Selectwood

:: Choosing Triple Glazed Windows

Net Zero, Deep Energy Retrofit, Passive House... all of these building techniques have one goal in common: to achieve the highest possible energy efficiency. Designing a house that relies on little or no traditional heating and cooling systems requires many advanced construction details. Reducing air leakage, maximizing the amount of insulation in the building envelope, providing healthy air exchange, taking advantage of solar heat-gain and the cooling effect of roof overhangs are just some of the design elements that help create a house which depends as little as possible on mechanical means to make a comfortable interior environment.

One of the most challenging design decisions when building a high efficiency project is specifying the windows. Given that most of the high-performance houses built today have a minimum R-20 floor insulation, R-40 in the walls and R-60 in the roof, the windows need to have the highest energy rating available within the project budget. This requirement typically points towards the use of triple-pane insulated glass which has considerably more insulating value than the standard double-pane windows commonly used in the United States. Most of the double-pane insulated glass (IG) windows available have an equivalent R-value of between three and four. Triple-glazed windows are rated at R-5 or better, typically a fifty percent improvement over double-pane units.

It is a logical conclusion that triple-pane (tripane) windows are more energy efficient than dual-pane insulated glass, but their use has been slow to catch on in the United States. In Europe, particularly in Sweden and Germany, tripane windows have been used for decades. In fact, Sweden established a stringent energy code in 1977 that led to the use of tripane windows in practically every building erected in the last 35 years. And for many years, Germany has been the leading manufacturer of energy efficient windows worldwide. Until recently, most builders in this country looking to use high quality triple-glazed products for their project had few options other than to order higher priced windows from Europe. Manufacturers in North America were slow to respond to the growing market for these windows, but that is no longer the case. Several window manufacturers in both the U.S. and Canada offer wood, fiberglass and vinyl frame triple-glazed windows. Two of these manufacturers have even had their windows certified by the Passive House Institute U.S. (PHIUS). This certi-

fication means that the window has met the demanding guideline requirements on energy performance established by the PHIUS. In Europe, where energy efficiency has been practiced longer, many window manufacturers have been certified by the PHIUS. The United States, however, is just beginning to embrace the Passive House movement along with Net Zero, Deep Energy Retrofits and even the Pretty Good House approach to designing and building energy-efficient houses to very high standards. It appears likely that the use of triple-glazed windows will gain in popularity and might become the standard glazing used in most new, energy-efficient construction projects.

In the United States, the most recently adopted building codes call for higher levels of energy performance than were previously required. Builders today need to achieve much higher R-values in the building envelope, and the use of high-performance windows as part of the wall system contribute to achieving this goal. U-factor values and the Solar Heat Gain Coefficient (SHGC) measure window performance. Manufacturers are required to list these values according to the standards issued by the National Fenestration Rating Council (NFRC). U-factor measures the heat flow through the window from room air to outside air. The lower the U-factor value, the greater the insulating capabilities of the window. The SHGC is a measurement of the percent of solar radiation that actually enters a building through a window as heat gain. A high coefficient means high solar heat gain; a lower number means the glazing is better at preventing solar heat gain. Climate conditions and building site orientation usually determine the desired SHGC of a particular window.

In northern climates, a good performing, double-glazed, insulated glass window has a U-factor between 0.28 – 0.30, depending on the particular type of Low E coated glass that is used. Triple-pane windows mostly have U-factors ranging from 0.17 – 0.20, which is an appreciable improvement in the insulating properties of the window. A window with a U-factor of 0.20 has an insulation value equivalent to R-5. SHGC numbers can vary a lot with the use of different glass configurations. In cold climates, most builders of high-performance houses look for windows with high solar gain characteristics, particularly for the south and west facing sides.

In the past, European manufactured triple-glazed windows were considered the only viable option for high-performance buildings. The perception was, and may still be, that the European companies offered more flexibility than their American counterparts. The notion that custom sizing, a variety of material options and performance characteristics, plus other specialized features, were only available on the other side of the Atlantic is not true. There are American manufacturers that offer similar options. Importing windows to the U.S. is time consuming and costly. The European windows tend to be more expensive compared to domestically manufactured units, and the lead times

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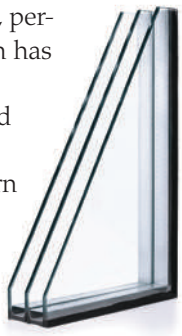
between order placement and delivery average 12 or more weeks, with similar lead times if any warranty issues need attention. There are only a few distributors of these windows in North America, so it is unlikely a manufacturer's representative will be quickly available to visit a job site if a problem arises.



Among the U.S. manufacturers offering triple-glazed window options, perhaps the best-known company is Marvin Windows and Doors. Marvin has offered tripane windows for many years and is certified by the Passive House Institute U.S. Marvin offers tripane units in both aluminum clad wood frames and their Integrity fiberglass line. It is worth noting that practically all of the European windows sold in this country are tilt-turn units. This type of window is an in-swing casement that is also capable of tilting in like a hopper window. Marvin has long offered tilt-turn windows along with traditional casement, awning and double hung windows in their tripane lineup.

Depending on the energy performance required for a particular project, Marvin has an array of options available for their tripane products, including different glass coatings, gas fills, grille configurations, hardware, wood species and finishes, integrated window shades, exterior cladding, fiberglass color and jamb depths up to 26". Marvin Integrity tripane casement sash can even be retrofitted into existing double-pane frames.

As energy costs continue to rise, more architects, builders and homeowners will be specifying tripane windows for their building projects. Given Marvin's extensive range of available products and options, as well as a three week average lead time, there is no need to look overseas for high-performance windows. Selectwood has been a leading Marvin Window dealer for over twenty years and has the knowledge and expertise to help with selecting whatever tripane window your design requires.