

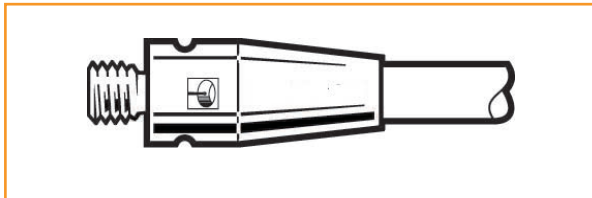
# Styli recommendations for OSP60 SPRINT™ scanning probes

**The SPRINT™ on-machine contact scanning system can be used with a range of SPRINT-specific styli to suit individual application requirements, all of which complement the enhanced capability provided by the OSP60 SPRINT probe.**

SPRINT-specific styli are available in two ranges: the SPRINT standard range, which is suitable for the majority of applications, and the SPRINT calibrated range (UKAS certified), which is designed for the most demanding applications. Both ranges incorporate a number of design elements which offer improved metrology performance for machine tool scanning applications.

## SPRINT standard range

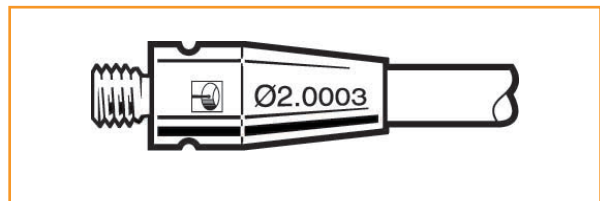
During scanning the stylus is constantly deflected, so the ceramic stem has been designed to be narrow and therefore tightly control all squareness tolerances. This ensures that even when measuring a part with vertical surfaces, such as on prismatic parts, the risk of the stylus shank contacting the part before the stylus tip is minimised.



## SPRINT calibrated range

In the variable temperature environment typical of a machine tool, the dimensional variation of the calibration sphere, compared with the machine structure, can degrade the performance of the measurement system. In the highest accuracy applications, this contribution to the overall system measurement uncertainty can be significant.

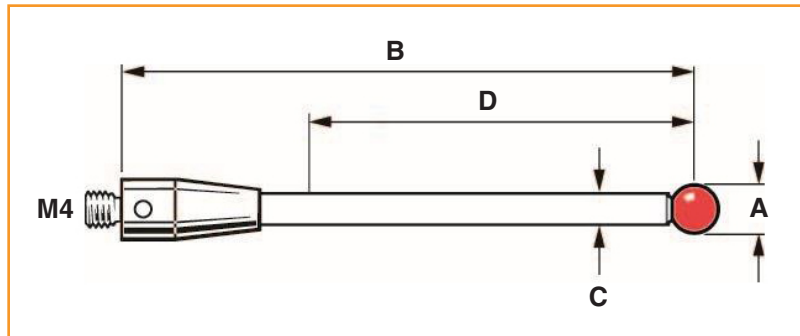
To ensure the highest possible measurement accuracy in all measurement conditions, the ball on each stylus within the SPRINT calibrated range is measured and UKAS certified. The exact ball diameter is engraved onto the stylus holder, so that this highly accurate value can be applied during probe calibration as an absolute reference.



## Information leaflet

### Styli for the SPRINT system

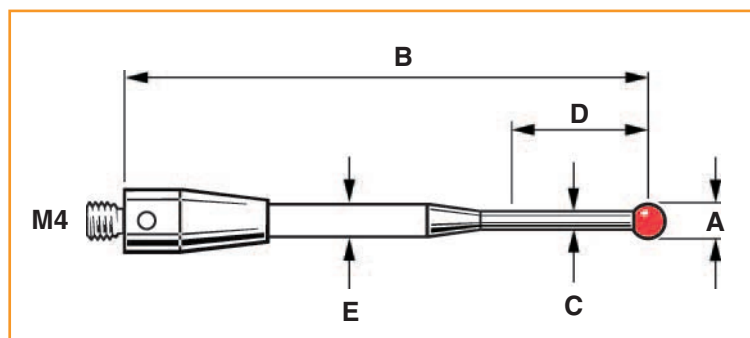
#### 6 mm ball diameter SPRINT styli (ceramic stems)



Part number (standard)		A-5004-4472 Ruby	A-5004-4474 Ruby	A-5004-6470 Silicon nitride	A-5004-6471 Silicon nitride
Part number (calibrated)		A-5465-8576 Ruby	A-5465-8577 Ruby	A-5465-5008 Silicon nitride	A-5465-5009 Silicon nitride
<b>A</b>	Ball diameter mm (in)	6.0 (0.24)	6.0 (0.24)	6.0 (0.24)	6.0 (0.24)
<b>B</b>	Length mm (in)	100.0 (3.94)	150.0 (5.91)	100.0 (3.94)	150.0 (5.91)
<b>C</b>	Stem diameter mm (in)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)
<b>D</b>	ESWL* mm (in)	62.9 (2.48)	71.5 (2.81)	62.9 (2.48)	71.5 (2.81)
	Mass g (oz)	6.5 (0.23)	8.0 (0.28)	6.5 (0.23)	8.0 (0.28)

\* ESWL = Effective Scanning Working Length, measured from the centre of the ball to the point at which the stem will foul against a vertical face when at the maximum scanning deflection.

#### 2 mm to 4 mm ball diameter SPRINT styli (ceramic and tungsten carbide stems)



Part number (standard)		A-5004-6463 Ruby	A-5004-6464 Ruby	A-5004-6465 Ruby	A-5004-6467 Silicon nitride	A-5004-6468 Silicon nitride	A-5004-6469 Silicon nitride
Part number (calibrated)		A-5465-5001 Ruby	A-5465-5002 Ruby	A-5465-5003 Ruby	A-5465-5005 Silicon nitride	A-5465-5006 Silicon nitride	A-5465-5007 Silicon nitride
<b>A</b>	Ball diameter mm (in)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)
<b>B</b>	Length mm (in)	80.0 (3.15)	100.0 (3.94)	100.0 (3.94)	80.0 (3.15)	100.0 (3.94)	100.0 (3.94)
<b>C</b>	Stem diameter mm (in)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)
<b>D</b>	ESWL* mm (in)	10.7 (0.42)	27.0 (1.06)	42.6 (1.68)	10.7 (0.42)	27.0 (1.06)	42.6 (1.68)
<b>E</b>	Stem diameter mm (in)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)
	Mass g (oz)	5.9 (0.21)	7.4 (0.26)	7.4 (0.26)	5.9 (0.21)	7.4 (0.26)	7.4 (0.26)

\* ESWL = Effective Scanning Working Length, measured from the centre of the ball to the point at which the stem will foul against a vertical face when at the maximum scanning deflection.

## Notes on stylus selection

Renishaw recommends the use of SPRINT-specific styli with the OSP60 probe. Standard M4 styli which are not SPRINT-specific may also be used with an OSP60 probe, but the effective scanning working length (ESWL) will be restricted.

### Stylus ball material

The material being scanned dictates the stylus ball material to be used.

- **Ruby:** Ruby is the optimum stylus ball material for the vast majority of measurement applications. It offers exceptional surface smoothness, excellent compressive strength and a high resistance to mechanical corrosion.
- **Silicon nitride:** Silicon nitride (a very hard and wear resistance ceramic) is recommended when scanning titanium alloys with coolant.

### Stylus ball size

Keep the ball as large as possible, consistent with the features to be scanned (smaller features are best scanned with a smaller ball). This maximises the ball/stem clearance, which reduces the chance of fouling on the stylus stem.

SPRINT styli are available with a ball size of 2 mm (0.08 in) to 6 mm (0.24 in). If the application requires a stylus outside this range, a standard stylus with a ball diameter of up to 8 mm (0.31 in) can be used. Alternatively, contact your local Renishaw distributor.

SPRINT styli ball diameters have a guaranteed ball diameter tolerance of  $\pm 2 \mu\text{m}$  (79  $\mu\text{in}$ ).

### Stylus ball sphericity

SPRINT styli use Grade 5 balls that have a maximum sphericity of 0.13  $\mu\text{m}$  (5  $\mu\text{in}$ ).

### Stylus stem length

When using an OSP60 SPRINT probe, Renishaw recommends the use of SPRINT styli with a stem length of 80 mm to 150 mm (3.15 in to 5.91 in). If the application requires a stylus outside this range, please contact your local Renishaw distributor.

### Stylus stem assembly

Minimise the number of joints in the stylus stem. Every joint between a stylus and any extensions introduces potential bending and deflection points. SPRINT styli are designed with a minimum number of constituent parts, joined together using high-specification, oven-cured adhesive.

### Stylus stem material

SPRINT stylus stems are made of materials that optimise the stiffness and ESWL of the stylus, combining stainless steel, tungsten carbide and ceramic. Ceramic stems are used for scanning due to their low mass, high stiffness and thermal stability.

Styli with carbon fibre stems are not recommended for use with an OSP60 probe.

### Stylus stem type

OSP60 SPRINT probes are only suitable for use with straight styli.

### Custom design service

If you cannot achieve your objectives using our range of SPRINT styli, Renishaw can provide you with a solution for your custom probing scanning applications. Renishaw's Styli and Fixturing Products Division has supplied over 5,000 different custom styli into probing applications worldwide. For advice and further details, please contact your local Renishaw distributor.

Always use genuine Renishaw styli or your probe performance will be compromised.

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