

Inspection Products & Services



Welcome to Torus Measurement Systems - Precision Measurement

Torus Measurement Systems offers a complete inspection solution to almost any measurement problem. Our UKAS approved laboratory provides a comprehensive range of calibration, sub contract inspection services, programming and training. Our engineering team will design, manufacture, build, test and support both standard 'off the shelf' inspection gauges and machines plus special purpose equipment.

Our commitment to quality and superior levels of service and support is paramount and is backed by our ISO 9001 quality management system, which is rigorously enforced to promote continuous improvement.

Torus Measurement Systems provide a fast, flexible and comprehensive calibration and sub contract inspection services from our facility in Derby and our environmentally controlled UKAS laboratory in Telford, UK.

Our inspection services facilities feature the very latest calibration and inspection equipment including the following; Hexagon, Mitutoyo, Wenzel and Renishaw CMMs' and both TESA & OGP Optical Machines. These facilities also include bench mounted traditional inspection equipment. All equipment is fully maintained, calibrated and traceable to UKAS standards.

From our extensive experience delivering Inspection Services to industry, Torus offer a full portfolio of products to assist in your Inspection. This catalogue features all aspects to support you in measurement capability and component handling.

For more information and prices please contact the Torus Measurement Systems Inspection team:

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Torus Measurement Systems

Inspection Products

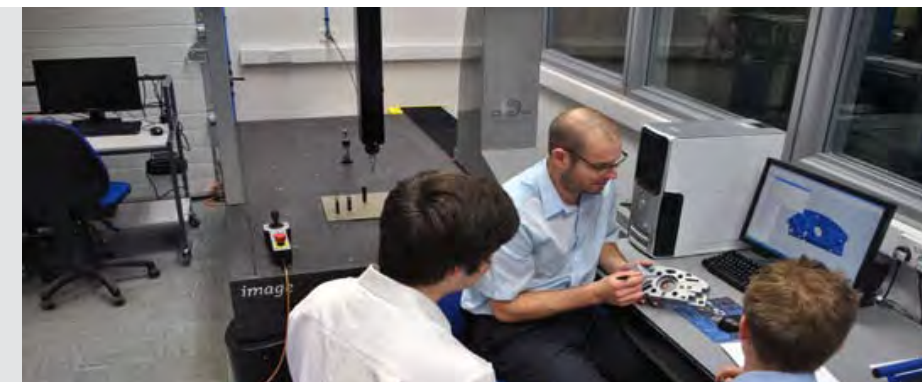
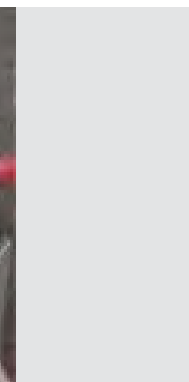
Page

CMM Enclosures	5-6
CMM Pallet & Transfer Systems	7-8
Moving Tables	9-10
Easichck Artefact	11-12
Modular Fixturing	13-14
Aerofoil Fixturing	15-16
Bespoke Fixturing	17-18
Articulated Arm & CMM Accessories	19-22

Inspection Services

Page

Programming	23-24
CMM & Portable Arm UKAS Verification	25-26
Training Courses	27-30
Laser Scanning & Reverse Engineering	31-32
Large Scale Measurement	33-34
Optical Non-Contact Inspection	35-36
Sub Contract Inspection	37-38
UKAS Calibration	39-40



CMM Enclosures

Torus Measurement Systems offer Enclosures to protect your CMM or other Measurement Systems from the elements in a busy shop-floor environment. The Enclosure is designed to fit closely to the CMM, thereby maintaining the smallest footprint. The basic system includes positive air pressure to minimize the chance of any air-borne particles from contacting the equipment during component loading/unloading.

- Components are loaded through a counterbalanced vertical or side folding door at the front
- Flexible Design
- Access doors to any pneumatic equipment
- Easy access service panels for removal when servicing the CMM
- Site survey
- Brush strip cable access
- Internal lighting
- Positive air pressure to keep the CMM free from dust & dirt

Sizes (W/L/H):

- 1.4m x 2.1m x 3m
- 1.8m x 2.5m x 3.5m
- Other - To suit your machine

Standard Colours

- Blue
- White
- Green
- Yellow
- Grey

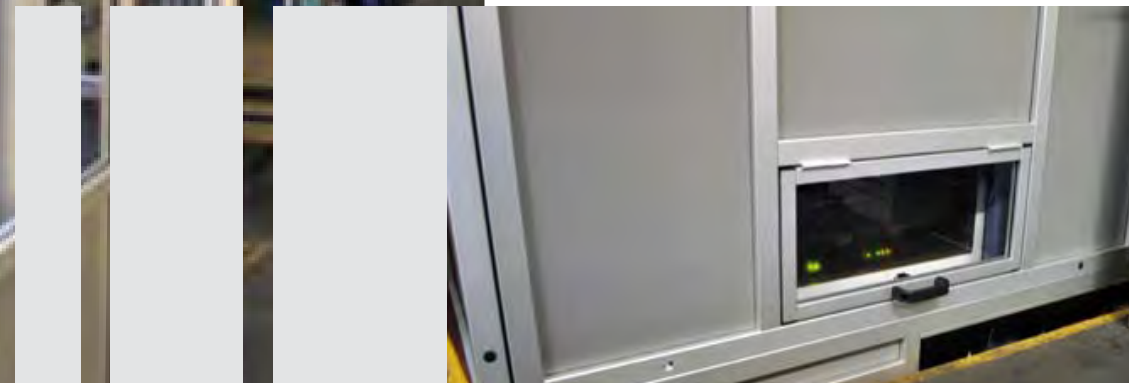
Installation

- The enclosures are installed by Torus' trained service engineers
- Can be secured to the floor using rawl bolts if required

Optional Extras

Air Conditioning

The temperature can normally be controlled within +/- 2°C in the majority of UK factory environments.



CMM Pallet & Transfer Systems

Torus provide a range of Pallet Systems to assist the user to load/unload complex and heavy components away from the CMM for safe handling.

Kinematic Base Plates

- Manually loaded on to a repeatable base & secured to the CMM table
- A simple low cost solution for small to mid-range Measuring Machines
- Automatically run measurement programs & requires no clamping
- The system can repeat very accurately & cannot be incorrectly loaded
- Enables the user to change components quickly, no need to re-align the fixture

Sizes:

- 300mm x 300mm
- 400mm x 400mm
- 500mm x 500mm

Manual / Automatic Pallet Systems

- The pallet is manually or automatically moved in and out of the measuring envelope
- The pallet is either pneumatically clamped in position or uses kinematic locations.

Standard Pallet Sizes:

- 600mm x 800mm
- 600mm x 1200mm
- Other
- ideal for component weight >100kgs

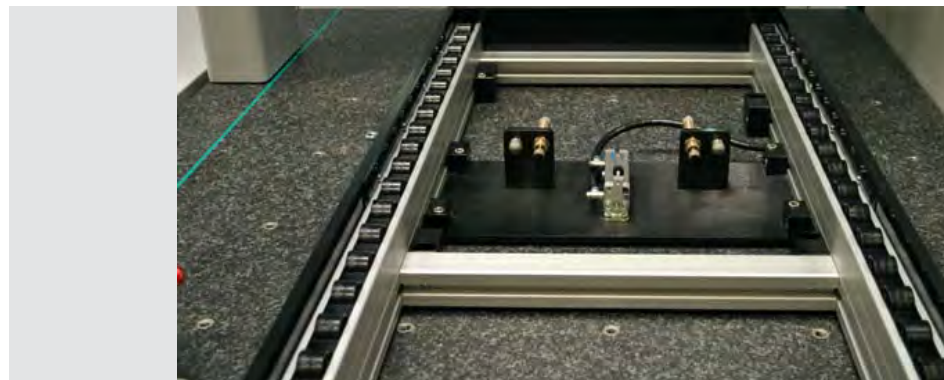
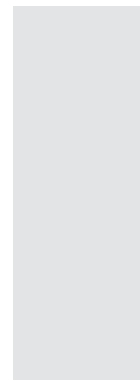
Transfer System Option Available:

To be used in conjunction with a pallet system to ensure safe work loading with minimal machine downtime.

- Safe work loading station
- Smooth transition onto the CMM
- Fixture Storage Location (Transfer System)
- Pre load fixture while measuring
-

Standard Colours

- Blue
- White
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- Yellow
- Grey

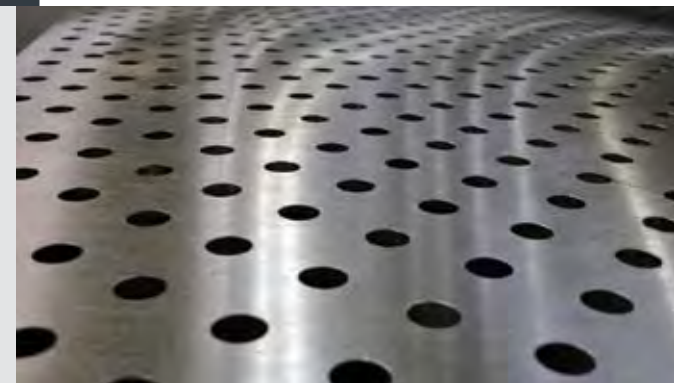
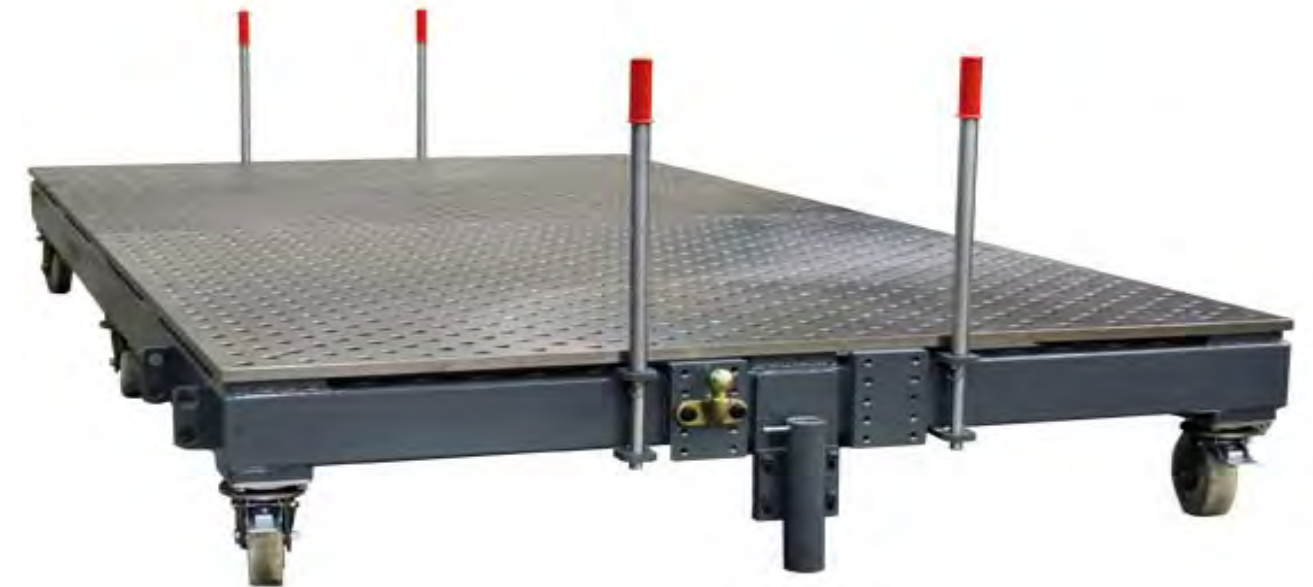


Moving Tables

Torus can provide a component handling system for large and heavy parts for use with your Gantry CMM.; where positioning & transporting components safely is of paramount importance.

Key Features

- Allows components to be craned onto a fixture away from your CMM
- A range of floor guided / parking station locations for a repeatable position
- Manual & Automatic trolley guided system
- Dedicated and flexible work holding design to suit component weight and holding locations
- A range of sizes to suit components & machine type



Easichck Artefact

The Easichck; a CMM & Articulated Arm checking artefact. The Easichck reference artefact enables the user to perform interim verification checks on any CMM or Arm inbetween annual calibrations. It is recommended your Arm or CMM is checked at regular intervals as part of the ISO 10360 standard, to monitor any change in your equipment.

Easichck comprises of:

- 400mm Parallel Length Bar
- 50mm Parallel Length Bar
- 50mm Internal Ring Gauge
- Ø30 Ceramic sphere
- Cone
- Supplied with UKAS Accredited Calibration Certificates (Imperial Equivalent items available)

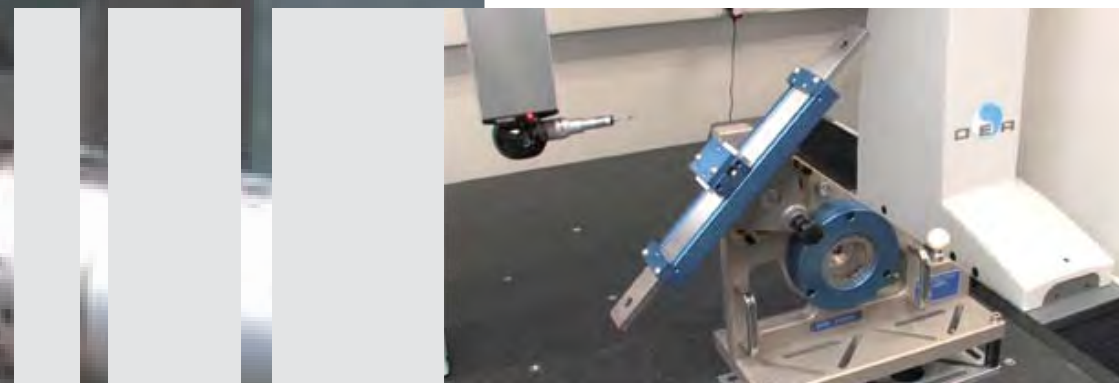
Key Features:

- Length Bars can be rotated in two 45° increments without additional bracketry
- Length Bar Holders can be moved incrementally, to improve scope of equipment
- Other Length Bars can be added to suit machine capacity
- High Quality Finish, with Storm case and User Guide



Optional Extras

- CMM Programs
- Results automatically updated into an analysis package
- Also available for Non-Contact Scanning Systems with coated artefacts



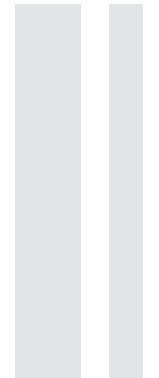
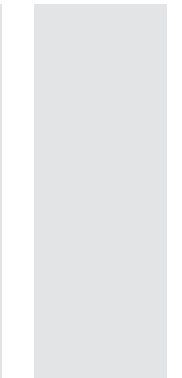
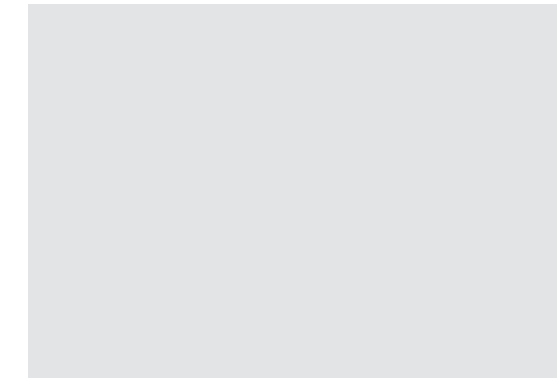
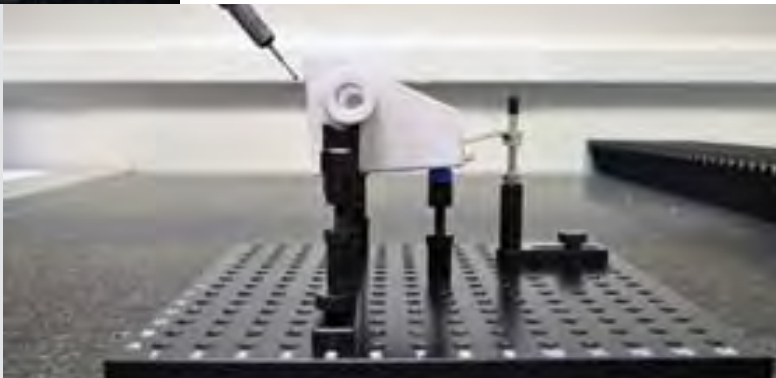
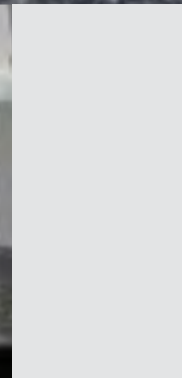
Modular Fixturing

Swiftfix is a Modular Fixturing System designed to assist the programmer to repeatedly locate and hold components in the most effective manner for measuring on your CMM or Optical machine. A wide range of accessories are available to suit every type of component. The basis of the system is the Stand-offs which can be screwed into the baseplate and are available in a variety of diameters and lengths. These can also be connected to each other to increase the range of the system.

Key Features

Gold, Silver and Bronze Kits are available with various base plate sizes. For Optical machines, clear baseplates and discreet smaller fixture elements are utilised. Fittings are available which can connect to these Stand-offs to give an even greater holding flexibility and include the following items:

- Stand-off Pin
- Magnet
- Cones
- Universal Joint
- Tension Clamps and Posts
- Spring Clamps
- Spring Plungers
- Toggle Clamps
- Lateral Pressure Pins

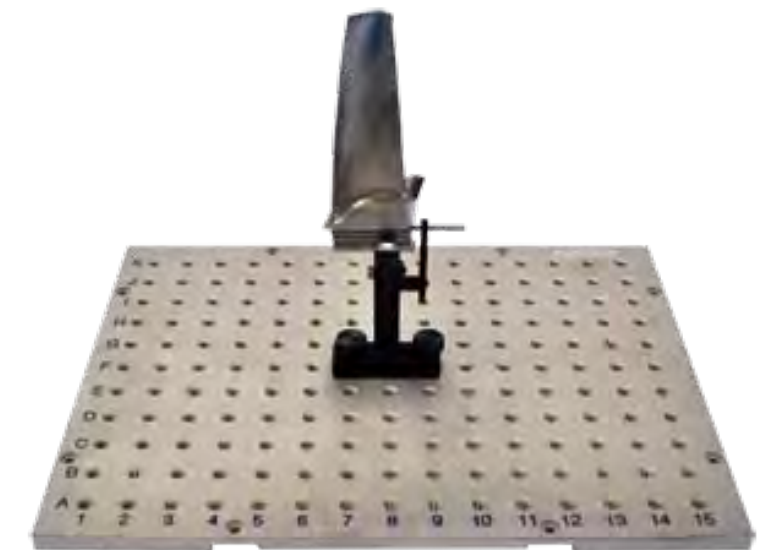
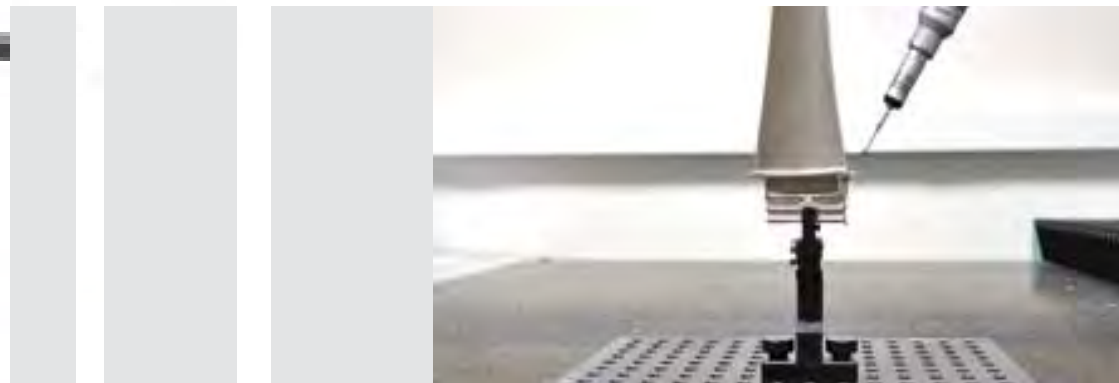


Aerofoil Fixturing

We have developed a system, primarily aimed at holding a range of Aerofoils. We clamp onto a fir tree root using standard, reversible location jaws that can accommodate forms using a Roller size from 1mm up to 6mm. The Jaws have a Vee form, which enables access to measure the root. This removes the need for using accurate Rollers.

Key Features

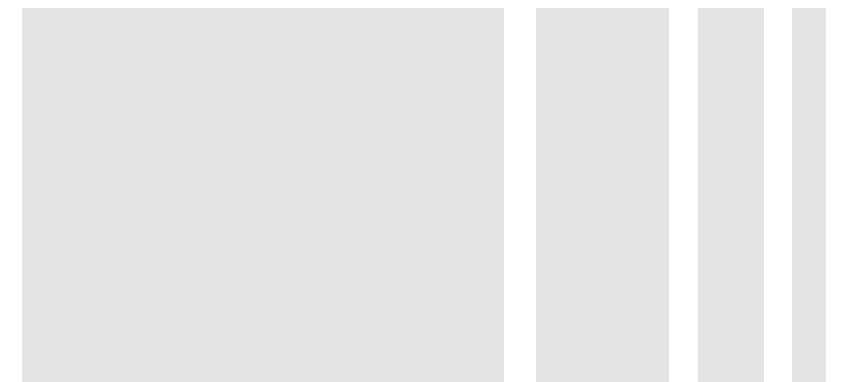
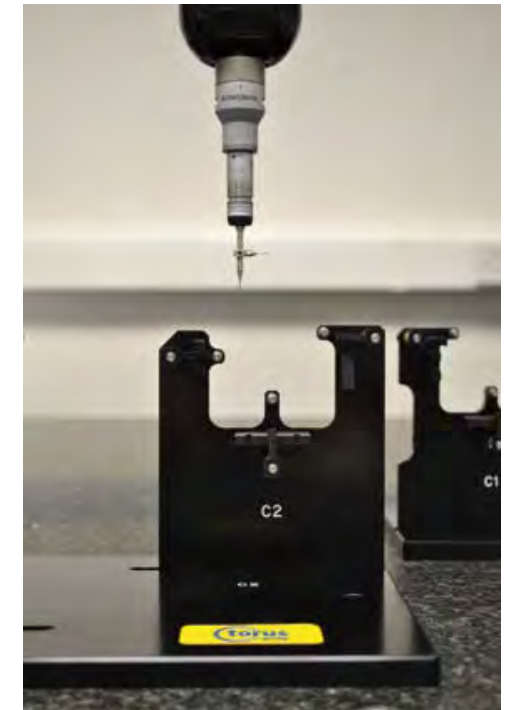
- Repeatable location system with maximum access for probing
- Interchangeable & reversible location Jaws
- Jaws made from stainless steel with ground faces
- Twin pivot arm position to increase component capacity
- To suit Ø1 to 6mm Roller sizes
- Dual clamping, Spring or Thumbscrew
- Adjustable End Stop, fits either side



Bespoke Fixturing

From initial enquiry, Torus closely supports the customer through the development process by providing CAD design, customer acceptance procedure, manufacture, assembly, testing and finally supply of the bespoke fixturing. The typical work-holding systems range from mechanical locations, vacuum fixture to electrically operated systems.

Torus have many years experience and expertise in the supply of bespoke fixturing solutions for any measurement task. We fully understand the importance of offering the component in the optimum position to enable the maximum access to measure features in one single operation. To achieve this, Torus have developed methods for locating and holding a wide range of components during the measurement process. The main criteria requirement is not to deform or damage the components and ensure the components do not move during measurement, which can be problematic with plastic moulded or sheet metal components.



Product Code: ARM0010



Probes

6mm Standard Zircon
Thread: 1.25-20UN
Length: 57mm
Ball diameter: 6mm
Suited to: USB Faro Arms

Product Code: ARM0011



Probes

3mm Standard Zircon
Thread: 1.25-20UN
Length: 57mm
Ball diameter: 3mm
Suited to: USB Faro Arms

Product Code: ARM0012



Probes

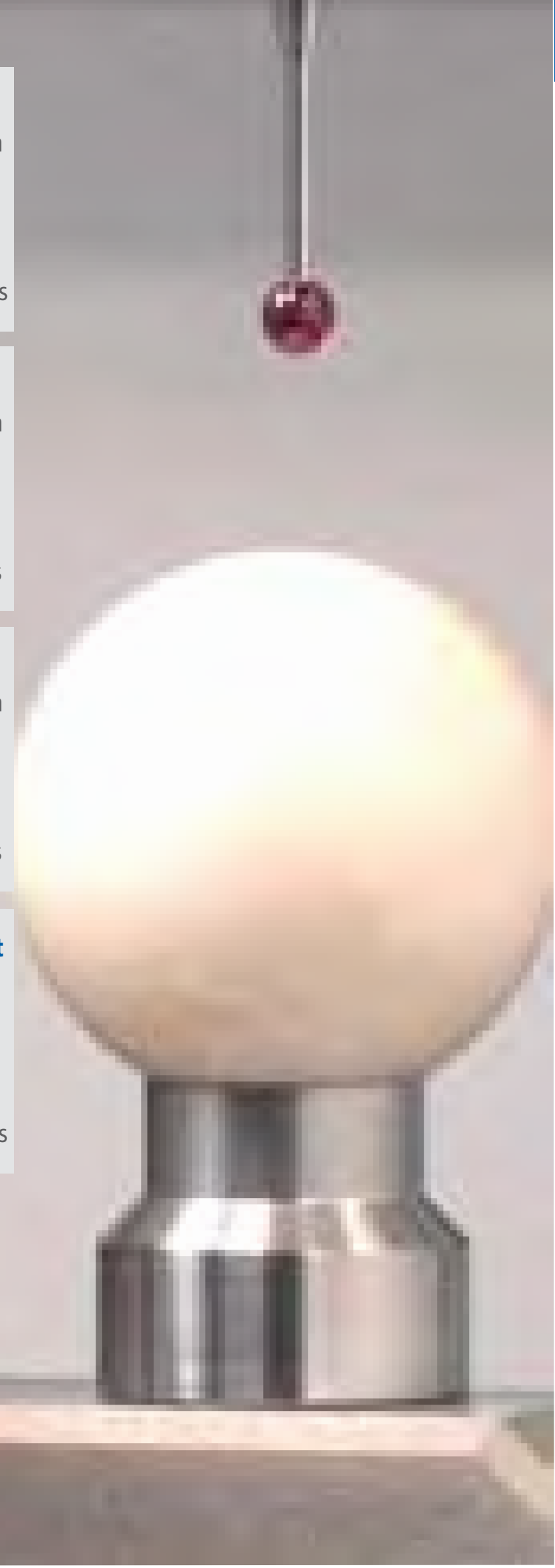
2mm Standard Zircon
Thread: 1.25-20UN
Length: 57mm
Ball diameter: 2mm
Suited to: USB Faro Arms

Product Code: ARM0013



Probes Extension Kit

Comprises of: 3mm & 6mm probes
2 x 3" extensions
1 x 4" extensions
90 & 60 degree adapters



Torus Articulated Arm and CMM Accessories

Product Code: ARM0014



Probes

3mm Standard Zircon
Thread: M6
Length: 43mm
Ball diameter: 3mm
Suited to: Serial Faro Arms

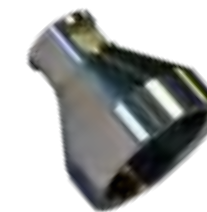
Product Code: ARM0015



Probes

6mm Standard Zircon
Thread: M6
Length: 43mm
Ball diameter: 6mm
Suited to: Serial Faro Arms

Product Code: ARM0009



Standard Adapter

Thread: M6
Length: 43mm
Allows M6 probes to be used on USB Arms

Product Code: ARM0008



Magnetic Trivet

Magnetic base.
Thread: M6
Can be used with cones or spheres



Torus Articulated Arm and CMM Accessories

Product Code: ARM0016

Magnetic Mount

Suited to: USB or Serial Arms
Supplied with case
110n/cm2 clamping force



Product Code: ARM0017

Standard Mount

3.5" Mounting Ring
Suited to: USB or Serial Arms



Product Code: ARM0002

Calibration Cone

Thread: M6



Product Code: ARM0001

Calibration Sphere

Thread: M6
25mm +/- 1 micron
(with UKAS cert)
Spheres available in:
- Tungston Carbide Grade 10
- Ceramic



Product Code: ARM0003

Calibration Trivet

Standard Trivet
Thread: M6



Product Code: ARM0005

Battery

7.2V Lithium Ion
6600mAh
Suited to: USB Arms



Product Code: ARM0006

Stand-alone Charger

Allows additional battery to be charged, without being connected to the arm.
Suited to: USB Arms.



Product Code: ARM0004

Arm Power Supply

Suited to: USB Arms.



Torus are suppliers of Renishaw equipment, we can provide all Styli and probing systems swiftly.

Programming

Torus supply CMM Programming to use on your existing equipment. Programming can be completed offsite without utilizing your CMM capacity and is fully proven.

Torus offer a programming service either onsite or offsite for:

- Hexagon PC-DMIS
- Mitutoyo Geopak
- Wenzel's Open-DMIS & Metromec
- Delcam
- Aberlink Users
- Modus

Simply provide us with a marked up drawing and a component and we will do the rest. Alternatively if you do not have a component yet, a CAD model will allow us to generate the measurement program offline. When the component has been manufactured simply execute the pre-written program for guaranteed trouble free measurement.

Our engineers are highly skilled and have many years experience across a wide range of sectors including automotive, presswork, aerospace, plastics and the medical sector. We work closely with multi-national organisations and small businesses alike. Key clients include Rolls Royce, Alstom, GE,

JCB, GKN, Toyota and GSK.



Flexible Gauging

Utilising Renishaws latest technology Torus provides programs using the modus software to enable a full turn key solution.



CMM & Portable Arm UKAS Verification

Key CMM UKAS Verification Service Features:

- CMM Service
- UKAS Calibration & Verification



All CMM verifications are carried out following ISO 10360 standards and a UKAS certificate is supplied with every verification. The verification covers a range of CMMs' and softwares'; these include Hexagon, Mitutoyo and Aberlink. The verification has the added benefit of providing you with accurate information on your CMMs capabilities and uncertainties.

Torus can pack move, service, repair and install your CMM prior to verification.

Key Portable Arm UKAS Verification Service Features:

- Articulated Arm Reverification
- UKAS Certification
- Software and Application Training
- On-site/Offsite Verification service



All Arm verifications are carried out following ISO 10360 standards and a UKAS certificate is supplied with every verification. This service can be carried out in our UKAS temperature controlled laboratory or onsite in its current working environment.

The verification can cover all articulated arms; it is important to test your articulated arm is in good working order and this includes testing, cleaning and servicing your arm with the added advantage of receiving accurate information on your arm's capabilities and uncertainties.

With our understanding that your equipment is important to you Torus can provide a 48 hour turnaround on our verification service from receiving the arm into our UKAS laboratory.



Training Courses

Training Target:

- Use typical component examples
- Advice on best practice and technique
- Build an understanding and confidence to get the best of your machine

Torus After Care:

- Identify continuous improvement
- A follow up; on site visit for face to face support
- A support line to give software and solution backup

Torus' Capabilities

A range of Hexagon, Mitutoyo, Wenzel and Renishaw CMM's are available to train on, which are equipped with either touch trigger probing or analogue scanning. Torus also provide OGP/TESA training on optical equipment.

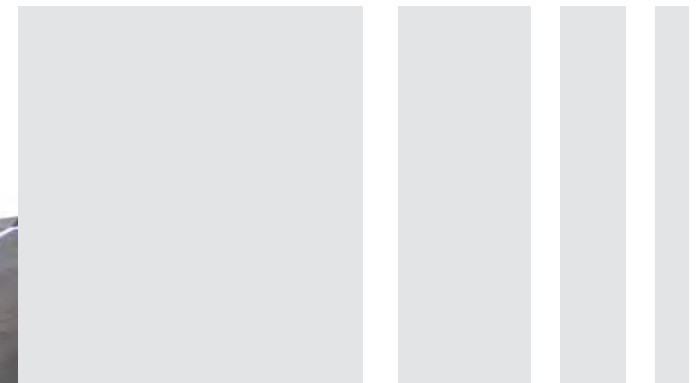
We cover a large range of software, including PC-DMIS, COSMOS, OpenDMIS, Metromec, Modus, Measurement 3D & Aberlink software and associated options. Torus also cover the Renishaw Equator - Modus Software.

Our comprehensive training can be either at our location or onsite. All levels from initial basic training for the new user to advanced training for the experienced programmer are covered. All

training is either one to one or in small specific groups - with a 'Hands On' approach.

The Training Course:

- Courses are unique to the customer
- Small intimate classes
- Hands on training
- Training utilises the trainee's components
- Post training programs
- On or Off site training available



Training Courses

CMM Training Centre

Torus Measurement Systems training facilities are located at both the Telford and Derby sites and boast;

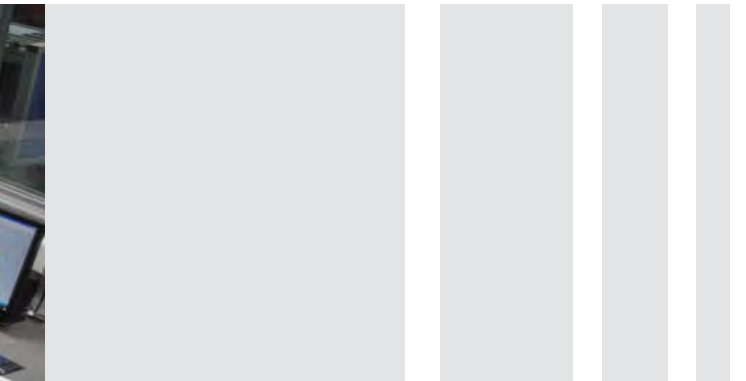
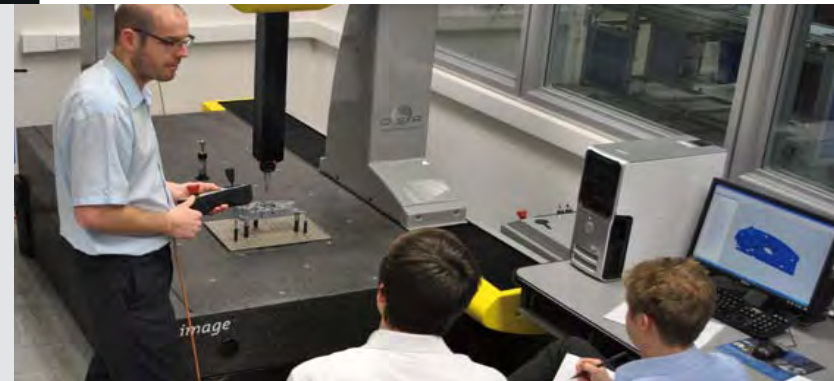
- Temperature controlled UKAS accredited laboratory
- Comfortable training and meeting rooms

Tailored Training Courses

Torus' training can follow either our standard format or tailored to suit. These range from operator training through to different levels of CMM Programmer. Each course is determined and quoted prior to delivery to ensure all the requirements are captured. The course is not purely based on software knowledge as that is only part of the program. The course structure is flexible; it is based on current skill level (as determined on the pre-assessment form), and the future modules requested.

Post Training Support

Training is not a one off event. When an engineer has completed a training course, it does not mean they know it all. There is a lead-time required to cement their new found knowledge and practice new skills. During this time they will need support from their managers and colleagues within their own company and Torus are also here to help. Following the course, Torus can visit the trainee within 8 weeks, for up to 4 hours which allows the trainee to have a face to face Q&As. The follow up visit also enables Torus to provide feedback to the manager on the trainees achievements.



Laser Scanning & Reverse Engineering

Using state of the art Laser scanning equipment we are capable of capturing highly accurate point cloud data which can be used for a variety of applications. Reverse engineering has become a standard procedure for engineers in a wide range of markets. The technique can be used in product development, production engineering, cost down programs and refurbishment of components. In situations where the engineer has only 2D data or no drawing at all, Torus will scan the component and generate a solid CAD model. The file can then be used to modify or manufacture the component. STL files can also be produced to allow the production of rapid prototypes and prototype castings.

Deviation Analysis

Laser scanning post production inspection and analysis is a new and powerful tool for design and manufacture comparison. Torus use software that allows the comparison of the actual part to the Nominal CAD model, in addition to part to part analysis.

A wide variety of comparison tools can be used for measurement and analysis including:

- Full part to nominal comparison
- Continuous or discrete tolerance settings
- Point to point measurement
- Wall thickness inspection

Reverse Engineering

A point cloud set is captured using the laser scanning system (500 000 points)



We can also offer a wide range of services including:

- Rapid Prototyping
- Wear and degradation analysis
- Manufacturing direct from scan data

Deviation Analysis

An actual part to 3D CAD nominal comparison can be performed using a surface tolerance topography.



Various surfacing techniques are used to accurately reverse engineer the data. A closed solid file is then delivered in the required format.



Large Scale Measurement

Torus Measurement Systems have extended their measurement capabilities to include onsite support utilising the latest portable laser trackers and articulated arms.

Torus service the automotive, defence, nuclear, aerospace, construction, marine and power generation industries.

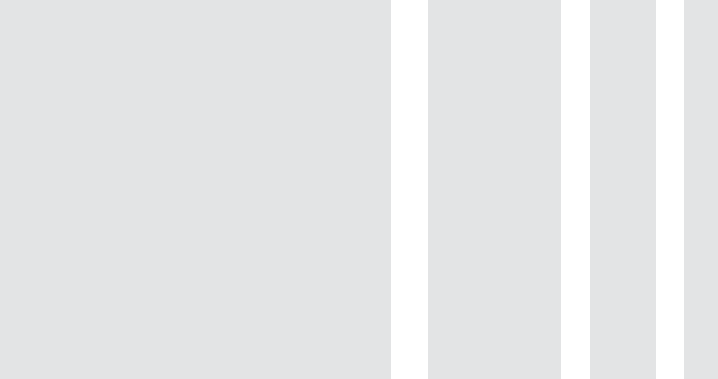
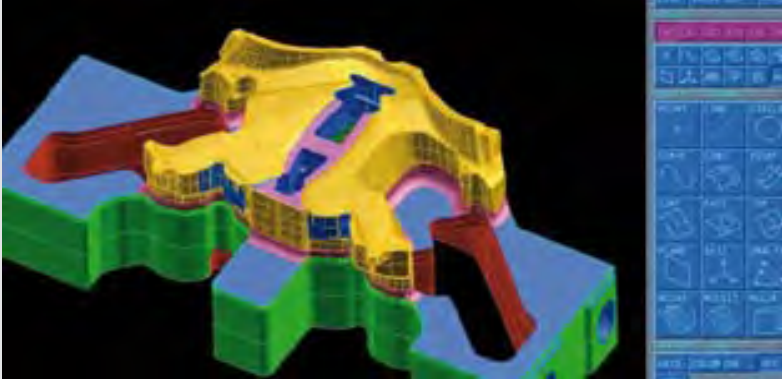
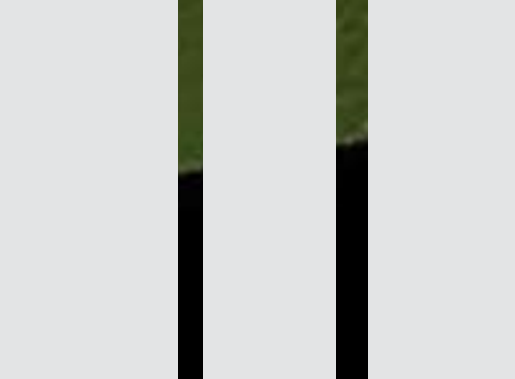
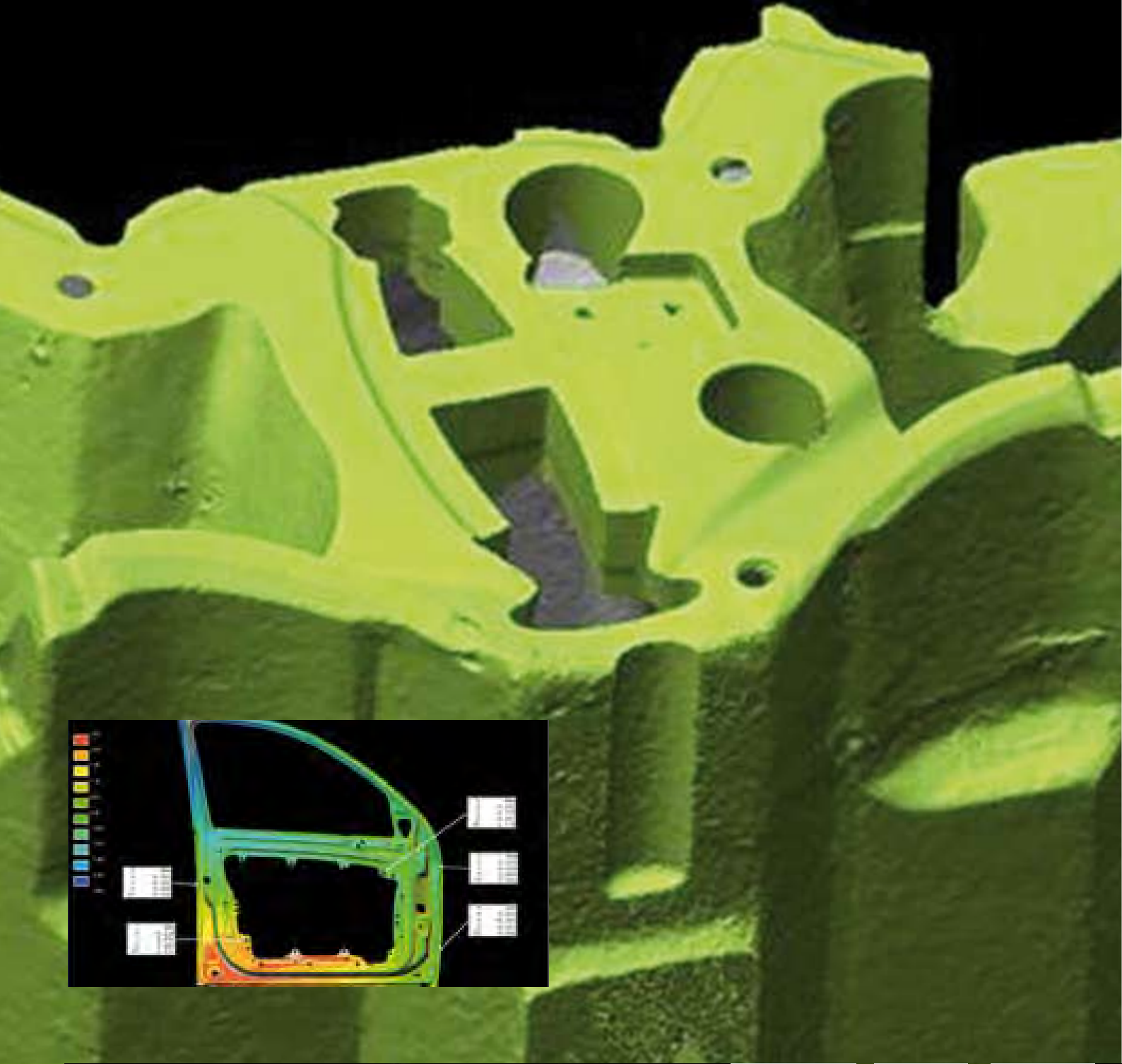
Large scale contract measurement is available for a single day of support through to several operators located onsite for months at a time.

Torus offer operator or equipment only hire, software support, accessories, training, best practice, reverse engineering, alignment, project support and independent analysis.

Measurement Capabilities:

Arms and Laser Trackers offer a versatile, accurate and dynamic measurement capability perfect for large scale parts.

- 1 meter to 70 meters measurement volume
- Faro/Leica Trackers
- Onsite Service



Optical Non Contact Inspection

Torus have invested in the latest state of the art Optical Non-Contact Inspection Systems. Offering a quick solution for small intricate components such as plastic parts for medical devices, and also large components such as flat panel displays and masks, or fixtured component part measurement up to a capacity of 500mm x 450mm x 200mm. All of our optical systems come complete with tactile probing to provide an all round solution.

Torus can provide subcontract inspection in addition to full turnkey projects to include program/ fixture supply.

We have capability in the leading brands of automated optical measuring equipment which include the following:

- Hexagon: Tesa Visio – PC-DMIS software
- OGP: CNC 500 – Measure X & MeasureMind 3D software

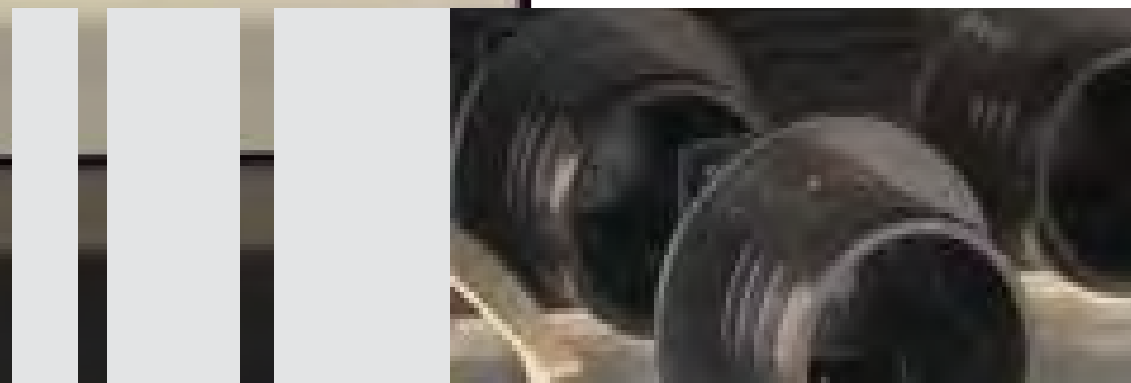


Measurement Capabilities:

The Optical non-contact systems have high quality zoom lens' providing excellent optical performance over their entire range. Illumination technologies track the X axis and provides square on profile lighting; crucial for the accurate measurement of thick walled or shaft components.

Surface illumination via vector light giving total lighting angle control ensuring important features are picked out for repeatable and accurate optical probing.

With a variety of optical viewing/lighting options and of course the addition of touch trigger probing, this allows flexibility as well as capability in the measuring system. The measurement of different materials and colours are now easily overcome. With the ability to measure direct to CAD models for profile comparison.



Sub Contract Inspection

- Independent third party evaluation
- Direct measurement to CAD model
- Contact and non-contact measurement
- Offsite Inspection using portable arm
- Reduced overhead costs
- Complex measurement made easy
- Our skilled engineers often reduce inspection lead-times
- Immediate assistance
- ISO / UKAS Calibration for Jig's and Fixtures

CMM Contract Inspection

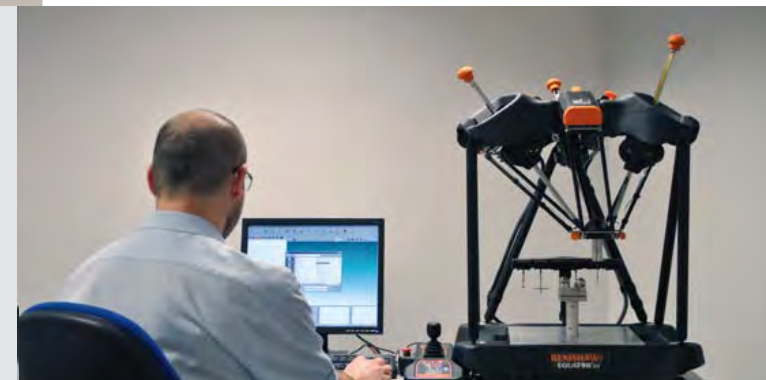
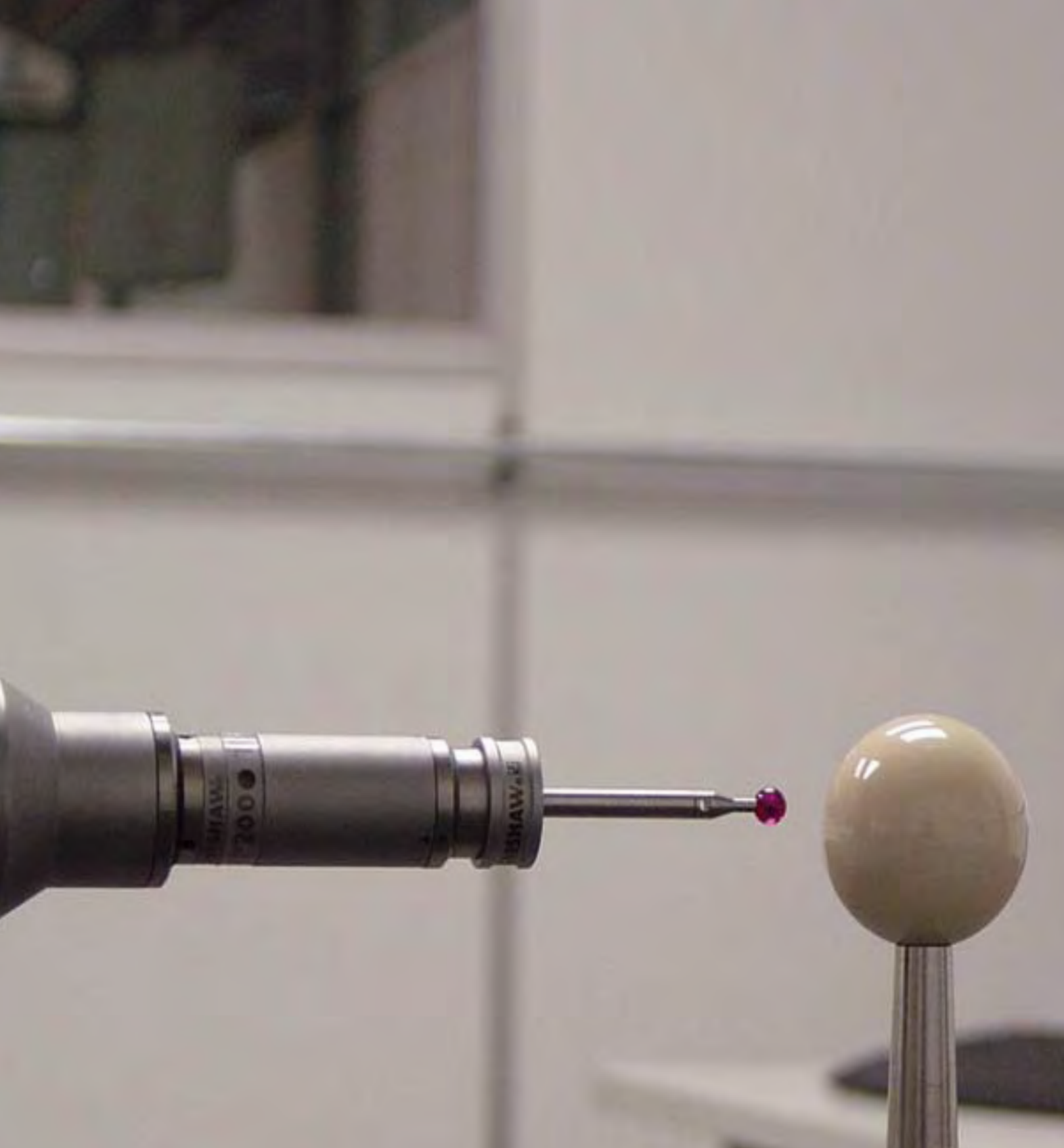
Torus Measurement Systems provide a unique contract inspection service to all industries. Our expertise and technical knowledge can assist you with your inspection requirements. From simple 'one-off' first off samples (ISIR), reverse engineering, direct comparison to CAD data, to large scale volume production; we have the capacity to assist with your immediate requirements and ease the demands caused by staff shortages, peak production periods or new product launches.

Our team of highly experienced engineers with knowledge across all industry sectors including automotive, presswork, aerospace, plastics and the medical sector provide an excellent service with quick response times, and assured quality of results. We offer impartial advice as an Independent supplier and have a wide range of high accuracy 'state of the art' measurement equipment.

To compliment the programs supplied to work in conjunction with the Renishaw Equator, Torus can generate a Cal file & UKAS certificate for your master artefact.

Portable Arm

With our portable Romer & Faro Arms, we can provide on-site inspection. For components or tooling that cannot be transported this is an ideal solution.



UKAS Calibration

Torus Measurement Systems calibration laboratory is equipped to perform a wide range of dimensional calibration. UKAS certification is achieved using first principle methods, and complemented by the very latest high accuracy co-ordinate measuring machines, all traceable to UKAS National Standards.

Accredited and rigorously audited to BS EN ISO. IEC 17025 and ISO 9001 ensures that the very high standard of quality systems and accuracy of results are being maintained.

Items requiring calibration can be pre-booked to minimise any inconvenience, ensuring that we

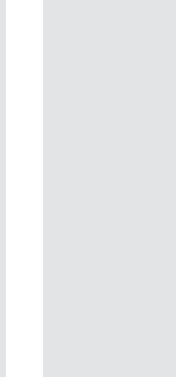
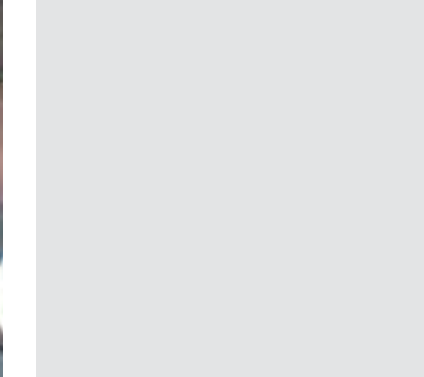
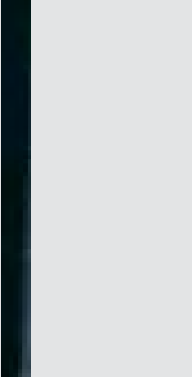
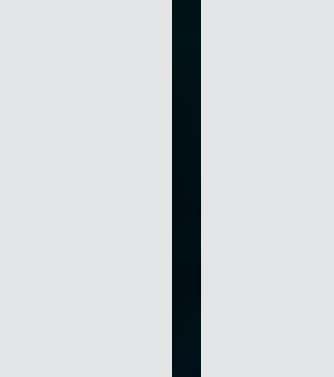


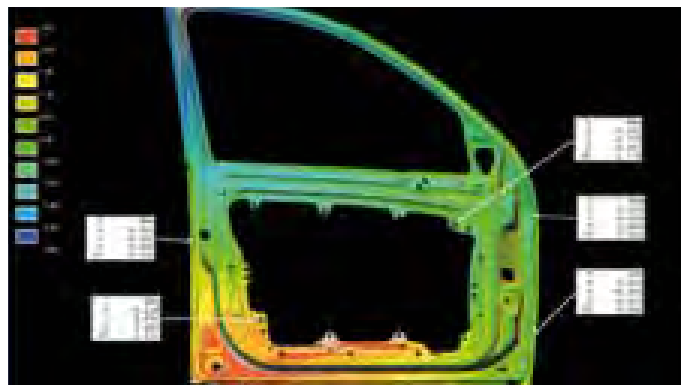
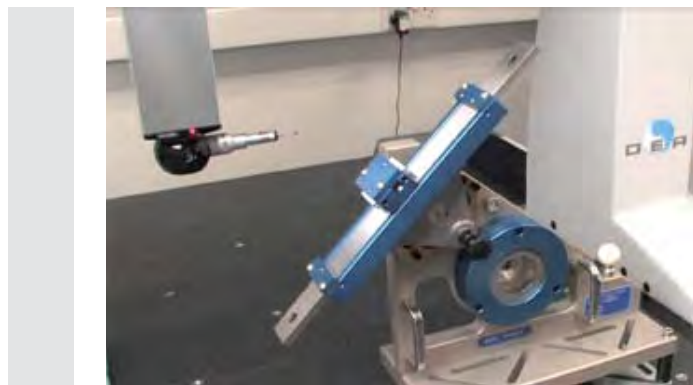
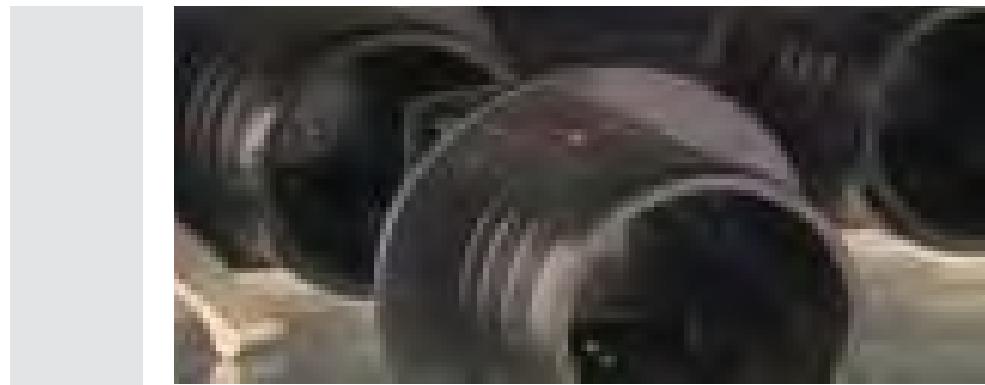
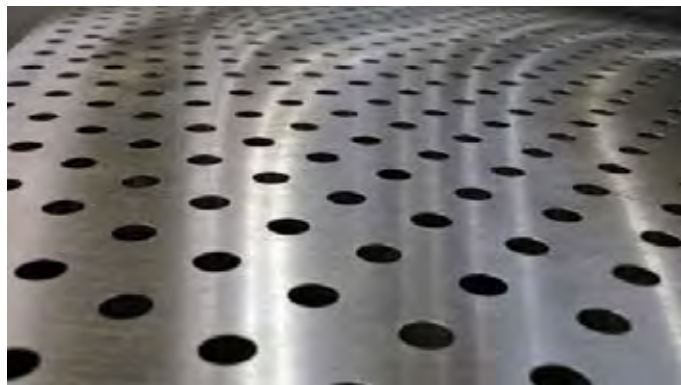
773

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