BOROFLOAT® 33 – Thermal Properties

Resistance to Thermal Gradients and Thermal Shock

BOROFLOAT® 33 from Germany is the world's first floated borosilicate flat glass. It combines superior quality and excellent flatness with outstanding thermal, optical, chemical and mechanical features. The chemical composition and physical properties of BOROFLOAT® 33 are in accordance with DIN ISO 3585 and EN 1748 T1. Rediscover BOROFLOAT® 33 and experience the infinite potential of our most versatile material platform. BOROFLOAT® – Inspiration through Quality.

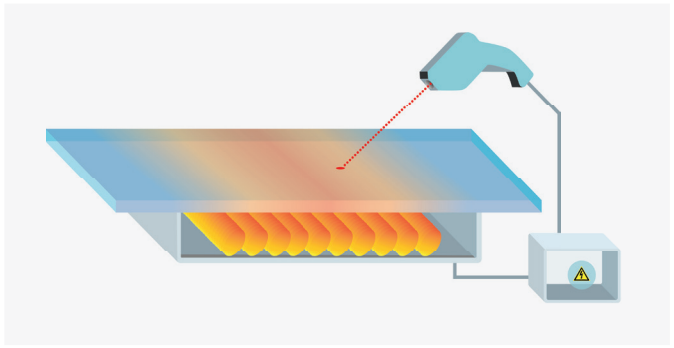
Maximum operating temperatures			
For short-term usage	σ_{max}	(< 10 h)	500 °C
For long-term usage	σ_{max}	(≥ 10 h)	450 °C

Resistance to Thermal Gradients (RTG) and Resistance to Thermal Shock (RTS) must be considered when determining max. operation temperatures.

Resistance to Thermal Gradients (RTG) of BOROFLOAT® 33

The RTG value characterizes the ability of a glass type to withstand a specific temperature difference between the hot center and the cold edges of a panel.

Test method



Resistance to Thermal Gradients (RTG)			
Glass Thickness	Tempering	RTG	
		T_{change} *	$T_{heat-up}$ *
3.8 mm	No	123 K	136 K
6.5 mm	No	119 K	132 K
11 mm	No	52 K	173 K
18 mm	No	31 K	188 K
6 mm	Thermal	>300 K	

Edges ground or polished

* T_{change}: sudden temperature change
$T_{heat-up}$: continuous heat-up

Panels measuring 25 x 25 cm² (10 x 10 inches²) are heated in the center of the panel to a defined temperature; the edges are maintained at room temperature. The temperature is increased within one minute to a level that initiates breakage of the test panel. The temperature is controlled via pyrometer. The RTG value is the difference in temperature between the hot center of the panel and the cool panel edge, at which breakage occurs in less than or equal to 5% of the samples. In order to simulate damage that can occur in practical use, the samples are abraded with 220 grid sandpaper before testing.

Real cases

Although the test method represents a typical situation, deviations are possible in practical use.

Deviations could be caused by:

- Surface condition better or worse than when abraded with 220 grid sandpaper
- Edge strength better or worse than when abraded with 220 grid sandpaper
- Slower heat up time
- Different distribution of thermal differences (i.e.: wider cold edges, smaller hot area)

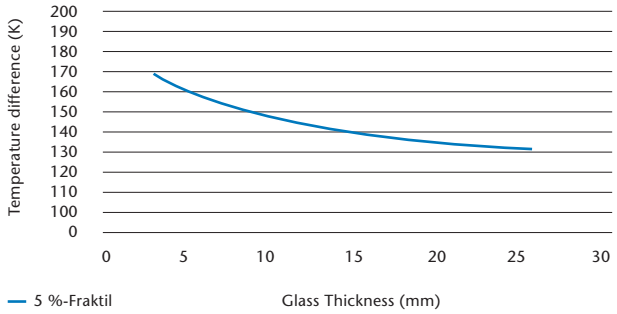
SCHOTT
glass made of ideas

Resistance to Thermal Shock (RTS) of BOROFLOAT® 33

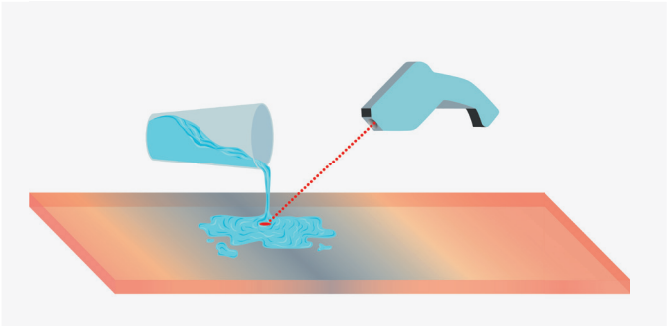
The RTS value characterizes the ability of a glass panel to withstand a sudden temperature shock.

Resistance to Thermal Shock (RTS)	
Glass Thickness	RTS (5 %-Fraktil)
≤ 3.8 mm	175 K
5.0 - 5.5 mm	160 K
6.5 mm	155 K
11 mm	142 K
18 mm	144 K
25 mm	128 K

RTS for BOROFLOAT® 33



Test method



Panels measuring 20 x 20 cm² (8 x 8 inches) are heated in an oven with circulating air and afterwards doused in the center with 50 ml of cold water (68 degree F). The temperature is controlled via pyrometer. The RTS value is the difference in temperature between the hot panel and the cold water, at which breakage occurs in less than or equal to 5% of the samples. In order to simulate damage that can occur in practical use, the samples are abraded with 220 grid sandpaper before testing.

Real cases

Although the test method represents a typical situation, deviations are possible in practical use.
Deviations could be caused by:

- Surface condition better or worse than when abraded with 220 grid sandpaper
- Edge strength better or worse than when abraded with 220 grid sandpaper
- Less / more water

The values shown here were obtained under the described test conditions and methods. Results obtained under different conditions or practical use may deviate. All data are intended to be used as guidelines, unless otherwise stated. Please contact Schott should you have additional technical questions.

SCHOTT Technical Glass Solutions GmbH
Otto-Schott-Strasse 13
07745 Jena
Germany
Phone +49 (0)3641/681-4686
Fax +49 (0)3641/2888-9241
info.borofloat@schott.com
www.schott.com/borofloat

SCHOTT
glass made of ideas