

Inaugural Issue!

# Tru-Performance

THE THERMA-TRU DOORS RESEARCH SERIES

**THERMA-TRU**  
DOORS

The Most Preferred Brand in the Business™

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## Energy Efficiency of Fiberglass

For years, homeowners and contractors have been working to raise the bar on both the look and energy efficiency of their homes. Additional wall and attic insulation, new windows and better caulking have traditionally led the way. Now, homeowners are increasingly turning to the high energy efficiency – and beauty – of fiberglass doors. Ongoing research at Therma-Tru's Advanced Technology Center in Edgerton, Ohio, proves that its fiberglass doors offer thermal efficiency that is three to seven times greater than traditional wood doors.

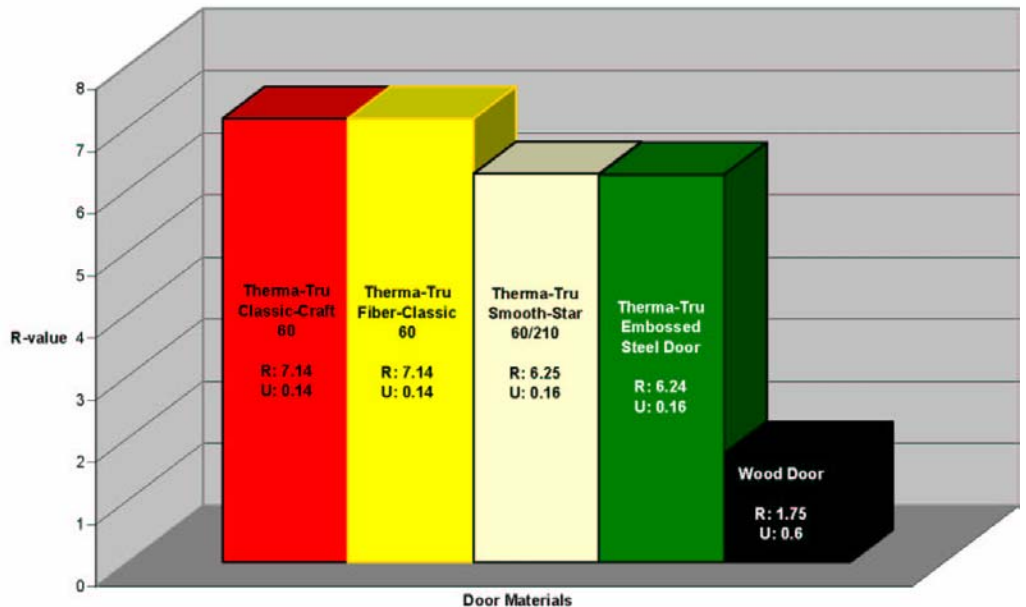
"The structural integrity that prevents Therma-Tru fiberglass doors from rotting, warping or cracking is an undeniable advantage in terms of thermal transmission," said Dan Templeton, Vice President, Technology for Therma-Tru Doors. "The long-term energy and aesthetic advantages of fiberglass far outweigh those of wood when it comes to entry doors."

To explore the thermal transmittance of fiberglass, Therma-Tru conducted extensive testing in accordance with NFRC 100-91, ANSI/ISDI-107; ASTM C-236; and ASTM C-1199.

In the thermal transmission ratings listed here for various six-panel fiberglass and steel door products manufactured and tested by Therma-Tru, U-value is related to the more common R-value by inverse mathematical relationship, where 1/U-value is equal to R-value and vice versa. High R-values or low U-values indicate superior thermal performance. These results prove that fiberglass doors, especially when coupled with quality installation and weather stripping, offer a high resistance to heat transfer.

Typical six-panel wood doors offer U-values of 0.4 to 0.8 and R-values of 2.5 to 1.25, whereas Therma-Tru fiberglass doors offer U-values of .14 to .16 and R-values of 7.14 to 6.24, representing thermal performance that is approximately three times to seven times less effective than utilizing fiberglass doors.

~Please see "Energy" on Page 2



Through extensive testing, Therma-Tru Doors proved that its fiberglass entry door systems provide thermal performance superior to that of wood doors. This chart represents the higher R-values (resistance to heat transfer) and lower U-values (heat transfer properties) provided by fiberglass.

## **Therma-Tru Door Testing Protocol**

In accordance with NFRC and ASTM standards, Therma-Tru installed a door system in a special three-part chamber. The Hot Box is maintained at a constant elevated temperature, while the Cold Box is maintained at a constant low temperature. The door system is installed in between the two. The Hot Box is further insulated from the surroundings by the Guard Box, which is also maintained at a high temperature. The Guard Box ensures that no heat is transferred from the Hot Box to the surroundings except through the door system.

During the test, as thermal energy is conducted from the Hot Box to the Cold Box through the door system, heaters pump additional heat into the Hot Box to maintain the constant temperature.

The amount of heat energy required to maintain this temperature in the Hot

Box during the test is the same amount that is conducted through the door system. The quantity is measured and converted into a heat transfer rate, or U-value.

The ICC 2003 International Energy Conservation Code (IECC) requires opaque doors to have a minimum U-value of 0.35 (wood is a much higher 0.6 compared with 0.14 for fiberglass; the lower the U-value, the better the thermal performance).

Although we are seeing widespread adoption of the IECC, some individual states may have their own criteria or may have no requirement for the thermal performance of entry doors. Clearly, however, the advantages of low U-value materials like fiberglass provide more benefits to the homeowner than other materials, such as wood.

## **Energy, cont.**

In Therma-Tru testing, the Classic-Craft® and Fiber-Classic® entry systems feature a thermal performance rating that is slightly better than comparable doors in other models. This is due to the heavier duty fiberglass skins utilized on these products. The urethane foam core insulation used to fill the fiberglass doors is environmentally friendly, and is consistent among the fiberglass doors studied here.

### **Test Standard Descriptions**

**NFRC 100-91:** Procedure for Determining Fenestration Product Thermal Properties

**ANSI/ISDI-107:** Thermal Performance Standard for Insulated Steel Door Systems

**ASTM C-236:** Standard Test Method for Steady State Thermal Performance of Building Assemblies of a Guarded Hot Box

**ASTM C-1199:** Method for Measuring Steady-State Thermal Transmittance of Fenestration Systems Using Hot-Box Methods

### **About Tru-Performance: The Therma-Tru Doors Research Series**

*Therma-Tru maintains one of the industry's few fiberglass door research and development centers in the world. At the Therma-Tru Advanced Technology Center (right), located in Edgerton, Ohio, Therma-Tru continuously tests and evaluates the performance of its door systems.*

*This is the first edition of **Tru-Performance: The Therma-Tru Doors Research Series**, which will report quarterly on issues related to the performance, style, and innovation of fiberglass entry and patio doors.*



**For more information about Tru-Performance: The Therma-Tru Doors Research Series, please contact Ann Krebs at 419.891.7426 or [akrebs@thermatru.com](mailto:akrebs@thermatru.com)**