

Fused and Quartz Silica

2009



NEW : Innovative Advanced Ceramic
Solutions



ADVANTAGES

- * Tailor made Solutions**
- * Very competitive Prices**
- * Rapid Services**

We supply solutions with advanced ceramics, systems and services for the following industries:

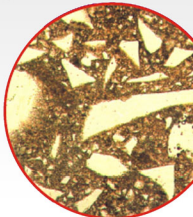
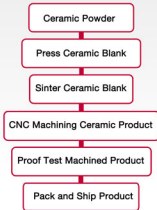
Photovoltaics
Glass production
Coke making
Steel making
Metallurgy

Precision foundries
Non-ferrous foundries
The chemical industry
Aeronautics
The nuclear industry

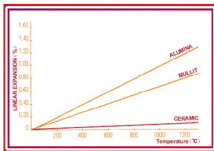


EXCELLENT QUALITY

PROCESS FLOW CHART



GRAINS



Ceramic Characteristics

Very low coefficient of thermal expansion ($0.6 \times 10^{-6} / ^\circ\text{C}$) thus it has high resistance to thermal shock up to 1100 in an oxidizing atmosphere.

Smooth surface for resistance to corrosion. High chemical purity that does not pollute the glass and silicon liquid. Low thermal conductivity. High electrical insulation. High precision and big dimensional products are available.



GLASS TEMPERING FURNACE



Tempering rolls
Roll seals
Press-bending mold
Furnace linings
Heating element supports

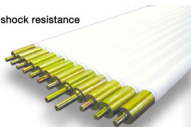
Low thermal expansion coefficient, good high temperature shock resistance

High rigidity to melting point, high mechanical strength

Good dimensional tolerances

Good corrosion resistance

Big dimensional monolithic blocks and rolls



Rolls in Operation

FLOAT GLASS PRODUCTION LINE

For the Dog House:

Thermalcouple blocks
Back wall
Front wall
Curtain blocks
Hot repair blocks

For the Waist:

Flat arches
Shadow wall
Screens

For the Canal:

Flat arches
Tweel
Cover tiles
Wet back tiles
Restrictor tiles
Screens

For the Dross Box:

Lift-out rolls
Lining

For the Lehr:

Lehr rolls



Our lift-out rolls and lehr rolls reduce over-cooling at the bottom surface and the edge of the glass ribbon, the stress crack of the glass is consequently reduced or removed. Non-wetting characteristics for tin apparently reduce the scratches and tin spots on glass surface.



Lift-out Rolls

GLASS MELTING

Stirrers, plungers, orifice rings, tubes, mandrels, stoppers, nozzles, spoons ...

GLASS MELTING KILN

On-line monitor the status of the ceramics, control through the network.

FIBER GLASS FURNACE

Blocks



For Silicon Steel

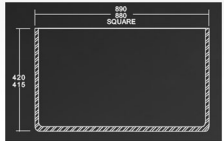
Fused Silica Rolls

Item	Steel Rolls	Our Ceramic Rolls
Thermal expansion	$18 \times 10^{-6}/^{\circ}\text{C}$	$0.6 \times 10^{-6}/^{\circ}\text{C}$
"Banana" phenomena	Yes	No
Dimensions consistency	Not good	Very good
Reaction with Sn, SnO, SnO ₂	Very high	No reaction
Sulfates build-up	A lot	Less build-up for the same quantity
Mechanical shock	Metal deformation	Only spalling
Breakage	No	Can have



PHOTOVOLTAICS

Crucibles are of crucial importance in DSS furnace for photovoltaic industry. Due to optimum ceramic physical properties our crucibles are available for huge sizes to manufacture cost-minimized silicon ingots. These properties also assure the reliability and consistency of our crucible throughout the whole application cycle. There is continuous invest in research and enlarging capacity to meet photovoltaic industry demanding requirements and to reduce the costs of the photovoltaic energy.





Product Data Sheet

Typical Composition:

- $\text{SiO}_2 \geq 99.5\%$
- $\text{Fe}_2\text{O}_3 \leq 45\text{ppm}$
- $\text{CuO} \leq 45\text{ppm}$
- $\text{TiO}_2 \leq 45\text{ppm}$
- $\text{Cr}_2\text{O}_3 \leq 45\text{ppm}$
- $\text{NiO} \leq 45\text{ppm}$
- $\text{MgO} \leq 40\text{ppm}$
- Sodium Oxide $\leq 40\text{ppm}$
- $\text{K}_2\text{O} \leq 40\text{ppm}$

Physical Properties:

- Density 1.90 – 2.00 g/cm³
- Apparent porosity <10 - 11%
- Compressive Strength > 50Mpa
- Modulus of Rupture >20MPa
- Crystallinity < 1%

Thermal Properties:

Thermal Conductivity

- 20°C: 0.64 W/m²K
- 500°C: 0.81 W/m²K
- 1090°C: 0.88 W/m²K
- Expansion Coefficient - 20°C – 1000°C : $0.6 \times 10^{-6} / ^\circ\text{C}$
- Max Use Temperature (a single thermal cycle) 1650°C
- Melt point /1750°C

Surface Quality :

- Dimensions Tolerance Unmarked $\leq \pm 2\text{mm}$.
- Flatness: Diamond finishing, convex /concavity $\leq \pm 2\text{mm}$.
- Ceramic does not have crack, corner /edge spalling, and opening bubbles.



Reliable Partner

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