



# Precision ceramic balls

Ceramic precision balls are available in various dimensions and materials. Precision balls are used in several products such as valves, ball bearings, measuring devices etc. Ceratec has a large stock with different dimensions precision balls.



## MATERIALS:

	unit	silicon nitride	alumina	zirconia	sapphire	ruby
chemischal formula		Si <sub>3</sub> N <sub>4</sub>	Al <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub> -MgO	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub> +Cr <sub>2</sub> O <sub>3</sub>
density	g/cm <sup>3</sup>	3.16	3.90	6.0	3.99	3.99
colour		grey/black	white	white	transparant	red
hardness	HV 0,5	1750	1900	1200	2300	2300
flexural strength 4 pt	MPa	>750	470	820	390	390
E-modulus	GPa	320	380	205	430	430
compressive strength	MPa	>2500	2400	1990	2100	2100
toughness	MPa√m	6.0	4	12	1	1
thermal conductivity	W/m.K	35	29	3	36	36
electrical resistivity	ohm.cm	10 <sup>12</sup>	10 <sup>14</sup>	>10 <sup>8</sup>	10 <sup>16</sup>	10 <sup>16</sup>
thermal expansion	mm/mK	3.5	8	10	5.3/4.5	5.3/4.5
maximum temperature	°C	1000	1800	900	2000	2000

## DIAMETERS:

≥0.2 mm, up to  
100 mm maximal for silicon nitride, alumina en zirconia  
35 mm maximal for sapphire  
12.7 mm maximal for ruby

## TOLERANCES:

Standard tolerance diameter ±0.25 micron, sphericity ±0.25 micron and smooth surface  
Higher tolerances up to grade 3 according to AFBMA and ISO 3290:

grade	Tolerance diameter	Tolerance sphericity	Surface roughness (Ra)
3	0.08 micron	0.08 micron	0.012 micron
5	0.13 micron	0.13 micron	0.02 micron
10	0.25 micron	0.25 micron	0.025 micron
16	0.40 micron	0.40 microns	0.025 micron

EXTREME  
P E R F O R M E R S

