

Built for Extreme Environments, Glass-Ceramics Find a Place in Home and Industry

Glass-ceramics are deployed in a growing number of applications because of their unique combination of properties. Resistance to thermal shock, low coefficient of thermal expansion, and high operating temperatures make glass-ceramics suitable for harsh environments both in the home, and in industry.



Fig. 1
High thermal shock and temperature resistance in combination with the ability of 3D-forming makes NEXTREMA® glass-ceramic a well-suited material for barbecue grills and opens up new design possibilities (Photo: SCHOTT AG)

This is particularly true of the SCHOTT NEXTREMA® glass-ceramic material platform, that marries superior technical properties with the aesthetic benefits and design possibilities of glass. NEXTREMA® is available in sheets of up to 1100 mm × 1954 mm and can be curved or bent; can be processed; can be smooth, nubby, or grooved; and is available in thicknesses of 2–6 mm.

The technical specifications of NEXTREMA® include:

- operating temperature up to 950 °C (1742 °F);

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- near-zero thermal expansion;
- thermal shock resistance of up to 820 °C (1508 °F);
- wide transmittance spectrum and high transmission in the infrared range;
- surface resistance to acid (DIN 12116) and alkali (ISO 695); hydrolytic class HGB 1 (DIN ISO 719);
- non-porous and highly resistant surface;
- Process inert;
- robustness at high temperatures of up to 165 MPa;
- homogeneously coloured.

That combination of material properties makes glass-ceramics a preferred choice in extreme environments. NEXTREMA® is highly versatile, with 6 material types offering com-



Fig. 2
SCHOTT NEXTREMA® glass-ceramic material platform (Photo: SCHOTT AG)

binations of technical specifications with unique transmission profiles. When a solution calls for glass-ceramic, there's almost certainly a type of NEXTREMA® to match.

The right tool for the job

NEXTREMA® has proven itself to be a suitable heat bed in 3D-printer designs, espe-

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Fig. 3
HEATSCOPE® PURE infrared radiant heater by
MHS Munich Home Systems GmbH with rounded
NEXTREMA® glass-ceramic (Photo: heatscope.com)



Fig. 4
In conjunction with transparent thin-film heating coatings,
NEXTREMA® glass-ceramics enable innovative design possibilities such
as the elegant toaster of the Morphy Richards Redefine Collection
(Photo: Morphy Richards Redefine Collection)

cially in those that require higher heat. In 3D-printing, other materials might warp during the cooling process, or sometimes as the object in production is still being made. To solve this problem, many printers use heated beds that slow the cooling process. NEXTREMA®'s near-zero thermal expansion and resistance to thermal shock enables more precise, higher quality print designs that themselves might operate in high temperature environments.

Adding infrared transmission

When combined with infrared transmission, the mechanical and thermal properties of glass-ceramic unlock new applications. One example of the versatility of NEXTREMA® is its use in an award-winning line of infrared heaters.

Because of its ability to provide technical and aesthetic benefits, NEXTREMA® has

found a place in radiant infrared heaters from MHS Munich Home Systems. The slim HEATSCOPE PURE® ambient infrared heater was recently awarded with the RedDot Design Award in 2018. Highlight, of course, is the curved NEXTREMA® glass-ceramic. The choice as stylish cover combined with suitable transmission in the IR range shows why NEXTREMA® is the perfect match of functionality and design in this application.

In conjunction with transparent thin-film heat coatings, innovative designs can also be realised for household appliances, such as transparent toasters – like the elegant toaster of the Morphy Richards Redefine Collection, in which NEXTREMA® serves as substrate for thin-film coatings.

In industrial settings, glass-ceramics have been employed in infrared heaters to ensure paint dries evenly on aircrafts and

automobiles. In high-temperature furnaces as carrier plate or inner linings in the field of display production due to the excellent thermal insulation properties of some NEXTREMA® types.

The size of NEXTREMA® has also proven to be an advantage in the industrial or commercial sector. Large plate sizes have made it possible to design larger and more efficient process ovens and replace materials such as quartz glass, which might only be produced in the respective plate formats with great effort.

Thermal shock resistance

High resistance to thermal shock means NEXTREMA® plays well in barbecue grills. NEXTREMA® can handle temperature swings of up to 820 °C, which means it not only functions at high heat, but can also be cooled rapidly without deforming or shat-



Fig. 5
Processed NEXTREMA® glass-ceramic tinted
(Photo: SCHOTT AG)

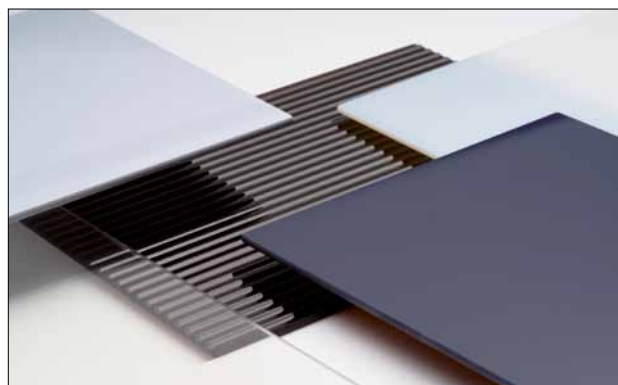


Fig. 6
SCHOTT NEXTREMA® glass-ceramic material platform
(Photo: SCHOTT AG)



Fig. 7
Processed NEXTREMA® glass-ceramic opaque grey
(Photo: SCHOTT AG)

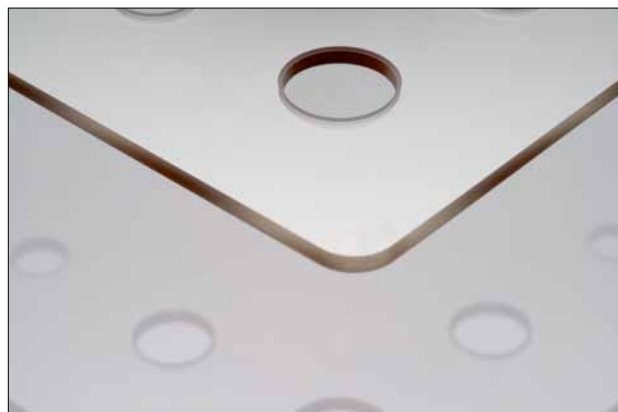


Fig. 8
Processed NEXTREMA® glass-ceramic transparent
(Photo: SCHOTT AG)

tering compared to tempered glass. A must have for undisturbed barbecue events – even when it starts to rain.

Glass-ceramic can also be formed into different curves or angles, opening new design possibilities for grills. This leads to interesting functional benefits. With a transparent material, grillers can watch their food without having to lift the lid. That retains more heat, making for more energy efficient grilling, and better results.

Glass-ceramic has also found a place inside the grill. When used as a burner shield,

glass-ceramic lets grillers see that the burner has ignited. At the same time, glass-ceramic is corrosion resistant, and spreads heat evenly.

Another barbecue product example is glass-ceramic BBQ pizza plates, which are inter alia sold by Morsø from Denmark. A stylish and time saving solution compared to conventional pizza stones.

A trusted partner

Good design is a differentiating factor that can indicate quality. NEXTREMA® glass-

ceramics can improve the design and functionality of products throughout various industries, while also offering the technical properties that, in turn, improves the functional quality of devices.

SCHOTT is an experienced partner in matching glass-ceramic materials to the right application. NEXTREMA® is a tried-and-true solution that has demonstrated its merits in a number of products. Share your ideas and visions for how NEXTREMA® can be used in your applications.



Fig. 9
NEXTREMA® burner shields – protect gas burners in the barbecue, and in combination with a transparent glass-ceramic window enable the griller to see if the flame has ignited correctly (Photo: SCHOTT AG)

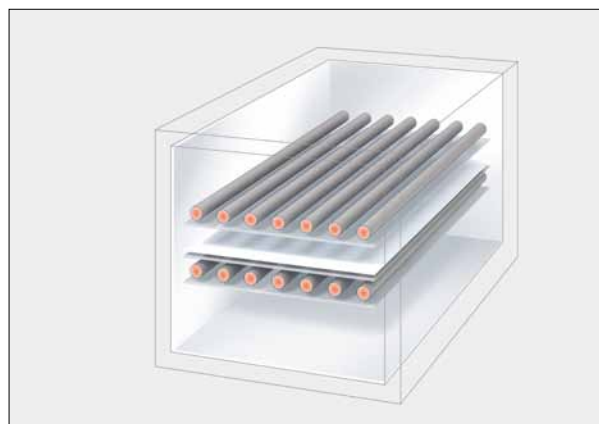


Fig. 10
NEXTREMA® glass-ceramic as carrier plate, inner linings, or heater cover in high-temperature furnaces (Photo: SCHOTT AG)