



Calibration & Measurement Services



UKAS AND TAYLOR HOBSON

Originally conceived as the British Calibration Service (BSC) in 1966, it merged with NATLAS, the National Testing Laboratories in 1985 to form NAMAS, the National Measurement Accreditation Service, and now yields to the title of the United Kingdom Accreditation Service (UKAS).

UKAS is a company limited by guarantee and recognised by the British Government as the UK body for the assessment and accreditation of competence for organisations performing calibration, testing, and sampling. Laboratories accredited by UKAS are regularly assessed and audited to ensure that they comply with the stringent UKAS criteria that are in accordance with the European standard EN 45001, ISO/IEC Guide 25, and the relevant sections of the BS EN ISO 9000 series of standards, all of which will have been replaced by the end of 2002 with a singular International standard ISO/IEC 17025.

Confidence in UKAS accredited calibrations is authenticated by the concept of Traceability of Measurement, a hierarchical system with direct links to the National Measurement Standards which are maintained and realised in the UK by the National Physical Laboratory (NPL) based at Teddington in Middlesex.



Regular surveillance visits by UKAS include a complete audit of the laboratory's quality system, including the staff, equipment, traceability of measurement, records, reports and the laboratory environment.

A UKAS calibration can actually improve measurement capability by quantifying the errors in a measuring instrument or calibration standard. These errors can subsequently be taken account of and thus increase your practical measurement accuracy.

The Laboratory

For more than 30 years the Taylor Hobson Measurement Services Department has provided an accredited calibration and measurement service for industry and first achieved accreditation in 1970.

Within its UKAS schedules of accreditation the laboratory is able to offer exceptional accuracies of measurement. These schedules cover both calibration of artefacts and small instruments within the laboratory (Category 0) and large instruments on customers sites (Category 1). This enables customers to minimise their own uncertainties of measurement and provide traceability to National Standards as required by ISO 9000 registered quality systems.

The calibration and measurements service is designed to give metrology support at all stages of the production process, from research and development to production batch measurement.

Mutual Recognition Agreements / International Traceability

UKAS is recognised internationally through bilateral and multilateral mutual recognition agreements throughout Europe with the European co-operation for Accreditation (EA), and Internationally with both the International Accreditation Forum (IAF), and the International Laboratory Accreditation Co-operation (ILAC).

United Kingdom	-	UKAS
Australia	-	NATA
Austria	-	BMwA
Belgium	-	OBE - BKO
Czech Republic	-	CAI
Denmark	-	DANAK
Finland	-	FINAS
France	-	COFRAC
Germany	-	DKD
Hong Kong	-	HOKLAS
Ireland	-	INAB
Italy	-	SIT
Netherlands	-	RvA
New Zealand	-	IANZ
Norway	-	NA
Portugal	-	IPQ
Singapore	-	SAC-SINGLAS
South Africa	-	SANAS
Spain	-	ENAC
Sweden	-	SWEDAC
Switzerland	-	SAS
USA	-	NVLAP (run by NIST)

Agreements have also been ratified with the majority of the above Accreditation Bodies with regard to Quality Systems, Testing, Products and Personnel.



UKAS ACCREDITED CAPABILITY

Roundness



The glass hemisphere is a high precision standard used to both calibrate and evaluate the performance of roundness measuring instruments.

By using exclusive measurement techniques, the UKAS laboratory calibrates the hemisphere to a resolution of 1 nanometre, with an uncertainty of measurement of 5 nanometres.

The resulting certificate includes a polar plot of the profile of the measured plane, which allows users to accurately ascertain any errors in their own system.

Measurement	Best Capability
Roundness of Standards and workpieces	$\pm 0.005 \mu\text{m}$
Cylindrical Magnification test specimens	$\pm 0.05 \mu\text{m}$
Straightness Parallelism Squareness	Dependent on precision of item
Diameter Length	$\pm 0.5 \mu\text{m}$ (20 μin) $\pm 0.5 \mu\text{m}$ (20 μin)
Roundness instruments	Dependent on quality and performance

Straightness

Assessment of the accuracy of a straightness and cylindricity measuring instrument can be achieved at any time by measuring a precision cylinder. The result can then be compared with the calibrated profile on the UKAS Certificate.



Surface Texture

The UKAS laboratory is able to measure all of the parameters associated with surface texture, including German and French derivatives.

Roughness standards are calibrated to an uncertainty of Ra which is the lowest currently available from any laboratory covered by the United Kingdom's Accreditation Service, with the exception of the National Physical Laboratory.

The tungsten carbide calibration ball is used to calibrate the Form Talysurf Series range of instruments. Its radius, roundness and surface texture are each calibrated, to provide a high precision multi-purpose standard.

The ball may be used to calibrate the instrument, or as a "confidence gauge", to ensure its accuracy is maintained.

Measurement	Best Capability
Surface texture standards (Ra) (Other parameters available)	$\pm(2\% + 0.004\mu\text{m})$
Surface texture of workpieces and components (Ra) (Other parameters available)	$\pm 3\%$ of measured value per track
Radius (derived)	$\pm 0.4\mu\text{m}$



Diameter and Length

The laboratory is currently accredited for the calibration of spheres, plugs, rings and length bars. Temperature corrected measuring techniques are used in conjunction with sophisticated control software to achieve uncertainties down to $\pm 0.5\mu\text{m}$.

Measurement	Best Capability
Spheres (diameter)	$\pm 0.5\mu\text{m}$
Spheres (radius)	$\pm 0.4\mu\text{m}$
Plug Gauges	$\pm 0.5\mu\text{m}$
Ring Gauges	$\pm 0.8\mu\text{m}$
Length Bars	$\pm 0.5\mu\text{m}$

UKAS ACCREDITED CAPABILITY

Polygons and Prisms

The basic methods employed for angle measurement are either the accurate division of a circle, by using a high precision index table, or the generation of a known angle by means of a precision sine bar (Angle generator).

A precision index table is used in conjunction with an autocollimator to calibrate a polygon. Any errors found in the polygon are tabulated on the UKAS certificate. By taking these errors into account during its use, a higher accuracy of measurement can be achieved.



Autocollimators

A small angle generator is normally used with traceable gauge blocks to calibrate an autocollimator. Both progressive and periodic errors are measured and certified. Knowledge of these errors enables more precise use of the instrument by the operator.

Measurement	Best capability
Angle gauges, Polygons, Prisms & Optical squares	± 1 arc second
Autocollimators	± 0.5 arc second
Clinometers, Spirit and electronic levels	Dependent on quality, sensitivity and overall performance
Rotary Tables	± 1.0 arc second

Clinometers and Levels

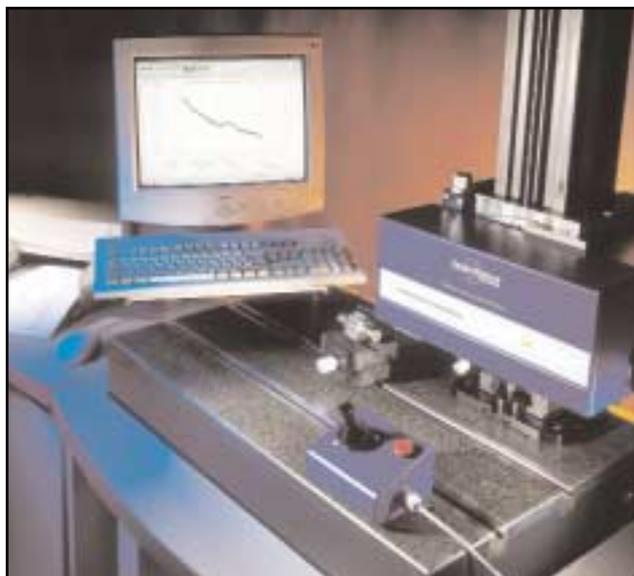
Block levels, clinometers, and electronic levels are calibrated by use of lever techniques. Here a Talyvel 4 Electronic Level is calibrated using a Taylor Hobson small angle generator. The user benefits from the ability to compensate for known errors when using the instrument.



Telescopes

The line of sight and displacement errors of a Micro Alignment Telescope are assessed by viewing into a variable focus collimator. Again, any deviations are recorded on the UKAS certificate, providing the means for more accurate measurement.

Measurement	Best Capability
Alignment telescopes, Targets & collimators	Dependent on quality and overall performance (typically $\pm 0.25\mu\text{m}$)



CATEGORY 1: On-site Calibration

In addition to its range of accredited calibrations made within the permanent laboratory (category 0), Taylor Hobson also has Category 1 Accreditation, which allows our approved operators to undertake calibration and/or verification of the Taylor Hobson ranges of measuring instruments and machine tools on customers premises. The uncertainties for these types of calibrations are environment dependent, which is continually monitored for the duration of the calibration and also the equipment stabilisation period beforehand.

Measurement	Best Capability
Straightness on slides	$\pm 0.15\mu\text{m}$
Squareness on slides	± 1 arc second
Roundness	$\pm 0.05\mu\text{m}$

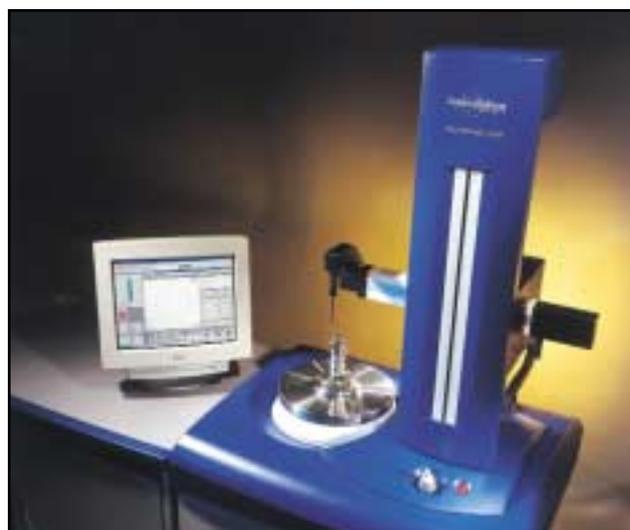
Measurement Services

In addition to UKAS calibration, Taylor Hobson also offers a wide range of measurement and inspection services.

This comprehensive service extends from bench inspection to co-ordinate measuring machine work, from micro surface evaluation to civil engineering applications.

The extensive range of measuring equipment manufactured by, or used within Taylor Hobson, is available for use by the laboratory staff.

Diverse sectors of industry and technical establishments use this service to help solve their measurement problems.



Serving a global market

Taylor Hobson is world renowned as a manufacturer of precision measuring instruments used for inspection in research and production facilities. Our equipment performs at nanometric levels of resolution and accuracy.

To complement our precision manufacturing capability we also offer a host of metrology support services to provide our customers with complete solutions to their measuring needs and total confidence in their results.

Contracted Services from Taylor Hobson

- 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

For the above services, contact our Center of Excellence:

email: taylor-hobson.cofe@ametek.com
 or call: +44 116 276 3779

- Design engineering**
 special purpose, dedicated metrology systems for demanding applications
- Precision manufacturing**
 contract machining services for high precision applications and industries
- Preventative maintenance**
 protect your metrology investment with a Talycare service cover plan

For the above services, contact our Sales Department:

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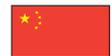
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