

Styli ball grading

When precision counts

- The sphericity of your stylus ball can affect your CMM measurements.
- To ensure the accuracy of your measurements, use DIN 5401:2002 Grade 5 balls.
- As standard, Renishaw uses Grade 5 styli balls with a sphericity of 0,13 microns and not the lesser Grade 10 that most manufacturers use as standard. Grade 3 balls are also offered.

DIN 5401:2002

Grade	Nominal size in mm		Size deviations* µm	Tolerances on one ball		
	over	up to		Ball dia. variation (µm) V_{DWS}	Deviation from sphere form (µm) t_{DW}	Surface roughness (µm) R_a
3	–	12	±5.32	0.08	0.08	0.010
5	–	12	±5.63	0.13	0.13	0.014
10	–	25	±9.75	0.25	0.25	0.020
16	–	25	±11.4	0.40	0.40	0.025
20	–	38	±11.5	0.50	0.50	0.032

* Values relate to the mean diameter of a ball, D_{WM}

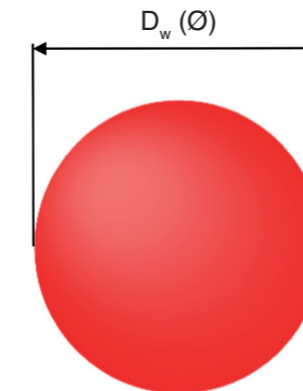
- The use of a Grade 10 ball instead of Renishaw's Grade 5 can result in CMM first term measurement errors increasing by up to 15%**.

** Based on a CMM tested to BS EN ISO 10360-2:2009 accuracy specification of $MPE_E (0,8 + 2L/1000)\mu m$.



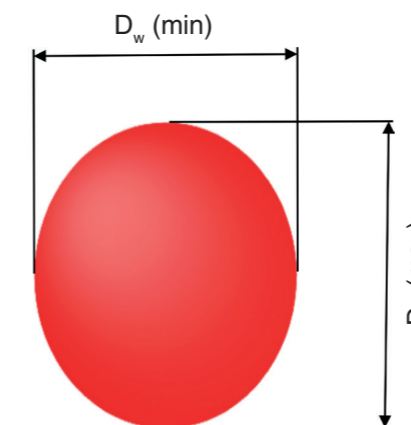
Nominal ball diameter D_w

The diameter value used to identify the ball size.



Ball diameter variation V_{DWS}

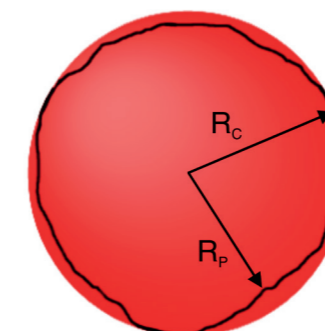
The difference between the largest and smallest diameters of one ball.



Ball diameter variation
 $V_{DWS} = D_w (max) - D_w (min)$

Deviation from a spherical form, t_{DW}

The greatest radial distance in any radial plane between a sphere circumscribed around the ball surface and any point on the ball surface.



R_c = Radius of circumscribing circle
 R_p = Smallest radius
 Deviation from spherical form
 $T_{DW} = R_c - R_p$

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