

U-FACTOR EDUCATION, BEYOND OPAQUE

The transition to a “superior indicator of energy efficiency”

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Editor's note:

Haas Door is leading the way as the industry transitions to the adoption of U-factor for evaluating thermal efficiency of garage doors. At Expo, the company displayed U-factor values for all the qualifying doors in their booth, and Haas Marketing Director Tina Mealer hosted three training seminars during the show geared toward educating their dealers about the U-factor and the DASMA Thermal Performance Verification Program.

There is a revolutionary shift underway in the garage door manufacturing industry — one that will improve both credibility and transparency: the adoption of U-factor as the standard metric for evaluating thermal efficiency. Participation in the DASMA Thermal Performance Verification Program (TPVP) marks the industry's transition from a calculated R-value to a third-party-tested U-factor.

Leveling the playing field

The transition isn't merely about embracing a different metric — it's about enhancing the credibility and reliability of our products across the entire industry. By subjecting garage doors to rigorous testing in

accredited labs, we ensure every aspect of thermal efficiency is appropriately and consistently evaluated, and we assist dealers in making valid product comparisons.

In the past, R-values were calculated individually by each garage door manufacturer. The process overlooked many differences in components and door panel construction methods. The TPVP, on the other hand, brings consistency to the testing methodology and includes guidelines on how the testing data can be used in marketing. This ensures that the information presented to dealers and consumers is comparable across manufacturers, which is a crucial step towards a more transparent and reliable industry.

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DASMA Thermal Performance

Program Training and Haas Door



U-factor: The what and the why

U-factor is a measurement of heat transfer from the warm side of a garage door to the cold side. The lower the U-factor number the better, as a lower value indicates less heat loss. A variable that's important to consumers who are concerned with the thermal efficiency of their homes.

U-factor has a history in the building industry. Other sectors, such as entry doors and windows, have already transitioned to U-factor. In 1991, the National Fenestration Rating Council (NFRC) moved to a system based on U-factor, which was recognized as a "superior indicator of energy efficiency."

Architects use U-factors to compare different facades and to determine thermal performance. Each year, building codes move toward U-factor as the main indicator for thermal efficiency. IECC 2021 specifically calls out garage doors in the U-factor method for opaque garage door thermal requirements C402.1.4.

U-factor is not equal to R-value

A frequent concern for dealers is keeping the information simple for customers. We get many requests for a conversion chart from U-factor to R-value. The formula they have in mind is that R-value is equal to $1 / U$ -factor. That sounds mathematically correct, but it is not due to how each measurement is derived.

The example to the right shows a door with a calculated R-value of 17.66 based on a portion of the door. When tested in the DASMA TVPV, the whole door received a U-factor of 0.094. Trying to determine R-value by taking the reciprocal of the U-factor is incorrect because the starting U-factor incorporates full-door components, such as stiles and thermal breaks — R-value does not take into consideration any of these components (See DASMA TDS #163).

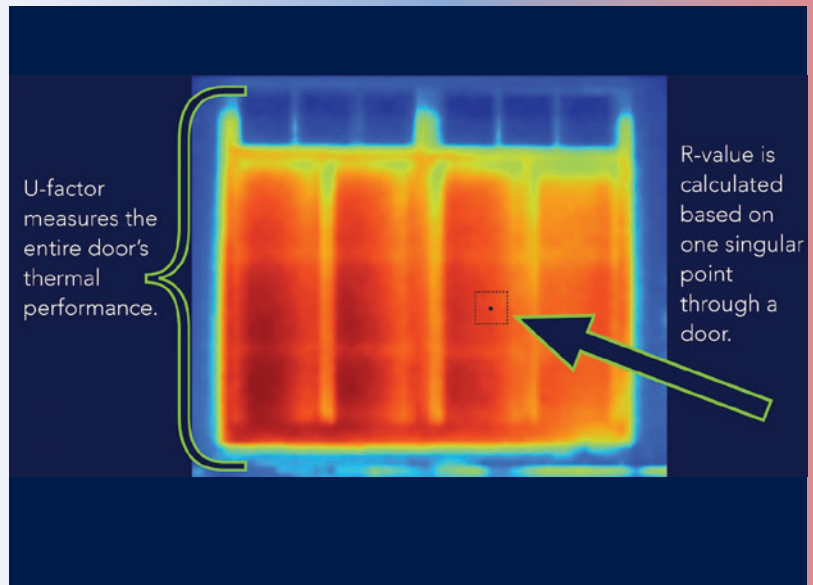
The aforementioned example demonstrates how U-factor is a much more accurate measure of testing thermal flow through a garage door assembly and ultimately provides a better picture of the product a consumer is purchasing.

How opaque is the door?

It is also important to understand what is considered an opaque door and what isn't. This is critical for comparing doors and ensuring the correct U-factor is applied. In the DASMA TPVP, an opaque door is considered less than or equal to 16% cutout for glazing. If a door exceeds 16% cutout for glazing, then the opaque U-factor doesn't apply.

Haas Door has tested all of our thermally efficient doors beyond 16% glazing cutout to provide the correct U-factor for the specific door ordered.

Considering the many variables, embracing the U-factor marks a new era of accuracy, consistency, and transparency in the garage door industry. It is a tool that empowers both professionals and consumers to make informed decisions about the thermal performance of doors. ■



R-value ≠ U-factor

Calculated R-value ≠ 1/U-factor (3rd party tested assembly)

2000 Series

Tested U-factor: 0.094
Calculated R-value 17.66

$R_{17.66} \neq 1/U_{0.094}$
(Calculated) (Tested)

Using the math to generate the R-value doesn't take into account...

- A full 10 x 10 door
- Section joints
- Thermal Breaks
- What the entire door actually tests

Example: 700 Series

10'x10'
½" Glass IG
Glass %: 8.2 (Opaque)
U-factor: 0.093

10'x10'
½" Glass IG
Glass %: 20.6
U-factor: 0.193