



ROBAX®

General Description

ROBAX® is a highly transparent glass-ceramic having virtually zero thermal expansion and sufficient mechanical resistance required for all standard applications. It is produced as flat sheets using a rolling process.

As a result of its extremely low thermal expansion, ROBAX® can be subjected to extreme temperature differences. Even when used in high temperature conditions, ROBAX® maintains excellent stability of form. ROBAX® can be further processed mechanically using all of the normal methods of glass processing.

Applications

ROBAX® possesses a high degree of resistance against thermal stresses and chemical surface attacks. Its diverse range of applications include: fireplace doors and windows, chemical process sight glass, high temperature vision windows, heat insulators, commercial ovens/broilers, architectural and outdoor lighting, electronics and UV light wave blocking applications.

Dimensions

Flat Panels/Stock Size Sheets

Thickness	Sheet Size
mm (in)	Minimum usable area mm x mm (in x in)
3.0 ± 0.2 (0.118 ± 0.008)	1580 x 840 (62.2 x 33.1)
5.0 ± 0.2 (0.197 ± 0.008)	1580 x 840 (62.2 x 33.1)

Flatness

Flatness is determined by laying a beveled straight edge diagonally across the horizontal panel and the deviation is read by means of a gauge.

Tolerance: ± 0.3% of edge length

Chemical Data

Hydrolytic resistance: ISO 719-HGB Class 1

Acid resistance: ISO 1776 Class 2

Alkali resistance: ISO 695-A Class A2

Mechanical Data

Density at 25°C = 2.6 g/cm³ / 0.094lb/in³

Young's Modulus = 93 GPa / 13.5 Msi

Poisson's Ratio = 0.25

Bending Strength

Bending Strength recommended values with surfaces in practical use conditions (per DIN EN 1288 Part 5):

For Normal Conditions 35 MPa (5076 psi)
For Safety Conditions 7 MPa (1015 psi)

Thermal Data

Linear Thermal Coefficient of Expansion

α (20 - 700°C) = $(0.0 \pm 0.5) \times 10^{-6} \text{ K}^{-1}$

α (68 - 1292°C) = $(0 \pm 0.28) \times 10^{-6} \text{ }^\circ\text{R}^{-1}$

Thermal Conductivity at 90°C (194°F)

$k = 1.6 \text{ W/(m}\cdot\text{K)}$

($k = 0.0776 \text{ BTU/(in}\cdot\text{hr}\cdot\text{ }^\circ\text{R)}$)

Mean Specific Heat Capacity

C_p (20 - 100°C) = 0.8 J/g·K

($C_p(68 - 212^\circ\text{F}) = 0.191 \text{ BTU/(lb}\cdot\text{ }^\circ\text{F)}$)

Resistance to Thermal Differences

The resistance to thermal differences (RTD) characterizes the ability of a glass type to withstand a specific temperature difference between the hot center of a glass panel (cold side) and the cold edges of the panel (room temperature). The RTD values are determined by a standard test method for various glass thicknesses.

RTD is an empirical method measuring the maximum temperature on the cold side surface of a panel that when exceeded could lead to breakage as a result of thermal stress. Recommended values for the RTD are limited to applications where the risk of breakage is not a safety concern (surface in normal practical use conditions).

RTD = ΔT 700K (1260°R)

Thermal Shock Resistance (TSR)

Thermal shock resistance (TSR) is the resistance of the ROBAX® panel to thermal shock when the hot panel is quenched with cold water (room temperature). The temperature refers to the maximum temperature on the cold side of the panel for which no cracking due to thermal stress occurs.

TSR = ΔT 700K (1260°R)

Temperature / Time Load Capacity

The temperature / time load capacity specifies the maximum allowed temperature for given load times for the practical use of ROBAX® as fireplace panels, below which no cracking due to thermal stress occurs. The temperature values refer to the hottest point on the exterior side of the panel ($T_{es, max}$).

Load Temperature $T_{es, max}$	Load Time
560°C (1040°F)	5000 hr
610°C (1130°F)	1000 hr
660°C (1220°F)	100 hr
710°C (1310°F)	10 hr
760°C (1400°F)	5 hr

For homogeneous heating conditions in a testing furnace, the following temperature / time load data applies. Note that this table is not applicable for fireplace panels which typically have uneven temperature distributions. The temperatures refer to the homogenous heating of ROBAX® panels (T_{hom}).

Load Temperature T_{hom}	Load Time
700°C (1292°F)	6000 hr
750°C (1383°F)	750 hr
775°C (1427°F)	275 hr
800°C (1472°F)	100 hr
825°C (1517°F)	35 hr

The maximum application temperatures stated for temperature / time load capacity are only valid in conjunction with the RTD values specified.

Installation Instructions

The basic guidelines for glass or glass-ceramic products apply also for the installation and handling of ROBAX®.

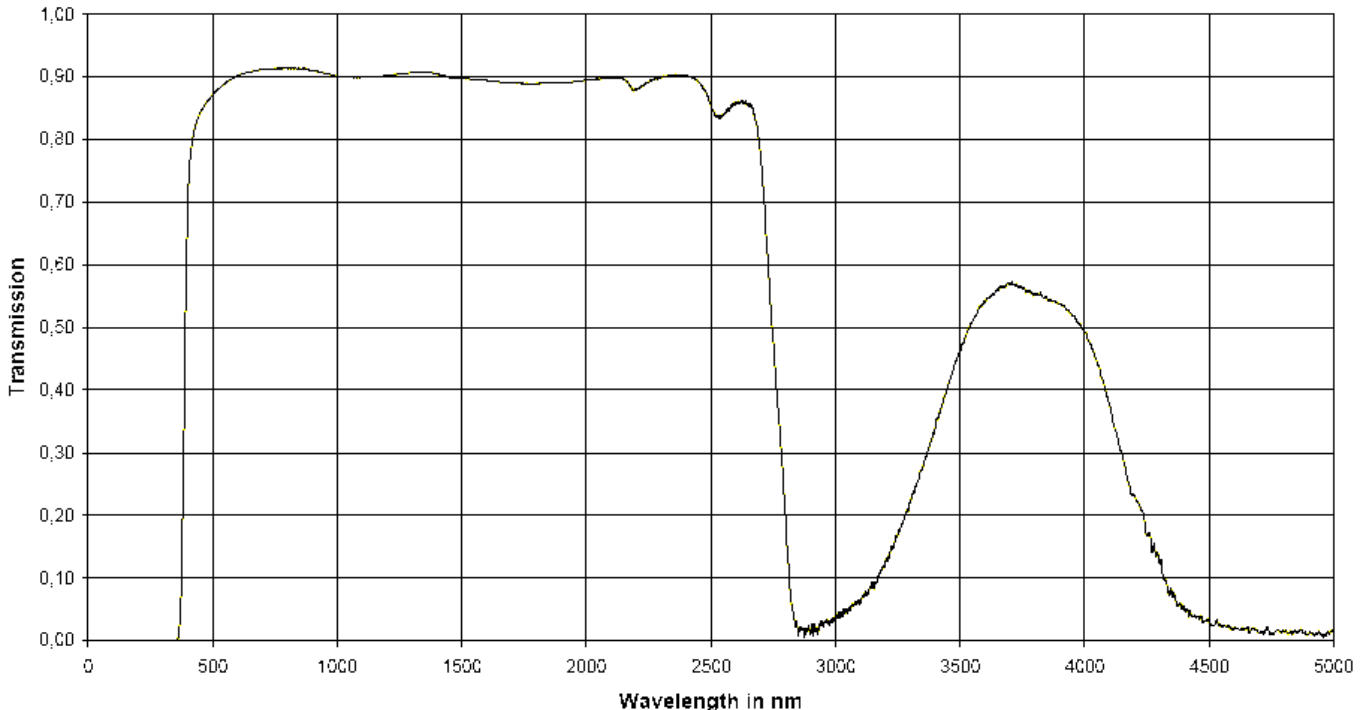
The differing thermal expansions and possible production tolerances of ROBAX® and the various frame materials must also be taken into consideration when determining the dimensions of the frames and panels.

Installation should be made in a distortion-free frame. Direct contact between the glass-ceramic and metal must be avoided. It is highly recommended to use a permanently flexible, heat resistant material as an intermediate layer.

If for constructive reasons the panel is required to be pressed into a frame, the contact pressure must be applied uniformly (never at points only) over the entire edge area of the panel.

Optical Data

Transmission
ROBAX, thickness 3 mm



ROBAX® is a registered trademark of Schott Glaswerke, Mainz, Germany