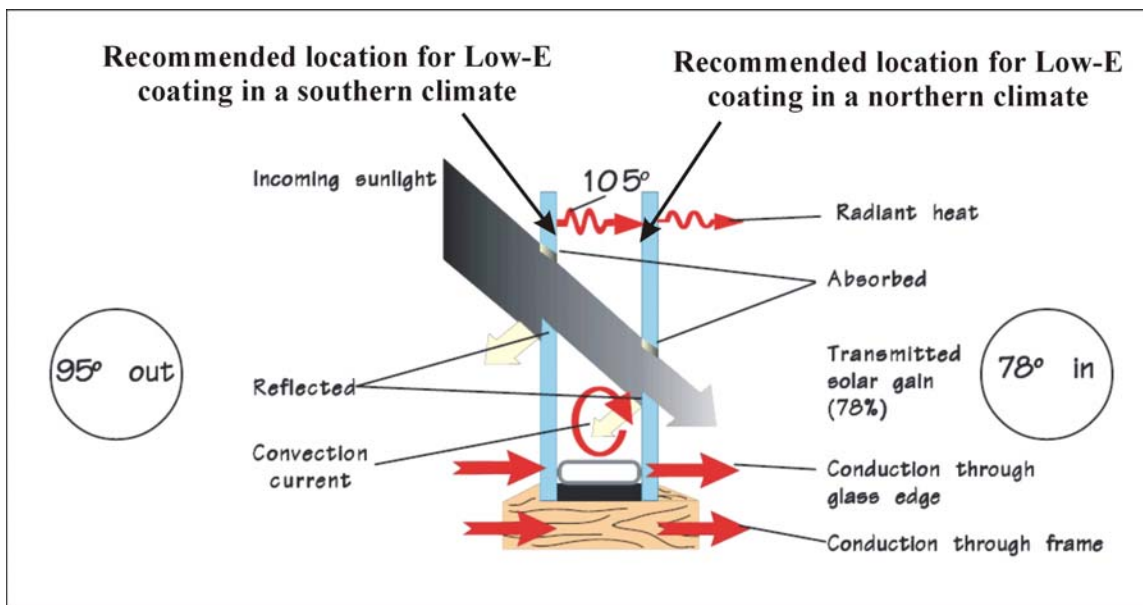


CONFUSED ABOUT WINDOWS?

by
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In Louisiana, many home owners are confused by window manufacturer's claims that their windows will save the homeowner a lot of money on their utility bills. The important thing to remember is that, in order for windows to provide energy efficiency, they need to perform differently in the northern U. S. than they do in the southern U. S. Heat always tries to move from the hotter side of the window to the colder side. In the southern U. S., the main concern is to keep the heat outside during the summer, and in the northern U. S., the main concern is to keep the heat inside during the winter.

Summer Heat Gain in a Typical Double-Glazed Window



Source: Builders Guide to Energy Efficient Homes in Louisiana, Department of Natural Resources, October 2002

Heat moves through windows in three ways: 1) conduction – heat moving through the window's solid materials (like heat traveling from a pot of boiling water through a metal spoon placed in it), 2) convection – heat moving through leaks and by the movement of hot air rising and replacing the colder air that was there, and 3) radiation – on a cold day when the sun is shining and you sit in the sunlight and feel the warmth of the sun, that warmth is due to radiation. You can guess that radiant heat is also present during the summer. Radiant heat travels through glass, away from the source, and not back toward the source. Once radiant heat gets inside the home, it stays there until it can be removed by the air conditioning system.

In order to control convective heat, tightly constructed windows that meet industry standards for acceptable infiltration rates should be used. Insuring that windows are properly fitted into and

caulked around the outside perimeter of the window opening and frame is also needed in window installations to control convective heat.

Well insulated windows are desirable to control conductive heat. The ability of a window to control conductive heat is rated by the windows U-factor. The lower (numerically) the U-factor rating of the window, the better it performs at controlling conductive heat. A good U-factor rating is what is referred to when window manufacturers boast of high-quality insulated windows. The U-factor rating of windows used in the northern U. S. is more critical than for the southern U. S. During northern U. S. winters, outside temperatures can fall to -10° or -20° Fahrenheit (F). A typical temperature inside the home would be around 70°F, resulting in a difference in temperature of up to 90°F. During southern U. S. summers, outside temperatures can reach 100°F to 110°F. A typical temperature inside the home would also be around 70°F resulting in a difference in temperature of only 40°F. This difference in temperature, or conductive heat flow, is what U-factor controls. In the northern U. S., conductive heat flow through windows (90°F temperature difference) is more than twice as high as in the South (40°F temperature difference).

Radiant heat is the heat that is radiated away from the heat source through open space. It passes straight through glass, unless it is acted upon by the glass in some way. In the southern U. S., this type of heat gain is the greatest heat gain attributed to windows. The ability of a window to control radiant heat is rated by the windows Solar Heat Gain Coefficient (SHGC). SHGC gives no indication of how well the window controls conductive heat. The lower (numerically) the SHGC rating of the window, the better it performs at controlling radiant heat. A window with a good SHGC will reflect the radiant heat back toward the source of the radiant heat. During northern U. S. winters, the desire is that the radiant heat be reflected back toward the heat source inside of the home (the furnace). During southern U. S. summers, the desire is that the radiant heat be reflected back toward the heat source outside the home (the sun). A good SHGC rating on a window is accomplished by applying a Low-E coating to one surface of the glass. Whatever glass surface that this Low-E coating is applied to determines in which climate the window performs the best. In a Southern climate, to insure that the Low-E coating is installed on the proper glass surface, specify Soft Coat Low-E. This tells the window manufacturer that the Low-E coating is applied to the inside surface of the outermost glass, and will reflect radiant heat back toward the outside of the home.

Windows that are gas filled have an inert gas, usually argon, installed between the glass panes to further control conductive, and convective heat flow. Gas filled windows are usually much more expensive than non-gas filled windows. It is a matter of personal choice whether a home owner chooses to purchase gas filled windows, but, again, conductive heat flow is much more critical in the northern U. S. than it is in the southern U. S., so why pay more for windows that are better suited for a northern climate. The recommended windows for installation in Louisiana are windows with a U-factor of .65 or below that also have a SHGC of .40 or below. Specify Soft coat Low-E to insure that the Low-E coating is on the correct surface of glass for a southern U. S. climate. Windows with these specifications will perform best in Louisiana's climate.