

SOLAR HEAT GAIN COEFFICIENT (SHGC) WORKSHEET

CEC-CF1F-ENV-03-E (Revised 06/14)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE		CF1R-ENV-03-E
Solar Heat Gain Coefficient (SHGC) Worksheet		(Page 1 of 2)
Project Name:	Date Prepared:	

A. Product Information

1	2	3	4	5	6	7
Tag/ Identification	Orientation	Fenestration has a temporary or Site-built NFRC label certificate	SHGC value from NFRC label	Using site-built Default SHGC Table 110.6-B	Exterior Shading Device Type	Exterior Shading SHGC

B. Default Solar Heat Gain Coefficient Using Table 110.6-B

1	2	3	4	5	6	7
Tag/ Identification	Orientation	Frame Type	Product	Glazing	Number of Panes	Default Fenestration SHGC

C. Non-Rated Site-built Solar Heat Gain Coefficient Calculation Using Equation NA6-2 from Nonresidential Appendix NA6.3

1	2	3	4	5	6	7
Tag/ Identification	Center of Glass (COG) Solar Heat Gain Coefficient	Conditioned Floor Area	5% of the Condition Floor Area	Proposed Area of site-built Fenestration	Total Allowed Non-rated site-built Fenestration Area	Total Allowed SHGC of the Non-Rated Site-Built Fenestration

D. Combined Solar Heat Gain Coefficient Calculation and Shading Device Calculation

1	2	3	4
Tag/ Identification	$SHGC_{max} =$	$SHGC_{min} =$	The total combined adjusted SHGC with exterior shading device; ($SHGC_{total}$)

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2013 Residential Compliance

June 2014

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

- The information provided on this Certificate of Compliance is true and correct.
- I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
- That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
- The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
- I will ensure that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

Registration Number:

Registration Date/Time:

HERS Provider:

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CF1R-ENV-03-E Instructions

This worksheet is to be used to determine the total Solar Heat Gain Coefficient (SHGC) value of fenestration in combination with an exterior shading device. This worksheet is to be completed for each different fenestration and exterior shading combination. Total SHGC_{total} value in subsection D4 is calculated by choosing the larger of A4, A7, B7 or C7 for SHGC_{max} and the smaller of A4, A7, B7 or C7 for SHGC_{min}.

The following rules apply when selecting exterior shading devices:

1. If using this worksheet, a standard bug screen must be assumed for all vertical fenestration unless replaced by another exterior shading device as listed in A5 (and Table S-1 below); only one exterior shading device may be applied to a vertical window.
2. The listed SHGC for bug screens is an area-weighted value that assumes that the screens are only on operable windows. If no exterior shade is selected then assume a SHGC of 0.76 for standard bug screens for all windows.
3. This requirement does not apply to skylights. For skylights the exterior shading SHGC is assumed to be 1.00.
4. When exterior shading devices are applied and the combined total SHGC values do not meet the prescriptive efficiencies for windows or skylights then these windows and skylight must be area-weighted using the CF1R-ENV-02-E. Different shading conditions may also be modeled explicitly in the computer performance method.

The target value for Total SHGC_{total} is 0.25 for Climate Zones 2, 4 and 6-16. However, not being able to meet the target value will require calculating the area weighted average (CF1R-ENV-02-E form) with other more efficient like windows and skylights.

The resultant Total SHGC_{total} value shall be documented prescriptively on the CF1R-NCB-01-E, CF1R-ADD-01-E or CF1R-ALT-01-E in the Fenestration section—attach a completed CF1R-ENV-03-E with submittal. When using the Performance Approach, the program will generate its own CF1R and will include the Total SHGC_{total} values.

Prescriptive Compliance using South-Facing Overhangs—a south-facing overhang may be used to meet the prescriptive SHGC criteria, see section E. below.

A. PRODUCT INFORMATION

1. Tag/Identification: Same data given on the other CF1Rs for the same fenestration; provides an identification name or tag name that uniquely identifies the window system. If there is a window schedule the tag name may be given on the plans.
2. Orientation: The direction the fenestration faces.
3. Fenestrations has a temporary or site-built NFRC label certificate: Indicate Yes or No. Does the fenestrations have either an NFRC temporary or a site built NFRC label certificate.
4. SHGC value from NFRC label: Provide the SHGC from the NFRC Label
5. Using site-built Default SHGC Table 110.6-B: Indicate Yes or No. If yes, complete Section B
6. Exterior Shading Device Type: Indicate the type of exterior shading device installed. Note: Default is Standard Bug Screens.
7. Exterior Shade SHGC: Indicate the SHGC for the installed shading device from table S-1.

B. DEFAULT SOLAR HEAT GAIN COEFFICIENT USING TABLE 110.6-B

1. Tag/Identification: Same data given on the other CF1Rs for the same fenestration; provides an identification name or tag name that uniquely identifies the window system. If there is a window schedule, the tag name may be given on the plans.
2. Orientation: The direction the fenestration faces.
3. Frame Type: Indicate Metal, Non-metal (such as wood or vinyl), or Metal w/Thermal Break.
4. Product: Indicate if the fenestration product is Fixed or Operable.
5. Glazing: Indicate if coating is Clear (not visibly tinted) or Tinted (visibly tinted).
6. Number of Panes: indicate the number of panes, valid entries are Single, Double or Glass Block.
7. Default fenestration SHGC: This value is from Table 110.6-B: Calculated value; not a user input

C. NON-RATED SITE-BUILT SOLAR HEAT GAIN COEFFICIENT CALCULATION USING EQUATION NA6-2 FROM NONRESIDENTIAL APPENDIX NA6.3

1. Tag/Identification: Same data given on the other CF1Rs for the same fenestration; provides an identification name or tag name that uniquely identifies the window system. If there is a window plan or schedule for the system, the tag name may be given on the plans.
2. Center of Glass (COG) Solar Heat Gain Coefficient: Indicate the $SHGC_c$ value calculated in accordance with NFRC 200 Section 4.5.1.1 <http://www.nfrc.org/software.aspx>
3. Conditioned Floor Area: Indicate the Conditioned Floor Area of the building. This should be the same value found on the CF1R-NCB-01-E, CF1R-ADD-01-E or CF1R-ALT-01-E
4. 5% of the Condition Floor Area: Calculated value; not a user input
5. Proposed Area of Site-Built Fenestration: What is the area of the site-built fenestration; Note: must be 250 ft² or less.
6. Total Allowed Non-Rated Site-Built Fenestration Area: Calculated value; not a user input
7. Total Allowed SHGC of the Non-Rated Site-Built Fenestration: Calculated value; not a user input

D. Combined Solar Heat Gain Coefficient Calculation and Shading Device Calculation

1. Tag/Identification: Same data given on the other CF1Rs for the same fenestration; provides an identification name or tag name that uniquely identifies the window system. If there is a window schedule, the tag name may be given on the plans.
2. $SHGC_{max}$: Calculated value; not a user input.
3. $SHGC_{min}$: Calculated value; not a user input.
4. The total combined adjusted SHGC with exterior shading device, ($SHGC_{total}$): Calculated value based on the $SHGC_{max}$ and $SHGC_{min}$

TABLE 110.6-B DEFAULT SOLAR HEAT GAIN COEFFICIENT (SHGC)

FRAME TYPE	PRODUCT	GLAZING	FENESTRATION PRODUCT SHGC		
			Single Pane SHGC	Double Pane SHGC	Glass Block SHGC
Metal	Operable	Clear	0.80	0.70	0.70
	Fixed	Clear	0.83	0.73	0.73
	Operable	Tinted	0.67	0.59	N.A.
	Fixed	Tinted	0.68	0.60	N.A.
Metal, Thermal Break	Operable	Clear	N.A.	0.63	N.A.
	Fixed	Clear	N.A.	0.69	N.A.
	Operable	Tinted	N.A.	0.53	N.A.
	Fixed	Tinted	N.A.	0.57	N.A.
Nonmetal	Operable	Clear	0.74	0.65	0.70
	Fixed	Clear	0.76	0.67	0.67
	Operable	Tinted	0.60	0.53	N.A.
	Fixed	Tinted	0.63	0.55	N.A.

TABLE S-1

Exterior Shading Device		SHGC _{Exterior Shade}
1	Standard Bug Screens	0.76
2	Exterior Sunscreens with Weave 53 x 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	Vertical Roller or Shades or Retractable or Drop Arm/Marquisolette or Operable Awnings	0.13
6	Roll Down Blinds or Slats	0.13
7	None (for skylights only)	1.00