



# Doors

of the overall heat loss in a typical home. However, if they are in poor condition (or just very old) they can contribute to higher amounts of air leakage and related energy losses.



## Exterior Door Replacement

Modern exterior doors often fit and insulate better than old ones, and their associated heat losses (or gains) come from opening and closing the door. However, damaged weatherstripping can increase energy loss around the door by many times. Check your weatherstripping every year and replace it as needed. After replacing the weatherstripping, check the door seal again. If the door still does not seal tightly to all sides of the jamb you either installed the weatherstripping badly or the door is bent and in need of replacement.

Consider an insulated metal or fiberglass door when replacing exterior doors. They are a better investment than wooden doors since they are much more durable, have lower maintenance needs and seal and insulate better. They also have the added advantage of offering more of a deterrent to intruders.

Most insulated door prices range from \$200 to \$400. One common type has a steel skin with a polyurethane foam core; they usually have a magnetic strip (similar to a refrigerator door magnetic seal) for weatherstripping. If installed correctly and, if the door is not bent, this type of door needs no further weatherstripping. The R-values of most steel and fiberglass clad entry doors range from R-5 to R-6 (not including the effects of a window.) For example: A 1-1/2 inch thick door without a window offers better than five times the insulating value of a solid wood door of the same size.

When you buy a door, it will probably be a pre-hung frame. Pre-hung doors usually come with wood or steel frames. In most cases, you will need to remove the existing door frame from the rough opening before you install a pre-hung door. The door frame must be as square as possible, so that the door seals tightly to the jamb and swings properly. It is a

good idea to use low- or non-expanding foam to seal the new door frame to the rough opening and threshold to prevent air from getting around the door seals and into the house. You should do this before adding the interior trim.

Glass or "patio" doors, especially sliding glass doors, lose heat much faster than other types of doors because glass is a very poor insulator. Multiple layers of glass and low-e coatings improve the situation by 2 to 3 times, but it is still considerable worse than for a foam-core door.

A sliding glass door's weatherstripping is intended to reduce air infiltration, however by the sliding nature of the door's design it is impossible to stop all the air leaking around the weatherstripping while still being able to use the door. Also, after years of use, the weatherstripping wears down and air leakage increases as the door ages. If the manufacturer has made it possible to do so, replace worn weatherstripping on sliding glass doors with new weatherstripping.

When replacing patio doors, keep in mind that swinging doors offer a much tighter seal than sliding types. Most modern glass doors with metal frames have a "thermal break," which is a plastic insulator between inner and outer parts of the frame. Glass doors are also optionally manufactured with several layers of glazing, low-e coatings, and low conductivity gases between the glass panes. These options are a good investment, especially in extreme climates. Over the long run, the additional cost is paid back many times over in energy savings.

## Storm Doors

Adding a storm door that costs about \$200 or less is generally a good investment if your existing door is old, but still in good condition. However, adding a new (or more expensive) storm door to a modern foam core filled door is not generally worth the expense since the added energy saved is very small. However, you may have aesthetic reasons for wanting a storm door anyway. In any case, never add a glass storm door if the door gets more than a few hours of direct sun each day. The glass will trap too much heat against the entry door and possibly damage it.



Storm doors for patio doors are hard to find but they are available. Adding one to a modern multi-glazed energy-efficient low-e door is seldom economic. Insulated drapes,

when closed for the night in the winter (or on sunny days in the summer) are also a good idea.

High quality storm doors and windows use low-e glass. Frames are usually made of aluminum, steel, fiberglass, or wood (painted or not). Wooden storm doors require more maintenance than the other types. Metal-framed storm doors and windows might have foam insulation in their frames.

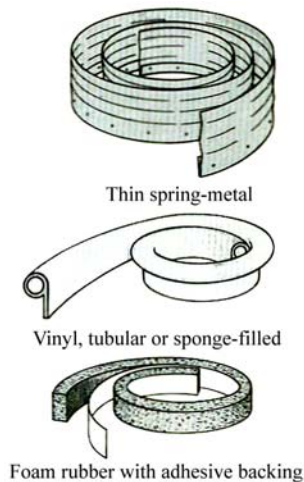
Some doors have self-storing pockets for the glass in summer and an insect screen for the winter. Some storm windows have fixed, full length screens and glass panels that slide out of the way for ventilation. Others are half screen and half glass; these two components slide past each other. Some are easily removed for cleaning while others are not. All of these features add some convenience and higher costs.

### Weatherstripping

Replacement weatherstripping is often available at most building supply and hardware stores. There are wide varieties of materials to choose from including: foam rubber, EPDM rubber, felt, bent metal, and plastic.

If you presently have a steel door, magnetic weatherstripping is available. This type of weatherstripping is similar to the one found on your refrigerator door.

When selecting weatherstripping, you should consider the durability of the material as well as what would work best for what you are weatherstripping. For example: bent brass and aluminum are found on many older doors and are durable, but they conduct heat easily, don't usually seal that well, and are easily damaged by being bent the wrong way or through poor installation. Bent metal weatherstripping is also one of the most expensive weatherstripping materials. Bent plastics are similar to the bent metals, but are less expensive. They are also less durable. Most rubber and foam materials stay flexible for years, are inexpensive, easily replaced and effectively seal air leaks. You should choose the appropriate door sweeps and thresholds for the bottom of the doors as well.



For the best possible results from your investment, you should make certain that the weatherstripping material will stay flexible under extreme weather conditions. Also, be sure to follow the manufacturer's instructions.



In general, you should:

- 1) weatherstrip the entire door jamb;
- 2) apply one continuous strip along each side;
- 3) make sure the stripping meets tightly at the corners; and
- 4) use a thickness that, when the door closes, the stripping tightly presses between the door and the door jamb without making the door too hard to close.

### Plastic Storm Doors

In most cases, storm doors are intended to be permanent additions to a home. If you have a window or door that is not opened for long periods, a less costly do-it-yourself solution is to seal it from the inside with a plastic sheet. You can make a temporary storm door (or window) by mounting the plastic sheet on a lightweight wooden frame, which has the same dimensions as the opening. Add small handles near the bottom half of the frame to make taking it out easier. Add a strip of felt weatherstripping around the frame for a tight seal. Some hardware and home improvement stores sell prepackaged kits. The plastic usually comes folded or in rolls, and is 4, 6, and 8 mils (one mil equals 1/1000 of an inch) thick. The thicker sheets are more durable. If you leave your plastic storm door (or window) up all year long, try to buy plastic that is ultraviolet (UV) resistant. It will last longer.

### Bibliography

- Source: <http://www.eren.doe.gov/consumerinfo/refbriefs/ed2.html>
- U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, EREC Consumer Brief, "Exterior Doors and Storm Doors."
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