NFRC 200-2004 (Non Residential Fenestration Systems) –

5.6 Non Residential building fenestration products:

This section covers methods for determining fenestration product SHGC and VT, for fenestration products installed in Non Residential buildings, including but not limited to fenestration products that are site assembled (built). This section also covers methods for determining fenestration product SHGC and VT, for solarium/sunroom systems.

5.6.1 Scope

To specify a method for determining the SHGC and VT, of Non Residential fenestration system, including site-built fenestration systems for Non Residential buildings.

The ratings derived from this procedure may be used to compare thermal performance characteristics of Non Residential fenestration systems and/or to provide architects, code specifiers, builders, etc. with a uniform and accurate means of determining and evaluating thermal performance characteristics of a specifically designed Non Residential fenestration system. As an alternative, ratings determined in accordance with section 4 are permitted.

5.6.2 Variations from Standard Product Lines

Non Residential fenestration systems covered by this method include products that are listed in NFRC 100 Table 4, including but not limited to:

a) Transparent and translucent wall systems where the glazing material is glass, plastic or other light transmitting panels (including opaque spandrel panels within the system), except those products where no testing or calculation procedure exists;

b) Glazed wall support and framing systems;

c) Changes made to a Product type to address structural loads, e.g. changes made to frame components to build different size products, address wind-loads and aesthetics.

d) Products with single or multiple glazing layers;

e) Products with spacer systems between glazings;

f) Horizontal, vertical and sloped systems;

g) Products that, by design, may have multiple framing components and/or glazing combinations.

h) Fenestration Systems using Unitized Construction, where a system is field assembled from factory assembled sub-units.

i) Spandrel Panels

j) Non Residential products or systems not covered by section 4.4 table 4 of NFRC 100 standard.

Combination assembly with common frame treatment: combination assembly that includes common frame members that wrap around the assembly and/or contain common mullion members that connect various individual products, so that the fenestration assembly is a single product and installed as such. combination assembly with common frame shall be treated as an assembly, consisting of individual products and rated as such, unless the heat flow through the common frame members is different by more than 20% than the heat flow through the frame assemblies of individual products; The heat flow shall be calculated using the best glazing option for individual cross sections of common frame members and their frame U-factors shall be compared to the respective frame U-factor of the individual cross-sections in the assembly.

5.6.3 Variations from Standard Individual Products

5.6.4 Variations from Standard Simulation and Test Conditions

5.6.5 Calculation of Total Product Rating

5.6.5.1 Component Modeling Procedure

The SHGC and VT, of a fenestration product may vary by size. To provide uniform rating procedure, and size specific information, the component modeling procedure, as described in this section shall be used [as primary method]. . For the comparison rating of Non Residential systems, the SHGC and VT, for model (standard) size per NFRC 100 table 1 is calculated. Non Residential systems SHGC and VT, for sizes other than standard size can be used for comparison for information purposes and when applicable.

Basic Product Line Model and Component information for calculation and Reporting of SHGC and VT,

SHGC and VT shall be reported on a component basis for each frame assembly (i.e., sill, jambs, head, etc.), each spacer configuration and each glazing system (center-of-glass). The SHGC and VT for Frame components shall be reported as $SHGC_f$ and VT_f (i.e. frame SHGC and VT) using the four representative options (best and worst), as defined in Table 5.6.1, and which gives a template for reporting SHGC and VT.

Definition of the Best and Worst configurations

Total of four best/worst or B/W configurations is defined. These configurations are assembled from two different glazing options at the extreme ends of thermal performance and two spacer configurations at the extreme ends of thermal performance. The following are four Best and Worst configurations:

(a) b1 in Table 5.6.1:: best glazing with best spacer ($SHGC_{b1}$ and VT_{b1}),

(b) b2 in Table 5.6.1: best glazing with worst spacer ($SHGC_{b2}$ and VT_{b2}),

(c) w1 in Table 5.6.1: worst glazing with best spacer ($SHGC_{w1}$ and VT_{w2}),

(d) w2 in Table 5.6.1: worst glazing with worst spacer ($SHGC_{ww}$ and VT_{ww}).

Table 5.6.1. Template for Reporting Component SHGC and VT

	Frame			
	w1	w2	b1	b2
SHGC				
VT				
PFD [m]				

Center of Glass: $SHGC_c$ =

Spacer: k_{eff} =

Quantities w1, w2, b1, and b2 are defined in Reference [15].

For each individual product, total fenestration product SHGC and VT shall be reported for the specified configuration at the model size, as shown in Table 4 of NFRC 100. The calculation of this total product SHGC and VT, is done using procedure detailed in Reference [15].

5.6.5.2 Approved Total Fenestration Product SHGC Calculation Procedure

The total fenestration product SHGC and VT calculation procedure shall be calculated as per procedure detailed in Reference [15].

Approved software shall be used for calculating the total fenestration product SHGC and VT. NFRC approved software is listed in Reference 7.

Follow NFRC approved procedure for rounding the final result. The SHGC and VT shall be reported to X.XX decimals. All variables used in the formula shall be expressed to at least three (3) significant decimal places.

Determining SHGC and VT for sloped glazing systems

All sloped glazing systems shall be rated for SHGC and VT at a slope of 90 degrees above the horizontal.

5.6.5.4 Approved Total Fenestration Product SHGC and VT for Non-Model Sizes

Procedure in Reference [15] and approved NFRC software as defined in section 5.6.5.1 shall be used to determine size specific product indices.