"DOLLARS & SENSE"…THE FACTS BEHIND A GARAGE DOOR'S R- VALUE

Consumers today are more sophisticated than ever in making informed decisions when purchasing goods, from a new car to a new laptop computer. A wealth of information is available via the Internet, consumer buying guides, blogs, etc. Taking this information at face value, however, can sometimes lead to buying decisions that may not provide the perceived benefits that were expected.

With the introduction of insulation materials in overhead garage doors, manufacturers decided to use R-value as a method to express the product's insulating performance. R-value is commonly used in other building product materials including fiberglass insulation and structural insulated panels (SIPS).

Why Use R-Value?

The use of R-values in promotional material for overhead garage door manufacturers has been accepted primarily because it is easier to understand for the consumer. Basically, the higher the R-value number, the better the thermal performance. However, it is questionable whether a calculated R-value is the appropriate measure of a garage door's thermal efficiency.

The shortfall with using "calculated" R-values in promoting overhead garage door insulating qualities is that it does not reflect the thermal performance of the *entire door assembly* – it merely illustrates the thermal resistance of the materials used in the door panel (fig. 1).

A better measurement of a door's thermal efficiency is U-factor, which defines the amount of heat loss through the entire door assembly (fig. 2). Window manufacturers have traditionally used U-factor to promote the thermal efficiency of their products.

Although garage door manufacturers could derive and advertise a "tested" R-value for their products by taking the inverse of the U-factor number (R-value = 1/U-factor); this is seldom done as the tested R-value is typically much less than the calculated R-value.

(Cross-section of garage door panel)

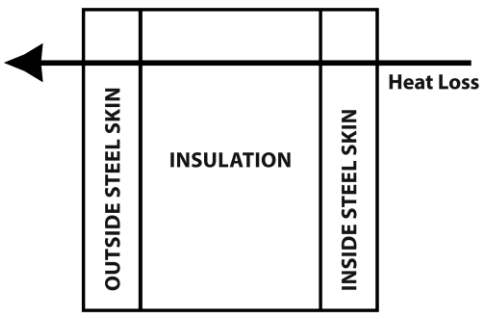

Fig.1

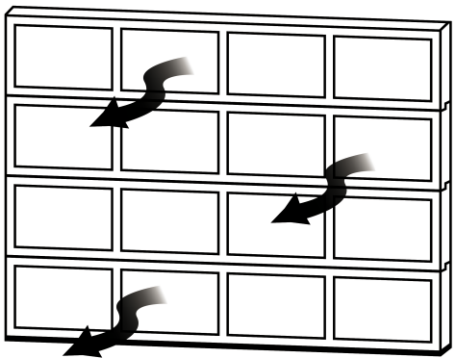

Fig. 2

Polystyrene vs. Polyurethane – Which type should I buy?

Polystyrene and polyurethane are the two most common materials currently used for insulated or "thermal" overhead garage doors. Polyurethane has increased in popularity recently because of the higher R-values associated with the material. How do these higher R-value numbers being promoted benefit the consumer in terms of dollars saved in heating costs?

The actual savings in heating costs of an installed insulated garage door would be difficult to quantify, given the many variables involved – outside air temperatures, wind velocities, how well the door is sealed, how often the door is opened on a daily basis. We can, however, use actual test results to compare the *relative performance* of the two types of insulated doors under similar test conditions. Under these laboratory conditions, we can then determine the cost savings of using one product over another.[1]

What is the test?

ANSI/DASMA 105 is the standard used currently by garage door manufacturers to test for the thermal transmittance, i.e. U-factor of a door. The amount of heat loss during the testing is indicated in BTU's or British Thermal Units. Below is a table containing test results of a 2" polystyrene door and a 2" polyurethane door:

	Installed Door				
Door Type	U-Factor	R-Value	Heat Loss @ 68 Deg. Inside and 18 Deg. Outside	Natural Gas Cost/Hr @ $4.00 / 1000 Cu. Ft.	Gas Cost / Day
2" Polystyrene	.22	4.55	1100 BTU / Hr*	$0.0044	$0.1056
2" Polyurethane	.16	6.25	800 BTU / Hr*	$0.0032	$0.0768

*Source: Architectural Testing, Inc.

What do the results mean to me?

First, these tests were undertaken under ideal laboratory conditions and used only to compare the relative performance of the two doors. In this case, the polyurethane door saved approximately $0.03 more in heating costs per day. Assuming a six-month period where the garage would be heated, this would equate to about $5.40 per year.

Does this make any difference in a consumer's buying decision? Perhaps not, but having better information concerning the thermal effectiveness of the doors you are considering can only be helpful, rather than basing a decision on an advertised R-value alone. In the two test doors shown above, the advertised R-value of the polystyrene door is 9.1, while the polyurethane door R-value advertised is 17.50. By basing much of your decision by looking at the highest advertised R-value, you may be neglecting other important considerations in evaluating what door is best for you.

What else should I consider?

In addition to thermal efficiency, it is important to compare other attributes of different garage doors including durability and overall product quality. Also, if choosing between a polystyrene or polyurethane door, what is the payback to the homeowner over time if there is a difference in cost? A qualified garage door dealer should be able to explain the different features of each product that may be important to your buying decision.

[1] Using 10'x10' test doors; heating costs based on 2012 average natural gas prices.

References:

Ginther, Jack. "Garage Door R-Value." *International Door & Operator Industry*. March/April 2005: 46-50.

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