Understanding Everything About Fenestration Performance

EL604a

6/21/2018

AIA Learning Units: 1 LU|HSW

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Questions related to specific products and services may be addressed at the conclusion of this presentation.

Learning Objectives

1. Understanding the process for certifying window and door performance ratings.

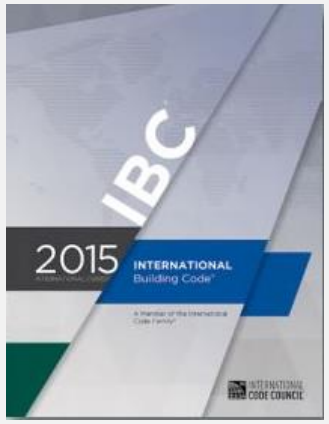
2. Dig into design performance terminology and considerations when specifying a performance classification on projects.

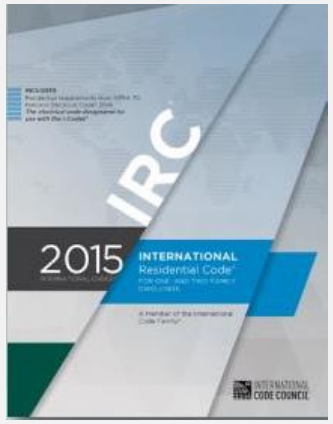
3. Review window and door thermal performance terminology and considerations to help specify thermal performance on projects.

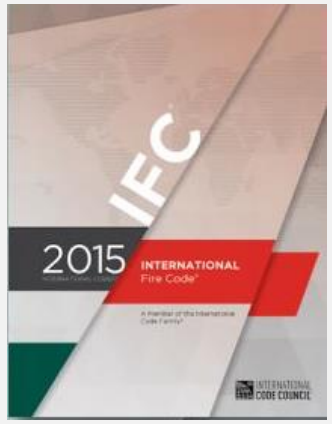
4. Understand the cost and benefits associated with the specification of increased STC and OITC ratings.

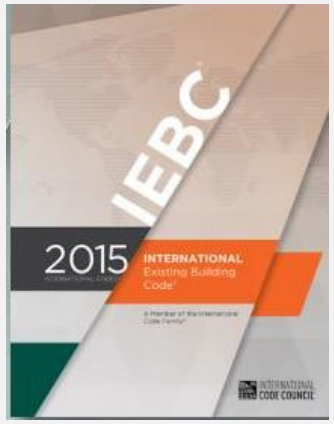
Building Code Landscape

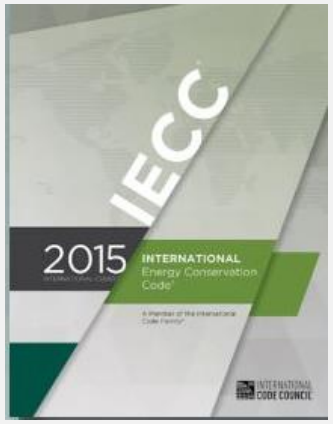
ICC
INTERNATIONAL CODE COUNCIL®





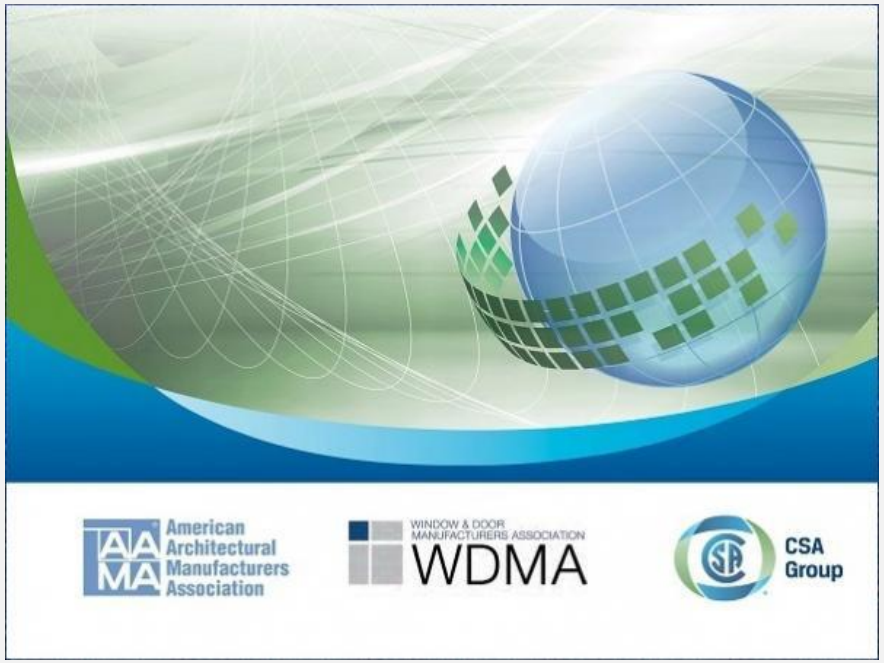






Compliance Paths

There are two main paths to code compliance.



Who Certifies Performance?

1. **Window & Door Manufacturers Association**
2. **National Fenestration Rating Council**
3. **Energy Star**
4. **Canadian Performance**

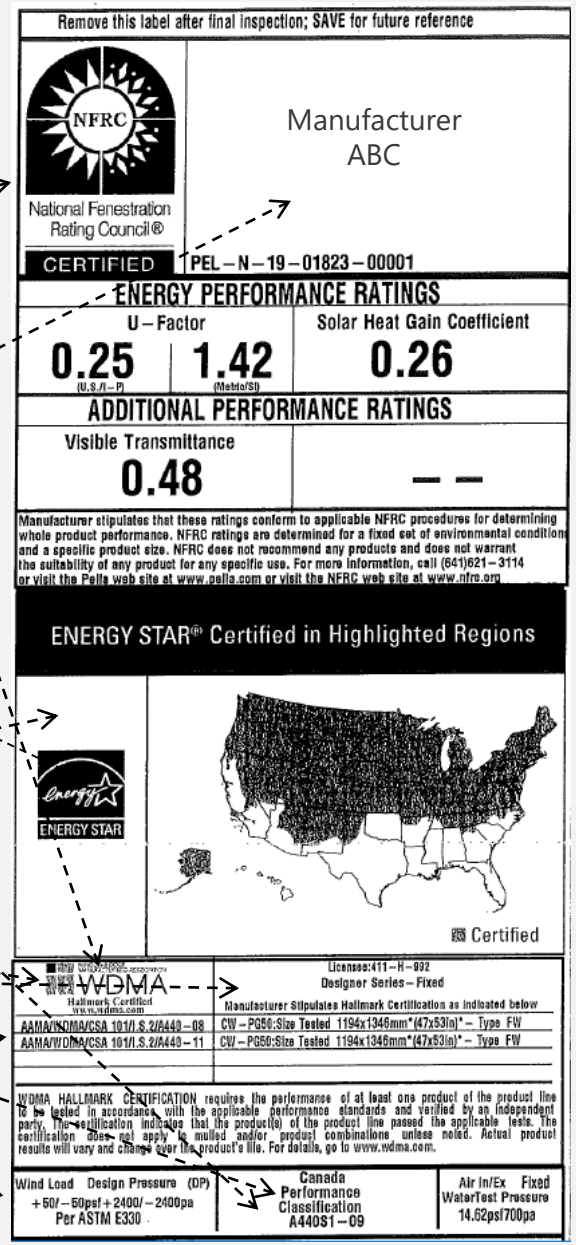
Labeling Requirements:

Identify Manufacturer

Approved Inspection Agencies

Performance

Indicate compliance with AAMA/NWWA-101/I.S.2



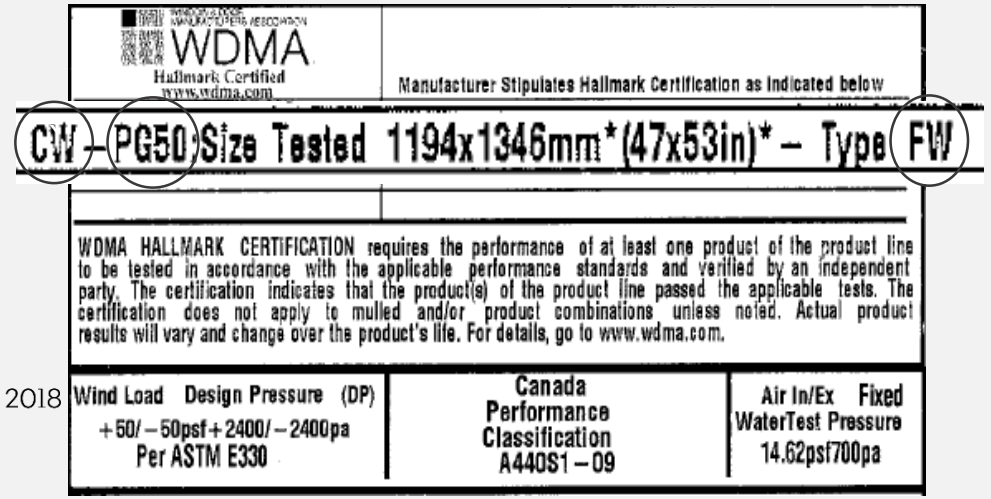
Product Designation System

CW-PG50-FW

Performance Class: CW

Performance Grade: 50 Design Pressure of 50

Product Type Fixed Window



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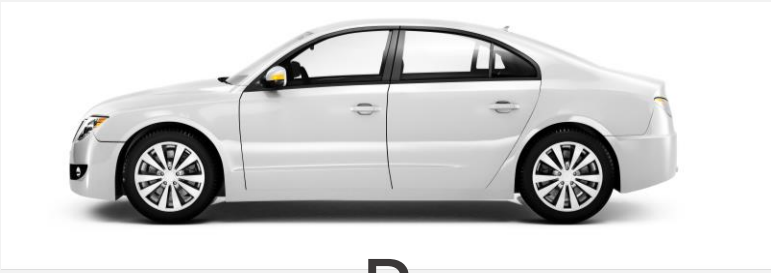
Performance Class

Quick and easy descriptor for the target application of a window.

Helps consumers understand which product has been tested to their specific building requirements.



R

LC

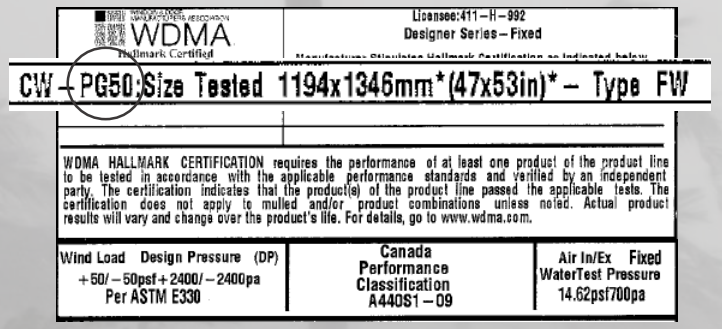
CW

AW

Performance Grade

Performance Grade (PG) is a numeric rating that indicates water penetration resistance and structural performance (DP).

The limiting factor, whether it be the water performance or structural performance would be the PG rating.



WDMA
Hallmark Certified

Licensee:411–H–992
Designer Series–Fixed

CW–PG50:Size Tested 1194x1346mm*(47x53in)*– Type FW

WDMA HALLMARK CERTIFICATION requires the performance of at least one product of the product line to be tested in accordance with the applicable performance standards and verified by an independent party. The certification indicates that the product(s) of the product line passed the applicable tests. The certification does not apply to mulled and/or product combinations unless noted. Actual product results will vary and change over the product's life. For details, go to www.wdma.com.

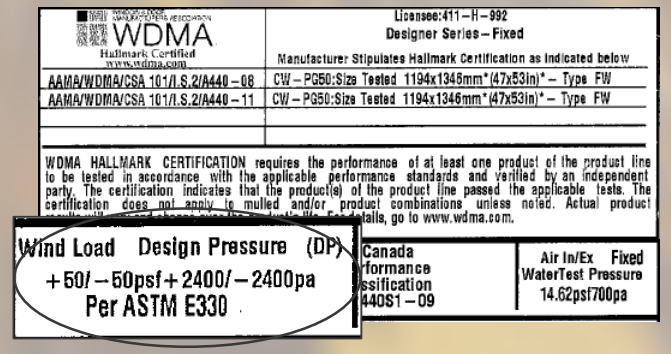
Wind Load Design Pressure (DP)	Canada Performance Classification	Air In/Ex Fixed WaterTest Pressure
+50/–50psf+2400/–2400pa Per ASTM E330	A440S1–09	14.62psf700pa

Design Pressure

Design Pressure is the rating that identifies the structural resistance to wind, expressed in how many pounds per square foot (psf) of pressure the window can withstand.

Structural (Resistance to wind)

- Design Pressure = DP
- Example: 40 psf
- Structural test pressure = DP x 1.5
- Example: 40 x 1.5 = 60 psf



Water Penetration Resistance

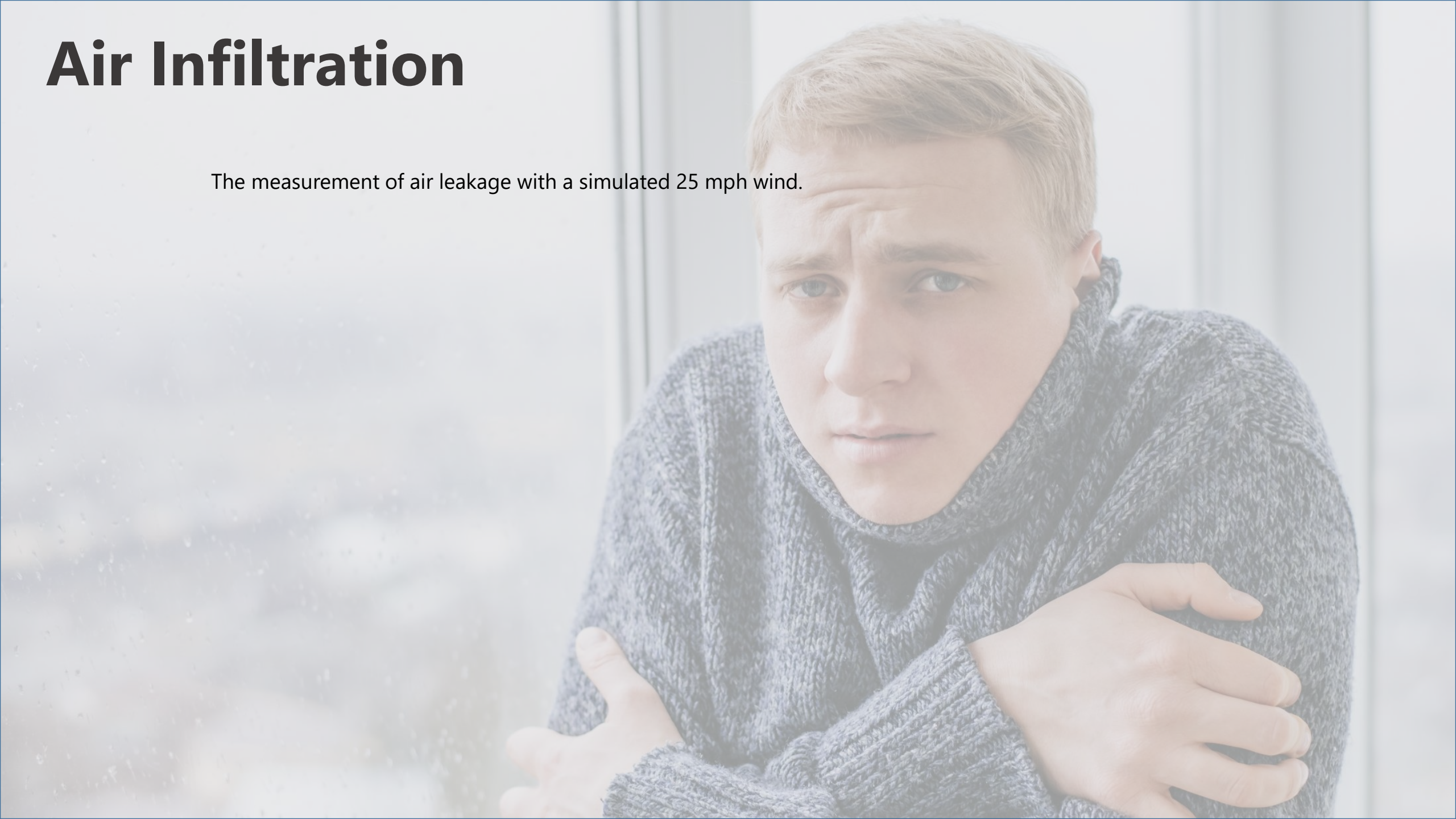
The measurement of resistance to non controlled water source.

Water (Resistance to water infiltration)

- Water test pressure = DP x 0.15
- Example: 40 x 0.15 = 0.60 psf

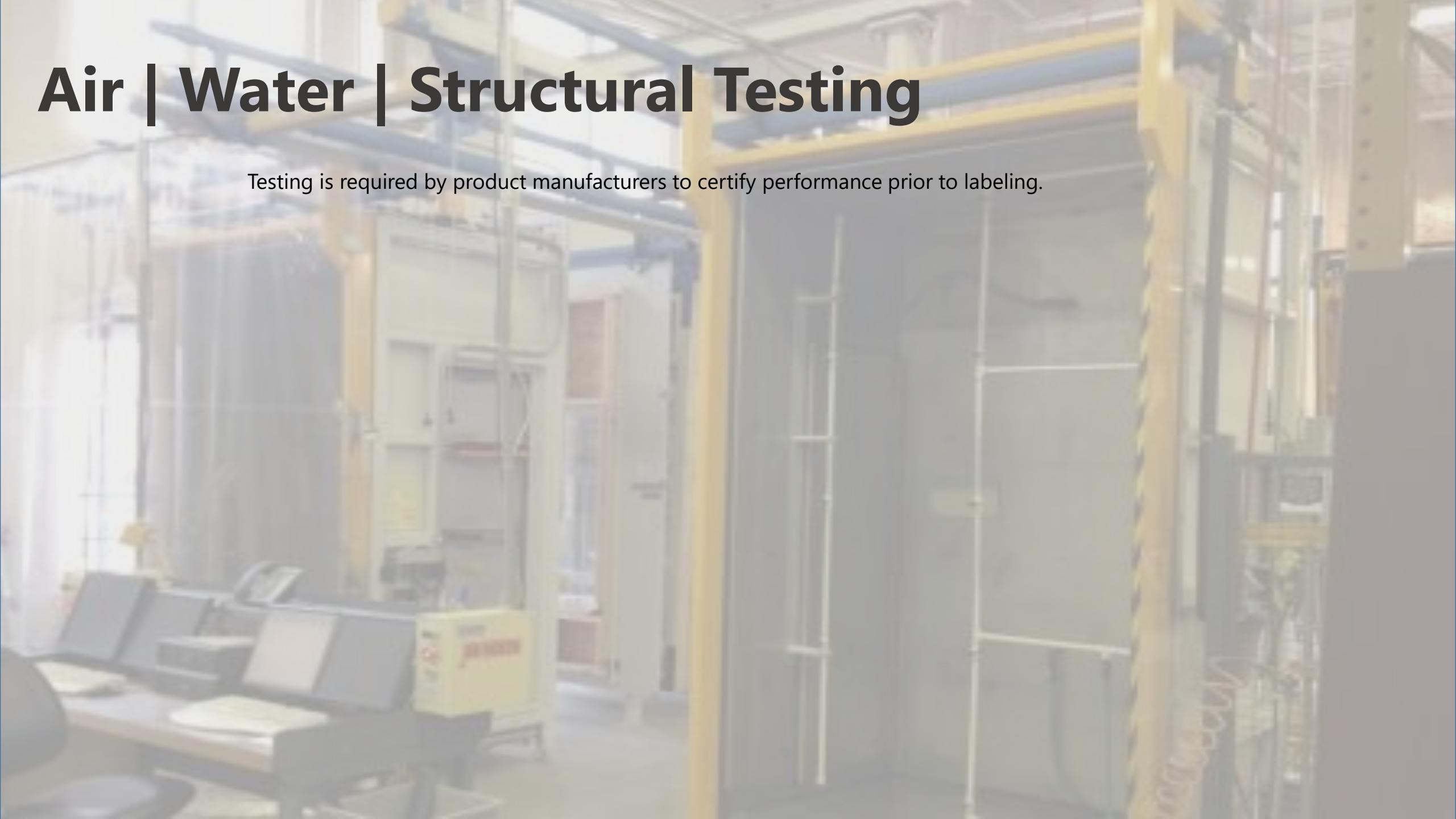
Air Infiltration

The measurement of air leakage with a simulated 25 mph wind.



Air | Water | Structural Testing

Testing is required by product manufacturers to certify performance prior to labeling.



Air | Water | Structural Testing

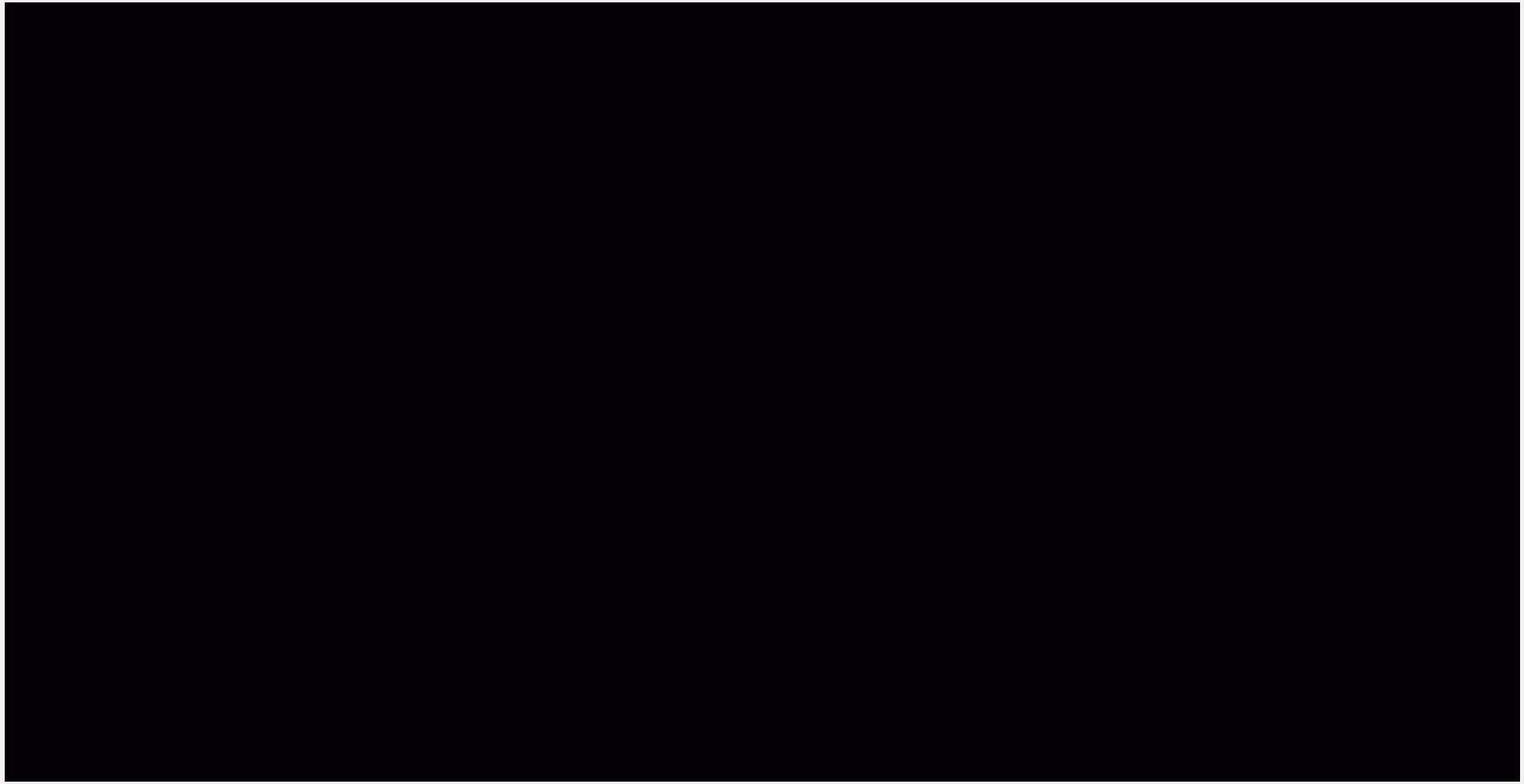
Hurricane Impact Testing

Missile D: 9 lb. 2x4 @ 50 ft/sec (35 MPH)

Missile C: 4.5 lb. 2x4 @ 40 ft/sec (27 MPH)

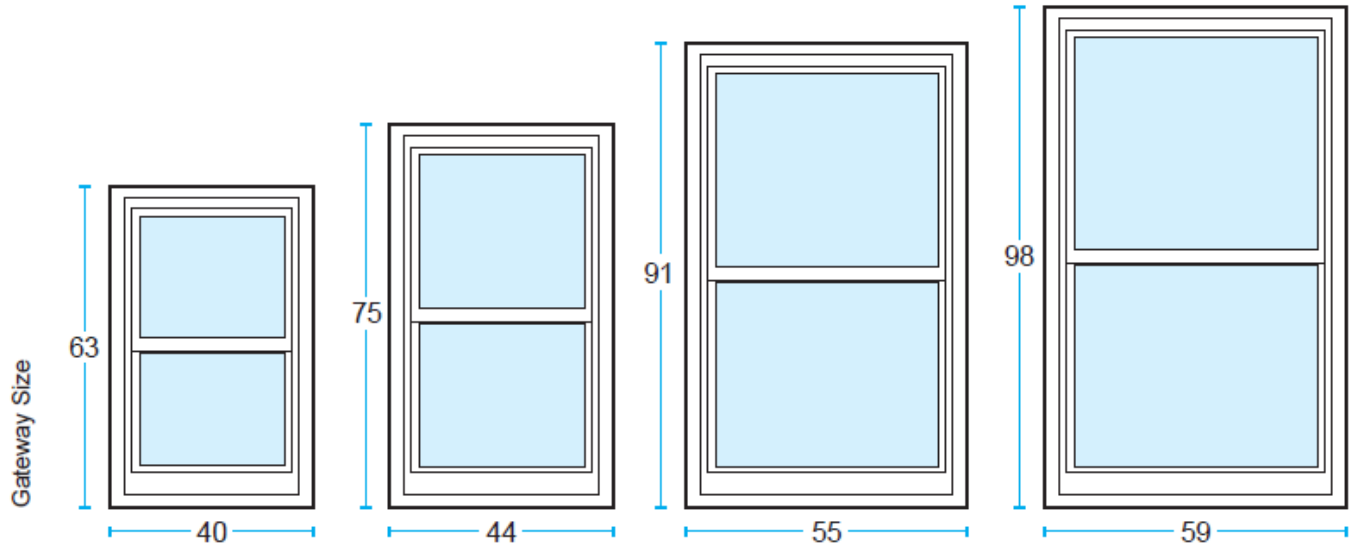
9000 hurricane wind pressure cycles after impact, 3500 positive, 3500 negative

Hurricane Impact Testing



Specifying Design Performance

PERFORMANCE CLASS CHARACTERISTICS



	R	LC	CW	AW
Min. Performance Grade	15	25	30	40
Max. Operating Force (Run)	30	34	45	45
Cost	$	$ - $$	$$ - $$$	$$$ - $$$$

Learning Objectives

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Thermal Performance

Required

Not Required

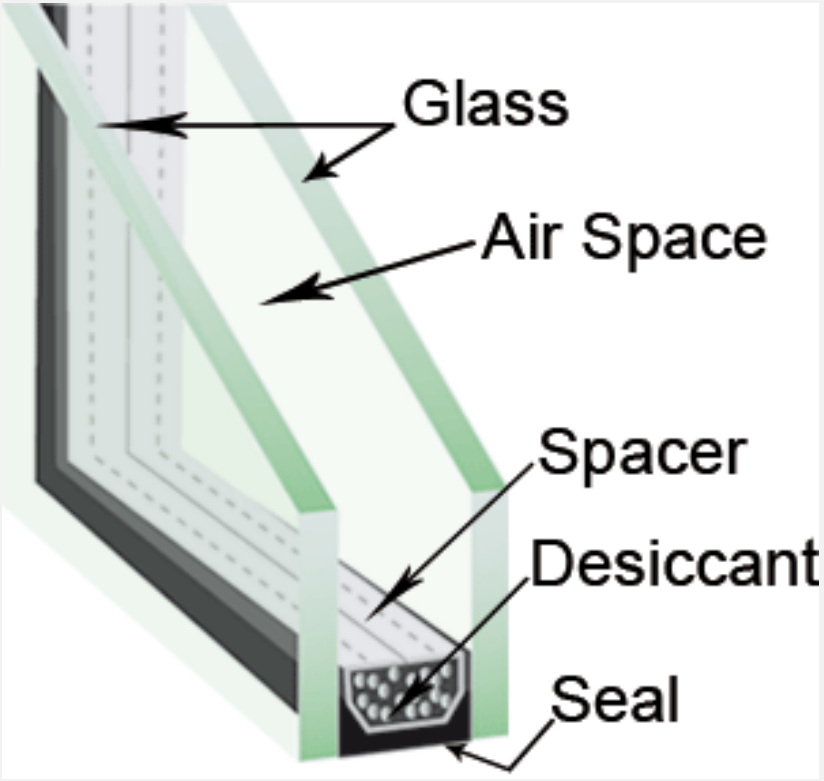
Heat Transfer

There are 3 main methods of heat transfer. Insulating glass reduces each of these.

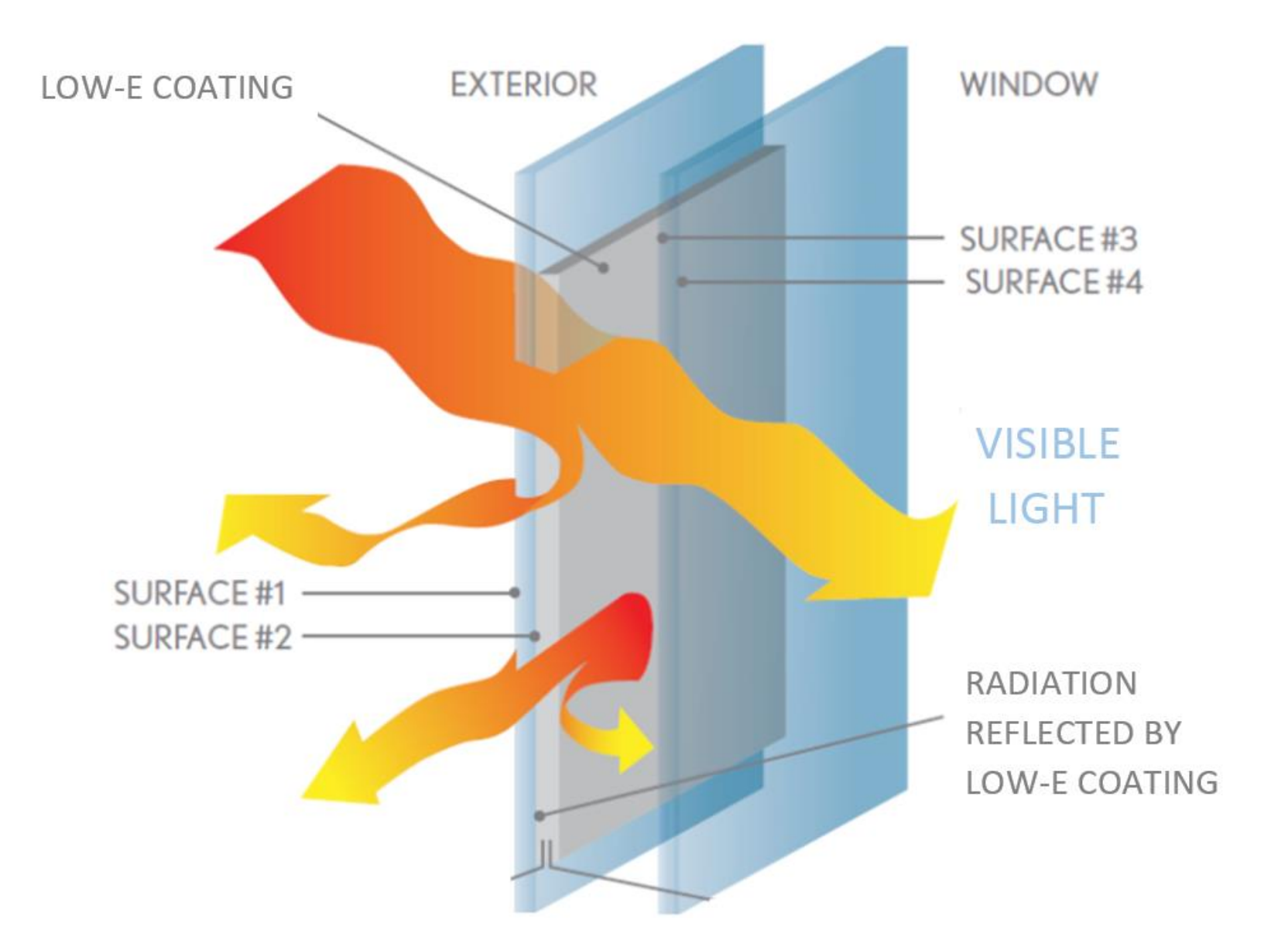
Conduction:
- Glass Panes are separated by insulator

Convection:
- Gas fill of argon or krypton are used in the air space

Radiation:
- Low-E coatings are applied to the glass surface(s)



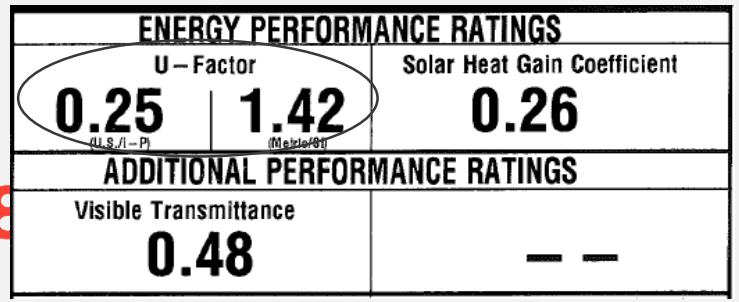
Low-E Glass Technology



U-Factor

U-Factor is a measure, through physical testing and computer simulation, of how well the product insulates against the exterior temperature.

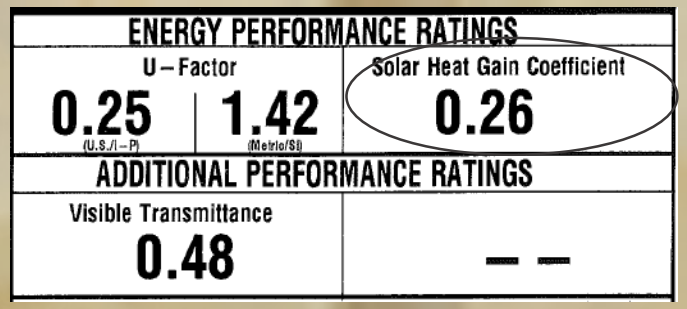
Smaller numbers equate to better performance.



Solar Heat Gain Coefficient

Solar Heat Gain Coefficient is a measure of how much of the sun's energy comes through a window.

Smaller numbers equate to better performance.



ENERGY PERFORMANCE RATINGS		
U – Factor		Solar Heat Gain Coefficient
0.25 (U.S./I – P)	1.42 (Metric/SI)	0.26
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance		
0.48		– –

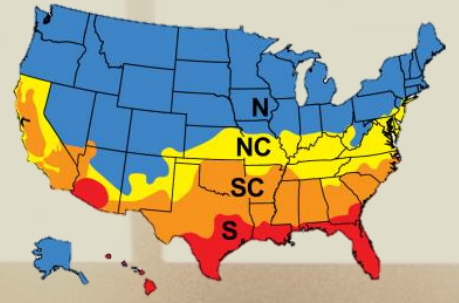
Visible Light Transmission

Visible Light Transmission indicates how much light a window allows into the room.

Higher percentage equates to better performance.

ENERGY PERFORMANCE RATINGS		
U – Factor		Solar Heat Gain Coefficient
0.25 (U.S./I – P)	1.42 (Metric/SI)	0.26
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance		
0.48		– –

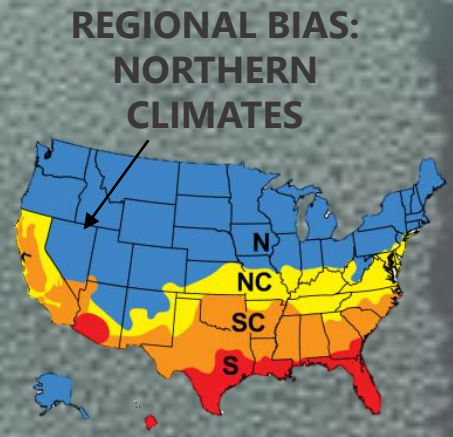
REGIONAL BIAS:
ALL CLIMATES



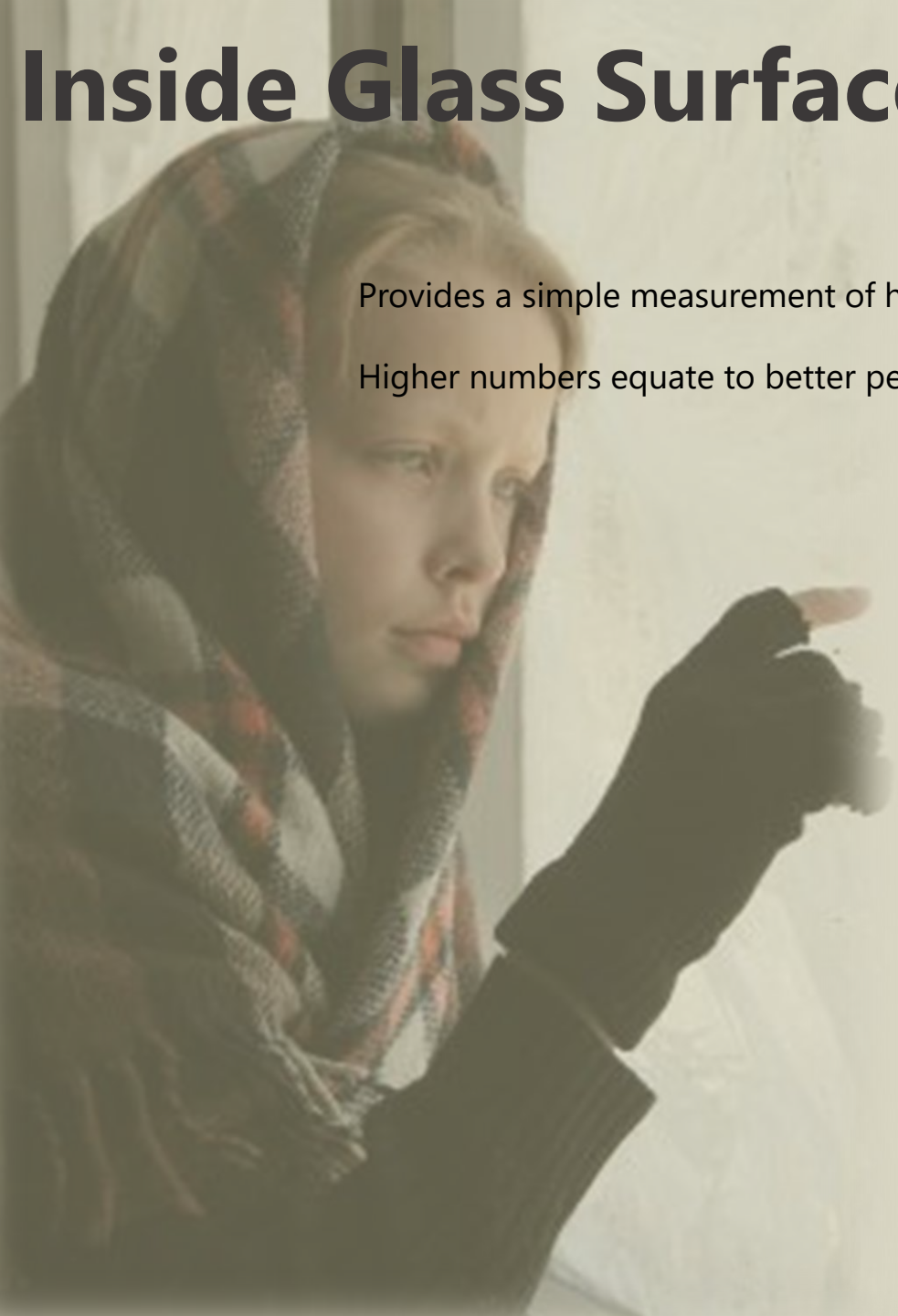
Condensation Resistance

Used to predict a window's ability to resist condensation.

Higher numbers equate to better performance.



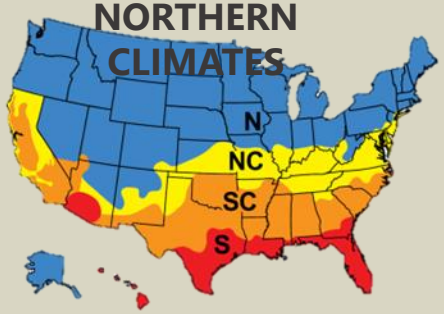
Inside Glass Surface Temperature



Provides a simple measurement of how well the glass assembly insulates against cold temperatures.

Higher numbers equate to better performance. (59˚ F is better than 56˚ F)

REGIONAL BIAS: NORTHERN CLIMATES



Color
of the Year 2018

Ultra Violet

UV Transmission

UV Transmission is a measure of the ultra violet rays allowed through a window.

It can be used to predict fading potential. (Also see LBL Damage Function)

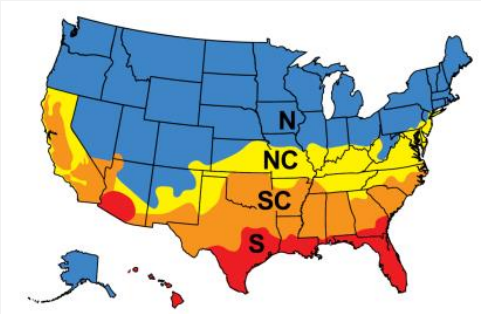
Lower percentages equate to better performance.

LBL Damage Function

LBL Damage Function measures resistance to UV rays that can result in material fading.

Lower numbers equate to better performance. (.15 is better than .17)

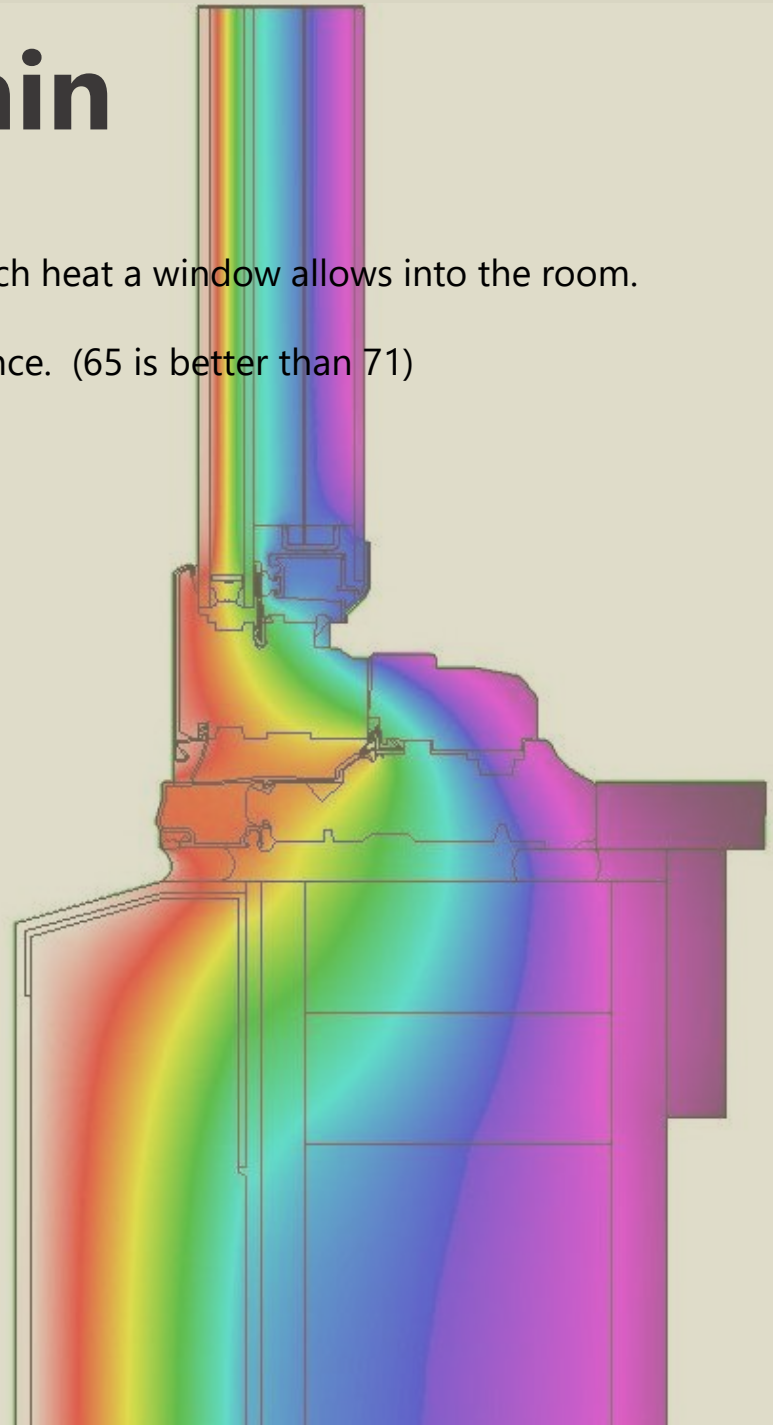
REGIONAL BIAS:
ALL ZONES



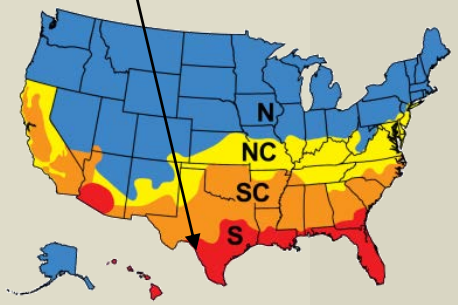
Relative Heat Gain

Relative Heat Gain is a measure of how much heat a window allows into the room.

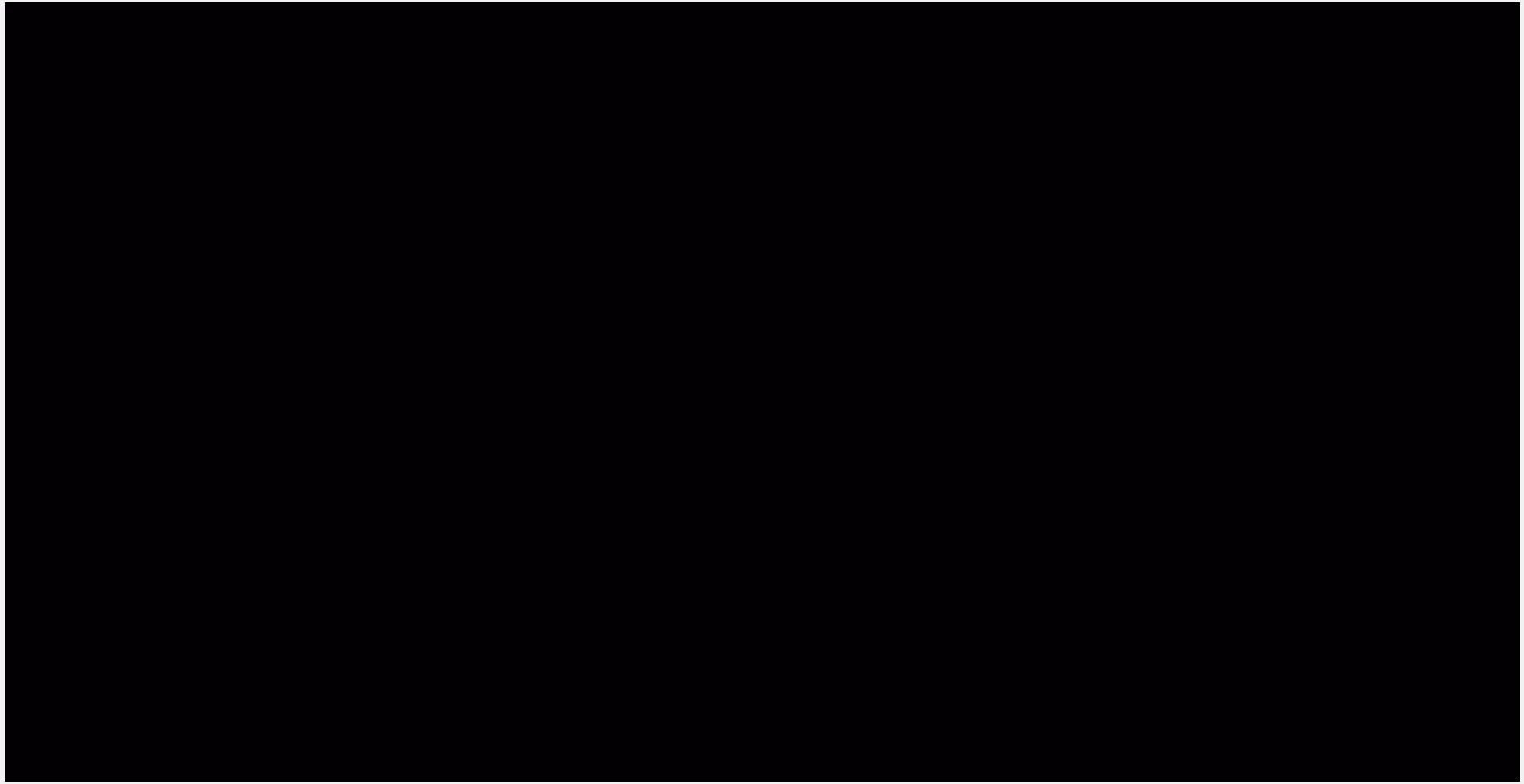
Lower numbers equate to better performance. (65 is better than 71)



REGIONAL BIAS: SOUTHERN CLIMATES



Thermal Testing



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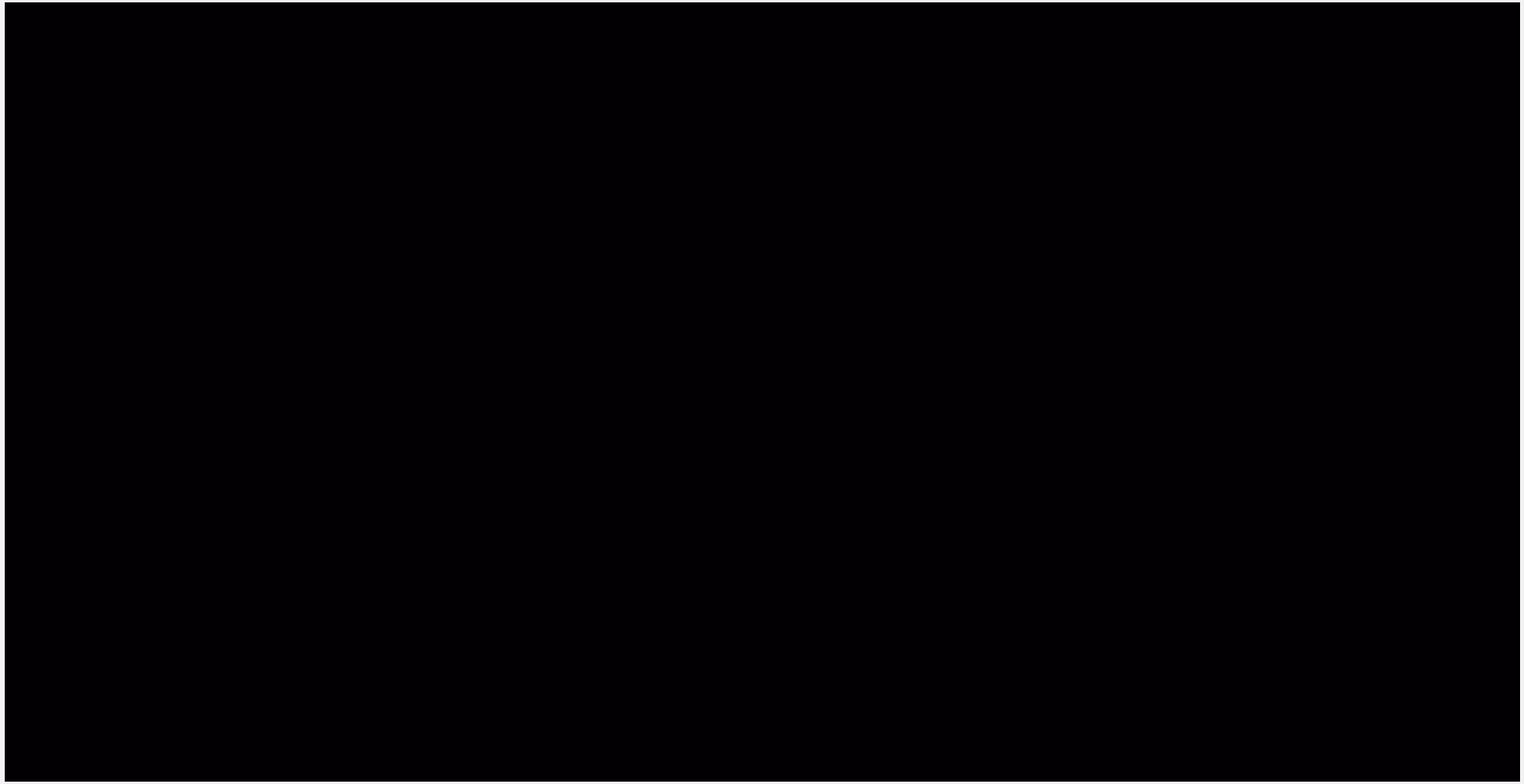
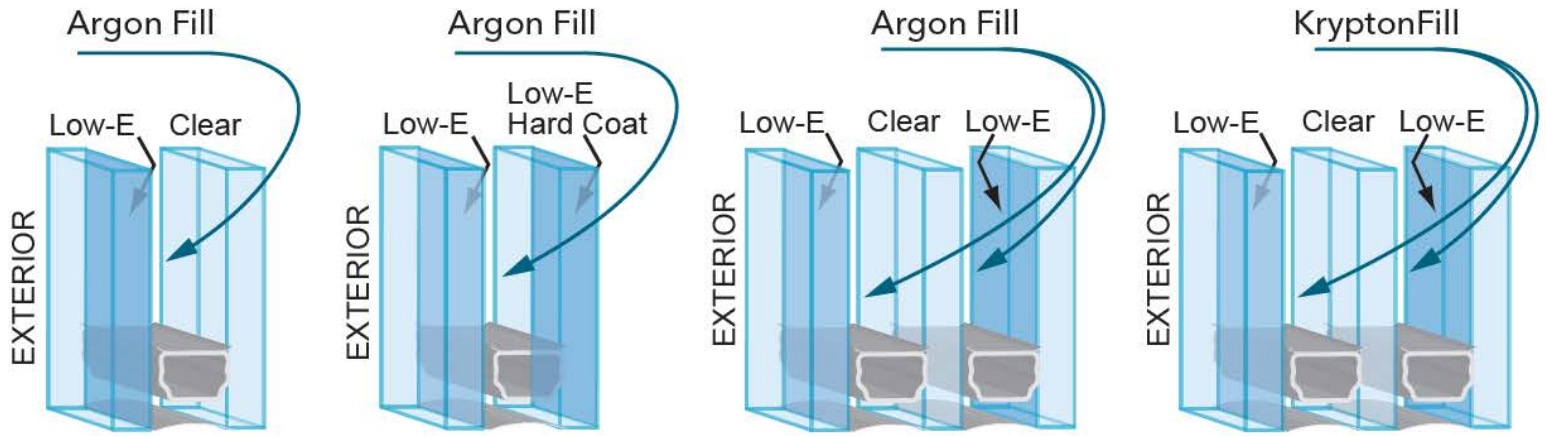


Specifying Thermal Performance

THERMAL PERFORMANCE CHARACTERISTICS



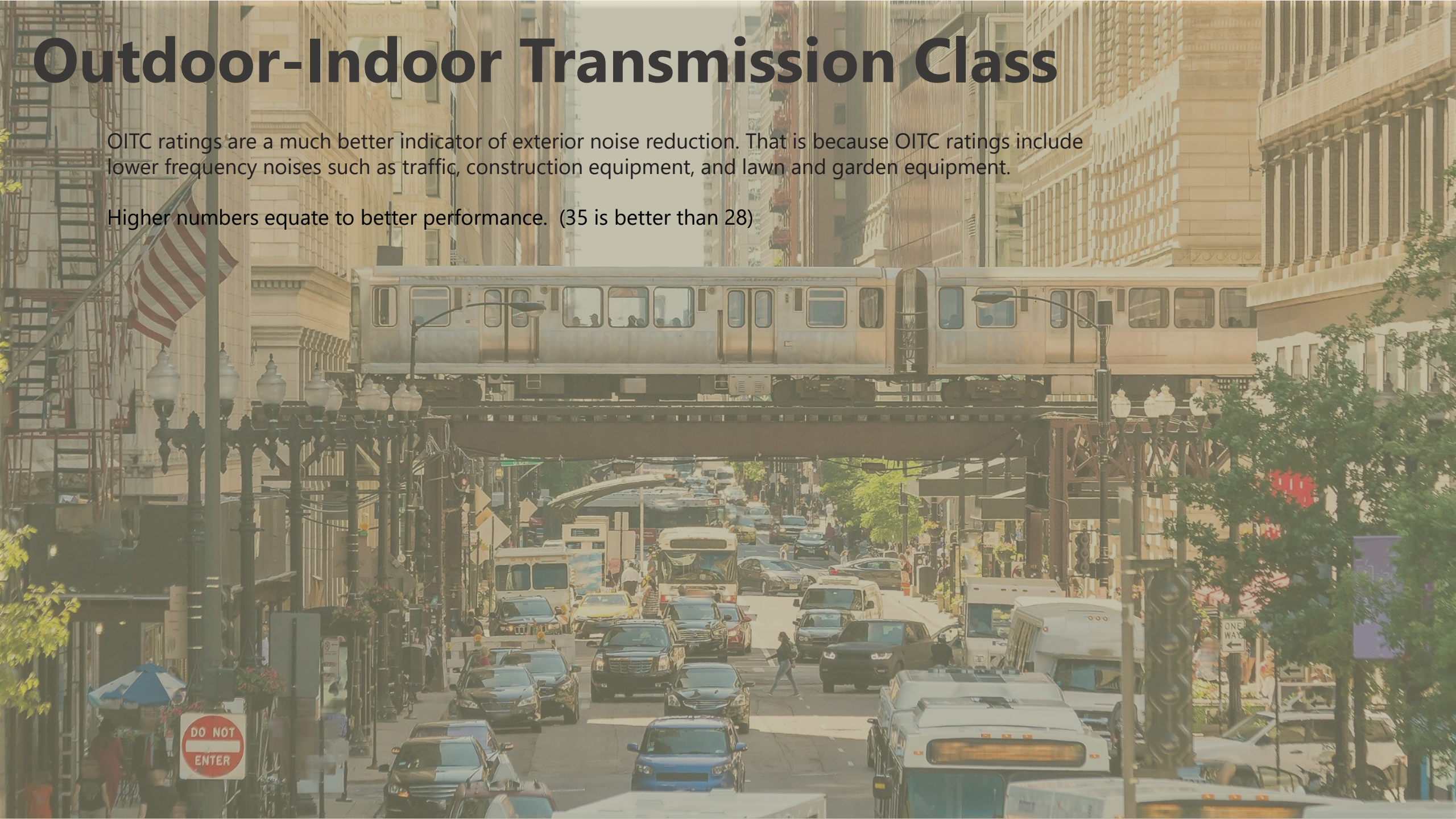
U-Value Range Center of Glass	0.24 - 0.25	0.20	0.13 - 0.19	0.11 - 0.14
U-Value Range Total Unit	## - ##	## - ##	## - ##	## - ##
Cost	$	$ - $$	$$ - $$$	$$$ - $$$$

Sound Transmission Class

STC ratings give an indication of noise reduction that can be achieved with typical indoor (high frequency) noises such as human speech, computers, printers, etc.

Higher numbers equate to better performance. (35 is better than 28)

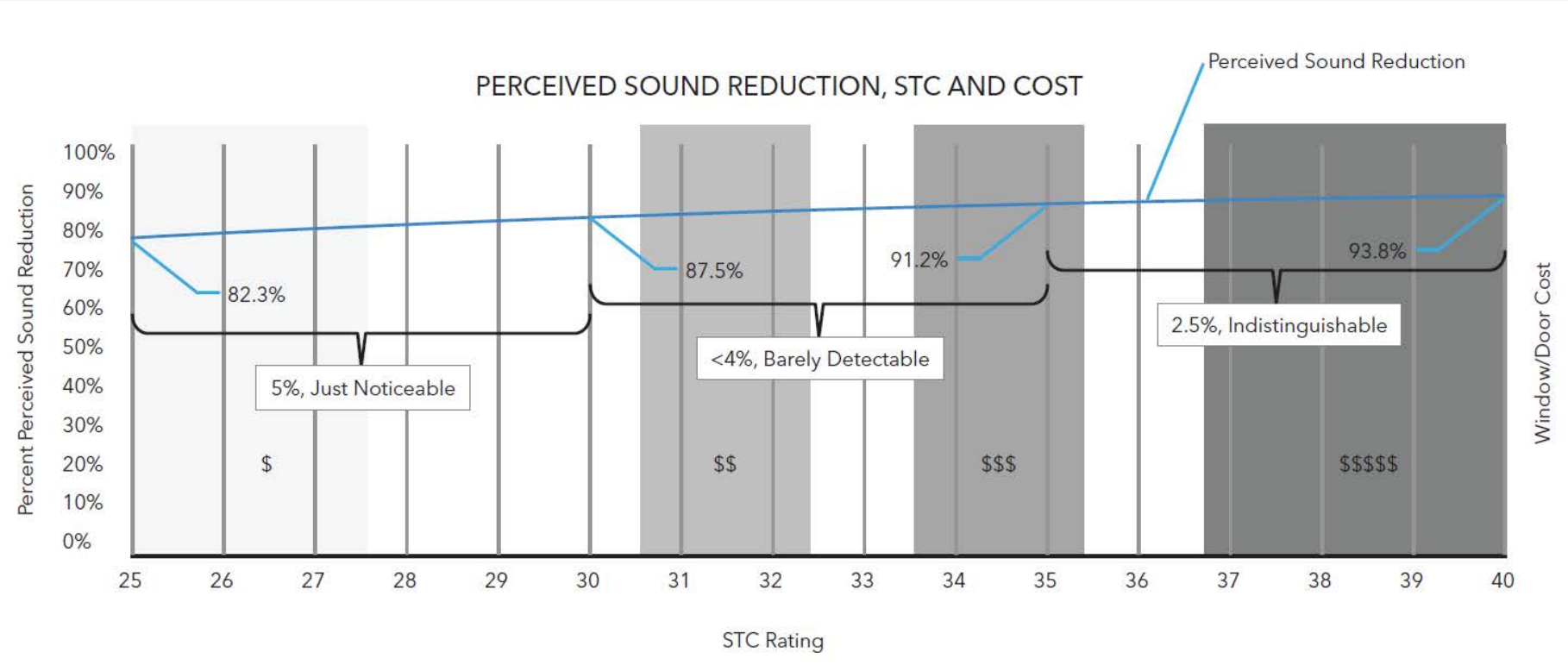
Outdoor-Indoor Transmission Class



OITC ratings are a much better indicator of exterior noise reduction. That is because OITC ratings include lower frequency noises such as traffic, construction equipment, and lawn and garden equipment.

Higher numbers equate to better performance. (35 is better than 28)

Specifying Sound Performance



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Contact Information

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Thank you!