



DASMA
Door & Access Systems
Manufacturers Association
International

COMMERCIAL & RESIDENTIAL GARAGE DOOR DIVISION

TECHNICAL DATA SHEET

#196

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U-factor on Garage Doors and the DASMA Thermal Performance Verification Program

Background

Thermal ratings on building products have become more important than ever as energy costs continue to climb. Energy conservation efforts are continual at every level of government and industry, and regulators, specifiers, architects, building owners and homeowners demand better thermally performing products.

In the past, the garage door industry used calculated R-value as the default thermal rating, but R-value is of limited usefulness as it is only a calculation of the thermal resistance through the center of a door section, not a measurement of the thermal properties of a complete door. The R-value calculation is explained in DASMA Technical Data Sheet #163.

U-factor: Description and Measurement

U-factor is an expression of thermal transmittance, reported in $\text{BTU}/(\text{h} \cdot \text{ft}^2 \cdot ^\circ\text{F})$. The lower the U-factor, the better the thermal performance of the installed garage door system. A garage door with a U-factor of 0.20 is twice as thermally efficient as one with a U-factor of 0.40.

U-factor is commonly used on building products such as entry doors, windows, and skylights. For garage doors, a common misconception is that the tested U-factor is the inverse of the calculated R-value. That is not the case. As described below, the methodology and testing requirements are completely different. Therefore:

For garage doors, U-factor does not equal $1/R$ -value

Note: Technical Data Sheets are information tools only and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific recommendations for their products and check the applicable local regulations.

This Technical Data Sheet was prepared by the members of DASMA's Commercial & Residential Garage Door Division Technical Committee. DASMA is a trade association comprising manufacturers of rolling doors, fire doors, grilles, counter shutters, sheet doors, and related products; upward-acting residential and commercial garage doors; operating devices for garage doors and gates, sensing devices, and electronic remote controls for garage doors and gate operators; as well as companies that manufacture or supply either raw materials or significant components used in the manufacture and installation of the Active Members' products.

U-factor testing for garage doors is based on ANSI/DASMA Standard 105, which is called out in the International Energy Conservation Code (IECC) as the thermal test method for garage doors, and which is itself based on ASTM E1423. Compared to the R-value calculation, U-factor testing is more accurate to real-world energy usage as seen in the installed environment, because it is a whole door approach that includes not only the door sections, but also the section joints and interface, the assembled hardware, and the perimeter design and construction.

In a U-factor test, a door is installed at an independent laboratory and its outside and inside surfaces are kept at two different temperatures. The rate of heat transfer from the hot to the cold side is the measured U-factor.

DASMA Thermal Performance Verification Program

DASMA has developed a Thermal Performance Verification Program that standardizes the reporting of U-factors for thermally efficient sectional garage doors. DASMA has partnered with ICC-ES, an internationally recognized testing, inspection, and certification company, to administer this program on behalf of its member companies.

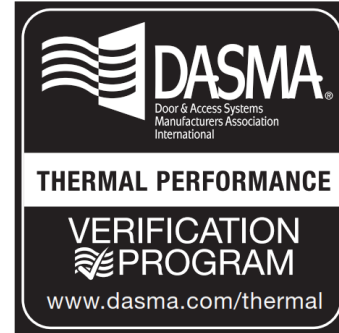
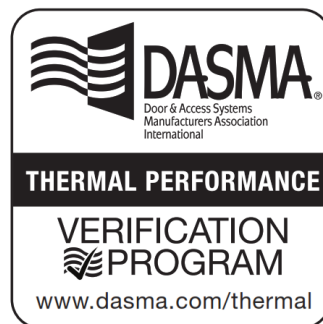
Participating DASMA companies submit U-factor test data from approved 3rd party laboratories to ICC-ES. ICC-ES reviews the test reports and keeps these thermal records, which allows the participating companies to publish the U-factors for doors in the program. DASMA publishes a list of doors in the Verification Program on the DASMA website. Factory, literature, and website audits of member companies' products to ensure compliance will be performed by ICC-ES or by another accredited inspection body acceptable to ICC-ES.

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DASMA Thermal Performance Verification Program Participant Mark, or Badge

Below is a representative example of a mark, or badge, that can be displayed by participants in the DASMA Thermal Performance Verification Program to identify doors listed in the program and to indicate their participation in the program:



This mark is represented virtually on member company websites and literature or on printed materials.

DASMA Thermal Performance Verification Program Icon

Below is a representative example of an icon that can be used by participants to identify individual products on both printed and digital materials to indicate products listed in the program.




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DASMA Thermal Performance Verification Program Label



Participants may use, but are not required to use, a temporary product label similar to the representative example below:

	<p>Manufacturer Name, LLC "Listed Model # (s)"</p>
<p>THERMAL PERFORMANCE VERIFICATION PROGRAM www.dasma.com/thermal</p>	
<p>THERMAL PERFORMANCE RATING</p>	
<p>U-Factor 0.21</p>	
<p>The manufacturer pledges that U-Factor rating conforms to ANSI/DASMA 105 procedure for determining whole product performance. DASMA ratings are determined for a fixed set of environmental conditions and specific product sizes and glazing. DASMA does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.dasma.com/thermal</p>	

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Participants have the option of providing an R-value on this label, as well, but it must appear after the U-factor and it must be displayed with smaller font.

	Manufacturer Name, LLC "Listed Model # (s)"
THERMAL PERFORMANCE VERIFICATION PROGRAM  www.dasma.com/thermal	THERMAL PERFORMANCE RATING
<p style="text-align: center;">U-Factor 0.21 Manufacturer Calculated, Not Verified R-Value: 10</p>	
<p>The manufacturer pledges that U-Factor rating conforms to ANSI/DASMA 105 procedure for determining whole product performance. DASMA ratings are determined for a fixed set of environmental conditions and specific product sizes and glazing. DASMA does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.dasma.com/thermal</p>	

Other Considerations of Program

The DASMA Thermal Performance Verification program covers doors where no more than 16% of the door's area has windows. Most garage doors with a single window section have less than 16% of window area; these are covered by the same U-factor label as a solid (no window) door.

Sectional garage doors with more than 16% window area are subject to different U-factor testing and labeling. Program participants may choose to enroll garage doors with windows representing more than 16% of the total door area, but it is not required.

Sectional garage doors that are not highly thermally efficient need not be included in the DASMA Thermal Performance Verification program. Other types of vehicular access doors, like rolling steel or high-speed doors, are not included in this program. Air infiltration and solar heat gain are not covered in this program. U-factor simulation per National Fenestration Rating Council (NFRC) Standard 100 and validation testing per NFRC 102 are not part of this program.

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Conclusion

The DASMA Thermal Performance Verification program creates a common testing and reporting format to represent U-factor throughout the sectional garage door industry.

Definitions/Glossary

U-factor – The measure of overall heat transfer through a garage door. The lower the U-factor, the less energy transmitted through the door. U-factors for garage doors are measured in units of BTU/hr·ft²·F° as tested per ANSI/DASMA Standard 105.

British Thermal Unit (BTU) – BTU is a measure of energy. One BTU is equal to the amount of energy required to raise the temperature of one pound of liquid water by one degree Fahrenheit.

ANSI/DASMA Standard 105, *Test Method for Thermal Transmittance of Doors* – This is the vehicular door industry test method for measuring U-factor.

International Energy Conservation Code (IECC) – The IECC is published by the International Code Council (ICC). The ICC creates and administers the IECC as well as the International Building Code and International Residential Code.

Thermally-Efficient Door – A door with an insulated core and a meeting rail design that incorporates a thermal break, and not having glazing cutouts of more than 16% of the total door surface area. A thermal break uses a material other than metal to minimize heat transfer from one side of the garage door to the other side. In other words, the heat transfer path is “broken” from front to back.

ICC-ES – Testing, inspection, certification and quality assurance organization. Part of the International Code Council Family of Solutions, ICC-ES operates three test laboratories in the U.S.

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