

Product Information Quarzal®

Quarzal® is a slip cast, fused silica material, which was developed within SCHOTT 30 years ago. Over that long period of Quarzal® production, the material was steadily improved. The characteristics of Quarzal® are mainly determined by the grain size distribution and the firing temperature, which is approx. 1100°C. The close collaboration between production, engineering and development gives us a big variety of experiences at different applications.

Quarzal® has an excellent thermal shock resistance, a high purity (99,6% SiO₂) and depending on the purity, a very low glass defect potential for solid defects or bubbles.

A big advantage is the availability of large blocks (up to 2000 x 2500 x 350mm), such blocks could be fabricated with an oriented glass contact surface, this means a surface with a maximum corrosion resistance.

We have all required capabilities for machining, as sawing, drilling grinding etc., on site. More complex shapes could be machined on our 3 or 5 axes NC-machines. Components and assemblies could be preassembled and checked in our workshop.

With the 2 different types of Quarzal® type N and type G we produce, we can supply a refractory material for considerable applications. Quarzal® could be applied in glass contact or as the crown or superstructure material. As glass contact material Quarzal® is used over long term period within SCHOTT and since 2007 more and more outside of SCHOTT.

For example:

Melting units, feeder, stirrer, damper, orifice rings or tweels. Because of the high purity and good thermal shock resistance Quarzal® also could be used for crucibles or as auxiliary device.

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Data Sheet Quarzal®; available Qualities G, N

Quarzal® is a slip cast and sintered amorphous SiO₂ product.

Typical Properties*		Quarzal®	
Chemical and physical			
Quality	Type G	Type N	
SiO ₂ -Content (wt-%)	> 99,6	> 99,6	
Colour	white	white	
Bulk Density (t / m ³)	2	1,9	
Apparent Porosity (Vol.-%)	10	13	
Max. Grain Size (mm)	6	1	
Cold Crushing Strength (MPa)	120	65	
Cold Bending Strength (in MPa)	14	12	
E-Modulus (GPa)	18	12	
Hot Bending Strength at 900°C (MPa)	20	22	
Hot Bending Strength at 1450°C (MPa)	19	20	
E-Modulus (GPa) / 900°C	26	18	
Thermal Expansion Coefficient linear 20°C-1000°C, (1/K)	0,5 x 10 ⁻⁶	0,5 x 10 ⁻⁶	
Specific Heat Capacity between 150°C-1000°C (kJ/kgK)	0,94 –1,26	0,94 –1,26	
Refractoriness Under Load T ₀₅ (°C)	1680	1680	
Firing Shrinkage at T > 1250°C (%)	< 3,0	< 4,5	
Heat Conductivity (W/mK)	1,04	0,96	
- bei 150°C	1,24	1,10	
- bei 550°C	1,40	1,24	
- bei 1100°C			

*)

The mentioned properties are typical average values. They are tested in accordance with standards. Material- and product specific variances have to be considered. The given values are for guidance only, they are not guaranteed properties. During operation or under influence of physical or chemical nature values could be influenced. Subject to revision as and when required.

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Range of Applications

Quarzal® G

- Blocks for melter assemblies:
Max. dimensions: 2,2m x 1,8m x0,3m
Max. weight per block 3t
- Melting pots, volume 200 Liter
- Channel blocks

Quarzal® N

- Formed parts, machined or un machined:

Feeder expendables:

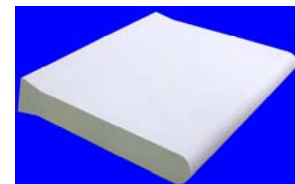
Tubes
Orifice Rings
Spout
Stirrer
Burner Blocks
Tweel

Glass type applications:

Borosilicat glass, opal glass, soda lime glass
and glass ceramic

- Crucibles for laboratory test melting

Complex shape capabilities



Recommendations in using Quarzal®:

Up to 1050°C: long term service with excellent thermal shock resistance

Up to 1680°C: long term service with excellent thermal shock resistance
within the temperature range max. 1680°C and min. 300°C, in case of
Cristobalite formation

Heat up temperature: up to max. 50°C/h for furnace blocks, feeders and
channel blocks.

Heat up temperature: up to max. 200°C for non glass contact applications

Higher heat up gradients are possible depending on special requirements

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References

Glasstypes:

Borosilikatglass 3.3 and 4.5
Opal glass
Soda Lime Glass

Range of application:

Glass contact material in the forehearth area. In the most cases customized design.

Channel blocks
Spout
Plunger
Orifice ring
Stirrer
Tube
Burner block (Spout)
Cover blocks (Spout)
Tweel

Customers:

Till 2007 exclusive within Schott
since 2007 external customers

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