

# ZERODUR® K20

Glass ceramic with low thermal expansion for high temperature applications

## Product Information

The high temperature ZERODUR® K20 glass ceramic material contains a crystal phase of more than 90% Keatite, produced by thermal transformation from the semitransparent ZERODUR® material. ZERODUR® K20 can be used at higher application temperatures compared to ZERODUR®. The material has high temperature stability and low thermal expansion and does not change its properties during multiple temperature cycles.

## Properties

- Low coefficient of thermal expansion together with high longterm temperature stability up to 850 °C
- Can be matched with low thermal expansion metal alloys, e. g. Invar®
- Excellent homogeneity and internal quality
- A remission of more than 90% in the visible with a matt brilliant white finish
- Free of pores and polishable to very low surface roughness levels
- Large-scale parts can be produced with dimensions in the meter range

## Applications

- Mechanical and optical components within high energy laser systems
- Diffuse reflectors for laser-cavities
- Mold material in hot forming processes (glass, plastic etc.)
- High precision manufactured components
- Ceramic engine components
- Calibration standards for optical and mechanical probes



## Forms of Supply

- Complex, customized CNC-manufactured products
- Serial production and prototype manufacturing

Properties	ZERODUR® K20	ZERODUR®
Density [g/cm <sup>3</sup> ]	2.53	2.53
Young's Modulus E [GPa]	84.7	90.3
Poisson's Ratio $\mu$	0.25	0.24
Knoop Hardness [HK 0.1/20]	620	620
Expansion Coefficient (20–700 °C) [10 <sup>-6</sup> /K]	2.4	0.2
Expansion Coefficient (20–300 °C) [10 <sup>-6</sup> /K]	2.2	–
Expansion Coefficient (0–50 °C) [10 <sup>-6</sup> /K]	1.6	0 ± 0.007 0 ± 0.010 0 ± 0.020 0 ± 0.050 0 ± 0.100
Heat Capacity $c_p$ (20 °C) [J/(gK)]	0.90 (extrapolated)	0.80
Thermal Conductivity (90 °C) [W/(mK)]	1.63	1.46
Max. Application Temperature [°C]	850	600



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