Morgan Advanced Materials

TECHNICAL CERAMICS

Large Ceramic Precision Balls

Morgan now has a developed technology to produce extremely accurate and large precision balls in full ceramic, even an extended stem or other shapes are possible.

When required, a sphericity < 1 µm has been achieved on a 120mm diameter sphere. A surface roughness up to Ra 0.02 is possible.

Materials applicable are Silicon Nitride, Silicon Carbide and Zirconia depending on your application. Whether it's a check valve, unidirectional bearing, ball hinge, bearing pad or a precision instrument, ceramics can make the difference.

Morgan Advanced Materials

At Morgan we focus on solution driven technologies, solving our customer's most challenging and arduous severe service problems. This is achieved by combining application engineering knowledge together with our unique portfolio of ceramic materials.

Our products are used in industries as diverse as energy, mining, mineral processing and materials handling industries.

Specifications

Size: Up to 200mm possible, fully dense

Ceramic material: Si_3N_4, SSiC, SiSiC, ZrO_2

Accuracy: Sphericity < 1µm

Surface finish: Ra0.02 or lower is possible

Compressive strength: 3000 Mpa or above, with smooth surface finish

To place your order or for any enquiries, please contact us via phone or email:

+44 (0)7584 684681

tim.hazlehurst@morganplc.com

Materials

Summary of available materials for ceramic precision balls.

Properties [1]	Units	Nilcra® Zirconia MS Grade	Nilcra® SiAlON E	Nilcra® Sintered Silicon Carbide
Density	g/cm^3	5.74	3.21	3.1
Fracture Toughness	MPa√m	12	8	3
Flexural Strength [2]	MPa (kpsi)	820 (118)	650 (94)	450 (65)
Weibull Modulus [3]		>30	15	12
Compressive Strength	MPa (kpsi)	1990 (289)	3500 (435)	3000 (435)
Hardness, Vickers	$HV_{0.3}$ kg/mm^2	1120	1630	2650
Modulus of Elasticity	GPa ($x10^6$ psi)	205 (30)	320 (46)	400 (58)
Poisson's Ratio		0.31	0.28	0.16
Average Grain Size	µm	40	1 - 10	1 - 5
Electrical Resistivity	ohm.cm	$>10^{11}$	$>10^{12}$	$>10^4$
Thermal Conductivity	W/m.K (BTU/hr/ft.°F)	3.08 (1.8)	25 (14)	125 (72)
Coefficient Thermal Expansion	x 10^{-6}/°C (/°F)	10.2 (5.7)	3.2 (1.7)	3.2 (1.7)
Specific Heat	J/g.K	0.47	0.65	0.67
Thermal Shock Resistance, ΔT	°C (°F)	375 (705)	600 (1100)	900 (1650)
Colour		White	Black	Black

* All values quoted are based on test pieces and may vary according to component design.
These values are typical and should be treated as indicative and for guidance only.
Notes: 1. Testing carried out at room temperature 20°C (70°F). **2.** Four point bend test. **3.** Calculated from production batch flexural strength data.

4 Redwood Drive, Notting Hill
Victoria 3168. Australia
E: melbournesales.mtc@morganplc.com

www.morgantechnicalceramics.com
www.morganadvancedmaterials.com