

VERIFIRE ASPHERE

Versatile vertically configured optical workstation provides high performance semi automated production metrology of aspheric surface form and radius of curvature of spherical optics.

SYSTEM

Measurement Capability	Surface form of aspherical, spherical and flat optics, and semi automated radius of curvature of spherical parts
Measurement Technique	Laser based, three-dimensional, mechanical phase-shifting interferometry combined with heterodyne displacement interferometry
Measurement Hardware	VeriFire AT+™ laser Fizeau interferometer and ZMI 501 displacement interferometer
Test Beam Diameter	4 inch (102 mm) or 6 inch (152 mm)
Orientation	Downward-looking configuration
Z-Axis Travel	850 mm
Zoom Range	Encoded; 1:5X
Computer and Software	High-performance Dell PC with dual monitors, ZYGO MetroPro™ software with proprietary asphere metrology algorithms and Microsoft Excel.

ASPHERIC MEASUREMENT PERFORMANCE

Form Uncertainty ⁽¹⁾	≤ 30°: ≥ F/1.0 ⇒ 60 nm ($\lambda/10$) ≤ 45°: F/0.71 ⇒ 100 nm ($\lambda/6$) ≤ 60°: F/0.58 ⇒ 200 nm ($\lambda/3$)
Alignment	Semi-automated computer alignment
Simple Repeatability ⁽²⁾	≤ 3 nm ($\lambda/200$) RMS
Surface Measurement Repeatability ⁽³⁾	≤ 10 nm ($\lambda/60$) RMS
Height Resolution	0.08 nm
Cycle Time	4 - 8 minutes (typical) ⁽⁴⁾

LASERS

Type	Helium-Neon, Class II
Wavelength	632.8 nm

PHYSICAL CHARACTERISTICS

Dimensions (HWD)	4 inch: 239 x 172 x 150 cm 6 inch: 262 x 172 x 150 cm
Weight	< 650 kg

UTILITY REQUIREMENTS

Power	100 to 240 VAC, 50/60 Hz
Compressed Air	80 psi (5.5 bar); dry and filtered source (for integrated vibration isolation system)

OPERATIONAL ENVIRONMENT

Temperature	15 to 30°C
Rate of Temp Change	< 1° C per 15 min
Humidity	5 to 95% relative, noncondensing
Vibration Isolation	Isolates frequencies 1 Hz - 120 Hz



TEST PART CHARACTERISTICS

Material	Various including glass, metals, ceramics and plastics
Aspheric Shape	Axially symmetric concave or convex shape with specular surface and a measurable apex ⁽⁵⁾
Departure from asphere design	Up to 10 μ m
Departure from vertex sphere R0	Approximately 800 μ m
Part Diameter	1 mm to 130 mm ⁽⁶⁾
Part Weight	≤ 5 kg
Reflectivity	0.1% to 100% (based on transmission element)

NOTATIONS

1. Form uncertainty is variation from first principle error budget.
2. 2σ variation of 30 measurements.
3. Difference of a single measurement from the average of 30 measurements. A mean $+2\sigma$ value.
4. Total Average Cycle Time (TACT) estimate for a 3D map with ~700,000 data points. Includes alignment, acquisition and analysis, and is dependent on the number of measured zones.
5. VeriFire Asphere calculator (OMP-0525) predicts part measurability.
6. Range depends on transmission sphere selection and part specifications.