Heraeus

HOMOSIL® 101

1. GENERAL PRODUCT DESCRIPTION

Heraeus HOMOSIL 101 is optical quartz glass grades manufactured by flame fusion of natural quartz crystals. They combine excellent physical properties with outstanding optical characteristics in the UV and the visible wavelength range. The index homogeneity is controlled and specified either in one direction (the direction of use or functional direction) or even in all three dimensions

HOMOSIL 101 grade shows a low bubble and inclusion content. HOMOSIL 101 meets the requirements for bubble class 0.

The optical homogeneity, which is the main criteria for very low transmitted wavefront distortion, refers to three categories:

- HOMOSIL 101 is an optically isotropic 3D-material. It is highly homogeneous and has no striations in all three dimensions. These properties are very important for multiple axis optics such as prisms, steep lenses, beam splitters or etalons.

For general technical data please refer to our data sheet POL-O/107E "Quartz Glass for Optics - Data and Properties".

2. OPTICAL DATA OF HOMOSIL 101

2.1 Bubbles and Inclusions

(Bubbles and inclusions ≤ 0.08 mm diameter are disregarded)

2.1.1 Bubble class (as per DIN 58927 2/70): 0, i.e. total bubble cross section within the volume is ≤ 0.03 mm²/100 cm³

2.1.2 Maximum bubble diameter: ≤ 0.10 mm for pieces ≤ 6 kg

2.1.3 Inclusions: None

2.1.4 Spots: None

2.1.1 and 2.1.3 should not be added together

2.2 Refractive Index and Dispersion

2.2.1 Refractive Index

n_C = 1.45646 at 656.3 nm
n_d = 1.45856 at 587.6 nm
n_F = 1.46324 at 486.1 nm
n_g = 1.46681 at 435.8 nm

At 20°C, 1 bar atmospheric pressure
Accuracy: $\pm 3 \cdot 10^{-5}$

2.2.2 Dispersion

$n_F - n_C = 0.00678$

$$\nu_d = \frac{n_d - 1}{n_F - n_C} = 67.6 \pm 0.5$$

2.3 Optical Homogeneity

2.3.1 Granular Structure: None

2.3.2 Striations: In all three dimensions free from striations, i.e. better than grade A, MIL-G-174-B.

2.3.3 Index Homogeneity:

Specified across 90% of diameter or sidelength for machined parts, respectively 80% for raw formed ingots.

In all three dimensions guaranteed total $\Delta n \leq 3 \bullet 10^{-6}$; with power subtracted Δn (p.s.) $\leq 2 \bullet 10^{-6}$; on special request total $\Delta n \leq 1 \bullet 10^{-6}$. (Maximum weight ca. 6 kg; larger pieces available on request).

□n (p.s.) (power subtracted) is calculated by subtracting from a measured □n distribution the proportion that gives an exactly spherical aberration of an originally plane optical phasefront. This subtraction procedure is built into most modern interferometer software as an option.

2.4 Residual Strain

≤ 5 nm/cm across 80% of diameter or side length
≤ 5...15 nm/cm in the rim area.

2.5 Spectral Transmittance

2.5.1 Typical transmission curves (including Fresnel reflection losses) for a 10 mm path length are shown in the figure.

2.5.2 Infrared Absorption

OH absorption bands occur at wavelengths around 1.39 μm, 2.2 μm, and

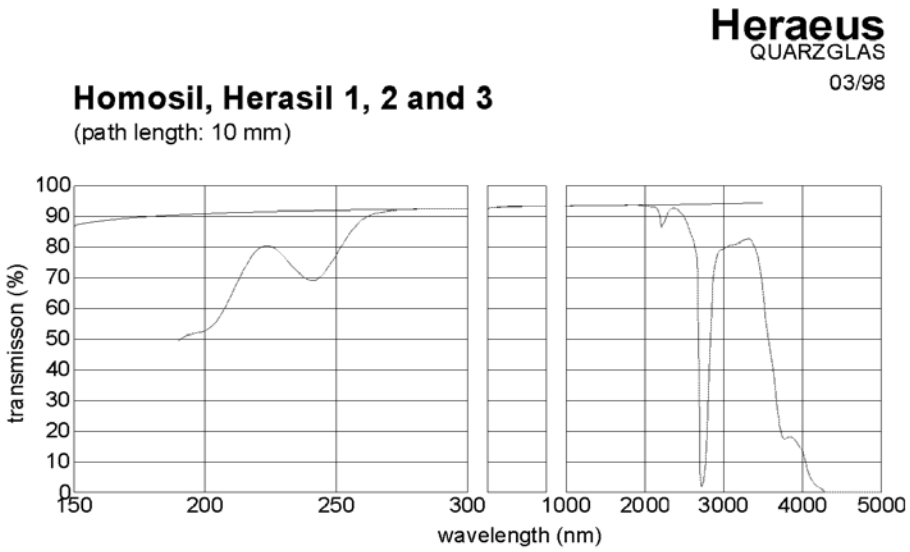
2.72 μm according to an OH content of approximately 150 ppm (weight).

2.6 Fluorescence

Blue-violet with 254 nm excitation (low pressure Hg lamp and Schott UG 5 filter) and visual inspection.

2.7 Radiation Resistance

Good, visible transmittance is not degraded significantly by ionizing radiation.



Typical spectral transmission including Fresnel reflection loss.
The uppermost nearly straight line indicates the calculated Fresnel reflection loss of two uncoated surfaces.