ULE™

Precision Glass and Optics
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Description:

ULE™ made by Corning is an ultra-low expansion titanium silicate material, transparent, isotropic with high homogeneity. It has long-term dimensional stability at room temperature and no expansion hysteresis after thermal cycling. ULE™ also has excellent weathering resistance and can be made into a wide variety of shapes and sizes. It is easily polished to a high quality specular surface.

Available Thicknesses:

Wide variety – per quotation.

Properties:

Refractive Index: n_d (λ = 589 nm) = 1.4828

n_f (λ = 486 nm) = 1.4892

Transmission: (estimated for 10 mm thick)

@320 nm	80%	@1000 nm	92.5%
@420 nm	90%	@1038 nm	85%
@500 nm	91%	@2000 nm	92%

Mechanical and Thermal:

Density	2.205 g/cm^3
Thermal Coefficient of Expansion	(5-35°C) = 0 ± 30 x 10^{-9}/°C
Young's Modulus at 25°C	67.6 GPa
Annealing Point	1000°C
Maximum Service Temperature	800°C
Knoop Hardness - 200 gm load	460 kg/mm^2

Chemical:

Solution	Time (Hrs)	Wt. Loss (mg/cm^2)
5% HCl	24	<0.01
5% NaOH	6	0.9
5% H_2SO_4	24	<0.01
n/50 Na_2CO_3	6	0.02

Electrical:

Dielectric Constant @ 1 Khz @ 25°C	3.99
Dielectric Loss tangent @ 1 Khz @ 25°C	5 x 10^{-5}
D.C. Volume Resistivity (Log R Ω cm)	14.5 @ 100°C
	11.5 @ 200°C
	8.5 @ 400°C

Applications:

Precision engineering, light weight mirror substrates for large astronomical and x-ray telescopes, frit-bonded elements, optical elements for comet probes, weather satellites, microlithography, frames and mirrors for ring laser gyroscopes. Flatness, parallelism, cutting tolerances, roughness, cosmetic defects and visual inspection all conform to the specifications to be agreed upon by Precision Glass & Optics and the customer.