HBQ®100 –

High purity **black** opaque quartz for enhanced thermal management

Applications

- **Semiconductor** single-wafer and batch process tools
- Thermal **homogenization** of process environment
- **Blocking of radiation** from certain process environments
- Baffle plates, pedestal plates, door plates, dummy wafers, heater covers

Characteristics

HBQ®100 is a **black** opaque high purity quartz glass composite. Its key **value addition** to the well-known white opaque (OM®100) and clear fused (HSQ®300) quartz solutions in the market are the absorption of ultra-violet (UV) up to beginning medium-wave infrared (MWIR) radiation. Optical **emissivity** is designed to mimic that of silicon when heated. On the contrary **thermal conductivity** – among most other physical properties – is low, thus matching that of industry standard fused quartz materials.

The composition of this semiconductor process suitable material was engineered to keep contamination of the process environment as small as possible without introducing foreign / unwanted dopants. Therefore the materials main ingredients are **silicon dioxide** (fused quartz) and **silicon**.

Dimensions

Maximum dimensions [mm]

Product	Length / OD	Width	Height
Round block	720	–	60
Square block	500	500	60
Rectangular bar	Up to 900	< 300	60
Flange blank in near net shape design	Up to 800	–	Up to 250

Chemical purity

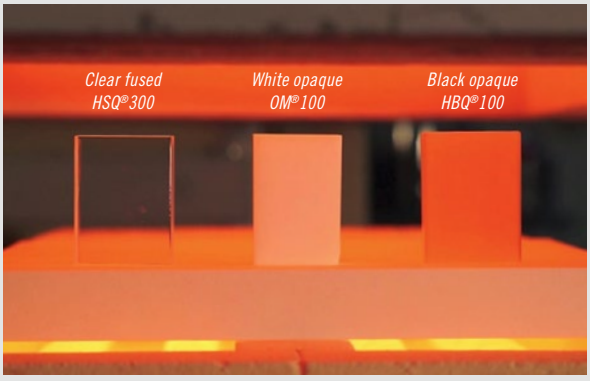
Typical impurity levels below:

	Li	Na	K	Mg	Ca	Fe	Cu	Cr	Ni	Mn	Ti	Zr	Al	OH
HBQ® 100	0.1	0.1	0.2	<0.03	0.5	0.3	<0.01	<0.01	<0.03	<0.03	1.1	1.0	15	n. s.
HSQ® 300	0.5	0.2	0.3	<0.03	0.5	0.1	0.01	<0.01	<0.01	<0.03	1.1	1.0	15	< 30
OM® 100	0.1	0.1	0.2	<0.03	0.4	0.1	<0.01	<0.01	<0.01	<0.03	1.1	1.0	15	n.s.

all values given in parts per million [ppm] by weight

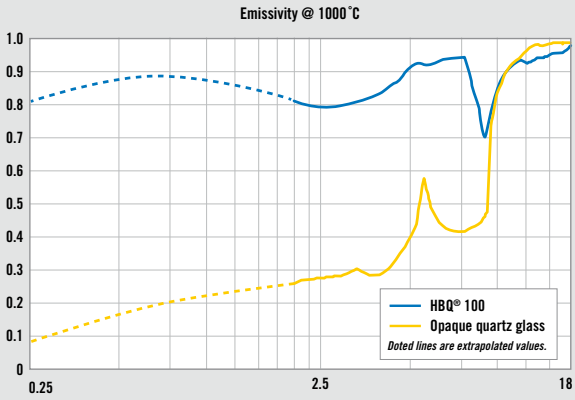
Emissivity (comparison to industry standard fused quartz)

Emissivity @ 1000 °C



HBQ®100 exhibits high – silicon like – emissivity combined with low thermal conductivity

HBQ® @ 1000 °C
Opaque quartz glass @ 1000 °C



Physical Properties

	HBQ®100	electrically fused quartz glass (e.g. HSQ®300)
Density g/cm³	2.19 – 2.20	2.203
Porosity	< 0.5 %	0 %
Pore size	< 10 µm	–
CTE (0...900°C)	0.57 x 10^{-6}	0.48 x 10^{-6}
Max. Working Temp – continuous	1160 °C	1160 °C
Max. Working Temp – short term	1300 °C	1300 °C
Specific Heat [J/(gK)], 20 °C	0.75	0.77
Specific Heat [J/(gK)], 500 °C	1.10	0.96
Specific Heat [J/(gK)], 900 °C	1.12	1.05
Heat conductivity [W/(mK)], 20 °C	1.49	1.38
Heat conductivity [W/(mK)], 700 °C	1.99	2.50
Heat conductivity [W/(mK)], 1000 °C	2.17	2.70

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