Precision balls – of the highest grade
**Materials and range**

**Sapphire**
Extremely hard material, completely transparent, monocrystalline alumina, synthetically manufactured and inert to aggressive media such as acids and alkalis.

**Ruby**
Red version of sapphire, contains a small amount of chromium oxide. The most widely used material for stylus balls.

**Alumina**
Simply referred to as ceramic, this is the most widely used high-performance ceramic material. Extremely hard, good insulator. As purity enhances the mechanical properties Saphirwerk only uses the highest-purity Al₂O₃.

**Zirconia**
High resistance to fracture achieved through stabilisation. Thermal expansion similar to steel. Applications include rigid rods and balls for ball bearings.

**Silicon nitride**
Very high resistance to fracture, small elastic modulus and low thermal expansion coefficient. Particularly wear-resistant. Uses include ball bearings.

**Carbide**
Composite material characterised by its wearresistance due to high level of hardness. Note its high density. Used mainly for cutting tools.

Properties of processed materials by Saphirwerk AG: www.saphirwerk.com
Our balls have made a name for themselves worldwide thanks to their exceptional accuracy and high quality. We have honed and perfected our process over many years, enabling us to achieve precise repeatability. Reliable and, on request, in multiple versions.

The ceramic balls are made from the toughest materials and are available in many different sizes: the smallest has a diameter of less than 0.2 mm, while the largest is over 50 mm in diameter. Our experience and expertise will provide you with the right solution.

### Dimensional and shape accuracy, roughness per DIN 5401 – Part 1

<table>
<thead>
<tr>
<th>Class</th>
<th>Ball Ø up to</th>
<th>Deviation from perfect shape $T_{DWS}$</th>
<th>Surface roughness $R_{a, max.}$</th>
<th>Diameter variation in LoS $V_{DWL}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3</td>
<td>12.7 mm</td>
<td>0.08 µm</td>
<td>0.010 µm</td>
<td>0.13 µm</td>
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<tr>
<td>G5</td>
<td>12.7 mm</td>
<td>0.13 µm</td>
<td>0.014 µm</td>
<td>0.25 µm</td>
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<tr>
<td>G10</td>
<td>25.4 mm</td>
<td>0.25 µm</td>
<td>0.020 µm</td>
<td>0.50 µm</td>
</tr>
<tr>
<td>G16</td>
<td>25.4 mm</td>
<td>0.40 µm</td>
<td>0.025 µm</td>
<td>0.80 µm</td>
</tr>
<tr>
<td>G20</td>
<td>38.1 mm</td>
<td>0.50 µm</td>
<td>0.032 µm</td>
<td>1.00 µm</td>
</tr>
</tbody>
</table>