

# Technical specifications

## Ball material properties

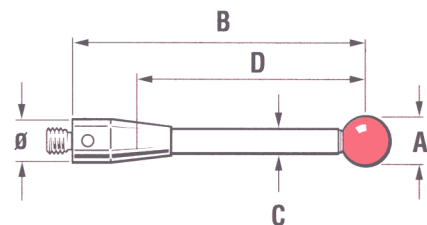
Stylus type	Material	Grade	Deviation from spherical form	Structure	Composition	Purity	Density	Hardness	Compression strength	Bending strength	Fracture toughness K1c
			( $\mu\text{m}$ )	-	(wt%)	(%)	( $\text{g}/\text{cm}^3$ )	HV	(MPa)	(MPa)	( $\text{MN}/\text{m}^{3/2}$ )
AL <sub>2</sub> O <sub>3</sub> Ruby balls	Synthetic ruby monocrystalline	Grade 5*	0.13	mono	99% AL <sub>2</sub> O <sub>3</sub>	99.90	3.99	2300	2100	400-700	1
Silicon nitride balls	Hard pressed Si <sub>3</sub> N <sub>4</sub>	Grade 5*	0.13	poly	Si <sub>3</sub> N <sub>4</sub>	90	3.0-3.2	1600	3000	850	6
Zirconia oxide balls	Sintered ZrO <sub>2</sub>	Grade 5*	0.13	poly	ZrO <sub>2</sub>	90-95	6.05	1200	2000	1000	10
Alumina hollow balls	White ceramic sintered alumina AL <sub>2</sub> O <sub>3</sub>	-	1	poly	AL <sub>2</sub> O <sub>3</sub>	99.80	3.8-3.9	1900	2500	350	3.5
Silver steel discs	Silver steel	-	1	-	-	-	8	450	-	-	-
Silver steel simple cylinder	Silver steel	-	Roundness 4 $\mu\text{m}$	-	-	-	8	200	-	-	-
Ruby ball ended cylinder	Synthetic ruby	Ball: Grade 5*	Ball deviation from spherical form : 0.13 Concentricity: Ball/cylinder 4 $\mu\text{m}$	mono	99% AL <sub>2</sub> O <sub>3</sub>	99.90	3.99	2300	2300	400-700	1
Tungsten carbide ball ended cylinder	Tungsten carbide	-	+ 20 $\mu\text{m}$ end radius	-	92-93.5% WC 6.5-8% CO	14.8	14.95	1550	6000	-	-
Silver steel simple pointer	Silver steel	-	Cone angle 30°	-	-	-	8	300	-	-	-
Tungsten carbide radius end pointer	Tungsten carbide	-	Cone angle 30°	-	92-93.5% WC 6.5-8% CO	99.90	15	1550	6000	-	-
Aluminium hollow balls	Al. alloy 6082-T6	-	30 $\mu\text{m}$	-	95.2-98.3% AL	-	2.7	95	-	-	-

\* Refers to DIN-5401, ISO 3290 and AFBMA 3290 ball grade standards.

\* Grade 3 sphericity balls are available on request.

## Extension material properties

Material	Coeff. of expansion @25°C
Stainless steel	$16 \times 10^{-6}/^\circ\text{C}$
Tungsten carbide	$5 \times 10^{-6}/^\circ\text{C}$
White ceramic sintered alumina	$8.1 \times 10^{-6}/^\circ\text{C}$
Carbon fibre	$-0.4 \times 10^{-6}/^\circ\text{C}$
Titanium	$9.2 \times 10^{-6}/^\circ\text{C}$
Ruby	$4.5 \times 10^{-6}/^\circ\text{C}$
Silicon nitride	$3.2 \times 10^{-6}/^\circ\text{C}$
Zirconia	$10.5 \times 10^{-6}/^\circ\text{C}$



- A** Ball diameter
- B** Overall length
- C** Stem diameter
- D** Effective working length
- $\varnothing$  M2 = 3 mm
- $\varnothing$  M3 = 4 mm
- $\varnothing$  M4 = 7 mm
- $\varnothing$  M5 = 10 mm