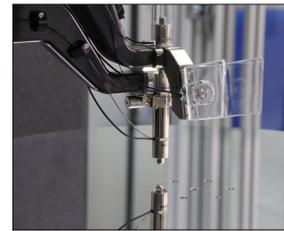


LUPHOScan⁸⁵⁰ HD

NEW



The world's most versatile, non-contact 3D form measurement platform for advanced large diameter optical surfaces

LUPHOScan⁸⁵⁰ HD

Advanced 3D Optics Metrology

Accurate measurement of aspheres, diffractives and freeforms up to Ø850 mm

LUPHOScan: A truly diverse range of non-contact metrology solutions

Taylor Hobson are pushing the boundaries of large optics metrology. Our expert metrologists are delighted to announce the launch of the LUPHOScan 850 HD.

Built on the foundations of the world renowned LUPHOScan HD platform, the LUPHOScan 850 HD delivers stable non-contact metrology for large complex optics applications.

The instrument has been developed working and listening closely to our many partners in optics manufacturing. Our metrologists understand the importance designing a system that delivers highly accurate, repeatable and reliable measurement data.

Results you can trust

The LUPHOScan with our forward-thinking innovation delivers true measurement accuracy

Revolutionary measurement capability

Highly accurate

- Capable of accurate and repeatable form error measurements to $< \lambda/20$ (PV99) and RMS from 5 nm*

Class-leading measurement flexibility

- From 5 mm up to 850 mm (dia.) x 210 mm (height)

High data density

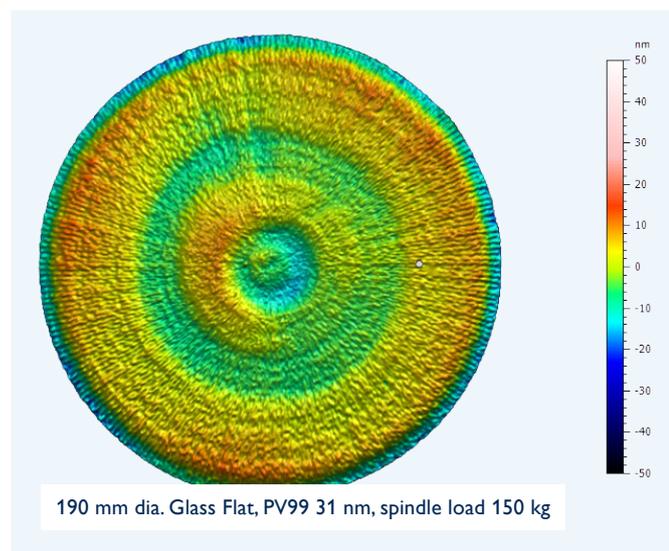
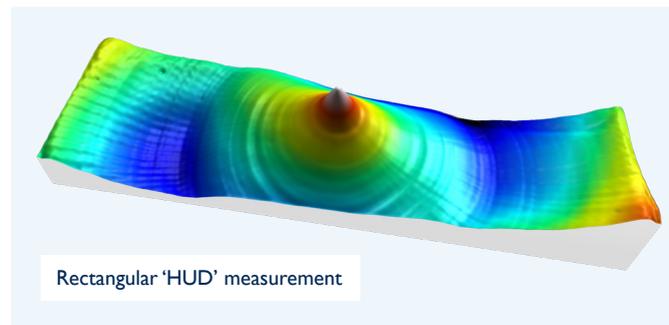
- Data density up to 6 million data points for accurate analysis of mid-spentials at large diameters

Freeform measurement

- Up to ± 8 degs for tangential slopes (radial slopes 90 degs)

Almost every material

- Transparent, specular, opaque, polished or ground



Optimised technology for measurement accuracy and reproducibility

Granite metrology frame

- Homogeneous metrology frame ensures accurate compensation for thermal expansion with optimised design to minimise vibration.

Real time compensation of ambient conditions

- 4 Temperature and 1 air pressure sensors

Low system noise for the highest accuracy

- Active anti-vibration designed by TMC, delivers optimised isolation of the measurement loop

Automatic centre and level

- Consistently accurate results through complete measurement automation

Ultra high repeatability

10 nm at 600 mm
with 150 kg load

(PV99i)

Large work load

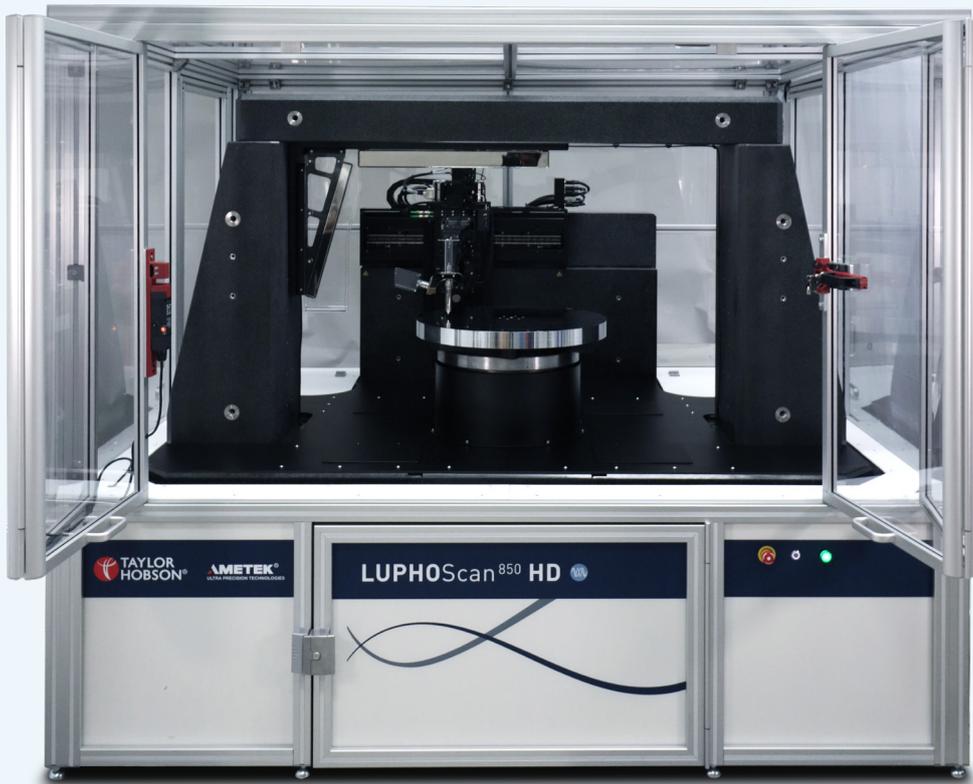
Up to
350 kg

Measurement capability

RMS from
5 nm

Freeform measurement

OAP, Toric,
True freeforms



Telescope



Space applications



Annular mirror

Measurement principle

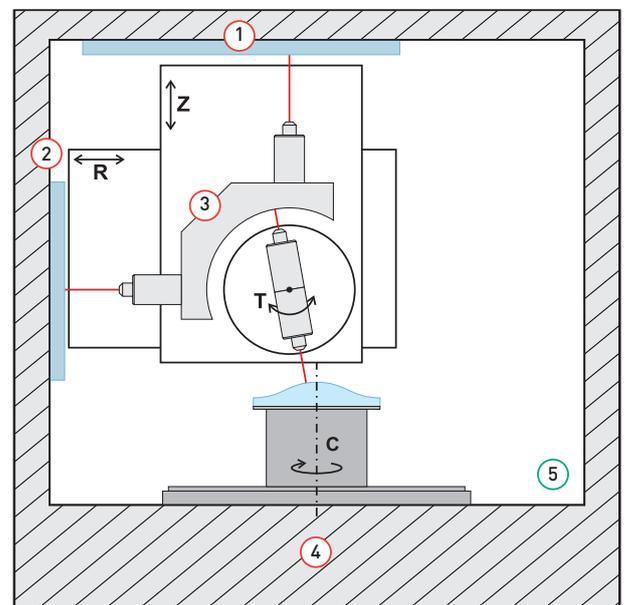
The probe tracks the form of the surface as the optic rotates, describing a spiral. This technique allows virtually any optical surface form to be measured.

Advanced probe technology

- Allows interruption of the probe during measurements without impacting measurement accuracy
- Critical for measurements on interrupted surface such as segmented or rectangular parts

Reference frame

- Probe stages (R, Z, T)
- Object stage (C)
- Temperature sensors (1-4)
- Air pressure sensor (5)



LUPHOScan 850 HD reference frame

Typical results

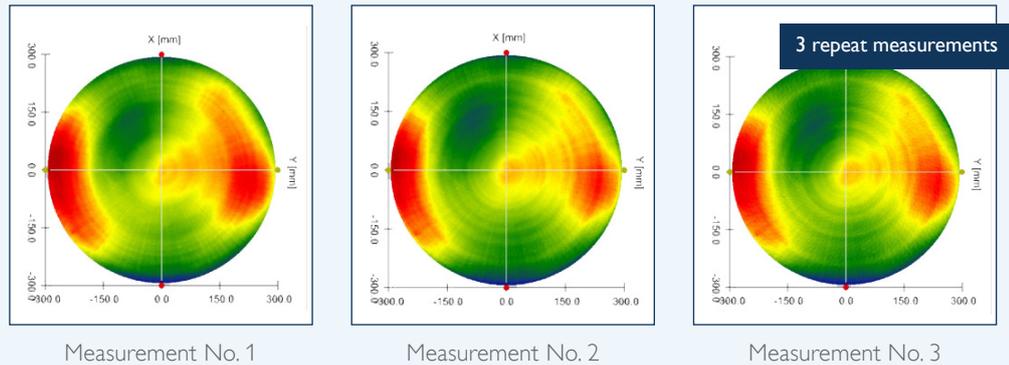
Study: repeatability and reproducibility

Repeatability study

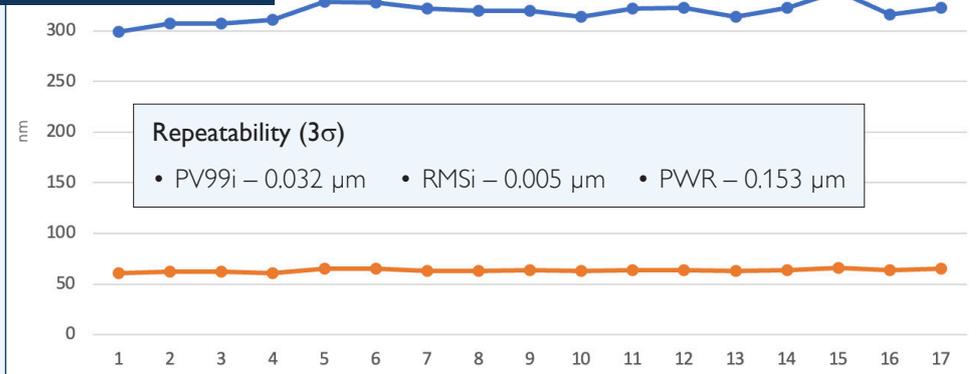
3 repeat measurements at 600 mm diameter on a precision glass flat with 150 kg additional spindle load.

Repeatability (3 σ)

- PV99i – 8 nm
- RMSi – 1 nm
- PWR – 0.033 μm



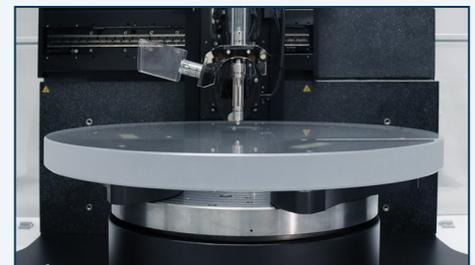
17 repeat measurements on a $\varnothing 600$ mm precision glass flat



Graph - 17 measurements taken over a 12 hour period without re-calibration (Inc. 150 kg spindle load)

Long-term repeatability

17 repeat measurements at 600 mm diameter on a precision glass flat with 150 kg additional spindle load.



Measurement of 600 mm precision glass flat

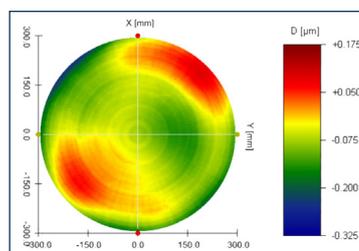
Reproducibility study

To demonstrate the accuracy and reproducibility, a $\varnothing 600$ mm reference flat is measured in two different orientations with and without a 150 kg work load.

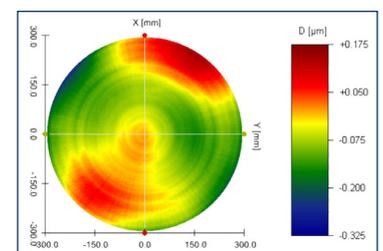
Clearly the form rotates with the system and PV99i remains stable for all orientations.

$\varnothing 600$ mm reference flat

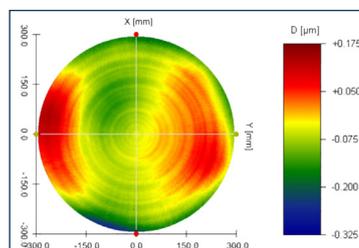
- 0° – 303 nm, 57 nm RMS
- 120° – 335 nm, 58 nm RMS
- 0° with 150 kg – 294 nm, 60 nm RMS
- 120° with 150 kg – 350 nm, 69 nm RMS



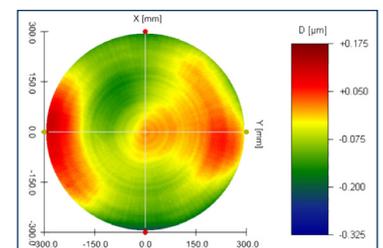
0° Orientation with no load



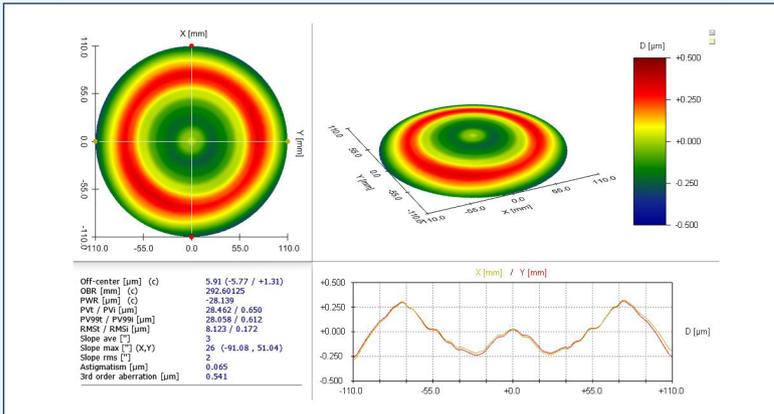
0° Orientation with 150 kg load



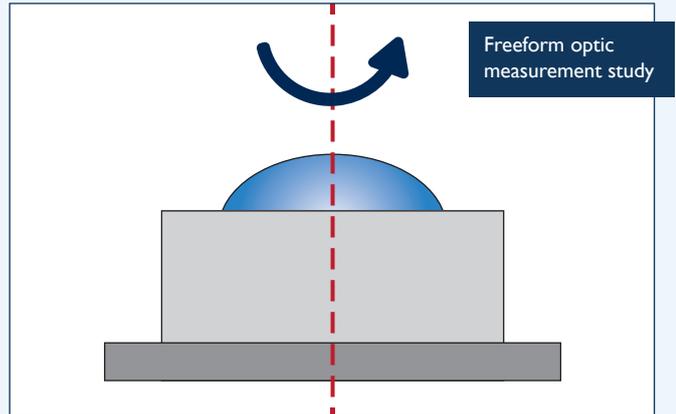
120° Orientation with no load



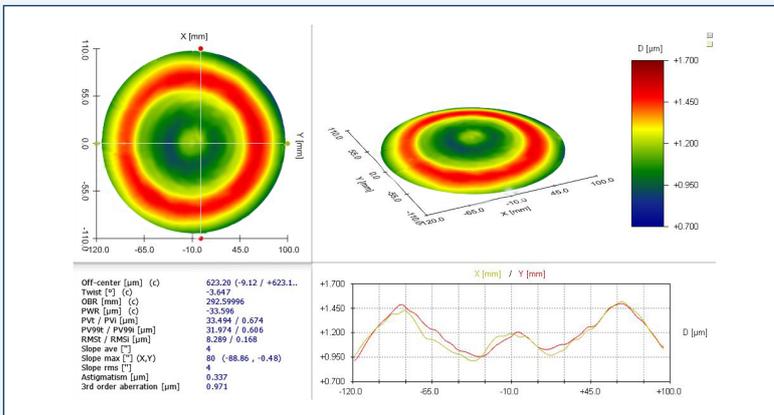
120° Orientation with 150 kg load



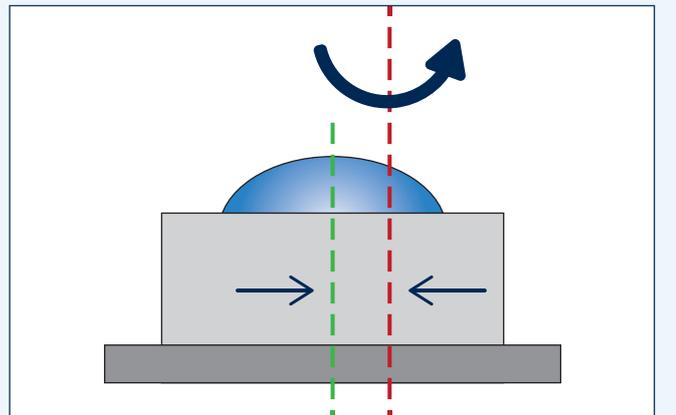
On-axis form error



Test sphere measured conventionally, on axis with spindle



10 mm off-axis form error



Test sphere offset 10 mm to spindle axis to simulate a freeform

Freeform measurement study

A large (220 mm) diameter, spherical component is measured on axis, then moved off axis.

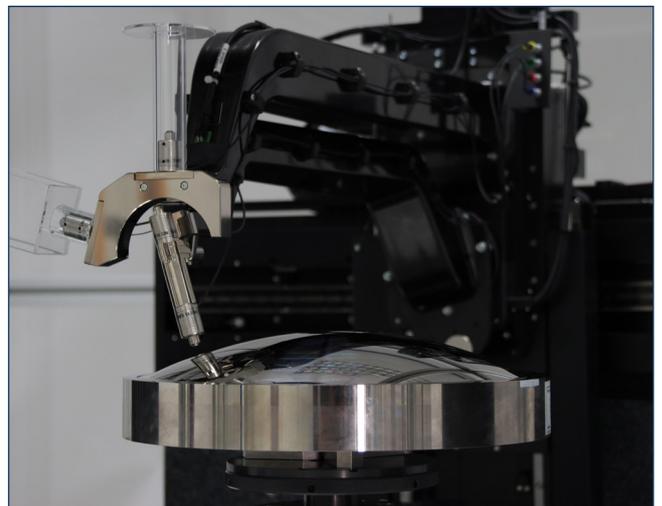
The 10 mm off-axis sphere is representative of a freeform component and allows direct comparison to the known, accurate, conventional spherical measurement.

On-axis measurement

- PV99i – 0.612 µm
- RMSi – 0.172 µm

Off-axis measurement

- PV99i – 0.623 µm
- RMSi – 0.167 µm



Measurement of 220 mm diameter simulated freeform

LUPHOScan⁸⁵⁰ HD

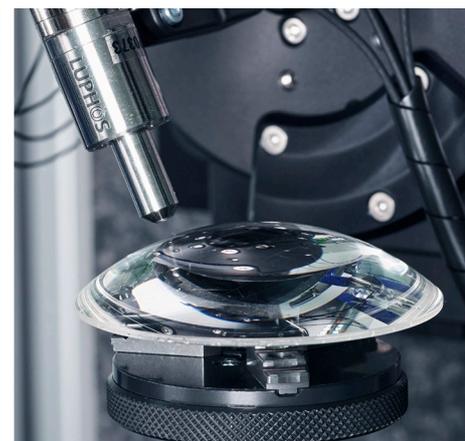
World-class global support

Local services from the optics metrology experts

Taylor Hobson's global brand reputation is built on a foundation of optics manufacturing coupled with an in-depth understanding of precision measurement for improving the design, throughput and performance of optics applications.

Taylor Hobson was established in 1886 with the vision of the Victorian entrepreneur, William Taylor, who founded a lens making company with his brother in Leicester, England. He was responsible for developing the world's highest quality cinema lenses which helped to develop the film industry in the early twentieth century.

As Taylor Hobson began to manufacture more accurate lenses, William Taylor realised there was a requirement for instruments that would measure the perfection of each lens. Without anything else on the market, Taylor Hobson did what they knew best - they invented something themselves, the first surface finish and roundness measuring instruments (Talysurf and Talyrond®).



Buy with confidence

When you purchase a Taylor Hobson metrology system, you benefit from the very best local after sales support. We know that the performance of your instrument is important to you. It is important to us as well.

We have a global network of Taylor Hobson accredited engineers and metrologists with the expertise to support you through the toughest measurement challenges, from small lenses, large freeforms and complex data analysis.

Future proof your investment

As you push the boundaries of optics manufacturing our metrology systems will develop with you. In conjunction with their flexibility LUPHOScan HD platforms facilitate production of more complex lens designs and are ready for future challenges in lens production.

Local training from metrology experts

Your instrument is only as good as the operator using it, we provide on-site training for your applications to give you the confidence you need in your measurement results.

Ongoing application support is delivered by our team of expert metrologists who have unmatched knowledge in the field of optics measurement. Our professional metrologists solve the most demanding application problems daily and thrive on the delivery of measurement solutions.

“ We take great pride on being the industry standard for non-contact metrology solutions ”

Dr. Juergen Petter | Director of Optics Metrology

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

Email: taylor-hobson.sales@ametek.com

Tel: +44 (0) 116 276 3771

- **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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