SOLAR HEAT GAIN COEFFICIENT WORKSHEET (Page 1 of 2) WS-3R

Project Title	Date

Items 1 through 4 must be completed for glazing/shading combinations by using the Default Table for Fenestration Products (Table 116-B of the Standard), NFRC certified data, or Solar Heat Gain Coefficients Used for Exterior Shading Attachments (Table S-1 below) for the specific conditions indicated (#1a or #1b or #3).

General Information

1a. For Fenestration Products w/NFRC testing and labels: $SHGC_{fen}$ = _____

OR

1b. For Fenestration Products without NFRC testing and labels (Table 116-B of the Standard): $SHGC_{fen}$ = _____

1c. Frame Type	1d. Product Type	1e. Glazing Type	1f. Single/Double Pane
_____	_____	_____	_____
metal, non-metal, metal w/thermal break	operable/fixed	(visibly) tinted clear (not visibly tinted)	single pane/double pane

2. Skylight (Y/N) _____
(A skylight is fenestration mounted on a roof surface at a slope less than 60º from the horizon.)

Combined Exterior Shade with Fenestration

Exterior Shade Type: _____

3. $SHGC_{Exterior\ Shade}$: _____
(If no exterior shade, assume standard bug screens, $SHGC_{Exterior\ Shade}$ = 0.76 for ordinary windows. This requirement does not apply to skylights where $SHGC_{Exterior\ Shade}$ is assumed to be 1.00. If another exterior shade is substituted for bug screens, use one of the values from Table S-1.

4. [(_____ × 0.2875) + 0.75] × _____ = [ ]
$SHGC_{max}$ $SHGC_{min}$ Total SHGC

Where:
$SHGC_{max}$ = Larger of (#1a or #1b) or #3
$SHGC_{min}$ = Smaller of (#1a or #1b) or #3

Note: Calculated Solar Heat Gain Coefficient values for Total SHGC may be used directly for prescriptive packages.

- Package C Target Value for Total SHGC is 0.38 for Climate Zones 2, 4, 7-15
- Package C Target Value for Total SHGC is 0.42 for Climate Zones 1, 3, 5, 6, 16
- Package D Target Value for Total SHGC is 0.40 for Climate Zones 2, 4, 7-15

Table S-1: Solar Heat Gain Coefficients Used for Exterior Shading Attachments for WS-3R and Computer Performance Methods [1,2]

Exterior Shading Device[3]	w/Single Pane Clear Glass & Metal Framing[4]
1) Standard Bug Screens	0.76
2) Exterior Sunscreens with Weave 53*16/inch	0.30
3) Louvered Sunscreens w/Louvers as Wide as Openings	0.27
4) Low Sun Angle (LSA) Louvered Sunscreens	0.13
5) Roll-down Awning	0.13
6) Roll Down Blinds or Slats	0.13
7) None (for skylights only)	1.00

1. These values may be used on line 3 of the Solar Heat Gain Coefficient (SHGC) Worksheet (WS-3R) to calculate exterior shading with other glazing types and combined interior and exterior shading with glazing.
2. Exterior operable awnings (canvas, plastic or metal), except those that roll vertically down and cover the entire window, should be treated as overhangs for purposes of compliance with the Standards.
3. Standard bug screens must be assumed for all fenestration unless replaced by other exterior shading attachments. The solar heat gain coefficient listed for bug screens is an area-weighted value that assumes that the screens are only on operable windows. The solar heat gain coefficient of any other exterior shade screens applied only to some window areas must be area-weighted with the solar heat gain coefficient of standard bug screens for all other glazing (see Form WS-2R). Different shading conditions may also be modeled explicitly in the computer performance method.
4. Reference glass for determining solar heat gain coefficients is 1/8 inch double strength (DSS) glass.

Instructions for WS-3R

The following explains how to calculate solar heat gain coefficients on WS-3R. The number of each item below corresponds to the appropriate item on WS-3R.

Enter either:

1a. For products with NFRC testing and labels, enter the product's labeled SHGC as #1a. $SHGC_{fen}$

OR

1b. Enter the default $SHGC_{fen}$ from Table 116-B of the Standards corresponding to the fenestration characteristics described in entries 1c, 1d, 1e, and 1f. Entries for 1c, 1d, 1e, and 1f are only needed if 1b is entered for $SHGC_{fen}$.

If 1b is entered, then:

- 1c Describe the Frame Type [metal, metal w/thermal break, or non-metal (non-metal includes both vinyl and wood)].
- 1d The Product Type (operable or fixed);
- 1e The glazing type (tinted or uncoated). Note that tints or coatings that cannot be easily observed by the building official must be classified as "uncoated;" that is, tints must be easily visible to the naked eye.
- 1f Single or double pane glazing.

2 For skylights mounted on a roof surface, enter "Y," otherwise enter "N." A skylight is fenestration mounted at a slope less than 60º from the horizon.

In a performance compliance, select s*tandard* or *draperies.* This is the only available choice and some compliance tools will eliminate this choice altogether.

3 Describe the exterior shading device in the space provided (e.g., roll down awning). List $SHGC_{Exterior\ Shade}$, the SHGC of the exterior shade with 1/8" clear single pane glass and metal framing, from Table S-1. If a single window or skylight has multiple exterior shades (i.e., shade screens and awnings) use the one shading device with the lower SHGC.

If no exterior shade is proposed, assume standard bug screens with a SHGC or 0.76 (or a SHGC or 1.00 for horizontal glazing). This applies to the full area of fixed fenestration products as well as operable.

4 Calculate $SHGC_{Shade\ Open}$ using values from Items 3 and either 1a or 1b. The result is the combined SHGC of the fenestration product and exterior device with the interior *shade open.*