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**Industrialized Housing and Buildings**  
**Technical Bulletin**

**IHB TB 05-01 – SHGC for Residential Buildings**  
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Section 502.1.5 of the 2003 IECC and section N1102.2 of the 2003 IRC specify that the area-weighted-average solar heat gain coefficient (SHGC) for glazed fenestration in residential buildings shall not exceed 0.40 when installed in locations with 3,500 or fewer heating degree days. This encompasses most of the State of Texas.

REScheck will automatically calculate the area-weighted-average SHGC, for climate zones where this requirement is applicable, for the residential building provided the correct SHGC is entered into the software for each glazed fenestration. Where critical, the compliance certificate will provide the maximum SHGC allowed and the area-weighted-average SHGC for the construction described – the area-weighted-average must be less than or equal to the maximum shown.

You may use the following formula to manually determine the area-weighted-average SHGC of glazed fenestration in residential buildings.

$$SHGC_{awa} = (\sum SHGC \cdot A) / A_t$$

Where:

SHGC<sub>awa</sub> = the area-weighted-average SHGC

SHGC = SHGC of each glazed fenestration

A = area of each glazed fenestration

A<sub>t</sub> = total area of all glazed fenestration

**Example:** *A single-family home is to be constructed in Houston, Texas containing the following windows and glazed doors: 8 double glazed clear windows with vinyl frames that are 46" x 60", 1 double glazed clear window with a vinyl frame that is 40" x 40", and 1 single glazed patio door with a metal frame that is 72" x 80", tinted gray. All the glazed fenestrations bear an NFRC label with a SHGC of 0.32 with the exception of the patio door, which does not bear an NFRC label. What is the area-weighted-average SHGC for this house?*

There are less than 3,500 heating degree days in the Houston area, therefore the area-weighted-average SHGC must be 0.40 or less.

The default SHGC for the patio door from Table 102.5.2(3) of the 2003 IECC is 0.61.

The SHGC<sub>awa</sub> for this house is determined as follows:

$$\begin{aligned} SHGC_{awa} &= [(8 \cdot 46 \cdot 60 \cdot 0.32) + (40 \cdot 40 \cdot 0.32) + (72 \cdot 80 \cdot 0.61)] / [(8 \cdot 46 \cdot 60) + (40 \cdot 40) + (72 \cdot 80)] \\ &= [7,065.6 + 512 + 3,513.6] / [22,080 + 1,600 + 5,760] \\ &= 11,091.2 / 29,440 \\ &= 0.38 \end{aligned}$$

0.38 is less than the 0.40 required by code, therefore this is acceptable