35	606	92.5	-2.5	16	3,302	93	74	1,808							
Maxwell AFB/Montgomery	AL	DOD	32.23	86.22	169	102.5	7.5	25	2,153	94	77	2,489							
Blytheville AFB	AR	DOD	35.57	89.57	264	102.5	-2.5	15	3,760	94	77	1,789							
Fort Smith	AR	DOD	35.20	94.22	463	107.5	-2.5	17	3,336	98	76	2,022							
Little Rock	AR	AWD	34.40	92.10	257	107.5	12.5	20	3,219	96	77	1,925							
LITLRKAR																			
Little Rock AFB	AR	DOD	34.55	92.09	311	97.5	2.5	18	3,241	94	77	2,034							
Davis-Monthan/Tucson	AZ	DOD	32.11	110.54	2,654	107.5	17.5	33	1,574	101	67	2,985							
Flagstaff	AZ	DOD	35.08	111.40	7,006	87.5	-12.5	4	7,322	82	55	140							
Fort Huachuca/Libby	AZ	DOD	31.35	110.20	4,664	97.5	17.5	28	2,551	92	62	1,573							
Luke AFB/Glendale	AZ	DOD	33.33	112.22	1,101	117.5	22.5	34	1,410	108	71	3,601							
Phoenix	AZ	AWD	33.30	112.00	1,117	112.5	22.5	34	1,765	107	71	3,508							
PHOENXAZ																			
Phoenix	AZ	BWD-TRY	33.24	112.00	1,117	112.5	22.5	32	1,918	106	76	3,508							
Yuma MCAS/IAP	AZ	DOD	32.39	114.37	213	117.5	32.5	39	1,005	109	72	4,195							
Alameda/Nimitz Field	CA	DOD	37.47	122.19	15	97.5	32.5	40	2,507	79	63	189							
Arcata	CA	DOD	40.59	124.06	218	87.5	32.5	33	5,029	69	59	0							
Beale AFB/Marysville	CA	DOD	39.07	121.26	113	107.5	22.5	30	2,835	100	69	1,525							
Bishop	CA	DOD	37.22	118.22	4,108	107.5	2.5	15	4,313	100	61	1,037							
Castle AFB/Merced	CA	DOD	37.23	120.34	188	112.5	22.5	31	2,590	99	69	1,566							
Edwards AFB	CA	DOD	34.54	117.52	2,302	112.5	7.5	22	3,077	102	67	1,829							
Fresno	CA	BWD-TRY	36.48	119.42	326	107.5	27.5	30	3,177	99	72	1,671							
Los Angeles	CA	BWD-TRY	33.54	118.24	99	102.5	37.5	45	1,872	78	67	615							
Los Angeles	CA	BWD-WYEC	34.00	118.20	99	102.5	37.5	43	2,061	80	68	615							
Los Angeles	CA	AWD	34.00	118.20	99	102.5	37.5	43	2,061	80	68	615							
LOSANGCA																			
Los Angeles IAP	CA	DOD	33.56	118.24	97	102.5	37.5	43	1,819	80	68	615							
McClellan/Sacramento	CA	DOD	38.40	121.24	76	107.5	22.5	31	2,566	99	69	1,406							
Moffett Field NAS	CA	DOD	37.25	122.03	34	92.5	27.5	36	2,511	81	65	239							
Norton/San Bernadino	CA	DOD	34.06	117.14	1,156	107.5	27.5	33	1,978	99	69	1,499							

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Weather Station	State	Weather	N Lat	W Long	Alt	Winter Temp	Heating Temp	Summer Design	MCWB	Cooling Deg Days	Design (2.5%) Deg	
Name	Type	Deg.Min	Deg.Min	(ft)	deg F	deg F (97.5%)	base 65 (2.5%)	deg F	base 65			
Filename												
=====												
=====												
Sacramento	CA	BWD-TRY	38.30	121.30	17	102.5	27.5	28	3,664	96	70	1,159
San Diego	CA	BWD-TRY	32.24	117.12	48	97.5	27.5	46	1,396	77	68	584
San Diego FWF	CA	DOD	32.43	117.09	48	97.5	27.5	46	1,782	78	70	584
San Francisco	CA	BWD-TRY	37.36	122.24	8	87.5	32.5	38	3,705	76	64	108
Travis AFB/Fairfield	CA	DOD	38.16	121.56	62	107.5	22.5	32	2,725	95	67	831
Vandenberg AFB/Lompoc	CA	DOD	34.43	120.34	368	97.5	32.5	38	3,451	70	61	66
Buckley ANGB/Denver	CO	DOD	39.42	104.45	5,663	97.5	-22.5	1	6,239	90	60	582
CO Springs/Peterson	CO	DOD	38.49	104.43	6,145	97.5	-17.5	2	6,473	88	57	461
Denver	CO	AWD	39.50	104.50	5,283	97.5	-2.5	1	6,283	91	59	625
DENVERCO												
Grand Junc/Walker Fld	CO	DOD	39.07	108.32	4,843	102.5	-17.5	7	5,605	94	59	1,140
Pueblo Memorial	CO	DOD	38.17	104.31	4,684	102.5	-22.5	0	5,394	95	61	981
Trinidad	CO	DOD	37.16	104.20	5,761	97.5	-17.5	3	5,642	91	61	705
Washington, Dist of Columbia	DC	BWD-WYEC	38.50	77.00	14	92.5	12.5	17	4,224	91	74	1,415
Washington, Dist of Columbia	DC	AWD	38.50	77.00	14	92.5	12.5	17	4,224	91	74	1,415
Washington, Dist of Columbia	DC	BWD-TRY	38.54	77.00	14	92.5	12.5	17	4,247	91	76	1,415
Dover AFB	DE	DOD	39.08	75.28	28	102.5	2.5	15	4,756	90	75	1,115
Wilmington Airport	DE	DOD	39.40	75.36	78	102.5	2.5	14	4,940	89	74	992
Eglin AFB/Valparaiso	FL	DOD	30.29	86.31	85	97.5	12.5	29	1,658	91	77	2,620
Fort Myers/Page Fld	FL	DOD	26.35	81.52	15	97.5	32.5	44	457	92	78	3,711
Homestead AFB	FL	DOD	25.29	80.24	7	92.5	37.5	47	218	89	78	3,906
Jacksonville	FL	BWD-TRY	30.30	81.42	80	97.5	22.5	33	1,385	92	78	2,775
Jacksonville/Cecil NAS	FL	DOD	30.13	81.53	80	97.5	22.5	31	1,379	93	77	2,775
Key West NAS	FL	DOD	24.34	81.41	6	92.5	47.5	55	102	90	79	4,663
MacDill AFB/Tampa	FL	DOD	27.51	82.30	13	97.5	27.5	40	560	91	77	3,493
McCoy AFB/Orlando	FL	DOD	28.27	81.20	96	97.5	27.5	38	709	91	76	3,354
Miami	FL	AWD	25.50	80.20	7	92.5	37.5	47	214	90	77	4,038
Miami	FL	BWD-TRY	25.48	80.18	7	92.5	37.5	49	186	89	79	4,038
Miami	FL	BWD-WYEC	25.50	80.20	7	92.5	37.5	47	214	90	77	4,038
Patrick/Cocoa Beach	FL	DOD	28.14	80.36	9	97.5	32.5	43	452	88	78	3,405
Pensacola/Sherman Fld	FL	DOD	30.21	87.19	30	97.5	12.5	30	1,654	91	78	2,642
Tallahassee	FL	BWD-WYEC	30.20	84.20	58	97.5	22.5	30	1,485	92	76	2,563
Tallahassee	FL	AWD	30.20	84.20	58	97.5	22.5	30	1,485	92	76	2,563
TALHASFL												
Tampa	FL	BWD-TRY	28.00	82.30	19	97.5	27.5	42	626	90	78	3,366
Tampa	FL	AWD	28.00	82.30	19	97.5	27.5	40	683	91	77	3,366
Tyndall AFB/Panama City	FL	DOD	30.04	85.35	18	97.5	17.5	33	1,413	90	77	2,737
Atlanta	GA	AWD	33.40	84.30	1,005	92.5	12.5	22	2,961	92	74	1,589
ATLNTAGA												
Atlanta	GA	BWD-TRY	33.42	84.24	1,005	92.5	12.5	25	3,105	87	76	1,589

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Weather Station Days Weather Name Filename	State	Weather	N Lat	W Long	Alt	Winter Temp	Heating Temp	Summer Design	MCWB	Cooling Deg Days	Design (2.5%) deg F	Deg base 65 (2.5%) deg F
=====												
=====												
Atlanta/Hartsfld IAP	GA	DOD	33.39	84.26	1,010	102.5	2.5	22	3,095	92	74	1,589
Augusta/Bush Fld	GA	DOD	33.22	81.58	136	102.5	12.5	23	2,547	95	76	1,995
Ft. Benning/Lawson AAF	GA	DOD	32.21	85.00	232	97.5	7.5	24	2,406	93	76	2,203
Glynco NAS/Brunswick	GA	DOD	31.15	81.29	25	97.5	17.5	29	1,765	91	78	2,423
Hunter AAF/Savannah	GA	DOD	32.01	81.08	42	102.5	17.5	27	2,029	91	77	2,372
Moody AFB/Valdosta	GA	DOD	30.58	83.12	233	102.5	22.5	31	1,549	94	77	2,716
Robins AFB/Macon	GA	DOD	32.38	83.36	294	102.5	7.5	25	2,244	93	76	2,276
Turner AFB/Albany NAS	GA	DOD	31.36	84.05	223	102.5	17.5	29	1,793	95	76	2,631
Barbers Point NAS	HI	DOD	21.19	158.05	34	92.5	52.5	62	1	86	74	3,929
Des Moines DESMONIA	IA	AWD	41.30	93.40	948	97.5	-17.5	-5	6,588	91	74	928
Des Moines MAP	IA	DOD	41.32	93.39	938	102.5	-17.5	-5	6,710	91	74	928
Sioux City MAP	IA	DOD	42.24	96.23	1,095	102.5	-17.5	-7	6,953	92	74	932
Boise	ID	BWD-TRY	43.30	116.12	2,842	102.5	-2.5	15	5,945	92	64	714
Boise	ID	BWD-WYEC	43.30	116.10	2,842	102.5	-2.5	10	5,809	94	64	714
Boise	ID	AWD	43.30	116.10	2,842	102.5	-2.5	10	5,809	94	64	714
Lewiston	ID	DOD	46.23	117.01	1,413	102.5	-17.5	6	5,464	93	64	657
Mountain Home AFB	ID	DOD	43.02	115.54	2,996	107.5	-12.5	8	5,732	97	63	907
Pocatello	ID	DOD	42.55	112.36	4,454	97.5	-22.5	-1	7,063	91	60	437
Chicago	IL	BWD-TRY	41.48	87.48	658	92.5	-2.5	3	6,237	89	74	664
Chicago	IL	AWD	42.00	87.50	658	92.5	-2.5	-4	6,639	89	74	664
Chicago	IL	BWD-WYEC	42.00	87.50	658	92.5	-2.5	-4	6,639	89	74	664
Chicago /O Hare IAP	IL	DOD	41.59	87.54	658	97.5	-17.5	-4	6,497	89	74	664
Evansville/Dress Rgnl. Aprt.	IL	DOD	38.03	87.32	381	102.5	-12.5	9	4,624	93	75	1,364
Glenview NAS	IL	DOD	42.05	87.49	659	97.5	-17.5	-3	6,582	89	74	832
Moline/Quad City Aprt.	IL	DOD	41.27	90.31	582	97.5	-17.5	-4	6,395	91	75	893
Scott AFB/Belleville	IL	DOD	38.33	89.51	453	102.5	-7.5	6	4,855	92	76	1,421
Springfield/Capital	IL	DOD	39.50	89.40	588	102.5	-12.5	2	5,558	92	74	1,116
Grissom AFB/Bunker Hill	IN	DOD	40.39	86.09	813	97.5	-17.5	-1	6,278	88	73	837
Indianapolis	IN	AWD	39.40	86.20	793	97.5	-7.5	2	5,699	90	74	974
Indianapolis	IN	BWD-TRY	39.54	86.18	793	97.5	-7.5	0	6,036	88	76	974
South Bend/St. Joseph Aprt.	IN	DOD	41.42	86.19	773	97.5	-12.5	1	6,462	89	73	695
Terre Haute/Hulman Fld.	IN	DOD	39.27	87.18	585	107.5	-17.5	4	5,351	92	74	1,110
Dodge City DODGCTKN	KS	AWD	37.50	100.00	2,594	102.5	2.5	5	4,986	95	69	1,411
Dodge City	KS	DOD	37.46	99.58	2,582	102.5	-7.5	5	5,046	97	69	1,411
Dodge City	KS	BWD-TRY	37.30	100.00	2,594	102.5	2.5	3	5,659	97	71	1,411
Forbes ANGB/Topeka	KS	DOD	38.57	95.40	1,064	107.5	-7.5	4	5,309	93	76	1,430

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Weather Station Days Weather Name Filename	State	Weather	N Lat	W Long	Alt	Max Bin Temp	Min Bin Temp	Winter Temp	Heating Temp	Summer Design	MCWB Deg Days	Cooling Design (2.5%)	Deg Design (2.5%)
Type	Deg.Min	Deg.Min	(ft)	deg F	deg F (97.5%)	base 65 (2.5%)	deg F	base 65					
=====													
=====													
Fort Riley/Marshall AAF	KS	DOD	39.03	96.46	1,065	107.5	-12.5	3	5,306	95	75	1,503	
Goodland/Renner Fld.	KS	DOD	39.22	101.42	3,654	107.5	-17.5	0	6,119	96	65	925	
McConnell AFB/Wichita	KS	DOD	37.38	97.16	1,371	107.5	-7.5	8	4,695	96	74	1,687	
Fort Campbell/Campbell AAF	KY	DOD	36.40	87.29	571	102.5	-7.5	10	4,290	92	75	1,472	
Fort Knox/Goodman AAF	KY	DOD	37.54	85.58	753	97.5	-12.5	7	4,616	90	75	1,360	
Louisville	KY	BWD-TRY	38.12	85.42	474	92.5	-7.5	10	4,660	93	74	1,268	
Barksdale AFB/Shreveport	LA	DOD	32.30	93.40	167	102.5	7.5	24	2,337	94	77	2,451	
England AFB/Alexandria	LA	DOD	31.20	92.33	89	97.5	12.5	27	1,964	94	77	2,606	
Lake Charles	LA	AWD	30.10	93.10	14	97.5	27.5	31	1,459	93	77	2,739	
LKCHASLA													
Lake Charles	LA	BWD-TRY	30.06	93.12	14	97.5	27.5	32	1,895	92	80	2,739	
Lake Charles	LA	BWD-WYEC	30.10	93.10	14	97.5	27.5	31	1,459	93	77	2,739	
Lake Charles MAP	LA	DOD	30.07	93.13	9	102.5	17.5	31	1,498	93	77	2,739	
New Orleans	LA	BWD-TRY	30.00	90.18	3	97.5	17.5	32	1,877	90	79	2,703	
New Orleans NAS	LA	DOD	29.50	90.01	3	97.5	17.5	31	1,617	91	78	2,703	
Boston	MA	BWD-WYEC	42.20	71.00	15	97.5	2.5	9	5,634	88	71	661	
Boston	MA	BWD-TRY	42.24	71.00	15	97.5	2.5	15	5,874	88	74	661	
Boston	MA	AWD	42.20	71.00	15	97.5	2.5	9	5,634	88	71	661	BOSTONMA
Hanscom AFB/Bedford	MA	DOD	42.28	71.17	133	97.5	-17.5	3	6,474	90	73	591	
Otis AFB/Falmouth	MA	DOD	41.39	70.31	132	92.5	-2.5	9	6,132	82	71	490	
Westover AFB	MA	DOD	42.12	72.32	245	97.5	-17.5	0	6,794	87	71	584	
Andrews AFB	MD	DOD	38.49	76.52	279	97.5	2.5	14	4,551	90	74	1,237	
Patuxent River NAS	MD	DOD	38.17	76.26	38	97.5	7.5	18	4,307	89	75	1,377	
Bangor IAP/Dow AFB	ME	DOD	44.48	68.50	192	92.5	-22.5	-6	8,034	83	68	304	
Brunswick NAS	ME	DOD	43.54	69.56	75	92.5	-17.5	-2	7,552	81	68	308	
Loring AFB	ME	DOD	46.57	67.53	746	92.5	-22.5	-12	9,500	80	66	152	
Portland	ME	AWD	43.40	70.20	61	92.5	-2.5	-1	7,511	84	71	252	PORTLNME
Portland	ME	BWD-TRY	43.42	70.18	61	92.5	-2.5	0	7,712	84	72	252	
Detroit	MI	AWD	42.20	83.00	633	92.5	2.5	6	6,232	88	72	743	DETROTM
Detroit	MI	BWD-TRY	42.12	83.18	633	92.5	2.5	4	6,549	88	77	743	
K I Sawyer AFB	MI	DOD	46.21	87.24	1,220	97.5	-22.5	-11	9,498	82	68	198	
Kincheloe AFB	MI	DOD	46.15	84.28	799	92.5	-22.5	-10	9,234	81	68	173	
Lansing/Capital City Aprt.	MI	DOD	42.47	84.36	841	97.5	-12.5	1	6,904	87	72	535	
Muskegon/Muskegon Co Aprt	MI	DOD	43.10	86.14	625	92.5	-12.5	6	6,890	84	70	469	
Selfridge ANGB/Mt. Clemens	MI	DOD	42.36	82.50	583	97.5	-12.5	3	6,665	86	72	661	
Traverse City Aprt.	MI	DOD	44.45	85.35	624	97.5	-22.5	1	7,698	86	71	376	
Wurtsmith AFB/Oscoda	MI	DOD	44.27	83.24	634	97.5	-17.5	-3	7,929	85	70	363	

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Weather Station Days Weather Name Filename	State	Max Bin N Lat	Min Bin W Long	Winter Alt	Heating Temp	Summer Temp Design	MCWB Deg Days	Cooling Design (2.5%)	Deg Days	Deg Design (2.5%)	Deg base 65	
=====												
Duluth IAP	MN	DOD	46.50	92.11	1,428	92.5	-32.5	-16	9,757	82	68	176
International Falls IAP	MN	DOD	48.34	93.23	1,179	97.5	-37.5	-25	10,547	83	68	176
Minneapolis MINAPLMN	MN	AWD	44.50	93.10	822	92.5	-22.5	-12	8,382	89	73	527
Minneapolis	MN	BWD-TRY	44.54	93.12	822	92.5	-22.5	-16	8,443	90	75	527
Minneapolis-St. Paul IAP	MN	DOD	44.53	93.13	834	97.5	-27.5	-12	8,310	89	73	527
=====												
Columbia	MO	BWD-TRY	39.00	92.18	778	112.5	-7.5	7	5,302	90	77	1,269
Columbia Regional Aprt.	MO	DOD	38.58	92.22	778	112.5	-7.5	4	5,078	94	74	1,269
Ft. Leonard Wood/Forney AAF	MO	DOD	37.45	92.09	1,158	102.5	-7.5	9	4,707	91	75	1,314
Kansas City	MO	BWD-TRY	39.06	94.36	742	102.5	-2.5	5	5,160	93	78	1,420
Kansas City KANCTYMO	MO	AWD	39.10	94.40	742	102.5	-2.5	6	4,711	96	74	1,420
RichardsGebaur AFB/Grandview 1,261	MO	DOD	38.51	94.33	1,090	102.5	-7.5	3	5,218	91	76	1,261
Springfield MAP	MO	DOD	37.14	93.23	1,268	107.5	-7.5	9	4,570	93	74	1,382
St Louis STLOUSMO	MO	AWD	38.50	90.20	535	97.5	-2.5	6	4,900	94	75	1,475
St Louis	MO	BWD-TRY	38.50	90.20	535	97.5	-2.5	6	4,900	94	75	1,475
St Louis/Lambert IAP	MO	DOD	38.45	90.23	535	107.5	-7.5	6	4,750	94	75	1,475
=====												
Columbus AFB	MS	DOD	33.39	88.27	219	102.5	2.5	20	2,890	93	77	2,039
Jackson	MS	BWD-TRY	32.18	90.06	310	102.5	2.5	24	2,583	93	79	2,321
Jackson/Allen Thompson Fld	MS	DOD	32.19	90.05	310	102.5	2.5	25	2,300	95	76	2,321
Keesler AFB/Biloxi	MS	DOD	30.25	88.55	26	97.5	12.5	31	1,549	92	79	2,793
Meridan NAS/McCain Field	MS	DOD	32.33	88.34	317	102.5	2.5	21	2,712	93	76	1,935
=====												
Billings/Logan IAP	MT	DOD	45.48	108.32	3,567	102.5	-22.5	-10	7,265	91	64	498
Glasgow AFB	MT	DOD	48.25	106.32	2,760	97.5	-32.5	-18	9,251	89	63	404
Great Falls	MT	BWD-TRY	47.30	111.24	3,664	92.5	-17.5	-14	7,689	88	61	339
Great Falls GRTFALMT	MT	AWD	47.30	111.20	3,664	92.5	-17.5	-15	7,750	88	60	339
Helena	MT	DOD	46.36	112.00	3,828	97.5	-37.5	-16	8,190	88	60	256
Malmstrom AFB	MT	DOD	47.30	111.11	3,525	102.5	-32.5	-15	7,671	89	61	370
Missoula	MT	DOD	46.55	114.05	3,190	102.5	-22.5	-6	7,931	88	61	188
=====												
Omaha	NB	BWD-WYEC	41.20	95.50	978	97.5	-2.5	-3	6,612	91	75	1,173
Omaha NB	NB	AWD	41.20	95.50	978	97.5	-2.5	-3	6,612	91	75	1,173 OMAHA-
Omaha	NB	BWD-TRY	41.18	95.54	978	97.5	-2.5	-1	6,430	90	78	1,173
=====												
Cherry Point MCAS	NC	DOD	34.54	76.53	29	97.5	12.5	24	2,832	90	78	1,922
Elizabeth City CGAS/MAP	NC	DOD	36.16	76.11	12	102.5	12.5	22	3,207	91	77	1,593
Fort Bragg/Simmons AAF	NC	DOD	35.08	78.56	242	102.5	12.5	21	3,105	92	76	1,760
Greensboro	NC	DOD	36.05	79.57	897	97.5	2.5	18	3,825	91	73	1,341
Raleigh	NC	BWD-TRY	35.48	78.48	433	92.5	12.5	20	3,839	88	76	1,394
Raleigh RALEGHNC	NC	AWD	35.50	78.50	433	92.5	12.5	20	3,393	92	75	1,394
Seymour Johnson AFB	NC	DOD	35.20	77.58	109	97.5	17.5	21	3,124	91	76	1,769

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Weather Station	State	Max Bin	Min Bin	Winter	Heating	Summer	MCWB	Cooling			
Days Weather	Name	N Lat	W Long	Alt	Temp	Temp Design	Deg Days	Design (2.5%)	Deg		
Filename	Type	Deg.Min	Deg.Min	(ft)	deg F	deg F (97.5%)	base 65 (2.5%)	deg F	base 65		
=====											
=====											
Bismarck	ND BWD-WYEC	46.50	100.50	1,647	97.5	-22.5	-19	8,851	91	68	487
Bismarck	ND AWD	46.50	100.50	1,647	97.5	-22.5	-19	8,851	91	68	487
BISMRKND											
Bismarck	ND BWD-TRY	46.48	100.48	1,647	97.5	-22.5	-19	9,724	91	71	487
Bismarck MAP	ND DOD	46.46	100.45	1,647	102.5	-37.5	-19	9,044	91	68	487
Grand Forks AFB	ND DOD	47.57	97.24	911	97.5	-32.5	-22	9,963	87	70	400
Minot AFB	ND DOD	48.25	101.21	1,668	102.5	-32.5	-20	9,625	89	67	398
Grand Island	NE DOD	40.58	98.19	1,841	107.5	-22.5	-3	6,420	94	71	1,036
North Platte/Lee Bird Fld	NE DOD	41.08	100.41	2,775	107.5	-22.5	-4	6,743	94	69	802
Offutt AFB	NE DOD	41.07	95.55	1,048	102.5	-17.5	-3	6,213	91	75	1,157
Scottsbluff	NE DOD	41.52	103.36	3,958	102.5	-17.5	-3	6,774	92	65	666
Pease AFB/Portsmouth	NH DOD	43.04	70.49	101	97.5	-12.5	2	6,846	85	71	481
McGuire AFB	NJ DOD	40.01	74.36	133	97.5	2.5	11	5,139	89	74	983
Newark IAP	NJ DOD	40.42	74.10	7	97.5	2.5	14	5,034	91	73	1,024
Albuquerque	NM BWD-TRY	35.06	106.36	5,310	102.5	7.5	17	4,597	92	64	1,394
Albuquerque	NM BWD-WYEC	35.00	106.40	5,310	102.5	7.5	16	4,348	94	61	1,394
Albuquerque	NM AWD	35.00	106.40	5,310	102.5	7.5	16	4,348	94	61	1,394
ALBUQRNM											
Albuquerque IAP/Kirtland AFB	NM DOD	35.03	106.37	5,311	102.5	-2.5	16	4,337	94	61	1,394
Cannon AFB/Clovis	NM DOD	34.23	103.19	4,283	102.5	-7.5	13	4,046	93	65	1,297
Farmington MAP	NM DOD	36.44	108.14	5,503	97.5	-17.5	6	5,713	93	62	749
Holloman AFB/Alamogordo	NM DOD	32.51	106.06	4,093	107.5	-2.5	19	3,223	94	64	1,870
Ely	NV DOD	39.17	114.51	6,253	92.5	-22.5	-4	7,814	87	56	207
Fallon NAS/Van Voorhis Fld	NV DOD	39.25	118.42	3,934	102.5	-7.5	12	5,229	96	63	892
Las Vegas	NV AWD	36.10	115.10	2,162	112.5	17.5	28	2,709	106	65	2,946
LASVEGNV											
Las Vegas	NV BWD-WYEC	36.10	115.10	2,162	112.5	17.5	28	2,709	106	65	2,946
Nellis AFB/Las Vegas	NV DOD	36.15	115.02	1,868	112.5	17.5	27	2,377	107	68	3,089
Stead AFB/Reno	NV DOD	39.40	119.52	5,023	97.5	-17.5	8	6,398	89	58	385
Tonopah MAP	NV DOD	38.04	117.05	5,426	102.5	-7.5	10	5,900	92	59	631
Winnemucca MAP	NV DOD	40.54	117.48	4,301	102.5	-12.5	3	6,629	94	60	407
Albany	NY DOD	42.45	73.48	275	97.5	-17.5	-1	6,888	88	72	574
Albany	NY BWD-TRY	42.45	73.48	275	97.5	-17.5	2	7,328	86	74	574
Buffalo	NY BWD-TRY	42.48	78.42	705	87.5	2.5	7	6,943	82	70	437
Griffis AFB/Rome	NY DOD	43.14	75.25	514	92.5	-22.5	-5	7,331	85	70	472
New York	NY BWD-WYEC	40.50	73.50	19	97.5	7.5	15	4,811	89	73	1,048
New York	NY AWD	40.50	73.50	19	97.5	7.5	15	4,811	89	73	1,048
NEWYOKNY											
New York	NY BWD-TRY	40.48	73.54	19	97.5	7.5	16	4,689	86	75	1,048

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Weather Station	State	Weather	N Lat	W Long	Alt	Max Bin	Min Bin	Winter	Heating	Summer	MCWB	Cooling
Days	Weather					Temp	Temp	Design	Deg Days	Design	(2.5%)	Deg
Name	Type	Deg.Min	Deg.Min	(ft)	deg F	deg F	(97.5%)	base 65	(2.5%)	deg F	base 65	
Filename												
=====												
=====												
Pittsburgh/Gtr Pburgh IAP	PA	DOD	40.30	80.13	1,137	97.5	-7.5	5	5,930	86	71	647
Wilkes-Barre-Scranton Aprt.	PA	DOD	41.20	75.44	930	97.5	-7.5	5	6,277	87	71	608
Williamsport	PA	DOD	41.15	76.55	524	97.5	-12.5	7	5,981	89	72	698
Quonset Point NAS	RI	DOD	41.36	71.25	30	97.5	-7.5	9	5,840	85	72	690
Charleston	SC	BWD-WYEC	32.50	80.00	41	97.5	17.5	27	2,033	91	78	2,078
Charleston	SC	BWD-TRY	32.54	80.00	41	97.5	17.5	28	2,389	89	78	2,078
Charleston	SC	AWD	32.50	80.00	41	97.5	17.5	27	2,033	91	78	2,078
CHRLTNSC												
Charleston AFB/MAP	SC	DOD	32.54	80.02	45	97.5	17.5	27	2,146	91	78	2,078
Greenville-Spartanburg Aprt	SC	DOD	34.54	82.13	957	97.5	7.5	22	3,163	91	74	1,573
Myrtle Beach AFB	SC	DOD	33.41	78.56	25	97.5	12.5	24	2,696	89	78	1,823
Shaw AFB/Sumter	SC	DOD	33.58	80.28	252	102.5	12.5	25	2,453	92	76	2,160
Ellsworth AFB/Rapid City	SD	DOD	44.08	103.06	3,276	102.5	-17.5	-7	7,049	92	65	738
Huron	SD	DOD	44.23	98.13	1,281	102.5	-27.5	-14	8,055	93	72	716
Sioux Falls/Foss Fld	SD	DOD	43.34	96.44	1,418	102.5	-22.5	-11	7,838	91	72	719
Bristol/Tri City Aprt	TN	DOD	36.29	82.24	1,507	97.5	-2.5	14	4,306	89	72	1,107
Knoxville/Alcoa Ang Sta	TN	DOD	35.49	83.59	980	102.5	2.5	19	3,478	92	73	1,569
Memphis	TN	BWD-TRY	35.06	90.00	322	102.5	-2.5	20	3,297	93	80	1,996
Memphis NAS/Millington	TN	DOD	35.20	89.53	322	102.5	-2.5	17	3,445	93	77	1,996
Nashville	TN	AWD	36.10	86.40	577	97.5	12.5	14	3,578	94	74	1,694
NASHVLTN												
Nashville	TN	BWD-TRY	36.06	86.54	577	97.5	12.5	16	3,677	90	77	1,694
Nashville	TN	BWD-WYEC	36.10	86.40	577	97.5	12.5	14	3,578	94	74	1,694
Sewart AFB/Smyrna Aprt	TN	DOD	36.00	86.32	543	102.5	-7.5	13	3,949	92	74	1,691
Amarillo	TX	BWD-TRY	35.12	101.42	3,607	102.5	12.5	16	4,645	94	70	1,433
Amarillo	TX	DOD	35.14	101.52	3,604	102.5	-7.5	11	4,183	95	67	1,433
Amarillo	TX	AWD	35.10	101.40	3,607	102.5	12.5	11	3,985	95	67	1,433
AMARLOTX												
Bergstrom AFB/Austin	TX	DOD	30.12	97.40	541	102.5	12.5	28	1,712	97	75	3,078
Brownsville	TX	BWD-WYEC	25.50	97.30	16	97.5	32.5	39	600	93	77	3,874
Brownsville	TX	BWD-TRY	25.54	97.24	16	97.5	32.5	43	646	92	79	3,874
Brownsville	TX	AWD	25.50	97.30	16	97.5	32.5	39	600	93	77	3,874
BRNSVLTX												
Brownsville IAP	TX	DOD	25.54	97.26	19	97.5	27.5	39	650	93	77	3,874
Carswell AFB/Fort Worth	TX	DOD	32.47	97.26	650	107.5	12.5	23	2,301	99	75	2,858
Corpus Christi NAS	TX	DOD	27.42	97.17	19	97.5	22.5	38	899	91	79	3,687
Dallas	TX	AWD	32.50	96.50	481	102.5	22.5	22	2,363	100	75	2,755
DALLASTX												
El Paso	TX	BWD-TRY	31.48	106.24	3,918	102.5	12.5	22	2,881	95	69	2,098
El Paso	TX	AWD	31.50	106.20	3,918	102.5	12.5	24	2,700	98	64	2,098
ELPASOTX												
El Paso	TX	BWD-WYEC	31.50	106.20	3,918	102.5	12.5	24	2,700	98	64	2,098
Ellington AFB/Houston	TX	DOD	29.37	95.10	40	102.5	17.5	31	1,384	94	78	2,937

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Weather Station	State	Max Bin	Min Bin	Winter	Heating	Summer	MCWB	Cooling			
Days	Weather	N Lat	W Long	Alt	Temp	Temp	Design	Deg Days	Design	(2.5%)	Deg
Name	Type	Deg.Min	Deg.Min	(ft)	deg F	deg F	(97.5%)	base 65	(2.5%)	deg F	base 65
Filename	=====										
Fort Bliss/Biggs AAF	TX DOD	31.51	106.23	3,947	107.5	2.5	23	2,432	97	65	2,253
Fort Hood/Robert Gray AAF	TX DOD	31.04	97.50	1,015	107.5	12.5	25	1,959	97	73	2,792
Fort Worth	TX BWD-TRY	32.54	97.00	544	97.5	17.5	22	2,555	96	77	2,755
Fort Worth	TX BWD-WYEC	32.50	96.50	481	102.5	22.5	22	2,363	100	75	2,755
Houston	TX BWD-TRY	29.42	95.18	50	97.5	22.5	30	1,772	92	79	2,889
Kelly AFB/San Antonio	TX DOD	29.23	98.35	690	102.5	12.5	29	1,520	97	74	3,190
Laughlin AFB	TX DOD	29.22	100.47	1,081	107.5	7.5	31	1,542	98	73	3,281
Lubbock	TX BWD-TRY	33.42	101.48	3,243	102.5	7.5	19	3,888	93	71	1,647
Perrin AFB/Sherman	TX DOD	33.43	96.40	763	107.5	7.5	20	2,837	98	75	2,337
San Antonio	TX BWD-TRY	29.30	98.30	792	102.5	22.5	30	2,045	97	77	2,994
San Antonio	TX AWD	29.30	98.30	792	102.5	22.5	30	1,546	97	73	2,994
SANANTTX											
Waco/James Connally Aprt	TX DOD	31.38	97.04	475	107.5	12.5	25	2,081	99	75	2,878
Webb AFB/Big Spring	TX DOD	32.13	101.31	2,561	107.5	7.5	20	2,678	97	69	2,382
Dugway PG/Michales AAF	UT DOD	40.12	112.56	4,340	102.5	-12.5	5	5,877	96	62	1,088
Hill AFB/Ogden	UT DOD	41.07	111.58	4,785	97.5	-12.5	10	6,081	92	62	920
Salt Lake City	UT AWD	40.50	112.00	4,220	102.5	2.5	8	6,052	95	62	927
SALTLCUT											
Salt Lake City	UT BWD-TRY	40.48	112.00	4,220	102.5	2.5	9	6,421	93	63	927
Wendover AF Range	UT DOD	40.44	114.02	4,237	102.5	2.5	12	5,673	95	59	1,137
Fort Belvoir/Davison AAF	VA DOD	38.43	77.11	69	97.5	-7.5	12	4,891	90	75	1,120
Langley AFB/Hampton	VA DOD	37.05	76.21	10	97.5	7.5	20	3,623	90	77	1,539
Norfolk	VA BWD-TRY	36.54	76.12	26	97.5	17.5	23	3,473	90	78	1,441
Richmond	VA BWD-TRY	37.30	77.18	164	102.5	2.5	19	4,721	90	78	1,353
Richmond/Byrd IAP	VA DOD	37.30	77.20	164	102.5	2.5	17	3,939	92	76	1,353
Roanoke/Woodrum Aprt	VA DOD	37.19	79.58	1,193	102.5	7.5	16	4,307	91	72	1,030
Burlington	VT BWD-TRY	44.30	73.12	331	97.5	-17.5	-5	8,096	85	72	396
Fairchild AFB/Spokane	WA DOD	47.37	117.38	2,462	102.5	-17.5	7	6,790	90	62	416
McChord AFB/Tacoma	WA DOD	47.09	122.29	322	92.5	2.5	24	5,287	82	65	94
Moses Lake/Grant Co	WA DOD	47.12	119.19	1,185	102.5	-17.5	7	5,809	94	65	707
Seattle	WA AWD	47.30	122.20	386	87.5	12.5	26	5,145	80	64	129
SEATTLWA											
Seattle	WA BWD-TRY	47.30	122.18	386	87.5	12.5	29	5,669	84	65	129
Seattle	WA BWD-WYEC	47.30	122.20	386	87.5	12.5	26	5,145	80	64	129
Seattle NSA	WA DOD	47.41	122.15	47	97.5	12.5	27	4,650	82	66	162
Green Bay/Austin-Straubel	WI DOD	44.29	88.08	682	97.5	-27.5	-9	8,098	85	72	386
La Crosse MAP	WI DOD	43.52	91.15	651	97.5	-27.5	-9	7,417	88	73	695
Madison	WI AWD	43.10	89.20	858	92.5	-17.5	-7	7,863	88	73	460
MADISNWS											
Madison	WI BWD-TRY	43.06	89.18	858	92.5	-17.5	-6	7,517	87	73	460
Madison	WI BWD-WYEC	43.10	89.20	858	92.5	-17.5	-7	7,863	88	73	460

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Weather Station Days Weather Name Filename	State Weather	N Lat	W Long	Alt	Min Bin Temp	Winter Temp	Heating Temp Design	Summer Temp Design	MCWB Deg Days	Cooling Design (2.5%)	Deg base 65	Deg base 65
Madison/Traux Field	WI DOD	43.08	89.20	858	97.5	-27.5	-7	7,730	88	73	460	
Charleston/Kanawha Aprt	WV DOD	38.22	81.36	939	102.5	-7.5	11	4,590	90	73	1,055	
Elkins/Randolph Co Aprt	WV DOD	38.53	79.51	1,948	92.5	-12.5	6	5,975	84	70	389	
Huntington	WV DOD	38.25	82.30	565	102.5	-12.5	10	4,374	91	74	1,098	
Casper IAP	WY DOD	42.55	106.28	5,338	102.5	-22.5	-5	7,555	90	57	458	
Cheyenne	WY BWD-TRY	41.12	104.48	6,126	92.5	-17.5	-3	7,382	85	60	327	
Cheyenne CHEYNEWY	WY AWD	41.10	104.50	6,126	92.5	-17.5	-1	7,381	86	58	327	
Cheyenne MAP	WY DOD	41.09	104.49	6,126	97.5	-22.5	-1	7,255	86	58	327	
Rock Springs	WY DOD	41.36	109.04	6,745	92.5	-22.5	-3	8,410	84	55	227	
Sheridan	WY DOD	44.46	106.58	3,964	102.5	-27.5	-8	7,708	91	62	346	

