Technical specifications

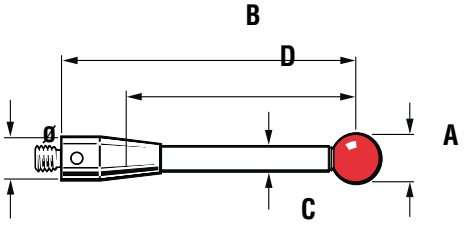
Ball material properties

Stylus type	Material	Grade	Deviation from spherical form	Structure	Composition	Purity	Density	Hardness	Compression strength	Bending strength	Fracture toughness K1c
			(µm)	–	(wt%)	(%)	(g/cm^3)	HV	(MPa)	(MPa)	($MN/m^{3/2}$)
AL_2O_3 Ruby balls	Synthetic ruby monocrystalline	Grade 5*	0.13	mono	99% AL_2O_3	99.90	3.99	2300	2100	400-700	1
Silicon nitride balls	Hard pressed Si_3N_4	Grade 5*	0.13	poly	Si_3N_4	90	3.0-3.2	1600	3000	850	6
Zirconia oxide balls	Sintered ZrO_2	Grade 5*	0.13	poly	ZrO_2	90-95	6.05	1200	2000	1000	10
Alumina hollow balls	White ceramic sintered alumina AL_2O_3	–	1	poly	AL_2O_3	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 µm	–	–	–	8	200	–	–	–
Ruby ball ended cylinder	Synthetic ruby	Ball: Grade 5*	Ball deviation from spherical form : 0.13 Concentricity: Ball/cylinder 4 µm	mono	99% AL_2O_3	99.90	3.99	2300	2300	400-700	1
Tungsten carbide ball ended cylinder	Tungsten carbide	–	+ 20 µm 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 µm	–	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	$16x10^{-6}$/°C
Tungsten carbide	$5x10^{-6}$/°C
White ceramic sintered alumina	$8.1x10^{-6}$/°C
Carbon fibre	$-0.4x10^{-6}$/°C
Titanium	$9.2x10^{-6}$/°C
Ruby	$4.5x10^{-6}$/°C
Silicon nitride	$3.2x10^{-6}$/°C
Zirconia	$10.5x10^{-6}$/°C



A Ball diameter
B Overall length
C Stem diameter
D Effective working length
ø M2 = 3 mm
ø M3 = 4 mm
ø M4 = 7 mm
ø M5 = 10 mm