

Talyrond® R-170 Raceway

Rapid, high precision measurement
for the bearings industry



World's highest throughput roundness system...

Talyrond® R-170 Raceway

High speed raceway measurement systems for the bearings industry

The Talyrond® R-170 Raceway system has been designed specifically to address the extreme demands of high volume bearing production measurement.

Working closely with bearings manufacturers, Taylor Hobson has focussed on the key attributes that are most important for quality control including very high measurement throughput, robustness and ease of use.

The Talyrond® R-170 Raceway system also includes fully active anti-vibration and active levelling to ensure the best possible result even when measuring directly on the manufacturing shop floor.

“Measurement without compromise”

Speed - 3 parts/minute including set-up

The most important benefit these systems offer is speed. In precision industries as manufacturing volumes increase all too often the bottleneck is metrology. High measurement throughput systems ensure higher sampling rates are achieved while also supporting increased manufacturing volumes.

Precision - ±15 nm spindle accuracy

Although many times faster than traditional benchtop roundness systems there is no loss of precision or accuracy. Full ISO compliant measurements can be taken with ±15 nm accuracy and 6 nm gauge resolution.

Robustness - suitable for 24/7 operation

All systems are designed for constant 24 hour, 7 days a week use in demanding shop floor environments; manufactured using only the most durable and hard wearing materials.

Ease of use - touchscreen software

The X-sight touch screen software platform with intuitive navigation make the Talyrond® R-170 Raceway as easy to use as a SatNav or SmartPhone with everything you need at your fingertips.



X-sight touch screen software

World's highest throughput roundness system...

- Increase manufacturing output
- Reduce part scrappage
- Ensure part traceability
- Improve 'right first time'



What can it measure?

The Talyrond® R-170 Raceway system is designed specifically for bearing raceway measurements. It can measure both internal and external races down to a minimum size of 3 mm diameter and maximum of 50 mm.

Patented gauge orientation

Using Taylor Hobson's patented gauge orientation with its robust locking mechanism changing orientation from roundness to flatness or internal to external only takes a few seconds.

Accurate gauging

All systems incorporate Taylor Hobson's accurate and reliable Talymin gauge technology, delivering 6 nm resolution.

Patented RapidCentre™

RapidCentre™ avoids valuable cycle time being lost on manual part centring. On most parts precision results are achieved following a very simple and fast loading procedure. Now roundness measurements can be made in less than 30 seconds including part loading, centring, measurement, analysis and results display!



Accessories and standards

A full range of accessories and standards are available to support the instrument. These include magnetic chuck, rapid centre fixture, glass hemisphere, calibration set, precision test cylinder, cresting standard, stylus kit, flick standard (20 µm or 300 µm) and replacement air filter modules.

Spindle protection system

Air bearing spindles are extremely accurate and require clean and dry air to work effectively. The new spindle protection system adds another level of filtration, preventing poor air supplies from contaminating spindles with oil, water and debris. System features include; isolator switch, particle filters (5 µm, 0.3 µm and 0.01 µm), dryer filter (Dew point -15°C), pressure switch and visual alarm.

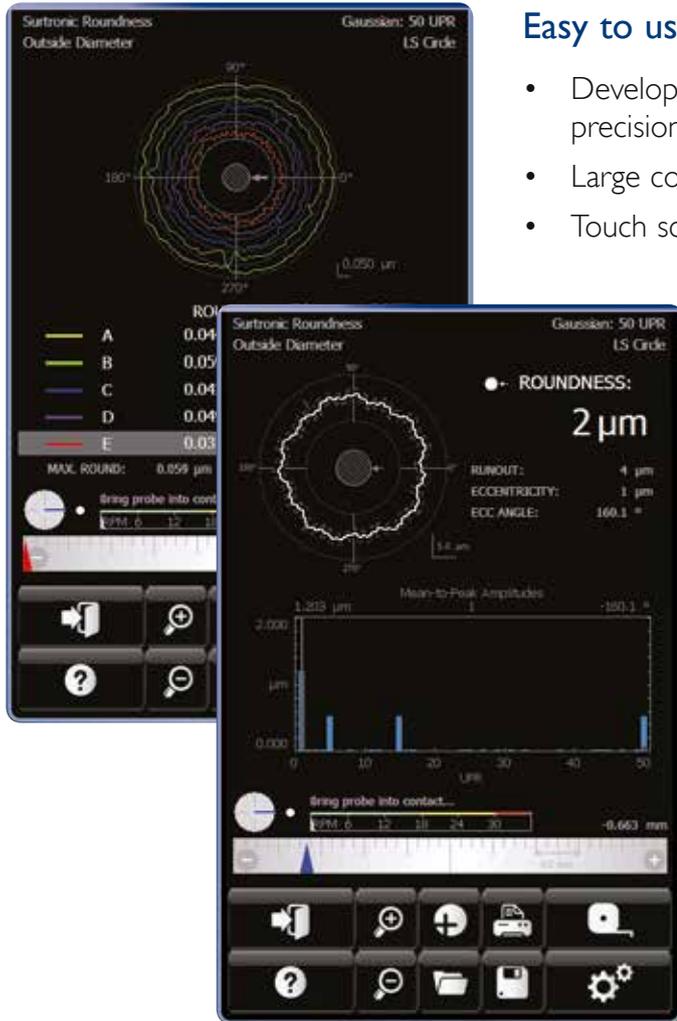


More than a measurement instrument...

...a new measurement concept

Easy to use X-sight touch screen software

- Developed in collaboration with key bearings, automotive and precision engineering companies
- Large colour display, easy viewing of results
- Touch screen operation means every feature at your fingertips

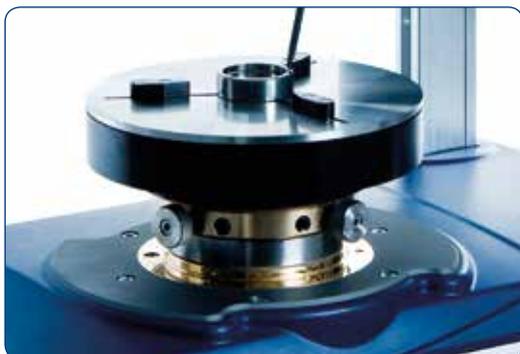


- Easy analysis setup with single button recall
- Advanced analysis packages for Harmonics and thickness variation
- Custom applications
- Digital Centring Levelling Assist (DCLA) - simple numeric readout and graphical target bar for centering and levelling parts



Taylor Hobson's tried and tested Patented RapidCentre™

- Includes auto aligning sleeve for ease of maintenance
- Ergonomic centering units
- 3-ball location and orientation pin – repeatable setup
- Custom configurable magnet layout
- Customised jaws configurations for a range of parts



Vibration Isolation - Active AV120

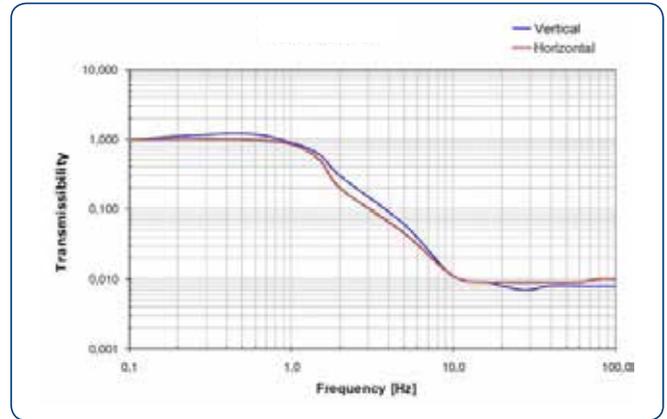
- Fully active isolation in seconds
- Compensates vibration amplitudes of upto 500 $\mu\text{m/s}$
- Vibration isolating feet
- Granite base and steel structure (>250 kg)



Transmissibility

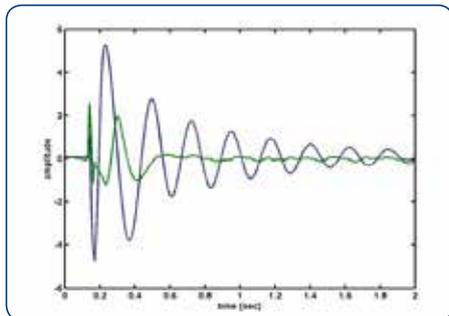
Transmission graph AV120, measured at a velocity of 100 $\mu\text{m/s}$ with a payload of 20 kg (44 lbs).

“Proven quality and performance”



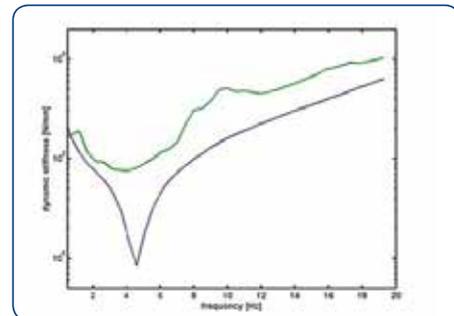
Settling time

Settling time of a AV120 system (green) compared to a conventional air-damped vibration isolation system (blue), made by one of the major manufacturers of optical tables and vibration isolated laboratory desks.



Dynamic stiffness

Dynamic isolator stiffness (green) of AV120 system compared to a commercially available passive air-damped isolation system (blue). Due to their higher dynamic stiffness, the AV120 system is less sensitive to direct forces affecting the isolation system.



Performance specifications		Other specifications	
Isolation technology	Control technology based on piezoelectric type acceleration pickup, fast signal processing and electro-dynamic type force transducers	Dimensions	500 x 400 x 90 mm
Force directions	Active compensation in all six degrees of freedom	Weight	20 kg (44 lbs)
Isolation performance	> 5 Hz = 25 dB (94.4%); >10 Hz = 40 dB (99.0%)	Table top material	Powder coated aluminium
Active bandwidth	0.6 - 200 Hz*	Top plate surface flatness	± 0.10 mm over complete surface
Settling time	300 ms**	Max. compensation level	500 $\mu\text{m/s}$ at 6 Hz and with a load of 60 kg (132 lbs)**
Max. correction forces	Vertical ± 8 N; Horizontal ± 4 N	Repeatability of load adjustment	120 μm
Load capacity	0 - 120 kg (0 - 265 lbs)		

* Floating table top is supported by steel springs; low-pass characteristics of spring-mass combination dominates the dynamic behavior above 200 Hz.

** The settling time and maximum compensation level depend on several conditions, such as payload, frequency, load distribution and height of the payload. For that reason this value should be considered as typical.

Talyrond® R-170 Raceway

Manufactured to the highest standards to deliver world-leading throughput



Talymin Gauge

Accurate and reliable Talymin gauge technology, delivering 6 nm resolution.

Spindle protection system

Adds another level of filtration, preventing poor air supplies from contaminating spindles with oil, water and debris.

Crutch angle setting aid

Easy reset of stylus angle without re-calibrating.

Patented RapidCentre™

Avoid valuable cycle time being lost on manual part centring.

Lifting and tethering points

For safety.

Ergonomic system layout

Designed for seated operation.

280 mm Column

Precision column.

Customised software

Easy to use X-sight touch screen software developed in collaboration with key bearings, automotive and precision engineering companies.

Higher-resolution cresting drive

Large diameter wheel drive including column deadstops.

Radial error

Radial limit of error ± 15 nm @ 6 rpm.

Active Vibration Isolation

AV120 – proven quality and performance.

Granite base & steel structure

Passive AV in base with optional wheels.



In depth analysis

Whatever your industry or application if you need high speed roundness measurement we have it covered...

- Roundness
- E Eccentricity
- ⊥ Squareness
- 📊 Harmonic analysis
- ▭ Flatness
- ◎ Concentricity
- // Parallelism
- ↔ Thickness variation
- Ⓜ Coaxiality
- ↗ Runout

Type of analysis	Measurement mode	Evaluation diagram	Type of analysis	Measurement mode	Evaluation diagram	Type of analysis	Measurement mode	Evaluation diagram
Roundness			Concentricity			Parallelism		
Flatness			Eccentricity			Measure Interrupted Surface		
Coaxiality			Squareness			Harmonic Analysis		
Runout	Axial		Thickness Variation	Axial		Radial		
	Radial							



Specification

Measuring capacity	
Max. diameter	35 mm (with fixture, 122-4918)
	300 mm (without fixture)
Max. height	280 mm
Max. weight	16 kg (with standard fixture)
	20 kg (without fixture)

Spindle	
Speed of rotation	15 rpm Max.
Radial limit of error (departure from the LS circle)	± 15 nm @ 6 rpm (1-15 upr) ± 20 nm @ 6 rpm (1-50 upr)

Gauge	
Range	2 mm
Resolution	6 nm

Environment	
Operating temperature	10°C to 35°C (50°F to 95°F)
Temperature gradient	< 2°C / hour (< 3.6°F / hour)
Operating humidity	30 % to 80 % relative humidity non-condensing
Storage humidity	10 % to 90 % relative humidity non-condensing
Free air flow rate	1.0 m / sec maximum steady (39.4 in / sec)

System features	
Roundness, flatness	Coaxiality, eccentricity
Concentricity, radial runout	Squareness
Parallelism	Measure interrupted surfaces
Harmonic analysis**	Centering attachment (50 mm)
Thickness variation**	Advanced harmonics**

* Above centering & levelling table (4 mm below fixture top).

** Optional.

Work table	
Diameter (Standard)	200 mm
Diameter (Accessory)	220 mm
Centering	±1.25 mm
Levelling	30 arc minutes
Height of neutral plane	51 mm*

Filter	
Type	None, Gaussian, Robust Gaussian, 2 CR-PC, Fourier
Standard filter cut-offs	1–15 upr; 1–50 upr; 1–150 upr; 15–150 upr; 1–500 upr; 15–500 upr
Special filters	User selectable & Bandpass

Air source requirements	
Max. source pressure	8.1 bar (120 psi)
Min. source pressure	5.4 bar (80 psi)
Air consumption	0.037 cu.m / min (1.3 cfm)
Operating pressure	4.1 bar (60 psi)
Filtering	10 nm
Moisture content – dewpoint	-15°C (5°F)

Electrical (alternating supply, single phase with earth, 3-wire)	
Voltage	90V - 260V
Frequency	47 Hz to 63 Hz
Consumption (Total system)	500VA maximum

Weight (without fixtures)	
650 Kg	

All accuracies and uncertainties are quoted at 20°C ± 1°C (68°F ± 1.8°F).
Due to continuing technical improvements, Taylor Hobson reserves the right to change these specifications.

Bearing components



Ball bearings

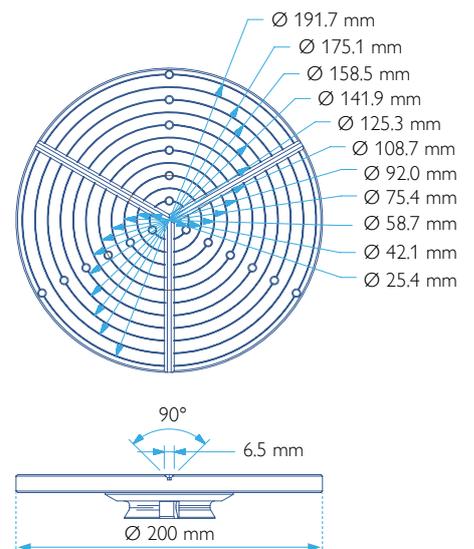
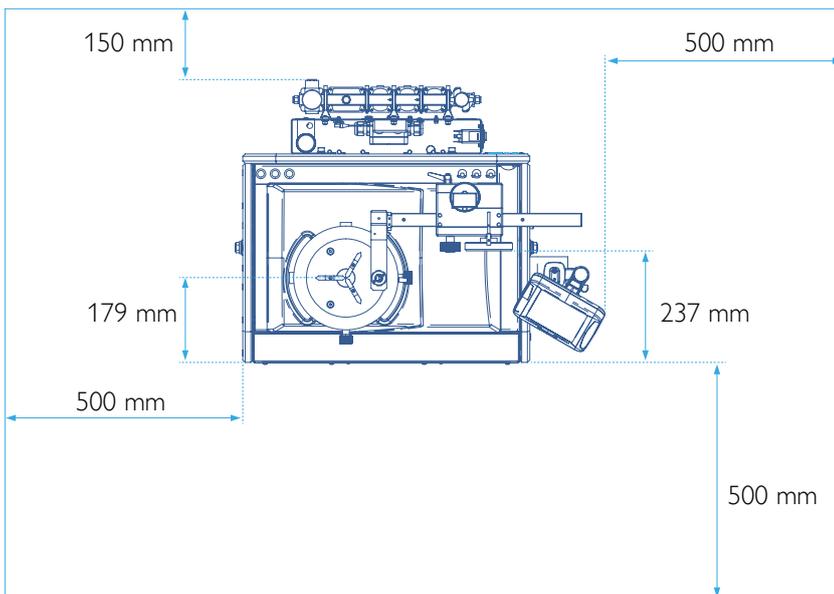
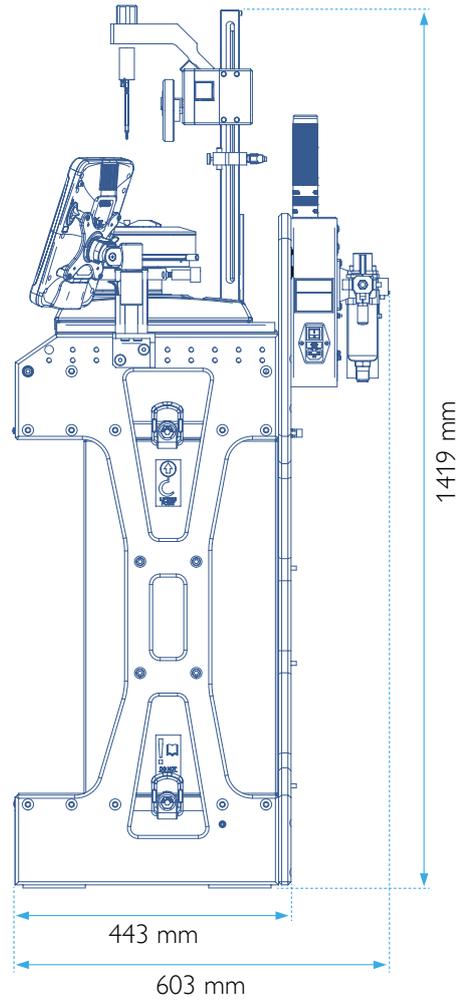
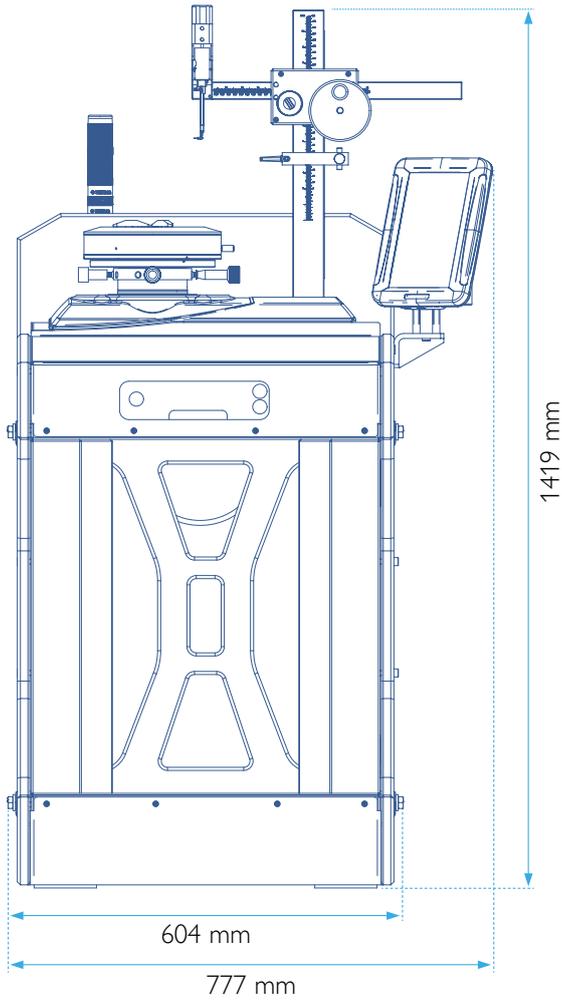


Balls



Needle and roller bearings

Floor and table top plan



Accessories

All the accessories you need to begin using Taylor Hobson roundness measuring systems are supplied as standard. However, for more demanding requirements or improved measurement throughput, we have a range of accessories which may be ordered separately.

1 Flick standard

For rapid calibration of the gauge head; alternative to the standard gauge calibration set.

20 µm (788 µ") range
code 112-2308*

300 µm (0.012") range
code 112-2233*

2 Stylus arms

Ruby ball x 100 mm (3.94").

1 mm (0.039in) diameter,
code 112-3245

2 mm (0.078in) diameter,
code 112-3244

4 mm (0.157in) diameter,
code 112-3243

Bar Stylus

A 100 mm (3.9 in) stylus for measuring small diameter components.

code 112-3489

3 Six jaw component chuck

A 6 jaw precision scroll chuck.

Capacity - Inside diameter
20 mm - 95 mm (0.78 in - 3.74 in).

Capacity - Outside diameter 2 mm
- 32 mm (0.08 in - 1.26 in).

code 112-1859

4 Glass hemisphere

For checking total system performance; UKAS calibration certificate is optional.

Roundness < 0.02 µm (0.8 µ")

code 112-2324*

5 Calibration set

For calibrating the gauge head.

Comprises a circular glass flat and three gauge blocks (2.5 mm, 2.8 mm and 3 mm).

code 112-2889*

6 Cresting pin

For checking the vertical and horizontal alignment of the gauge head.

code 112-4313

7 Precision collet chuck – removable

Three ball type location.

code 112-4313

Note: Collet required – see below.

- 112/3554-1.0 - 1 mm collet
- 112/3554-1.5 - 1.5 mm collet
- 112/3554-2.0 - 2 mm collet
- 112/3554-2.5 - 2.5 mm collet
- 112/3554-3.0 - 3 mm collet
- 112/3554-3.5 - 3.5 mm collet
- 112/3554-4.0 - 4 mm collet
- 112/3554-4.5 - 4.5 mm collet
- 112/3554-5.0 - 5 mm collet
- 112/3554-5.5 - 5.5 mm collet
- 112/3554-6.0 - 6 mm collet
- 112/3554-6.5 - 6.5 mm collet
- 112/3554-7.0 - 7 mm collet
- 112/3554-7.5 - 7.5 mm collet
- 112/3554-8.0 - 8 mm collet

8 RapidCentre™

For repeatable centering of small components. Standard range available, please contact Taylor Hobson for a customised solution.

Kinematic dowel support set

For stable workpiece mounting.

code 112-1861

Customised solutions for special applications

Our strategy for success is simple, instead of just selling products, we provide solutions. If our standard instruments and accessories do not satisfy your needs, we can customise a solution to match your application.



* Add UC to code for UKAS calibration.

Specifications are subject to change without notice.

Surtronic® product range

Surtronic® Duo measures surface roughness at the touch of a button and shows the result on a large colour LCD screen. Cycle time is 5 seconds and the result is saved until another measurement is taken.

- Ready to use out of the box
- Battery life more than 10,000 measurements

Parameters	Range	Resolution
Ra:	40 µm (1600 µin)	0.01 µm (0.4 µin)
Rz, Rv, Rp, Rt:	199 µm (7800 µin)	0.1 µm (4 µin)



Surtronic® S-100 Series Portable roughness testers robust enough for the shop floor and flexible enough for any inspection room.

- Unique stylus lift for total flexibility
- Long traverse length & extended pick-up reach
- Powerful PC software included

Inductive pick up	
Gauge range / resolution	400 µm (0.012 in) / 0.01 µm (0.4 µin)
Accuracy (5 µm diamond tip)	1% of reading + LSD µm



Intra Touch / Intra Contour are a range of precision shop floor solutions for surface finish and contour measurement.

- 50 mm (1.97 in) traverse with straightness datum
- Automatic calibration over a sphere ensures that radius and form measurements are correct

Features	
Gauge range	Max. 32 mm
Gauge resolution	Max. 0.8 nm



Surtronic® R-100 Series robust enough for the shop floor but accurate for any inspection area, giving a flexible solution for all roundness and form measurements. Improved feature set includes advanced harmonic analysis and higher gauge resolution.

- Robust, fast and easy-to-use
- Includes RapidCentre™*
- Throughput 3 parts / minute including set-up

Features	
Gauge resolution	6 nm (0.24 µin)
Spindle accuracy	±25 nm (0.98 µin)

* Centering attachment is supplied as standard with 120/125 models, or available to purchase as an accessory on other models.



The Metrology Experts

Established in 1886, Taylor Hobson is the world leader in surface and form metrology and developed the first roundness and surface finish measuring instruments.

www.taylor-hobson.com

Sales department

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- **Design engineering** – special purpose, dedicated metrology systems for demanding applications.
- **Precision manufacturing** – contract machining services for high precision applications and industries.

Centre of Excellence department

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Tel: +44 (0) 116 276 3779

- **Inspection services** – measurement of your production parts by skilled technicians using industry leading instruments in accord with ISO standards.
- **Metrology training** – practical, hands-on training courses for roundness and surface finish conducted by experienced metrologists.
- **Operator training** – on-site instruction will lead to greater proficiency and higher productivity.
- **UKAS calibration and testing** – certification for artifacts or instruments in our laboratory or at customer's site.

Service department

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- **Preventative maintenance** – protect your metrology investment with an AMECare support agreement.



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