Heraeus

Product: Quartz wool	Technical information	Date issued: 02-27-06
		Revision: 1
Dr. Thomas Block thomas.block@heraeus.com	Business Unit Base Materials	

1. Products

Purchase order number	Fiber thickness	Dimension	Weight [g]	Density [kg/m^3]	Volume [dm^3]
quartz glass (loose)					
09622012	5-30µm	bag	10	1	10
09622013	5-30µm	bag	50	1	50
09622014	5-30µm	bag	100	1	100
09622015	5-30µm	bag	250	1	250
09622016	5-30µm	bag	500	1	500
09622017	5-30µm	bag	1000	1	1000
09622018	8µm	bag	227	1	227
09622019	15µm	bag	227	1	227
Quartz glass (mat)					
09788546	530µm	0.455x0.317x0.005m	15.6	15	1
09622024	530µm	1.42x1x0.05m	500	7	70
09622020	530µm	2.85x1x0.05m	1000	7	140
09622028	12µm	2.80x0.305x0.005m	43	15	3

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2. Chemial purity

Typical trace elements [in ppb] for loose quartz wool

Li	Na	K	Mg	Ca	Fe	Cu	Cr	Mn	Ti	Al	Zr	Ni
50	3500	2000	200	2000	1000	< 50	100	50	2000	18000	800	50

Typical trace elements [in ppb] for quartz wool (mat)

Li	Na	K	Mg	Ca	Fe	Cu	Cr	Mn	Ti	Al	Zr	Ni
200	3500	2000	300	3500	5000	2000	300	50	2000	18000	800	100

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3. Physical properties

3.1. Heat conductivity

Temperature [°C]	Density of fused silica wool	
	40 kg/m^3	100 kg/m^3
	$\frac{W}{K \cdot m}$	$\frac{W}{K \cdot m}$
50	0.044	0.047
100	0.057	0.056
200	0.091	0.074
300	0.135	0.098
400	0.188	0.128
500	0.247	0.155
600	0.316	0.189
700	0.397	0.227
800	0.488	0.273

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3.2. Summary of physical properties

Physical Properties	Electric-Fused Quartz
Mechanical Data	
Density [g/cm³]	2.203
Modulus of elasticity (at 20 °C) [N/mm²]	7.25×10^4
Poisson's ratio	0.17
Compressive strength (approx.) [N/mm²]	1150
Tensile strength (approx.) [N/mm²]	50
Bending strength (approx.) [N/mm²]	67
Torsional strength (approx.) [N/mm²]	30
Modulus of torsion [N/mm²]	$3.0 \cdot 10^4$
Mohs hardness	5,5...6,5
Micro-hardness [N/mm²]	8600...9800
Knopp hardness 1 N load [N/mm²]	5800...6100
Internal damping	$1 \cdot 10^{-5}$
Sound velocity for longitudinal waves [m/s]	5720
Ultrasonic velocity at 50 °C [m/s] for longitudinal waves for transversal waves	 5968 3774
Temperature coefficient of ultrasonic velocity for longitudinal waves [1/K]	$71 \cdot 10^{-6}$

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4. Chemical properties

Reactions of quartz wool with different elements and compounds

A	The element or compound does not react with fused quartz or fused silica.
B	It reacts only above the indicated temperature.
C	Only the melt of the compound reacts with fused quartz or fused silica.
D	The element or compound reacts with fused quartz or fused silica.

Metals and non-metals		
Element	Reactivity	Remarks
Ag	A	-
Al	B	From 700 to 800 °C rapid reaction
Au	A	-
Br	A	-
C	B	Only above 1500 °C
Ca	B	Only above 600 °C
Cd	A	-
Ce	B	Only above 800 °C
Cl	A	Also with heat and humidity no reaction
F	D	Only in humid state
Hg	A	-
I	A	-
Li	D	Only above 250 °C
Mg	B	From 700 to 800 °C rapid reaction
Mn	A	-
Mo	A	-
Na	A	Reacts only in vapor state
P	D	-
Pb	A	-
Pt	A	-
S	B	Above 1000 °C very weak reaction
Si	C	-
Sn	A	-
Ti	A	-
W	A	-
Zn	A	-
Gases and vapors		
Compounds		
HCl	A	-
H_2	A	-
N_2	A	-
O_2	A	-
NO_2	A	-
SO_2	A	-
CO	A	-
Cl_2	A	-
Br_2	A	

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continuation

Acids		
Compounds		
H_2O	A	-
H_2SO_4	A	-
HNO_3	A	-
HCl	A	-
HF	D	But weaker than with ordinary glass
H_3PO_4	D	Above 300 °C strong reaction, but weaker than with ordinary glass
Organic Acids	A	-
Salts		
Compounds		
BaCl	C	-
$BaSO_4$	B	Only above 700 °C
Borate	C	-
BCl_3	B	Only above 900 °C
KCl	C	Promotes devitrification
KF	C	-
NaCl	C	-
Na-metaphosphate	D	-
Na-polyphosphate	D	-
Na_2SO_4	A	-
Na-tungstate	D	Promotes devitrification
Nitrate	C	-
Pt-NH_4Cl	B	Only above 900 °C
$ZnCl_2$	C	-
Zn-phosphate	B	Light at 200 °C, considerable at 100 °C
Zn-silicate	B	Only above 1000 °C
Oxides		
Compounds		
Al_2O_3	B	Only above 1200 °C
BaO	B	Only above 900 °C
CaO	B	Only above 1000 °C
CuO	B	Only above 950 °C
Fe-oxides	B	Only above 950 °C
MgO	B	Only above 950 °C
PbO	C	-
ZnO	B	Only above 800 °C
Basic oxides	B	Acceleration of devitrification only above 800 °C

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5. Safety data sheet

1. Identification of the substance/preparation and of the compa ny/undertaking

Identification of the product

Product name: **Quartzglas (Amorphous silicon dioxide)**

Manufacturer/supplier identification

Company: Heraeus Quarzglas GmbH & Co. KG * 6345(Hanau * Germany * Tel.++49(0)6181/35-1
Contact for information: HQS-UA*Telephone: 06181/35-6264*Telefa : 06181/35-6229
Emergency telephone No : ++49(0)6181/35-6434*Telefax: 06181/35-62 9

2. Composition/information on ingredients

CAS-No.: 7631-86-9
Molar mass: 60.08 EINECS-No.: 231-545-4
Molecular formula: SiO_2

3. Hazards identification

No evaluative data are available. A classification according to categories of danger as specified in Directive 67/548/EEC and laid down in the legislation of t e country concerned can therefore not be made

4. First aid measures

For generated dust:
After inhalation: fresh air.
After skin contact: wash off with water.
After eye contact: rinse out with water.
After swallowing (large amounts): consult doctor if feeling unwell.

5. Fire-fighting measures

Suitable extinguishing media:
In adaption to materials stored in the immediate neighbourhood.

Special risks:
not known to date

Other information:
Non-combustible.

6. Accidental release measures

Person-related precautionary measures:
Avoid generation of dusts; do not inhale dusts.

Procedures for cleaning/absorption:
Take up dry; Forward for disposal. Clean up affected area.

7. Handling and storage

Handling:
No further requirements.

Storage:
Storage temperature: no restrictions.

8. Exposure controls/personal protection

Specific control parameter
MAK Germany (max. workplace conc.) Silica, amorphous:
4 mg/m³ inhalable dust, Class. pregnancy: C

Personal protective equipment:

Respiratory protection:	required when dusts are generated. Filter FFP 1 (acc. to DIN 3181) for solid and liquid particles of toxic and very toxic substances
Eye protection:	required
Hand protection:	not required
	Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Industrial hygiene:
Wash hands after working with substance.

9. Physical and chemical properties

Form:		ingots, plates, rods and tubes	
Colour:		colourless	
Odour:		odourless	
pH value		not available	
Melting temperature (softening point)		1730	°C
Boiling temperature (sublimation temperature)		2230	°C
Ignition temperature		not available	
Flash point		not available	
Explosion limits	lower	not available	
	upper	not available	
Relative vapour density			
Density	(20°C)	2.20	g/cm³
Solubility in			
water	(20°C)	insoluble	
hydrofluoric acid 40%	(20°C)	soluble	

10. Stability and reactivity

Conditions to be avoided

not known to date

Substances to be avoided

hydrogen halides, halogen oxides, light metals/heat, xenon hexafluoride
No first-hand knowledge of hazardous properties.

Hazardous decomposition products

not known to date

Further information

none

11. Toxicological information

Acute toxicity

Quantitative data on the toxicity of this product are not available

Subacute to chronic toxicity

An embryotoxic effect need not be feared when the threshold limit value is observed.

Further toxicological information

When dusts are generated: Chronic uptake results in damage of: respiratory tract.
On the basis of the morphology of the product, no hazardous properties are to be expected when it is handled and used with appropriate care.

12. Ecological information

Ecotoxic effects:
Quantitative data on the ecological effect of this product are not available.

Further ecologic data:
No ecological problems are to be expected when the product is handled and used with due care and attention.

13. Disposal consideration

Product:

There are no harmonised regulations on the disposal of chemicals in the member states of the EU. In Germany, the Recycling and Waste Management Act (KrW-/AbfG) stipulates recycling as a requirement. This means that a distinction must be made between „wastes for recycling" and „wastes for disposal". Particular aspects – in the main concerning delivery – are also governed by the Laender. Please contact the competent body (authority or waste disposal company) where you will obtain information on recycling or disposal.
The contact person at Heraeus Quarzglas GmbH in Hanau is attainable through the tel.no. 06181/35-6264 (within Germany).

Packaging:

Disposal in compliance with official regulations. Handle contaminated packaging in the same way as the substance itself. If not officially specified differently, non-contaminated packaging may be treated like household waste or recycled.
Contact at Heraeus Quarzglas GmbH: as stated under the product.

14. Transport information

Not subject to transport regulations.

15. Regulatory information

Labelling according to EC Directives

Symbol:	—
R-phrases:	—
S-phrases:	—

German regulations
Water pollution class non

Other national regulations
Swiss toxic class: F

16. Other information

Reason for alternation
General update.

The information contained herein is based on the prese it state of our knowledge.
It characterizes the product with regard to the approp iate safety precautions.
It does not represent a guarantee of the propert es of the Produkt.