

## Clarification of Tolerances on Declared Values for Radiation Properties

The harmonised European Standards for the glass products incorporate as essential characteristics the ‘radiometric properties’, i.e. the light transmittance/reflectance and solar energy characteristics.

The declared values for these characteristics are given without any explicit tolerances being quoted. The implicit expectation is that the tolerance taken be the industry norm, i.e.  $\pm 0,03$ . This value only applies to monolithic glass products, i.e. soda lime silicate glass, thermally treated glasses, etc.

**Note** For composite products, i.e. laminated glass, insulating glass units, due to their complex nature, no tolerances have been specified.

EN 1096 – 4: *Glass in building – Coated glass – Part 4: Evaluation of conformity/Product standard* is the only standard that quotes tolerances on radiometric properties. According to Annex A – Tables A.1 and A.2; Section 3 – Product control; Ref.3 – Radiometric properties, there is a requirement for the measurement of the following:

$\tau_v$	Light transmittance
$\rho_v$	Light reflectance
$\tau_e$	Solar direct transmittance
$\rho_e$	Solar direct reflectance

The requirements are as follows, i.e. measured value equals declared value + tolerance

$$\tau_{v,m} = \tau_{v,d} \pm 0,03$$

$$\rho_{v,m} = \rho_{v,d} \pm 0,03$$

$$\tau_{e,m} = \tau_{e,d} \pm 0,03$$

$$\rho_{e,m} = \rho_{e,d} \pm 0,03$$

That is to say that the declared values have a tolerance of  $\pm 0,03$ . However, if the declared value is quoted as a percentage then the tolerance is  $\pm 3$ .

**Examples**  $\tau_{v,d}$  is given as either 0,60 or 60 %.

Measured values  $\tau_{v,m}$  will be:

$$0,60 \pm 0,03, \text{ i.e. between } 0,57 \text{ and } 0,63, \text{ or}$$

$$60 \% \pm 3 \%, \text{ i.e. between } 57 \% \text{ and } 63 \%.$$

The tolerance on all monolithic glass products shall be the same as for the coated glass

*Glass for Europe is the trade association for Europe’s flat glass sector. Flat glass is the material that goes into a variety of end products, primarily in windows and facades for buildings, windscreens and windows for automotive and transport as well as solar energy equipment, furniture and appliances. Glass for Europe brings together multinational firms and thousands of SMEs across Europe, to represent the entire building glass value-chain. It is composed of flat glass manufacturers, AGC Glass Europe, Guardian, NSG-Group, Saint-Gobain Glass Industry and Siseçam-Trakya Cam, and works in association with national partners gathering thousands of building glass processors and transformers all over Europe.*