General information

In addition to its attractive appearance, ROBAX® is mainly known for its “intrinsic” values. Regardless of whether one refers to its mechanical, thermal, chemical, or optical properties, the transparent glass ceramic meets even the highest requirements with poise. The following technical information applies to ROBAX® in general. Unless otherwise indicated, the data provided is intended as a point of reference. Values for which no generally applicable measurement method exists or, alternatively, are not defined in a generally applicable manner (for instance by a standard), are specified and explained.

Mechanical properties

Density	ρ approx. 2.6 g/cm³ (at 25 °C / 77 °F)
Bending strength	$\bar{\sigma}_{bB}$ approx. 35 MPa*

* The test is carried out in accordance with DIN EN 1288 T5, with the surface in its normal condition of use as encouraged in practice.

Impact resistance

Comments can only be made on impact resistance when more is known about the actual application. Of particular importance here are application-specific standards that must be met with respect to strength requirements. Basic values available upon request.

Comments on mechanical properties

Values presented on the strength of glass and glass ceramic must also take into account the special properties of these materials.

In the technical sense, glass and glass ceramic are “ideally elastic”, yet brittle materials in which there are no flow patterns. When they come into contact with materials of the same hardness, this causes surface damage in the form of fine nicks and cracks. When glass and glass ceramic are subjected to a mechanical load, the build-up of critical stress at the points of such nicks and cracks cannot be relieved by plastic flow, as is possible with materials like metals.

The consequence of this behavior is that the structurally based high strength of glass and glass ceramic ($\geq 10^4$ N/mm²) is practically irrelevant. It is reduced by the effect of unavoidable surface defects (in the case of unprotected surfaces) to a practical value of approx. 20 bis 200 N/mm² bending strength, depending on the surface state and test conditions.

The strength of glass and glass ceramic is therefore not a material constant (as its density, for example), but is dependent on the following criteria:

- processing condition of the panel (incl. edge finish, bored holes, etc.)
- usage condition (type and distribution of surface defects)
- time-related conditions or alternatively the duration of the effective load
- surrounding conditions (corrosive substances, e.g. hydrofluoric acid)
- the area subject to load, as well as the thickness of the panel
- how the panel is installed

Its strength is also subject to a statistical distribution in accordance with the type and distribution of the surface defects.

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Thermal properties

Coefficient of mean linear thermal expansion	$\alpha_{(20-700\,°C)}$	(0 ± 0.5) x 10^{-6}/K

Resistance to thermal gradients (RTG)

The RTG value measures how well a material can resist temperature differences within a defined area, e.g. the temperature difference between the hot area in the center of a panel and the cold edge area (room temperature). No breakage caused by thermal stress occurs at a maximum temperature of $T_{max} \leq 700$ °C (1292 °F).

Resistance to thermal shock (RTS)

The RTS value measures the panel’s ability to withstand a sudden thermal shock. No breakage caused by thermal stress occurs at a maximum temperature of $T_{max} \leq 700$ °C (1292 °F).

Temperature/time loading

The temperature/time loading limits determine the permissible temperature for set usage times at which no breakage caused by thermal stress occurs. The pairs of values shown in the following table are relevant for the practical usage of glass ceramic as a viewing panel for stoves and fireplaces.

The temperature values refer to the hottest points on the outside of the panel. One must make sure that these temperature/time loading limits are not exceeded. Taking resistance to thermal gradients and thermal shock into account, the following applies:

Usage temperature	Usage time
560 °C / 1040 °F	5,000 hours
660 °C / 1220 °F	100 hours

Chemical properties

Chemical composition

The chemical composition of ROBAX® complies with the requirements for a glass ceramic in accordance with EN 1748 T2.

The glass can be reused by recycling the material.

Hydrolytic resistance

Glass grain hydrolytic resistance class according to ISO 719: **HGB 1**

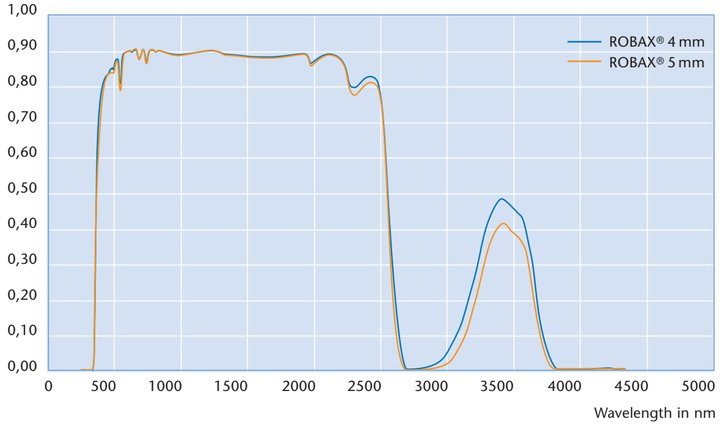
Hydrolytic class	Possible description
HGB 1	high-resistance glass
HGB 2	resistance glass
HGB 3	medium-resistance glass
HGB 4	low-resistance glass
HGB 5	very low-resistance glass

Surface modifications caused by use

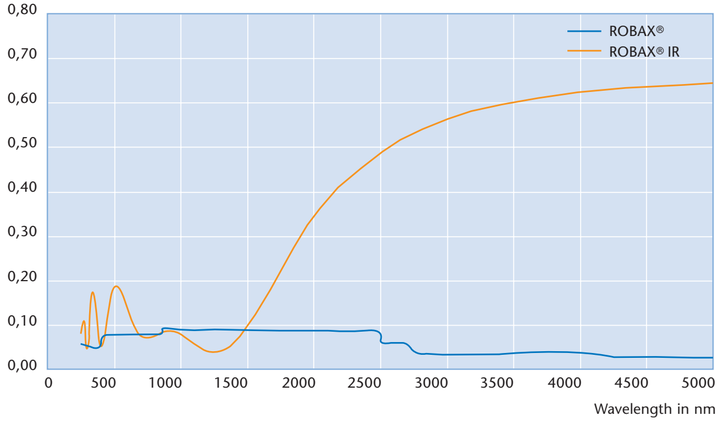
ROBAX® has a high degree of resistance to surface attacks. In individual cases, however, surfaces can experience changes under critical conditions, e.g. corrosive combustion gases (formation of acid at high temperatures). In such cases, practical tests should be conducted before using ROBAX®.

Optical properties

Transmission ROBAX® | 4 mm and 5 mm thicknesses



Reflection ROBAX® and ROBAX® IR | 4 mm | in comparison



These illustrations are based on data from individual measurements. Deviations may result from manufacturing processes.

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