

A Look Through Patio Doors

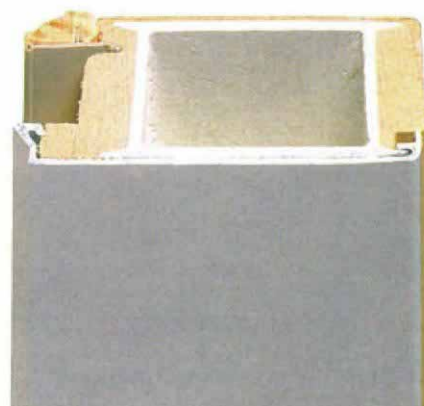
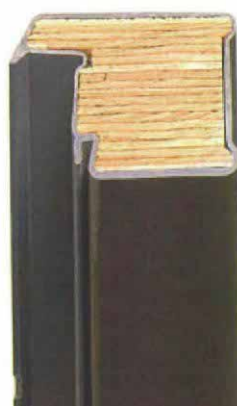
THE DOOR FRAME SHOULD BE STURDY, STABLE AND ROTPROOF

The best door frame is one that won't rot or warp, is a good thermal barrier and will last forever. The ideal finish will hold up under all sorts of weather without any maintenance. There is no perfect frame yet, but here are some of the latest combinations vying for that distinction.

Solid-wood veneer over finger-jointed wood. This veneer takes a variety of finishes but requires regular maintenance; the core is warp resistant, a dimensionally stable substrate for cladding and a good use of resources.

Vinyl cladding over laminated-wood veneer. Vinyl is low maintenance and has good weather resistance, although dark colors tend to fade. Laminated veneers are stable and an efficient use of resources.

Extruded aluminum cladding over Ultrex. Extruded aluminum is strong but difficult to repair if scratched and will corrode without a finish. Ultrex, a Marvin product, is a fiberglass composite that's strong, dimensionally stable and somewhat expensive.



Sliding or hinged, big panes or multilite, these glass doors should be built to withstand the elements as well as years of abuse

BY CHARLES BICKFORD

It's always a trade-off, isn't it? You want light in the house, so you cut a hole in the wall: Now the floor gets wet when it rains, so you cover the hole with glass. A little cross ventilation might be nice, so you figure out a way to open and close the glass. Now the glass leaks again. Just wait until you try to make the window into a big door.

Forty years ago, when oil was cheap and we didn't know better, patio doors were novelties, just big sliding windows that often leaked or came apart after a few years. There are better products available these days, and patio doors are a hot item (Andersen Windows alone made nearly 150,000 sliders last year). But with every window shop getting into the act, it's hard to tell the diamonds from the zircons. To find out what's going on, I talked with carpenters, architects, manufacturers and designers about these big walk-out windows.

More than 100 companies make patio doors, and they all offer a wide variety of materials (photos below), styles and options. The number of permutations is exponential, but here are the basics.

The door buyer's menu is divided into two basic choices: either hinged doors or sliding doors. Hinged doors include French doors (a matched pair of hinged, operating panels that traditionally have divided lites) and patio doors (one hinged door that has been paired with a fixed panel). Hinged doors offer a traditional design; French doors open a larger area and are available as in-swing or out-swing designs. Hinged doors are also more expensive, more difficult to install and often require adjustment.

Sliding doors usually consist of one fixed panel and one operating panel that rolls on a track. Sliders don't take up any room when they open, are less expensive and are easy to screen. Unfortunately, they don't seal as well as hinged doors.

Hardware keeps the doors straight and tight

If you're thinking about security, worrying about the lock on a door that's mostly glass might be a little silly, but locks also help to keep the door tight against air infiltration. For sealing purposes, hinged patio and French doors need to be secured to the jamb

in more than one spot. Multipoint locks (drawing p. 60) engage in at least three places, and they not only fortify the door but also minimize warping stiles by pinning the door to the jamb. Some multipoint locks consist of shoot bolts that go up into the head jamb and down into the sill; other varieties operate horizontally above and below the lockset; and some locks offer a combination of both. Marvin and Kolbe & Kolbe offer a feature that prevents the lock from engaging until the door is shut; it's all too common to engage the door handle and to try to shut the door with the lock pins protruding, which then puts big dings in the door trim.

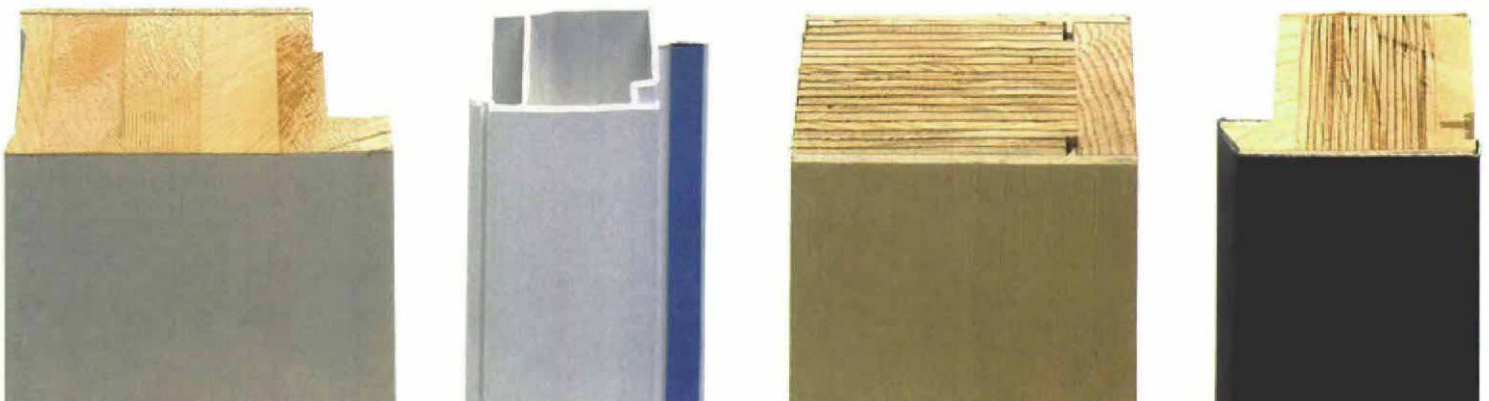
One of the best things going in the world of hinged doors these days is adjustable hinges. Most offer three-way adjustments at the hinge plate, much as fancier cabinet hinges do. It's a great thing to be able to make a door work again after a not-quite-perfect installation or after the house has settled. Andersen, Kolbe & Kolbe and Hurd are some of the companies that offer these adjustable hinges on all their doors; most others offer them as options. Ball-bearing

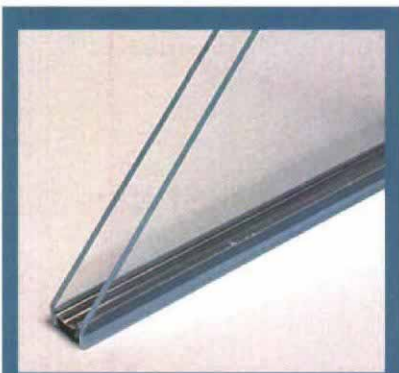
Urethane- or polyester-based finishes on wood veneer over finger-jointed wood. These industrial paints are usually guaranteed, weather resistant and difficult to repaint. Color choice is limited by the manufacturer's selection.

Extruded vinyl is inexpensive and needs no maintenance; exposure to heat and UV-radiation may make it structurally unstable over time. Solid vinyl is usually available only in light colors.

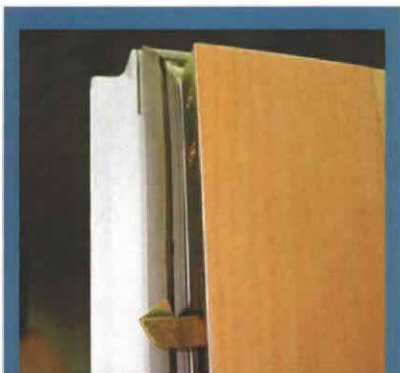
Fiberglass/composite cladding over engineered wood. Available in smooth or faux-grained skins, fiberglass can be painted or stained; weather resistant, it's also difficult to repair and will degrade if not finished.

Rolled aluminum cladding over engineered wood. Rolled aluminum is inexpensive but easily dented or scratched and difficult to repair. Extruded aluminum is also commonly used over engineered-wood substrates.





Most manufacturers offer low-E glass to improve energy efficiency



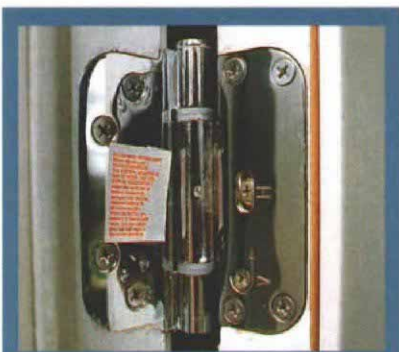
Multipoint locks fortify the door and minimize stile warping.



Jacketed urethane foam weatherstripping is resilient in all temperatures, resists tearing and retains its shape

THE IDEAL HINGED DOOR

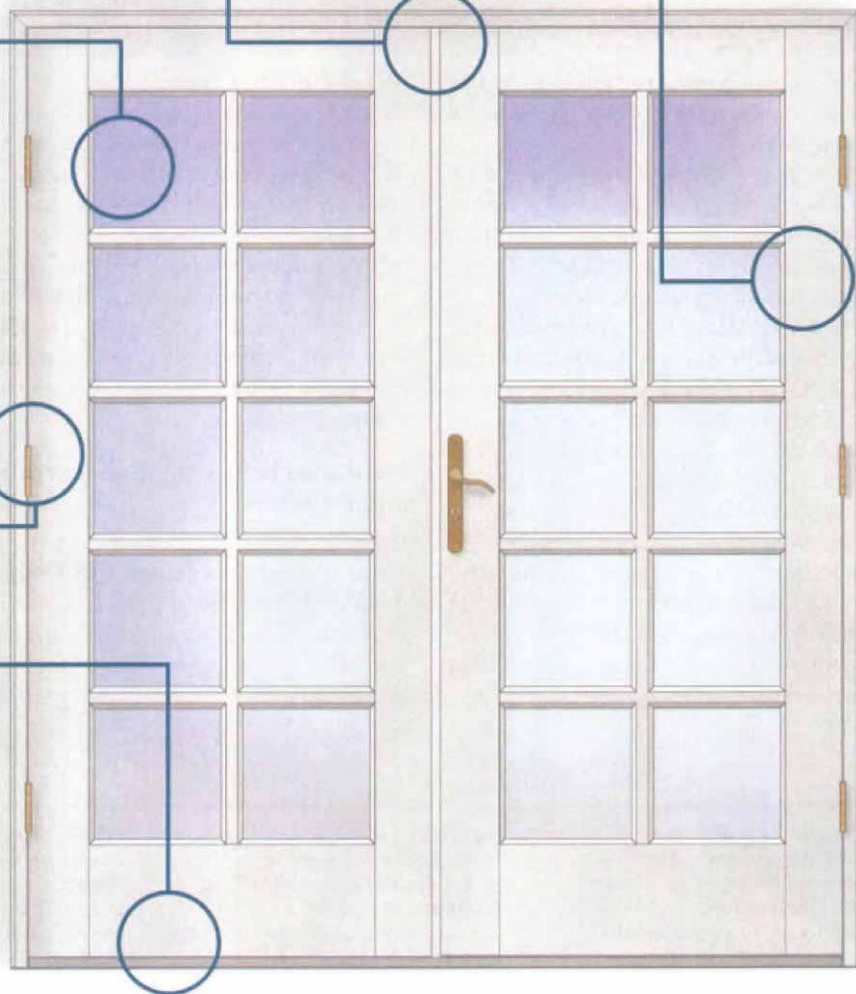
A perfect door doesn't exist, but various manufacturers offer critical features that you should look for.



Adjustable hinges allow easy realignment once the door has settled.



Fiberglass sill makes a good thermal barrier and provides weep holes for water trapped under door.



hinges, great for handling heavier doors, are also options.

Sliding doors depend on rollers and a good lock (drawing facing page). Most of the rollers in sliding doors are zinc-plated steel; stainless-steel rollers, mostly available as an option, make sense when the doors are operating near saltwater. Slider locks should be jimmyproof (that is, engage from below the strike) and provide the necessary muscle to seal the door tightly. Andersen has a good

lock that reaches out and pulls the door tight against the weatherstripping; Pella has a double lock (one up, one down) that operates with similar efficiency; and most others have a simple latch.

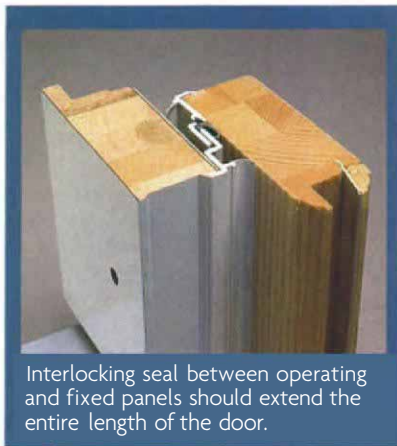
Keeping wind and water outside: weatherstripping and sills

The problem with any door is that it may leak, a problem that's compounded with French doors. All door and window products

made by major manufacturers must pass the Window and Door Manufacturers Association's design-pressure test, which measures the unit's ability to withstand combined wind and water. A rating of DP40 means the unit must not leak under a wind pressure equal to 155 mph or 8 in. of rain per hour driven at 50 mph. Florida's Dade County knows hurricanes and uses DP40 as a code minimum for all doors and windows; the rest of the country accepts DP25 as a minimum.



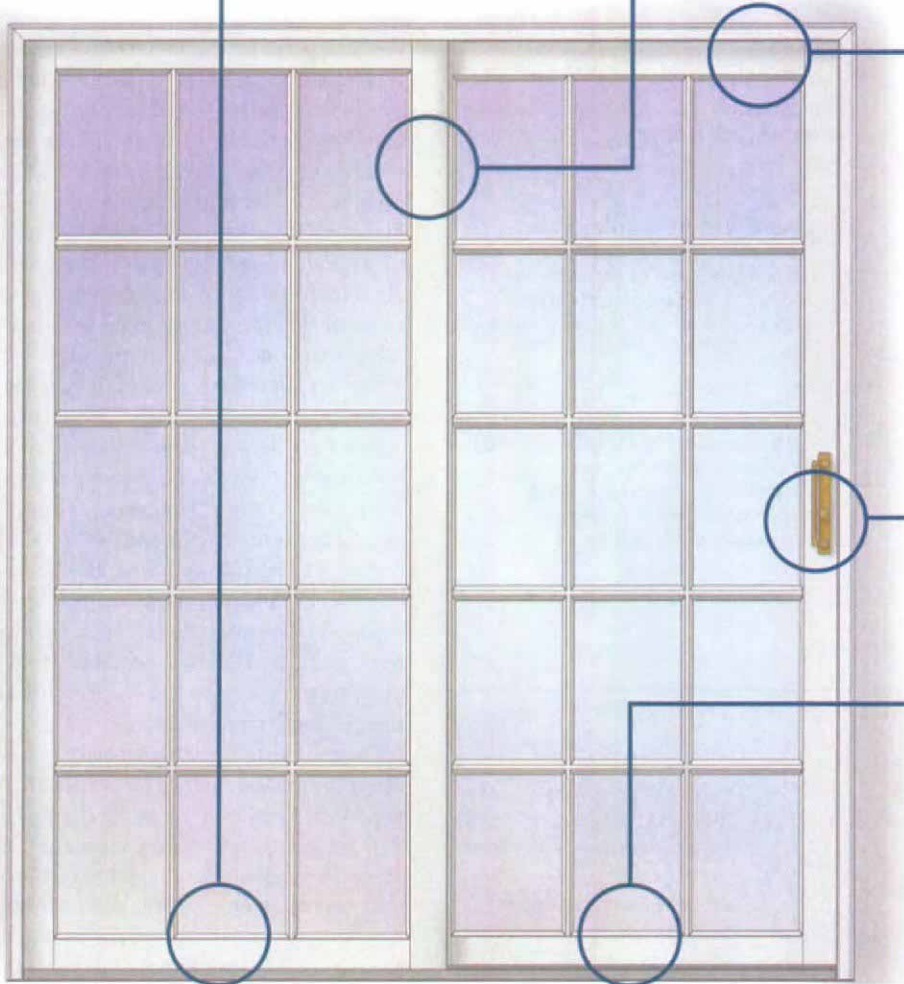
Optional stainless-steel rollers last longer in corrosive environments.



Interlocking seal between operating and fixed panels should extend the entire length of the door.



Top-hung screens operate with less trouble than ones with bottom rollers.



NO ONE MAKES A PERFECT SLIDING DOOR

But there are key points to consider when buying a slider.



Slider lock should engage jamb from below and pull door tightly into weatherstripping.



Sill should make a good thermal barrier and keep air and water out.

Weatherstripping is a door's defense against air and water infiltration, especially important on patio doors, which are often installed in the face of prevailing weather (that's where the good view is). A bronze interlocking weatherstrip can be effective on hinged doors in high-wind situations, but it can add \$300 to the cost of each door. Silicone is a good material, but larger companies don't use it because it's too expensive. Instead, they use compression gaskets or bulb

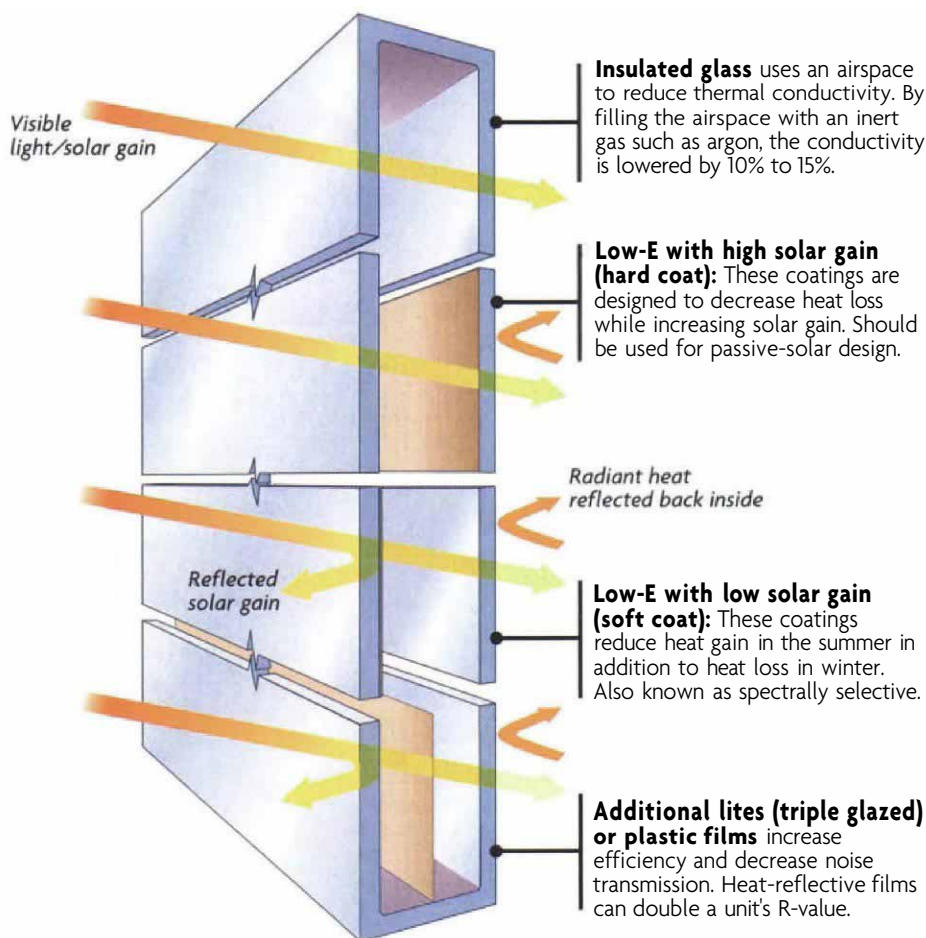
types made from neoprene or elastomers. At the bottom of doors, multiple sweeps usually make a better seal against the sill. Although inexpensive weatherstripping may tear or lose its ability to seal, most are replaceable.

As the anchor of the door jamb, the sill and threshold assemblies should be rot-free and weathertight. Because wood sills are difficult to waterproof and weatherstrip, most manufacturers don't use them; some small shops still use wood on a custom basis. Instead, big

companies use extruded aluminum or fiberglass composites. Neither will rot, but a solid-aluminum sill will wick cold temperatures inside and cause condensation. Some companies integrate a section of fiberglass that acts as a thermal break and improves the sill's performance, or laminate a wood (typically oak) threshold to the interior. Extruded fiberglass, Lexan and related composites have better thermal properties and seem to be as resilient as aluminum. Peachtree has a

Glass options offer energy savings

The basic unit of insulated glass is double glazed, a pair of glass panels separated by an airspace that slows thermal transfer from inside to out. The efficiency of a glazed unit is increased by adding low-emittance (low-E) coatings, inert gases and reflective films.



good idea, too: an adjustable sill that can be raised to tighten the gap beneath a door.

Glass is the reason you want a patio door, isn't it?

Patio doors are about 85% glass, which is great for the view but lousy for your energy bill. Most companies now offer at least two types of insulated-glass options, some as many as five or six (drawing left), that will help to keep the house warm in the winter and cool in the summer. The most common choices are low-emissive (low-E) coatings that reflect radiant heat back into the interior, reduce solar-heat gain in the summer and block ultraviolet rays; filling the airspace with an inert gas such as argon is usually the next step to reducing the thermal transfer. (If you live above 3,500 ft. in altitude, manufacturers must install small tubes that equalize pressure inside the insulated glass; unfortunately, the tubes allow any added gas to escape, so it's a better idea just to maximize efficiency with coatings.) Additional reflective films added to the inside of insulated glass are expensive but also can increase the R-value of the door. Door makers also use another method to improve the glass's energy efficiency: Stainless-steel spacers at the edge of the glass keep the edge of the windows warmer and less prone to condensation.

To find out how a door is supposed to perform, most manufacturers submit their products for testing by the National Fenestration Rating Council. The NFRC samples doors and windows for heat loss (U-value), R-value (the inverse of U-value) and solar-heat gain coefficient; products that have been tested carry an NFRC label that lists the product's performance.

The government is also getting in on the act of promoting energy conservation. Under the U. S. Department of Energy's Energy Star program (www.energystar.gov), homeowners are being encouraged to buy products that maximize energy use. Windows that are Energy Star-certified are tailored for different regions of the country according to their heating and cooling requirements. (For more information on energy and windows, see "Understanding Energy-Efficient Windows," *FHB* #114, pp. 68-73, and the Efficient Windows Collaborative's Web site, www.efficientwindows.org.)

Another aspect of glazing is the aesthetics of size. The arrangement of smaller sections of glass and mullions known as *divided lites* fits into traditional design and has always been considered upscale. This fact isn't lost on door makers, who first came out with external grilles (photo facing page) that con-

Sources of patio doors

There are too many door manufacturers to list them all, but here's a bunch to get you started. Search the Internet for more, and check with your lumberyard to see what's available locally.

Andersen Windows Inc.
(800) 426-4261
www.andersenwindows.com

Loewen Windows
(800) 245-2295
www.loewen.com

Silverline Windows
(800) 234-4228
www.silverlinewindow.com

Atrium
(800) 935-2000
www.atriumcompanies.com

Marvin Windows and Doors
(888) 819-2470
www.marvin.com

Simpson Door Company
(800) 952-4057
www.simpsondoor.com

Eagle Window and Door
(800) 453-3633
www.eaglewindow.com

Milgard Windows
(800) 391-6937
www.milgard.com

Therma-Tru Doors
(800) 843-7628
www.thermatru.com

Hurd Millwork Company
(715) 748-2011
www.hurd.com

Peachtree Doors and Windows
(800) 732-2499
www.peach99.com

Weather Shield Windows and Doors
(800) 477-6808, ext. 998
www.weathershield.com

Jeld-Wen
(541) 882-3451
www.doors-windows.com

Pella Corporation
(800) 547-3552
www.pella.com

Resource Conservation Technology
(410) 366-1146
Good source for weather-stripping.

Kolbe & Kolbe Millwork
(715) 842-5666
www.kolbe-kolbe.com

vert a single insulated lite into a faux French door. The grilles are inexpensive (\$50 to \$150), easy to remove and certainly make painting and window-washing easier. Simulated divided lites (photo right) feature attached grilles on both sides of the glass and often a spacer grille, look a little more realistic and usually add 50% to the cost of the door. True divided lites, individual lites separated by mullions, can easily double the cost of a door. However, unlike simulated versions, true divided lites are less energy efficient.

Screens have lots of bugs

If you want to keep out insects and have fresh air in the house at the same time, you need a screen. Unfortunately, many of the screens made for patio doors are junk, especially the sliding type. Once the track gets dirty, the rollers wear out, and eventually, the thin frame gets racked or broken from too many hard pushes.

Marvin and Pella get around this problem with screened doors that hang from top rollers that seem to operate smoothly. On their patio door, Pella puts a substantial wood and aluminum screen on the inside, so you have to open the screen, which, of course, lets the bugs in, before you can close the slider.

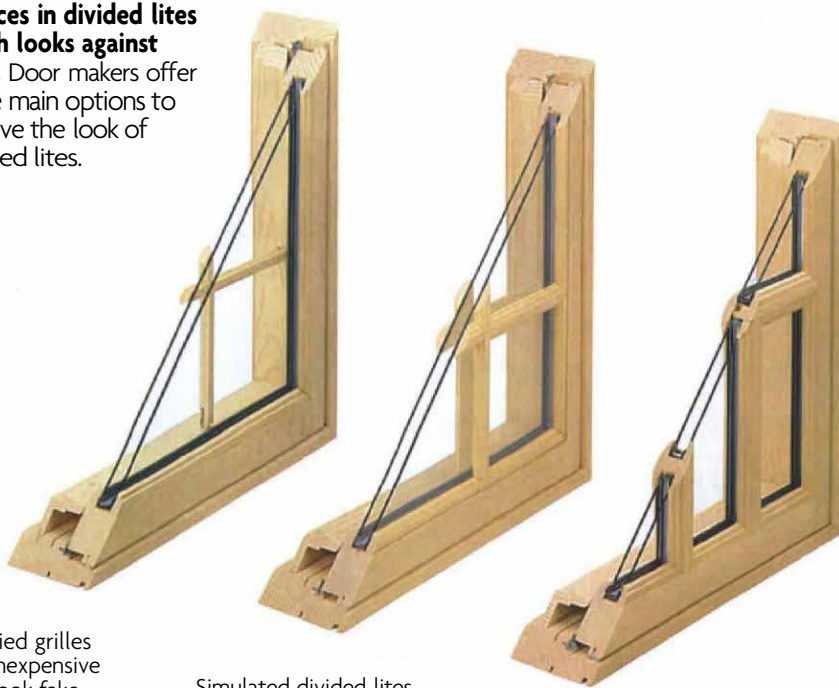
Although screens (sliding or hinged) are an option for French doors, unless you get a top-hung sliding design, you're probably better off with a pair of hinged screens. Like most of the sliding types, hinged screens have delicate-looking aluminum frames on automatic closers and can easily add \$300 to \$600 to the price of the doors.

Andersen has an optional roll-up screen that also works on the inside of the door; the screen is stretched between flexible frames and retracts on a spring-loaded roller on the side of the door. Costing about \$500, it seems a pricey version of the old window blinds that never worked, either.

The sill is the key to a good installation

Want to know the most common mistake when installing patio doors? Not keeping the sill flat and level. If the sill isn't flat, the door won't work. For a detailed look at the installation process, check out Gary M. Katz's article on installing sliders (*FHB* #108, pp. 74-79). Speaking of sliders, be careful when shimming side jambs during installation; a bow in the jamb will create

Choices in divided lites weigh looks against cost. Door makers offer three main options to achieve the look of divided lites.



Applied grilles are inexpensive but look fake.

Simulated divided lites look more realistic and don't affect the thermal properties of the glass.

True divided lites are expensive, often bulky-looking and reduce the efficiency of the glass slightly.

seal problems that are hard to see when the door is closed.

Many architects also recommended locating these doors under an overhang or in a vestibule to decrease the chance of leaks.

If I were buying a patio door

I didn't do a scientific comparison of makes and models

for this article, but I have learned a thing or two about these doors. The market is competitive; all the manufacturers keep working to reach an increasingly educated consumer. Once you get out of the bargain bin, where you can buy a \$300 extruded-vinyl slider, for instance, the quality, service and availability of products is more consistent. The choice of product depends on your needs. However, if I had lots of money, I'd have a small shop make the doors with all the best features of different manufacturers. Being more realistic, I'd check out an Andersen (slider or hinged, about \$1,000) for its simple, smart design and high-quality standard options. For an additional \$1,000, I might think about an Eagle French door with simulated divided lites (true divided lites aren't worth the extra cost); the mullions look clean, and multipoint hardware is standard. For a more expensive, factory-built, good all-custom door, I'd consider Marvin. □

Charles Bickford is an associate editor at *Fine Homebuilding*. Photos by the author, except where noted.

