MATERIAL PROFILE / DIN 7080

Borosilicate Glass 3.3

INFORMATION SHEET • hitegla@hitegla.com

Main ingredients of this glass are sodium oxide Na_2O, boron oxide B_2O_3, silicon dioxide SiO_2. In those ingredients, boron and silicon have high content: boron 12,5 – 13,5 %, silicon 78 – 80 %.

COMPOSITION OF BOROSILICATE GLASS 3.3

SiO_2	B_2O_3	Na_2O	Al_2O_3	K_2O
80%	13%	4%	2%	1%

MATERIAL OVERVIEW

The feature of borosilicate glass 3.3 is that it has low thermal expansion coefficient, good thermal stability, chemical durability and electric property. Therefore, it's chemical resistant, heat resistant and mechanical property is excellent. So borosilicate glass is also called heat resistance glass.

Borosilicate glass 3.3 can be milled, drilled, grounded and toughened. Its low coefficient of thermal expansion, high thermal shock resistance and ability to work at temperatures up to 450 °C for a long period of time, make this type of glass particularly suitable for use in stable temperature conditions. Is suitable for operation at low temperatures.

This glass can withstand the temperature to about -196 °C (is suitable for use in contact with liquid nitrogen). During thawing ensure that the temperature difference does not exceed 100 K. In general is recommended for use down to -70 °C.

This glass is extremely resistant to water, alkalis, acids and organic substances.

450 °C	-196 °C	100 K
long-term operation	minimum temperature	maximum thawing ΔT

PROPERTIES / MECHANICAL PERFORMANCE

Density	**2.23 ±0.02 g/cm³**
Bending strength	**160 N/mm²**
Surface compressive stress	**100 N/mm²**
Young's modulus	**64 GPa**
Poisson's ratio	**0,2**
Hardness	**5.5 Mohs, (470 Knopp, 580 Vickers)**

While every attempt has been made to verify the source of the information, no responsibility is accepted for accuracy of data.

TECHNICAL SPECIFICATIONS / DIN 7080

Properties

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THERMODYNAMIC PERFORMANCE

Thermal expansion coefficient (0 – 300 °C)	**3.3 ±0.1×10^{-6}K^{-1} (@ 0 – 300 °C)**
Softening point	**815 ±10 °C**
Strain point	**560 ±10 °C**
Caloricity (20 – 100 °C)	**0.83 KJ× (kgxK)$^{-1}$ (@ 20 – 100 °C)**
Thermal coefficient	**1.2 WxmxK^{-1}**
Thermal shock resistance	**180K**

MAXIMUM WORKING TEMPERATURE

Non-tempered glass / Short time (< 10h)	**-196 up to 500 °C**
Non-tempered glass / Long time (> 10h)	**-196 up to 450 °C**
Tempered glass / Short time (< 10h)	**-70 up to 500 °C**
Tempered glass / Long time (> 10h)	**-70 up to 280 °C**

CHEMICAL PERFORMANCE

Water resistance	**ISO 719 / DIN 12111 HGB1 / ISO 720 HGA1**
Acid resistance	**ISO 1776 / DIN 12116 1**
Alkali resistance	**ISO 695 / DIN 52322 A2**

OPTICAL PROPERTY / REFRACTIVE INDEX

λ = 587.6 nm	**nD = 1.4724**
λ = 480.0 nm	**nF = 1.4782**
λ = 546.0 nm	**nE = 1.4740**
λ = 644.0 nm	**nC = 1.4701**

ELECTRIC PROPERTY

Electric Volume Resistivity	**8.6 x 10^{13} Ω×cm (at 25 °C)**
Electric Volume Resistivity	**1.4 x 10^{6} Ω×cm (at 300 °C)**
Dielectric dissipation fraction	**38 × 10^{-4} (at 1 MHz, 20 °C)**
Dielectric constant εr	**4.6 (at 1 MHz, 20 °C)**

LIGHT TRANSMISSION

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Wykres przepuszczalności szkła borokrzemowego

