Opto Alignment

QuickPRO-CUBE™ Mini
High-Speed, dual-surface, geometry characterization of single or in-tray optical components

By integrating a pair of single-point, non-contact, nanometer-resolution chromatic confocal sensors with high-speed, nanometer-encoded X/Y/Z coordinated motion, the QuickPRO-CUBE™ captures front, back and datum surface 3D point cloud topography for the geometric characterization of single lenses or micro lenses in trays. The form invariant motion architecture permits measurement of both rotationally symmetric and more complex non-axially symmetric or freeform shapes to a maximum measurement diameter of 50mm. The total measurement time is from 30sec to 60sec per surface per lens, depending on the lens diameter and 3D point cloud sampling density.

Measured geometric parameters include:

- Front-to-Back surface Vertex Offset relative to defined centration

- Front-to-Back surface Wedge Angle relative to defined tilt datum

- Front-to-Back Total Thickness variation (TTV)

- Front and Back surface Sag/Form error

Applications

The CUBE is specifically designed for factory-floor QA of polished, molded, or diamond turned optical components, including optically opaque infrared lens materials and metals. An added advantage is the ability to measure multiple smaller lenses in-tray or lens arrays during a single measurement sequence.

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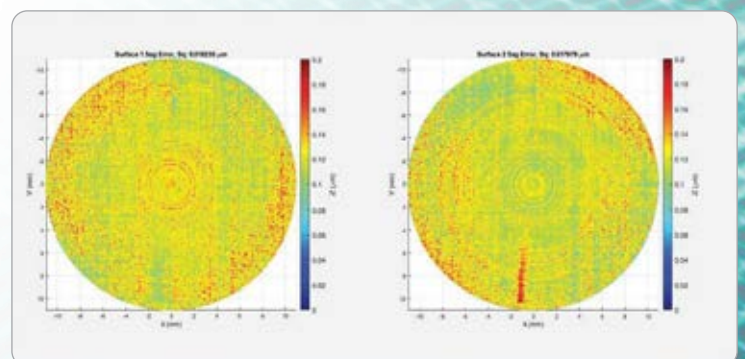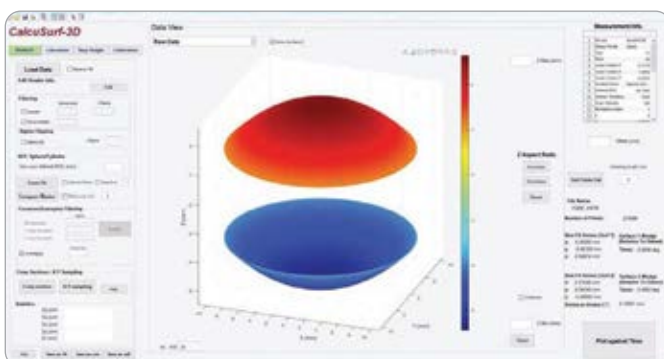
System Characteristics

- Compact, bench-top unit with environmental enclosure.

- Dual single-point, non-contact, visible-light, chromatic confocal sensors with up to 10kHz combined measuring rate.

- Vibration insensitive and dimensionally stable Invar metrology frame.

- Nanometer encoded X/Y/Z coordinated motion with magnetic linear motors and cross roller bearings for fast raster, spiral or custom-scanning over 50mm (X), 50mm M, 50mm (Z).

- Self-centering fixture with precision quick connect for fast load/unload.

- Fixtures for both single optical components and micro-lens trays.

- User-friendly QuickPRO™ instrument control and data acquisition software for sensor optimization, auto-centering, data capture and coordinated motion sequencing.

- CalcuSurf-3D™ view and analyze software for multi-surface 3D point cloud data.

Geometric Parameters

- Vertex-to-Vertex Offset (V_1-V_2)
- Wedge Angle (θ_W)
- Center Thickness (CT)
- Edge Thickness Variation (ET_1-ET_2)
- Radius of Curvature (R_1 & R_2)
- Sag (Sag_1 & Sag_2)
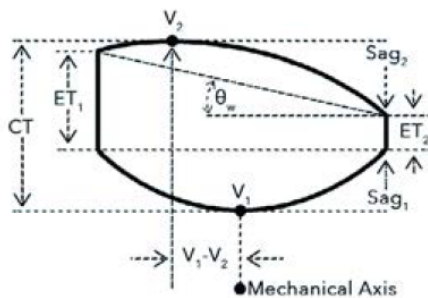
QuickPRO-CUBE™ Mini

SYSTEM	
Dimensions (L: W: H)	560mm x 560mm x 370mm
Weight	60kg
System Controller	Motion and sensor control; high-speed data link
Power Requirements	110-220V AC, 50-60 Hz, 2 amps (220V), 5 amps (110V)

MOTION	
Measurement Area (X: Y: Z)	50mm x 50mm x 30mm
Position Accuracy	< 1µm
Drive Type	Linear servo motor w/magnetic counterbalance (Z)
Stage Speed	100mm/s
Scan Type/Path	Spiral, Raster, User-Defined
Max Sample Size	Ø75mm
Load Capacity	2kg

SENSORS			
Technique	Chromatic Confocal x2		
Applications	Distance, Centration, Wedge, Sag, Thickness		
Sampling	Up to 10,000 points/sec/sensor		
Probe Range	0.4mm	0.5mm (HS)	1mm
Lateral Resolution	2µm	5µm	4µm
Working Distance	15mm	11mm	37mm
Axial Resolution	3nm	20nm	150nm
Maximum Slope	±45°	> ±45°	±45°

MEASUREMENTS		
V1-V2 Decenter Accuracy	0.010mm	Includes edge run-out
Wedge Accuracy	0.005° [18 arcsec]	Requires datum surfaces
Axial Measurement Accuracy	0.001mm	
Thickness Accuracy (TTV)	0.002mm	Depends on refractive index

Dependent on sample quality and 3D point cloud density

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