

Daylighting Potential TG Status Report

2018 Fall Meeting
October 9, 2018
Albuquerque, NM

Chair: Ray Garries



Why is Daylighting Potential Rating Important?

- Industry and consumer needs a simple comparative measure for daylight at the fenestration mainly in Residential market
- Daylighting is a key Green building factor
- NFRC needs to own this key measure for our products
- Our current VT measure is an incomplete measure of daylight and is embedded as a measure of inside- out darkness. This DPR will start the process for consideration of change

NFRC Daylighting Potential Task Group

Developing a New, Simplified Product Rating for Residential Customers

Task Group Objective:

- To bring forth a standardized value to all fenestration products that expresses the overall Daylighting impact of the fenestration on the interior space as defined by the NFRC.

Need:

- Establish a new, simple product rating for vertical fenestration that provides the consumer with insight on annual daylighting potential provided by a rated product.

Three Options Have Been Explored:

1. Apply VT_{annual} (as defined in NFRC203) as the foundation and Proxy for a new annualized performance rating applied to a product's label.
2. Develop an online Application allowing Customers to calculate annualized daylighting performance for a given application and fenestration product.
3. Create detailed, annual performance data.

Result:

- VT_{annual} is the best place to start.

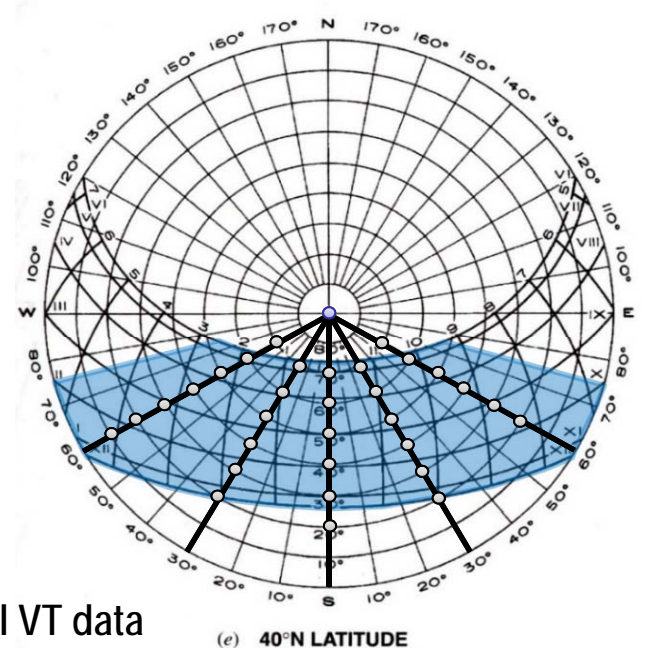


Daylight Potential

An extension of the NFRC 203 VT_{annual} Rating

What is NFRC 203's VT_{annual} Rating?

- New Certified Product Rating for a product's *real* Visible Light Transmittance (VT)
- VT_{annual} is *Different* from normal VT – don't compare them!
- VT_{annual} provides a product's yearly-average Visible Transmittance.
 - Rating accounts for annual, clear sky sun path using 18 individual VT data points multiplied by Zonal Time Weighting Factors (ZT) representing the frequency with which the sun exists throughout the year in 30 different sky zones.
 - Represents a product's annual average clear sky Visible Transmittance for 9:00 AM to 5:00 PM Day



Daylight Potential

An extension of the NFRC 203 VT_{annual} Rating

Application to Vertical Fenestration

- ❑ NFRC 203's unique multi-point visible transmittance measurement and rating protocol, and the use of fenestration, orientation-based, zonal-time weighting functions, can serve as the basis for augmented simulation-based VT_{annual} ratings of vertical fenestration products.
- ❑ Required VT data points are easily calculated using WINDOW 6.3 and/or 7.4 for existing fenestration systems.
- ❑ Annual solar Zonal Time weighting functions can also be calculated (per the NFRC 203 protocol) to account for sun-path data for specific cardinal orientations of vertical fenestration products, which would then yield orientation-specific VT_{annual} product ratings for any vertical fenestration product.
- ❑ VT_{annual} ratings can be produced and reported for cardinal orientations (ideally, would be presented for N, S, E, and W, but for simplification, could be distilled to N and S) of vertical fenestration Products.

Daylight Potential

An extension of the NFRC 203 VT_{annual} Rating

Application to Vertical Fenestration

□ Two New “Daylight Potential” Product Rating Options (reported by Cardinal Orientation) being Explored:

1. Unitless rating for a product, independent of sample size (e.g. VT_{annual}) – “Good” Option.

2. Annual Average Lumen Output or Surface Exitance of a product – “Best” Option.


✓ VT_{annual} data combined with CIE vertical surface illuminance data by cardinal façade orientation could be used to calculate and report a product’s effective annual average Lumen Output (for an industry-standard product size) or Surface Exitance (reported in lumens/m², or lumens/ft²).

Advantages of 203 as Base for DR

- Allows multidirectional light
- Uses WINDOW 6.3/7.4 for calculation
- Allows orientation differentiation
- Allows a calculated Annual Average Lumen Output of a product in Lumens/Sq.ft
- Confirms that this is the POTENTIAL DR at the inside surface of the product- not the reflected “in-room” Daylighting
- **New European Research performed by Fraunhofer ISE adds support for diffuse sky performance!**

Daylighting Potential Rating

Optional Label Proposal

 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Series "2000" Casement Vinyl Clad Wood Frame Double Glazing • Argon Fill • Low E XYZ-X-1-00001-00001	
	ENERGY PERFORMANCE RATINGS	
U-Factor (U.S. / I-P) 0.35	Solar Heat Gain Coefficient 0.32	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance 0.51	Condensation Resistance 51	
Daylighting Potential Rating Non-North XXX LUMENS	Daylighting Potential Rating North XXX LUMENS	
<small> Manufacturer stipulates that these ratings conform to applicable NFRCC procedures for determining whole product performance. NFRCC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRCC 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.nfrcc.org </small>		



LBNL will perform simulations and Daylight Potential Calculations for a representative set of basic Fenestration products.

Three different grades of products (basic, enhanced, high-performance) will be modeled for the product categories of Patio Doors, Vertical Sliders, and Skylights. Thus, a total of 9 different product configurations will be modeled.

Vertical Fenestration products will be analyzed for the four cardinal orientations (N, S, E, W)

Skylights will be analyzed for a Horizontal orientation.

Develop Sample Ratings and Labels for use in Consumer Survey asked for by our Board

Daylighting Potential Rating Next steps

- **LBNL to complete initial simulated ratings for sample products**
- **Proof calculations**
- **Complete the DPR proposal to board using NFRC 203 Methods**
- **Post approval creation of Draft #1**