



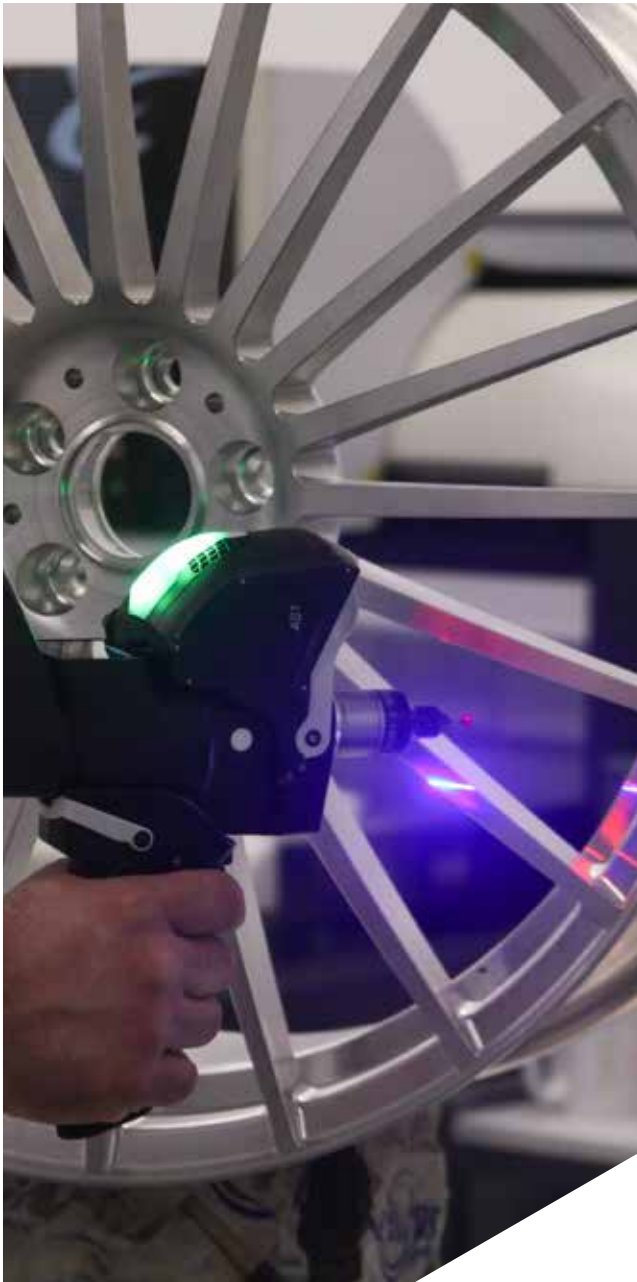
MASTERS OF METROLOGY OUR METROLOGY SERVICES



YOUR METROLOGY NEEDS COVERED

Unlock a wealth of metrology services – from CMM verification and training, Arm verification, UKAS, calibration, Height Gauge verification, sub-contract inspection and programming, to overarching training support, we are masters of metrology.

Global test and measurement company Industrial Physics is home to numerous specialist brands – including Torus, renowned for its first-class metrology offering. It's our purpose to protect the integrity of your brand and product through world-class products and services. Whether you're looking for test and measurement instruments that span a broad range of industries, or a trusted service offering that ensures the installation, calibration, repair, and preventative maintenance of your equipment, we're here to help.

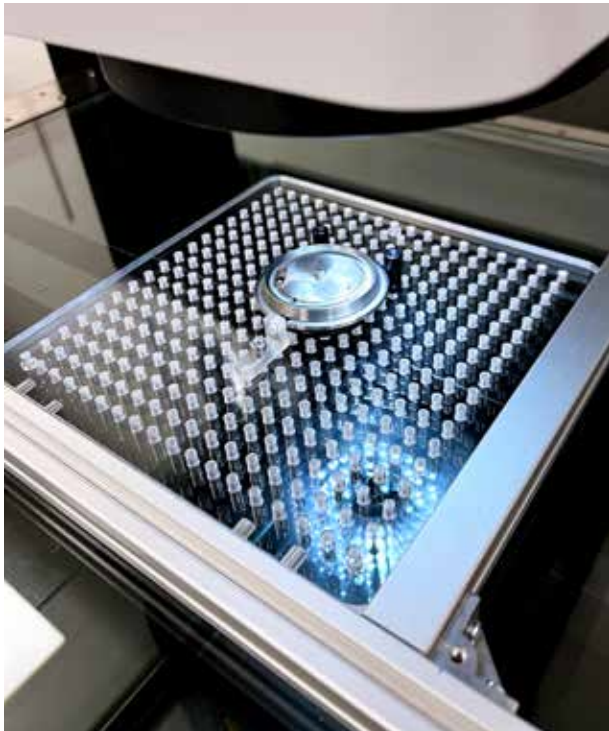


When you choose Industrial Physics as your metrology partner, you're investing in a specialist team of industry experts with over 100 years of combined experience.

Our environmentally controlled UKAS Accredited Laboratory - located in Telford, UK – is packed with professionals ready to advise you on the best service option for your unique business requirements. Both our UKAS Accredited Services and Sub-Contract Inspection Services are traceable to National Standards providing complete confidence in all certification and reporting.

You can also rest assured that your needs are being serviced using the latest and most innovative calibration and inspection technology – our facilities are home to Hexagon, Mitutoyo, and Zeiss CMMs, as well as traditional bench mounted inspection equipment.

No matter the requirement, we're here to help. For more than twenty five years, we've been supporting customers with metrology services across a wealth of industries, including aerospace, automotive, rail, defense, and medical devices. And you can rest assured that our equipment is fully maintained, calibrated, and traceable to UKAS and BSI/ISO 9001 standards.



UKAS CALIBRATION

Our UKAS service provides UKAS calibration for dimensional measurements.

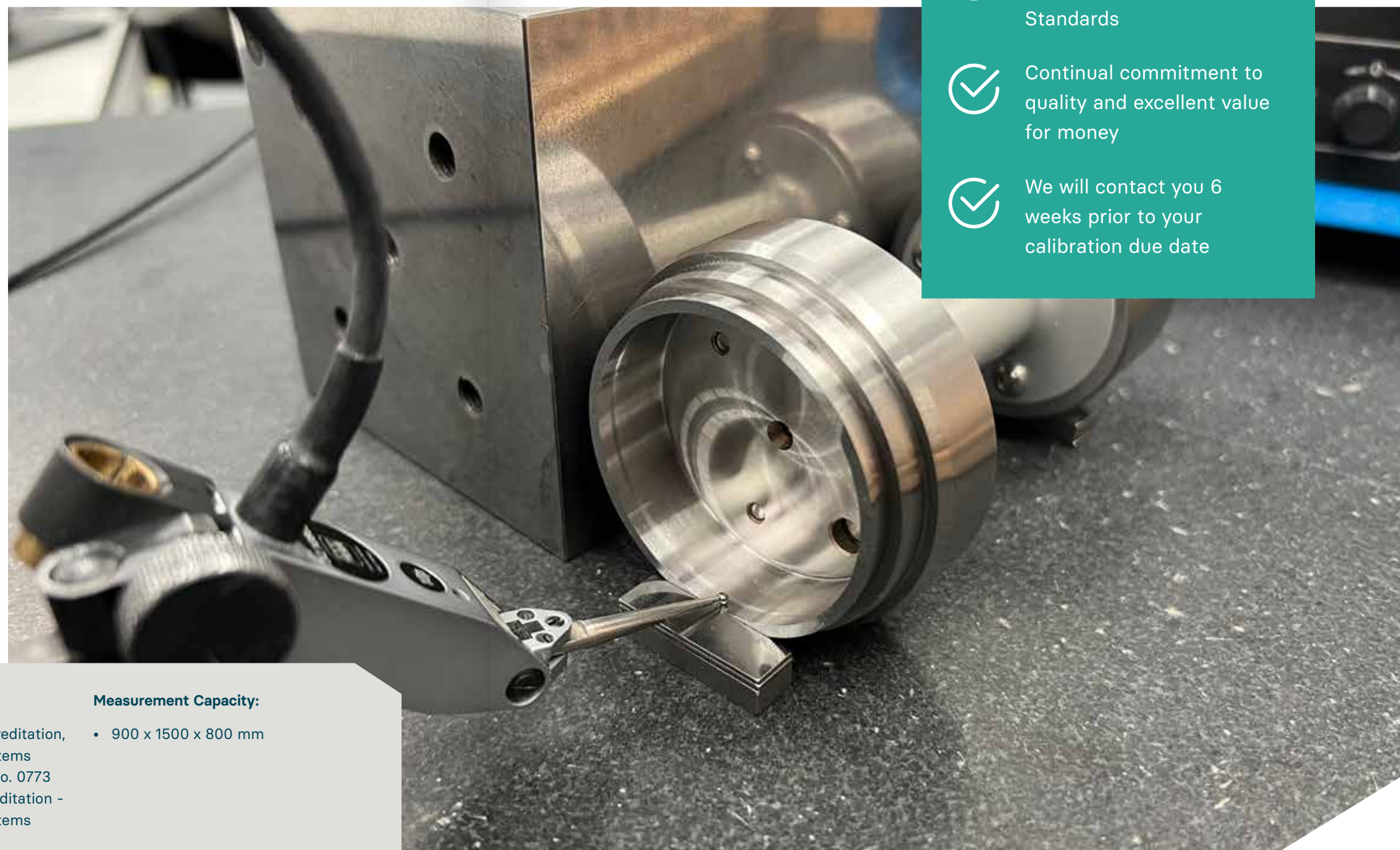
Offering both 1st Principle and CMM capabilities, our expertise and knowledge provide a complete UKAS Calibration Service for the dimensional measurement of receiver and positions gauges, jigs, and fixtures.

We also provide a comprehensive UKAS calibration and recall service for all Masters and Artefacts.

We recommend an annual re-calibration in which your Masters and Artefacts will be assessed for wear, damage and integrity to ensure your final product quality is never compromised.

BENEFITS FOR YOU

- ✓ Accredited and professional calibration service
- ✓ Traceable to UK and International Standards
- ✓ Continual commitment to quality and excellent value for money
- ✓ We will contact you 6 weeks prior to your calibration due date



Accreditations:

- ISO/IEC 17025:2017 (UKAS approved measurement methods)
- ISO 9001:2015 (BSI approved Quality Management System)
- UKAS Certificate of Accreditation, Torus Measurement Systems Calibration Laboratory No. 0773
- UKAS Schedule of Accreditation - Torus Measurement Systems

Measurement Capacity:

- 900 x 1500 x 800 mm

CMM VERIFICATION AND SERVICE

We can provide a UKAS CMM verification and service across a wide range of industries.

We recommend an annual UKAS verification and service of all CMM equipment, due to dust and airborne contaminants settling on CMM scales, belts, drives, pipe-lines and guide-ways. This ensures minimal impact on production and manufacturing, whilst providing verification that the CMM continues to satisfy your measurement requirements.

Your verification and service will include:

- A standard service ensuring your CMM is in good working order including a detailed review.
- A comprehensive CMM verification.
- Upon completion, a detailed verification report and UKAS calibration certificate.

WE COVER THE FOLLOWING BRANDS:

- > MITUTOYO
- > HEXAGON
- > LK
- > WENZEL
- > DEA
- > BROWN & SHARPE
- > QCT
- > ABERLINK
- > ZEISS

Your UKAS calibration certificate will be provided in accordance with:

BS EN ISO 10360-2
BS EN ISO 10360-5
BS EN ISO 14253-1

- Verified against customer and OEM specification
- Verified at 7 measurement positions including angles
- Using 1020 mm NPL UKAS

- calibrated Koba gauge and UKAS calibrated 25 mm sphere
- Reporting stylus form error, MPE, Stylus size error, Repeatability and Error of length

BENEFITS FOR YOU

- ✓ Confidence in your CMM accuracy and performance
- ✓ Error mapping service available if required
- ✓ Multiple volume verification option for larger CMMs
- ✓ We will contact you 6 weeks prior to your calibration due date



WE'VE GOT YOU COVERED

We have the capability, along with our technical partners to support most CMMs with the following:

Response

Typically we can be on site within 48 hours and in most cases carry out the repair on the first visit.

Overhaul

We have the capability to refurbish obsolete drive systems or provide replacements of items which are no longer available.

CMM Moves

Looking to move your CMM? Working with our heavy lift company we are able to decommission, move and recommission most manufacturers and types of CMM.



Error Mapping

If adjustments to the error map are required then we use Xpert Mapping™ to achieve OEM specification.

Shipping/Transportation Brackets

We can supply custom made brackets to guarantee safe transportation of your CMM.

Legacy Controllers

Along with partners we have a robust collection of spares for legacy controllers - including replacements for many types of CMM.

Jog Boxes

Along with our partners we hold refurbished jog boxes for many brands of CMM and can offer either a loan unit whilst yours is being repaired or a repair by exchanging.

Granite Repairs

We have access to granite repair services. This includes chips, holes and general wear in the bearing surfaces.

SPARES AND ACCESSORIES

We provide independent on-site consultation to determine the best solution for your application.

We stock a wide variety of spares and aim to deliver within 48 hours.

We are also able to source components from multiple OEM's and can be your 'one-stop' shop saving you time and effort.

We also supply our own range of metrology tables and enclosures, all designed and built in-house in Telford, UK to your requirements.



Bodies

- > TP20
- > TP200

Modules

- > TP20 6 way
- > TP20 EP
- > TP20 LP
- > TP20 MP
- > TP20 SF

Tips/Styli

A variety of tip lengths, ruby diameters and extensions are available

Probeheads

- > From PH10T upwards
- > Manual and CNC
- > 3 axis and 5 axis

Datum Spheres

- > 12 mm
- > 19 mm
- > 25 mm
- > 3/4"
- > 1"

Metrology Tables

Designed and built to your specification with a range of accessories available

Scanning Probes

We supply the full range of scanning set-ups from SP25 upwards

Racks

A full range of probe changer racks are available

Enclosures

Designed and built to your specification with a range of accessories available

ARM VERIFICATION

We can provide a full UKAS Arm verification service covering a wide range of industries.

We recommend an annual UKAS verification of all measurement Arms, ensuring confidence in the Arm performance within the working environment, to ensure a minimal impact on production and manufacturing, whilst providing verification that the Arm continues to satisfy your measurement requirements.

Your verification and service will include:

- A basic health check on your Arm to ensure good working order prior to the verification
- A verification carried out in accordance with the technical specification detailed below
- A detailed verification report and UKAS Calibration certificate
- A reminder of your upcoming verification due date 6 weeks prior

WE COVER THE FOLLOWING BRANDS:

- > FARO
- > KREON
- > HEXAGON/ROMER
- > NIKON
- > LK

Your UKAS calibration certificate will be provided in accordance with:

BS EN ISO 10360-12

- Verified against customer and OEM specification
- Verified at 7 measurement positions including angles
- Using 1020 mm NPL UKAS calibrated Koba gauge and UKAS calibrated 25 mm sphere
- Reporting stylus form error, MPE, Stylus size error, Repeatability and Error of length

BENEFITS FOR YOU

- ✓ Confidence in your Arm accuracy and performance
- ✓ Off site verification turnaround within 48 hours
- ✓ On site verification completed with 1 working day (UK and Ireland)
- ✓ Advanced reporting



HEIGHT GAUGE VERIFICATION

We can provide a full UKAS height gauge verification service covering a wide range of industries.

We recommend an annual UKAS verification of all complex height gauges ensuring confidence in the gauge performance within the working environment. This ensures minimal impact on production and manufacturing whilst providing verification that the height gauge continues to satisfy your measurement requirements.

Your verification and service will include:

- A bi-directional verification over the full range of your height gauge
- A detailed verification report and UKAS Calibration certificate
- A reminder of your upcoming verification due date 6 weeks prior

Your UKAS calibration certificate will be provided in accordance with:

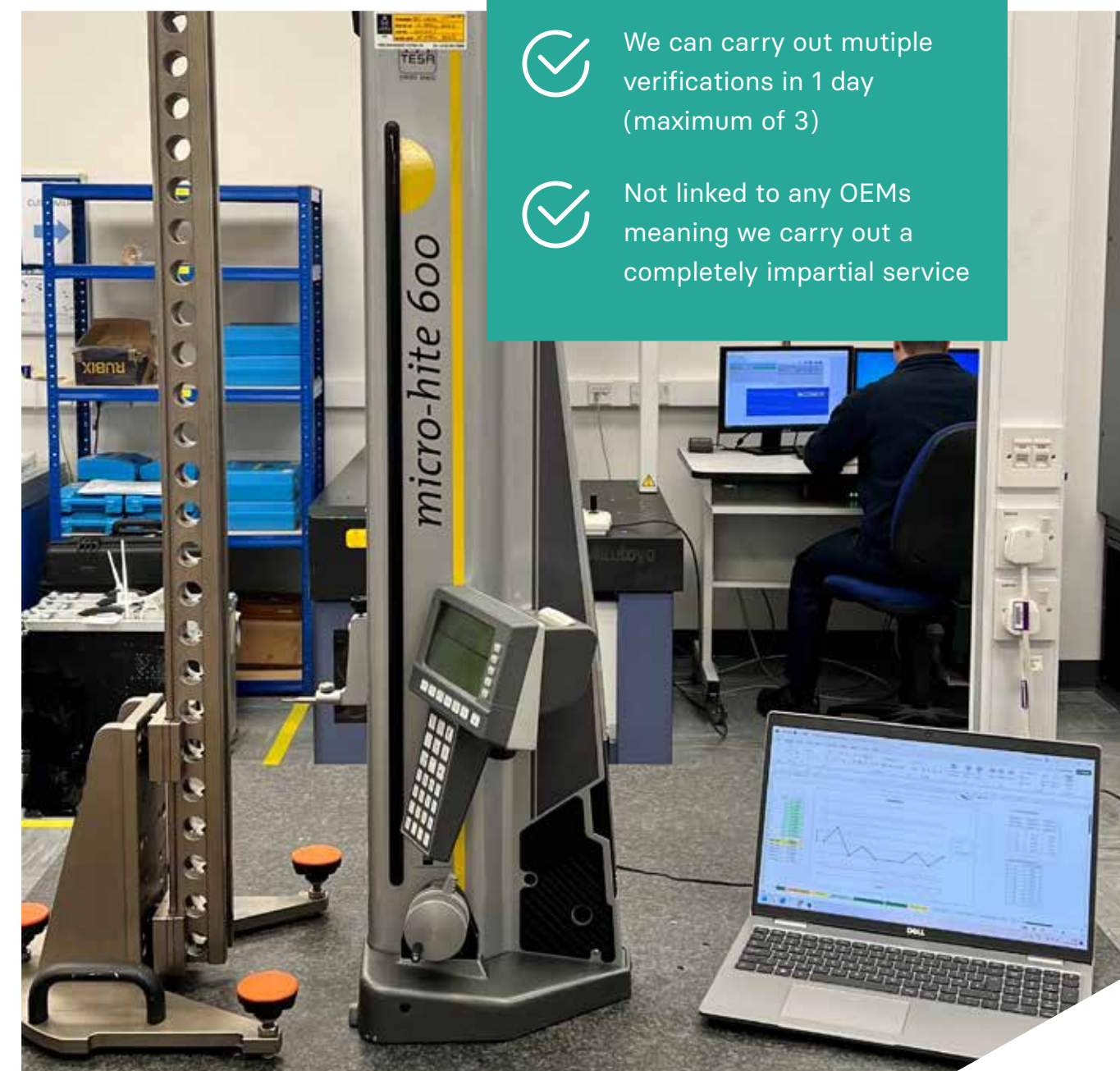
- BS EN ISO 13225
- BS EN ISO 14978
- BS EN ISO 14253-1
- Verified against customer and OEM specification
- Using NPL calibrated 1020 mm Koba Step Bar

WE COVER THE FOLLOWING BRANDS:

- > TESA
- > MITUTOYO
- > DIGIMAR
- > ELEY
- > BROWN & SHARPE

BENEFITS FOR YOU

- ✓ Confidence in complex height gauge accuracy and performance
- ✓ UKAS calibration certificate for all height gauge verifications
- ✓ We can carry out multiple verifications in 1 day (maximum of 3)
- ✓ Not linked to any OEMs meaning we carry out a completely impartial service



SUB CONTRACT INSPECTION

We offer comprehensive sub contract inspection services, designed to elevate your quality assurance with precision measurement tailored to your specific requirements.

Our inspection team work closely with our customers to meet their measurement requirements; our expertise and knowledge means we offer swift, seamless and professional metrology reports. Our experience across a wide range of industries including **medical, automotive, aerospace, presswork, injection moulding, packaging** and more, allows us to tailor part measurement and inspection services precisely to each customer's specific requirements; from first articles to large volume batches.

We have several technologies to ensure a complete inspection service including Tactile CMMs, Portable Measurement Arms, First Principle and Vision (non-contact) CMMs. Each item is calibrated to UKAS standard to ensure the precision, traceability and integrity of the supplied measurement data.

Rest assured, Torus is poised to be your partner of choice in delivering meticulous and professional inspection solutions, including;

- First/Last Article Inspection (FAIR/LAIR)
- Initial Sample Reporting (ISIR)
- Gauge R&R & MSA
- 3D Chromatic Reports (Colourmap)
- Process Evaluation Testing
- Non-contact VMM Inspection and more

Technical Specification:

Tactile Measurement Capacity:

- 900 x 1500 x 800 mm working volume

Optical Measurement Capacity:

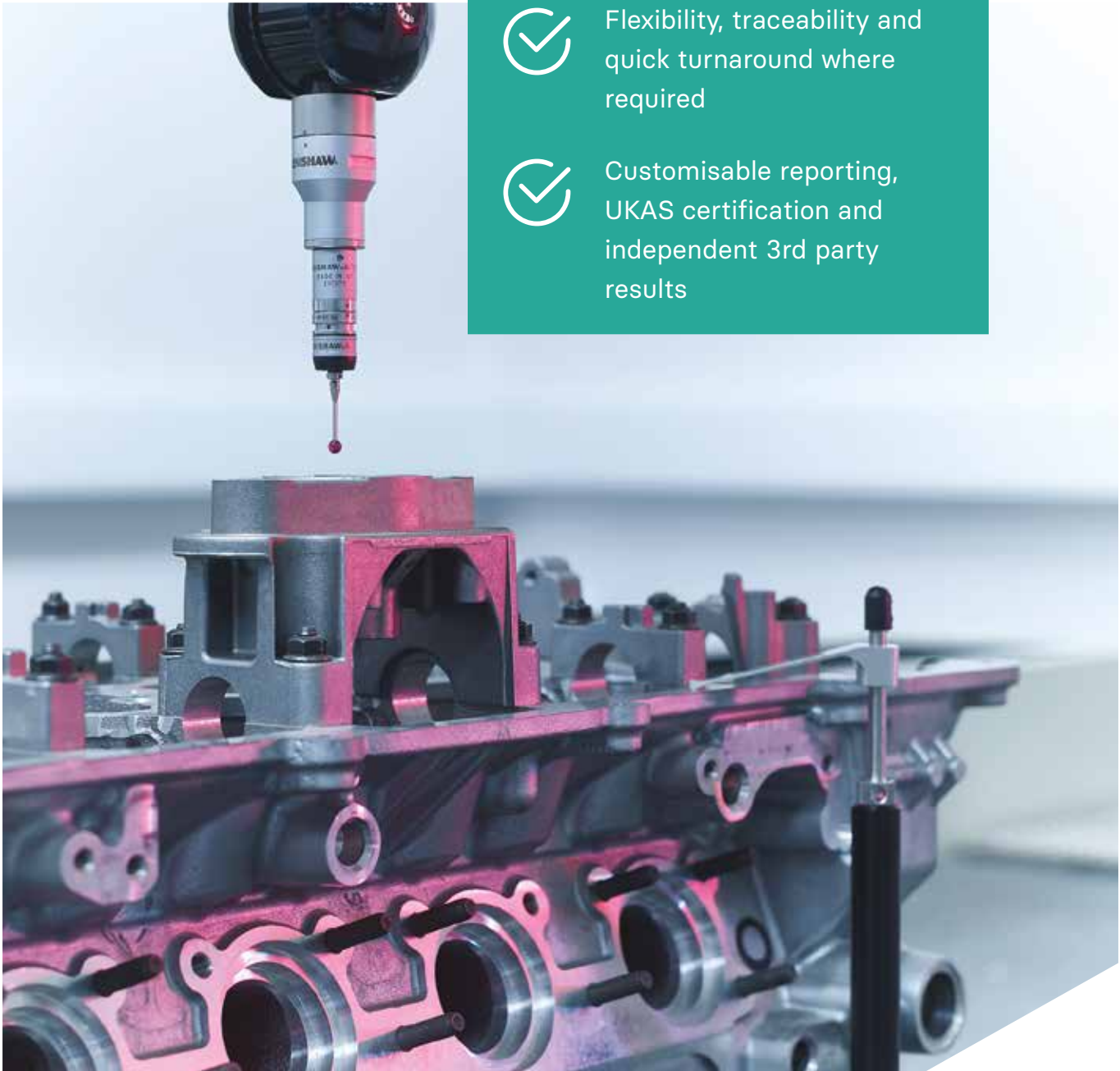
- 500 x 500 x 200 mm working volume

Portable Measurement Capacity:

- 2.5 meter Romer Arm with RS5 scanner
- 3.5 meter Hexagon Arm with AS1 scanner

BENEFITS FOR YOU

- ✓ Increase your inspection capability by using our laboratory
- ✓ Off site capacity you can switch on or off as needed
- ✓ Flexibility, traceability and quick turnaround where required
- ✓ Customisable reporting, UKAS certification and independent 3rd party results



SUB CONTRACT PROGRAMMING

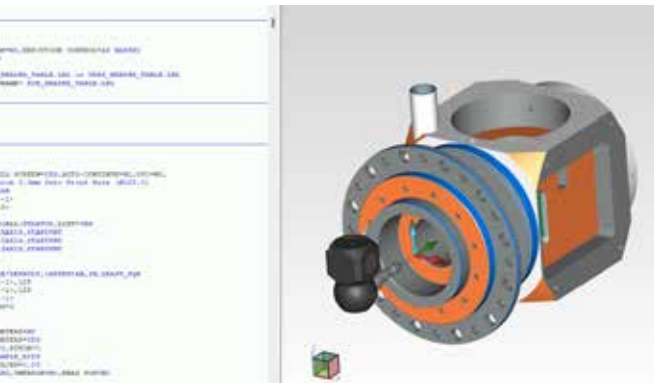
We can be your trusted metrology partner, elevating your manufacturing excellence through expert part programming services.

Our team of experienced engineers can help alleviate your programming load to create high quality, ready-to-go programs catered to your drawing requirements. Our experience across a wide range of industries means we can create programs for even the most demanding components, with or without CAD data.

Programs can be created offline or live on a sample component in our UKAS Accredited Laboratory, ensuring program prove out is completed without disruptions to your production/inspection schedule. Can't send a sample? Don't worry - we have in-house 3D printers available, simply send us the CAD file and we can prove out the programs using printed components.

Fixtures can be designed, manufactured and tested at our site in Telford to provide full turnkey solutions installed by our engineers. Our in-house 3D printing capability means we can create bespoke fixturing systems that traditional manufacturing would struggle with. A smooth handover process means you only need to press go!

We can assist you with on-site programming. Our engineers will come to your site and work on your CMM to cover any lost production time.



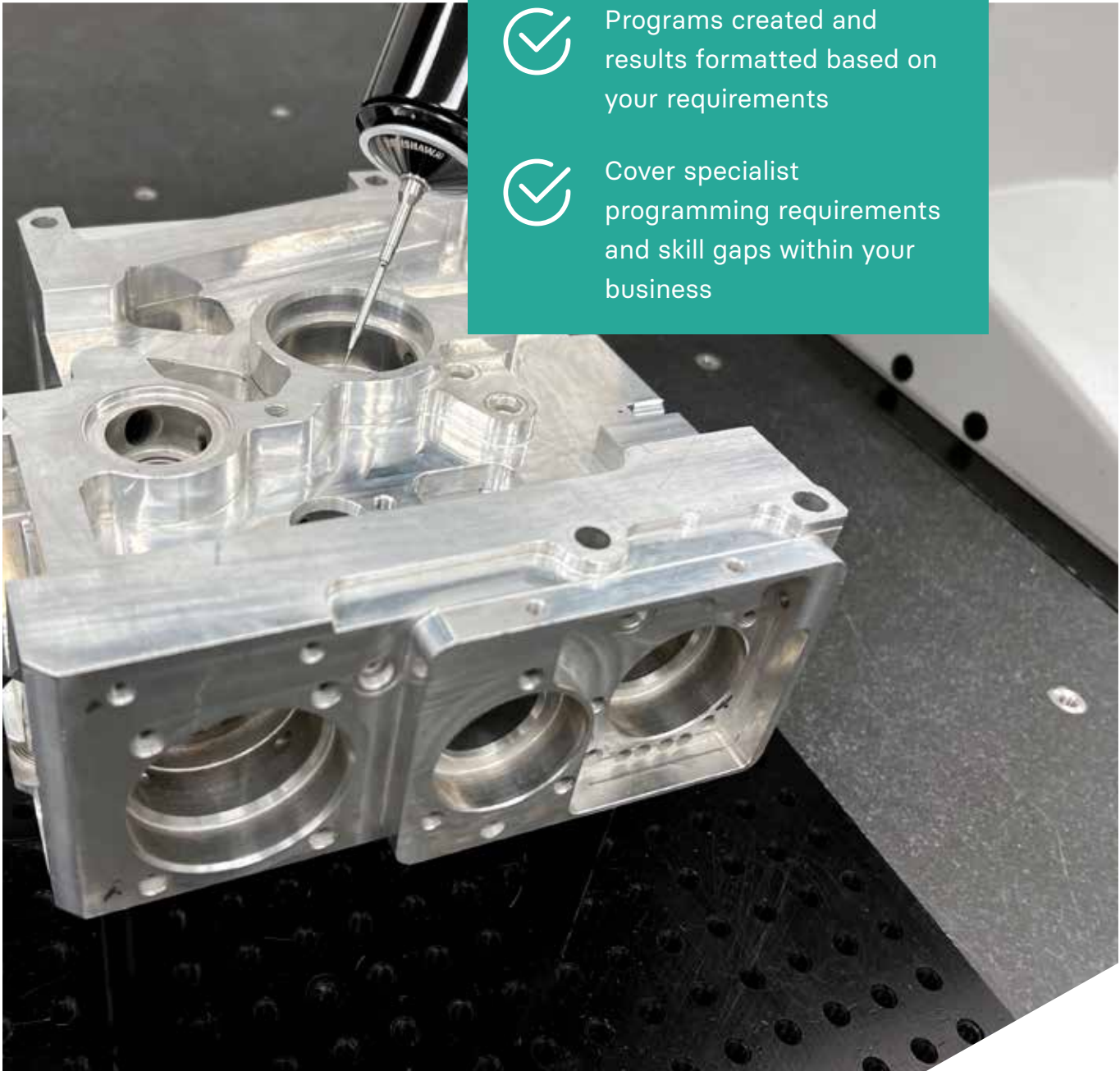
Software Capabilities:

- Hexagon PC-DMIS
- Mitutoyo MCOSMOS
- OGP MeasureMind 3D
- OGP Measure-X

Challenge us, we're engineers at heart!

BENEFITS FOR YOU

- ✓ Reduce machine down time - programming is the longest part!
- ✓ Reduce inspector workload and improve efficiency
- ✓ Programs created and results formatted based on your requirements
- ✓ Cover specialist programming requirements and skill gaps within your business



TRAINING COURSES

By choosing us as your CMM training provider, you gain access to a highly experienced training team with a wealth of knowledge in CMM technology.

Our team of experts have designed a comprehensive training program that not only fulfils all essential CMM training requirements but also encourages participants to customise the course to suit their specific needs. We are committed to providing your team with the essential skills and knowledge to excel in the ever-evolving metrology industry.

Depending on your preferences and objectives, we offer flexible training options such as personalised one-to-one sessions or small group classes. We have the capability to offer on-site training at your facility or at our UKAS accredited laboratory.

Rest assured, with Industrial Physics, you'll receive a high level of CMM training that aligns perfectly with your business goals.



COURSE OVERVIEW:

INTRODUCTORY

- | | |
|-------------------------|-------|
| 1. Introduction to CMMs | 1 day |
| 2. Operator training | 1 day |

BEGINNER

- | | |
|----------------|--------|
| 1. CMM level 1 | 4 days |
| 2. Arm level 1 | 2 days |

INTERMEDIATE

- | | |
|----------------|----------|
| 1. CMM level 2 | 3-5 days |
| 2. Arm level 2 | 2 days |

ADVANCED

- | | |
|---------------------|----------|
| 1. Application GD+T | 2 days |
| 2. Bespoke | Variable |

INTRODUCTORY

Introduction to CMMs



Duration: 1 day



On site at Telford or off site at yours!

Prerequisites:

- None

The Introduction to CMMs course provides:

- A fundamental understanding of a Coordinate Measurement Machine (CMM)
- An introduction to Coordinate Systems such as cartesian and polar
- A foundational understanding of probing systems and CMM software

Enables:

- Participants to understand the principles of CMMs
- Participants to, at a foundational level, understand the difference between CMM/probing types
- Participants to understand the importance of CMM maintenance and calibration

Course Summary/Agenda:

Industrial Physics' Introduction to Coordinate Measuring Machines (CMMs) course provides participants with the foundational knowledge and skills to understand the nature and operational intricacies of CMMs within the context of production and quality assurance processes. Participants will gain a foundational knowledge of CMMs encompassing their working principles, various components, and the different types of CMM.

Topics covered include:

CMM basics, Coordinate systems, probing systems, dimensional metrology concepts, maintenance, calibration, safety and best practice.

Operator Training



Duration: 1 day



On site at Telford or off site at yours!

Prerequisites:

- Basic computer literacy

The Operator Training course provides:

- A foundational knowledge of opening and running CMM routines
- A core understanding of reading metrology reports and pass/fail concepts
- Methods to safely load metrology fixtures and operate CMMs

Enables:

- Participants to open and execute measurement routines
- Participants to be comfortable handling different probing systems during manual operation
- Safe and efficient use of your metrology hardware at an operational only level

Course Summary/Agenda:

Industrial Physics' CMM Operator course provides participants with foundational understanding of the best practices to load metrology fixtures and operate CMM measurement routines in a safe manner. The course will cover the inspection process from loading components correctly and safely into metrology fixtures to proficient interpretation and storage of metrology reports.

Topics covered include:

Machine familiarisation, basic operational skills, understanding alignment techniques, basic troubleshooting, safety protocols, probe system handling and data analysis and reporting.

BEGINNER

CMM Level 1



Duration: 4 days



On site at Telford or
off site at yours!

Prerequisites:

- Introduction to Metrology/Experience
- Basic computer literacy

The PC-DMIS CMM Level 1 course provides:

- A foundational understanding of the CMM hardware
- Understanding of the process to create and edit simple measurement routine
- The methods required to create measurement reports
- Best practice use for measurement and reporting

Enables:

- Participants to create basic measurement routines using both manual and DCC operation
- Safe and efficient use of your metrology hardware and software
- Participants to create basic measurement routines

Course Summary/Agenda:

The course provides participants with fundamental training in using PC-DMIS or MCOSMOS, two of the most widely used CMM metrology software applications, designed for those with limited or no experience with CMMs. The course is intended to take participants from the foundational principles of CMM operation and gradually build their expertise to a level where they can confidently write, execute and edit CMM measurement routines. By the end of the course, trainees will have the skills to create accurate and detailed metrology reports. Our comprehensive approach ensures participants gain a thorough understanding of both the theoretical concepts and practical applications of CMM programming.

Topics covered include:

Probe definition and calibration, part alignment, measured and constructed features, creating an automated routine, reporting measurement results and best practice measurement techniques.

Arm Level 1



Duration: 2 days



On site at Telford or
off site at yours!

Prerequisites:

- Introduction to Metrology/Experience
- Basic computer literacy

The Arm Level 1 course provides:

- A foundational understanding of the Arm hardware
- Understanding of the process to create and edit a simple measurement routine
- The methods required to create measurement reports
- Best practice use for measurement and reporting

Enables:

- Participants to create basic measurement routines using the measurement Arm
- Safe and efficient use of your metrology hardware and software
- Participants to create basic measurement routines

Course Summary/Agenda:

The course provides participants with fundamental training in using a portable Arm. This course is tailored to individuals new to, or having limited knowledge of portable inspection. The course is designed to take trainees from the foundational principles of Arm operation and build their expertise to a level where they can confidently write, execute, and edit measurement routines. By the end of the course, trainees will have the skills to create accurate and detailed metrology reports. Our comprehensive approach ensures trainees gain a thorough understanding of both the theoretical concepts and practical applications of portable inspection.

Topics covered include:

Probe definition and calibration, part alignment, measured and constructed features, reporting measurement results and best practice measurement techniques.

INTERMEDIATE

CMM Level 2



Duration: 3-5 days



On site at Telford or
off site at yours!

Prerequisites:

- CMM Level 1 and experience OR relevant experience

The PC-DMIS CMM Level 2 course provides:

- An understanding of more complex alignment systems
- The ability to use scanning probes
- An introduction to using variables and routine flow control
- An understanding of using more advanced features
- Participants with more complex reporting techniques

Enables:

- Participants to gain a higher understanding of CMM software to improve efficiency and proficiency

Course Summary/Agenda:

The course provides participants with an elevated level of competence, understanding and proficiency to utilize your CMM to its full potential. Tailored to those who have successfully completed CMM Level 1 and/or possess relevant experience, this course is structured to provide a comprehensive skill set.

Topics covered include:

The course is modular and covers five topics: Advanced Alignments, Advanced Features, Scanning, Flow Control and Logic, Advanced Reporting. Any of the topics can be selected and combined to tailor the course to your specific requirements. Each module is one day long.

Arm Level 2



Duration: 2 days



On site at Telford or
off site at yours!

Prerequisites:

- Arm Level 1 and experience OR relevant experience

The Arm Level 2 course provides:

- An understanding of more advanced measurement techniques
- The ability to scan, both tactile and with laser systems
- Information on pointclouds and how to utilize them

Enables:

- Users to write more complex routines within PC-DMIS
- Export more complex metrology reports
- Participants to use a laser scanning system and interrogate the data it produces

Course Summary/Agenda:

The course provides participants with an elevated level of competence, understanding and proficiency so they can utilize measurement Arms to their fullest potential. Tailored to those who have successfully completed Arm Level 1 and/or possess relevant experience, this course is structured to provide a comprehensive skill set in the use of a measurement Arm.

The course is designed to take users from a foundational level of understanding to a complex level of knowledge enabling them to write and operate complex programs that create complex and intuitive metrology reports including the ability to output laser scanned data.

It is recommended that users have their own parts available for this course where feasible.

Topics covered include:

Complex alignments, dimensioning, reporting, colour mapping and, where possible, exporting of scanning data.

ADVANCED

Application GD&T



Duration: 2 days



On site at Telford or
off site at yours!

Prerequisites:

- Level 2 and experience OR relevant experience

The Application GD&T course provides:

- Theoretical and practical knowledge in using GD&T functions within PC-DMIS
- A higher level of competence and understanding of how PC-DMIS approaches GD&T

Enables:

- Users to create routines that correctly interpret complex drawings containing GD&T
- Participants to create metrology reports that are up to date with standards and correct to metrology best practices

Course Summary/Agenda:

The course offers participants a comprehensive grasp of Geometric Dimension and Tolerancing (GD&T) symbols, within the context of PC-DMIS software. This course is designed to equip attendees with the knowledge and skill set necessary to effectively comprehend GD&T symbols, their interpretation within the PC-DMIS software, and the application of best practices for the creation of accurate and reliable metrology reports. Structured to cater to individuals who have successfully completed the PC-DMIS Level 2 course and/or possess relevant experience.

The course is structured to take participants from a base understanding of PC-DMIS and its GD&T functionality to a level whereby they are creating meticulous metrology reports, pivotal for streamlining production processes and bolstering operational efficiency in your business.

Topics covered include:

Each of the GD&T symbols including a theoretical understanding and practical application of each.

Bespoke Training



Duration: Variable



On site at Telford or
off site at yours!

Prerequisites:

- None

Our Bespoke Training courses provide:

- Users with a course that is tailored exactly to their requirements
- The ability to change the course 'on the fly' to suit as new topics naturally appear

Enables:

- You to create a course designed around your work flow and metrology requirements

Course Summary/Agenda:

Industrial Physics' bespoke training courses epitomize a personalized approach to metrology education, crafted to align with your training needs at the heart of its construction. Simply get in touch with us and one of our experienced training providers will discuss your requirements to create a course that will be customized to you, with individually tailored training delivery and a continuous feedback process allowing for 'on the fly' changes as the course progresses.

YOUR TRUSTED METROLOGY PARTNER



“I would like to commend Rob Allward on his visit to our site this afternoon. We reached out late morning for some assistance on a CMM issue, and although he had a full schedule planned Rob attended site 3 hours later and resolved the problem.

That support is very much appreciated and has put us back on track to meet our schedule. Rob attended with a happy disposition, was very knowledgeable and verified the issue within minutes”

“We were very happy with the training provided. The training was tailored to our needs and Evan as a trainer was brilliant. He explained everything really well, provided in depth training fulfilling our needs to move the business further”

“I just wanted to drop you a quick email to say how happy we have been with the service provided from yourselves! From start to finish it has been a pleasure”

Hannah Cox, Automotive Accessories Ltd

GET IN TOUCH

Find out more about how we
can support your unique needs,
get in touch today, email:

tms.inspection@industrialphysics.com

