Silzot®

built to last.

SILICON NITRIDE
FOR CERAMIC & SOLAR APPLICATION
Silicon Nitride

**SILICON NITRIDE PRODUCTION:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>1992</td>
<td>Start of production of ceramic quality</td>
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<tr>
<td>1998</td>
<td>Quality improvement with α-content above 80%</td>
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<tr>
<td>2002</td>
<td>Production extension and first trials for solar grade silicon nitride</td>
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<tr>
<td>2004</td>
<td>Further improvement of ceramic quality to α-content above 89%</td>
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<td>2008</td>
<td>Third plant extension to current size</td>
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<td>2009</td>
<td>Introduction of the solar grade process and start of commercial production of solar quality</td>
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<tr>
<td>2011</td>
<td>Start of construction of a second production unit, 13 Mio € investment</td>
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<tr>
<td>2012</td>
<td>Start-up of new production line in summer</td>
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**PRODUCT DESCRIPTION:**

Silicon Nitride is a hard ceramic material having high strength over a broad temperature range, moderate thermal conductivity and unusual high fracture toughness.

**PRODUCTION PROCESS:**

Direct reaction between silicon and nitrogen at high temperatures without any use of catalysts: No metal catalyst used!

**CHARACTERISTICS:**

Construction material and additive for the manufacturing of components and assemblies for extreme mechanical and thermal operating conditions

**FIELDS OF APPLICATION:**

Ball/Roller bearings
Cutting tools
Plant components in direct contact with the melt in metallurgical operations
High-endurance ceramic parts for the automotive industry
Heater plugs
Components for current generators
Sealings, parts for the dental technology, cooler/heater elements for semiconductor application, and many others

**SILICON NITRIDE**

FOR HIGH-PERFORMANCE TECHNICAL CERAMICS AND HIGH-STRENGTH SPECIAL STEEL GRADES

**THERMAL SHOCK RESISTANT CONSTRUCTION ELEMENTS FOR APPLICATION IN AERONAUTICS**

**NO METAL CATALYST USED!**
PRODUCTION CONDITIONS FOR HIGH PURITY SILICON NITRIDE SILZOT® SQ:
Raw materials are solar grade silicon and highly purified nitrogen gas
Reaction conditions must be controlled very precisely
Specific reactor enables production of high purity silicon nitride
Dedicated micronisation equipment delivers needed particle size

FIELD OF APPLICATION:
Coating of the inner surface of the quartz crucible during controlled solidification of multi-crystalline silicon, production of solar wafers, to be assembled to photovoltaic modules

CHARACTERISTICS:
High purity quality derived from the direct chemical reaction of ultrapure silicon metal (polysilicon) and pure nitrogen obtained from the air, low fraction of impurities (in particular Cl, F, O and metals like Al, Fe, W, Cr, Ni, etc.). Ideal grain size for application with established spraying machines. Residue-free release of the silicon ingot from crucibles

QUALITY CONCEPT:
Intake control of solar grade silicon includes the determination of the most prevalent contaminants per GDMS. Each batch of produced SiN is checked for the content of N, C, O, particle size and for relevant metal impurities. Delivery conditions: By ship or air-freight
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