MACHINE PARTS MADE OF HIGH-PERFORMANCE CERAMIC: INCREASED PRECISION, REDUCED FAILURE
Wear-resistant ceramic components ensure high dimensional stability. Due to their function, machine parts are particularly vulnerable to mechanical, thermal and chemical stress at critical points. Ceramic precision components can withstand these stresses and surpass conventional materials in terms of stability and durability. Furthermore, ceramic has special electrical properties in terms of insulation, dielectric strength and the lack of inductive coupling properties.
BECAUSE THEY SIMPLY DO NOT WEAR.

GRIPPING AND HANDLING ELEMENTS, FIXTURE CONSTRUCTION AND TESTING TECHNOLOGY: WITH CERAMIC ON THE SAFE SIDE.

Whether gripper fingers, test plugs or receptacle pins, the benefits of high-performance ceramic as a guarantor for process safety and quality are proven in all these cases. Precise guidance of components, even at the highest clock rates, and excellent mechanical, electrical and thermal properties characterise this material as an all-in-one solution for the highest demands.

High-performance ceramic is:

- extraordinarily wear-resistant: even the smallest geometries keep their dimensional accuracy permanently
- usually more durable than a series cycle
- extremely temperature-stable
- electrically and magnetically neutral
- resistant to welding spatter and repel solder
- ideal for clean rooms
- chemically inert

For technical data, please refer to the table in page 7.
WHAT ARE THE ADVANTAGES?

SAFETY, QUALITY AND DURABILITY

Gripping device made of high-performance composite materials (GRP/ceramic)

Positioning pins
DOCERAM high-performance ceramics combine the advantages of plastic (fixed high/low frequency, electrically insulating, non-magnetic) with those of metals (tough, precise, durable), coupled with very high resistance to wear. Ceramic is also non-abrasive. Components are therefore not contaminated by metal or plastic particles, which avoids rejection. Ceramic can be used wherever circuit boards and electronic components are picked up, processed and tested. This includes grippers, test plugs, fixing pins, dowel pins, etc.

WHAT ARE THE DISADVANTAGES?

NONE!

EXAMPLES OF MACHINE PARTS MADE OF HIGH-PERFORMANCE CERAMIC
LEARN MORE ABOUT OUR SOLUTIONS FOR YOUR MANUFACTURING PLANTS

EXAMPLES OF MANUFACTURING PROCESSES
- Assembly of PCBs
- Soldering, welding and gluing of components
- Functional tests
- Mounting of PCBs inside a component such as a control unit

EXAMPLES OF CERAMIC PARTS
- Gripping elements
- Test plugs
- Fixing pins
- Dowel pins
- Component stations and grippers for high/low frequency fields

HIGH-PERFORMANCE CERAMIC COMPONENTS GENERALY LAST LONGER THAN A SERIES CYCLE. THIS LEADS TO HIGHER PROCESS SAFETY AND A BETTER PRODUCT-QUALITY WHILE REDUCING PLANT DOWNTIME AND MAINTENANCE NEEDS.
# Material Properties of Doceram High-Performance Ceramics

The values listed were determined on standard test specimens. The material properties can deviate from these values depending on the application and component geometry. Please contact us should you require a precise clarification of the material suitability. Other technical data on request. Subject to technical modifications and errors. 2014 edition.

## Table of Material Properties

<table>
<thead>
<tr>
<th>DOCERAM Name</th>
<th>Unit</th>
<th>A-132</th>
<th>A-141</th>
<th>M-132</th>
<th>M-141</th>
<th>Z-141</th>
<th>Cerazur</th>
<th>Volcera 131</th>
<th>M-121</th>
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<tbody>
<tr>
<td>Composition</td>
<td></td>
<td>-</td>
<td>Al₂O₃</td>
<td></td>
<td>Al₂O₃</td>
<td></td>
<td>Al₂O₃ + ZrO₂</td>
<td>ZrO₂ Y-PSZ</td>
<td>ZrO₂ Y-PSZ</td>
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<tr>
<td>Colour</td>
<td></td>
<td>-</td>
<td>ivory</td>
<td>light pink</td>
<td>white</td>
<td>off-white</td>
<td>white</td>
<td>blue</td>
<td>grey, black</td>
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<tr>
<td>Density</td>
<td>(g/cm³)</td>
<td>3.9</td>
<td>3.9</td>
<td>4.1</td>
<td>5.5</td>
<td>&gt;6.04</td>
<td>6</td>
<td>3.2</td>
<td>3.0-37</td>
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<tr>
<td>Bending strength</td>
<td>(MPa)</td>
<td>390</td>
<td>390</td>
<td>600</td>
<td>1600</td>
<td>1200</td>
<td>1300</td>
<td>750</td>
<td>15-100</td>
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<tr>
<td>Compressive strength</td>
<td>(MPa)</td>
<td>3900</td>
<td>3900</td>
<td>3600</td>
<td>3600</td>
<td>3000</td>
<td>3000</td>
<td>2500</td>
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<tr>
<td>Elastic modulus</td>
<td>(Gpa)</td>
<td>390</td>
<td>390</td>
<td>350</td>
<td>200</td>
<td>205</td>
<td>205</td>
<td>320</td>
<td>10-50</td>
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<tr>
<td>Impact strength</td>
<td>(Mpa m/2)</td>
<td>5.2</td>
<td>5.2</td>
<td>7.5</td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>6.7</td>
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<tr>
<td>Weibull modulus</td>
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<td>-</td>
<td>12</td>
<td>12</td>
<td>18</td>
<td>12</td>
<td>12</td>
<td>25</td>
<td>15</td>
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<tr>
<td>Vickers hardness</td>
<td>(HV 0.5)</td>
<td>2000</td>
<td>2000</td>
<td>1600</td>
<td>1400</td>
<td>1300</td>
<td>1150</td>
<td>1650</td>
<td>HV10</td>
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<tr>
<td>Thermal expansion</td>
<td>(10⁻⁶ K⁻¹)</td>
<td>5.5-8.4</td>
<td>5.5-8.4</td>
<td>6.0-8.6</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>3.4</td>
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<tr>
<td>Thermal conductivity</td>
<td>(W/mK)</td>
<td>28</td>
<td>28</td>
<td>18</td>
<td>6</td>
<td>&lt;2</td>
<td>&lt;2</td>
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<tr>
<td>Thermal shock resistance</td>
<td>(AT°C)</td>
<td>120</td>
<td>180</td>
<td>200</td>
<td>660</td>
<td>290</td>
<td>280</td>
<td>550</td>
<td>extremely good</td>
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<td>Maximum operating temperature</td>
<td>(°C)</td>
<td>1700</td>
<td>1700</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>900-1600</td>
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<tr>
<td>Special resistance at 20°C</td>
<td>(Ω cm)</td>
<td>&gt;10⁶</td>
<td>&gt;10⁶</td>
<td>&gt;10⁶</td>
<td>-</td>
<td>&gt;10⁶</td>
<td>&gt;10⁶</td>
<td>&gt;10⁶</td>
<td>&gt;10⁶</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>(kV/mm)</td>
<td>22</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td></td>
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</tbody>
</table>

Please note that the values listed in this table were determined on standard test specimens. The material properties can deviate from these values depending on the application and component geometry. For further information, please contact us or visit our website. ¡Doceram! Advanced Ceramic Solutions.
Questions about our products?

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