

Form Talysurf PGI 840



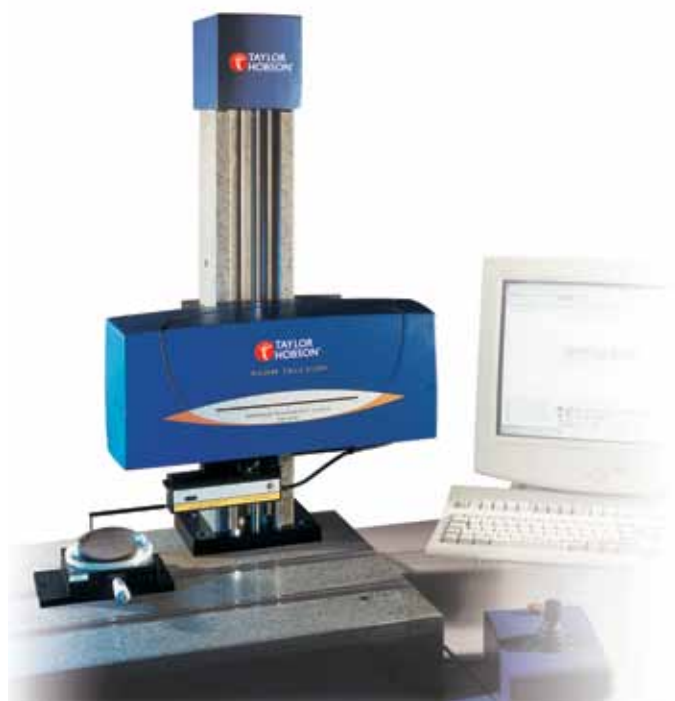
Precision form & surface finish measurement for aspheric optics

The Form Talysurf PGI 840 from Taylor Hobson is a premium specification measurement system for the small to medium sized aspheric optics market. It is designed for applications where optimum component quality and consistency cannot be compromised.

PGI 840 - A new generation of excellence

At Taylor Hobson we are proud of our reputation as the solution provider of choice within aspherics metrology. The Form Talysurf has evolved over the past 20 years, delivering continuous improvement for our customers. The PGI 840 Aspherics Measurement System represents a new level of performance for applications such as:

- Diamond-turned or Ultra-precision ground molds for plastic or glass optics
- Aspherics for laser applications
- Digital cameras, projectors, etc
- IR & Diffractive optics up to 120mm diameter



Designed to meet research & production needs

Ultra-high precision processes such as Single-Point Diamond Turning allow aspheric lenses to be manufactured with form tolerances down to small fractions of λ . To achieve such levels of precision, metrology must be fully integrated with machining.

Form Talysurf PGI 840 delivers this capability by directly exporting measurement results back to the machine tool, creating a corrective 'feedback loop'. New custom styli expand the range of applications which can be measured using the PGI 840.

PGI 840 has industry leading specifications

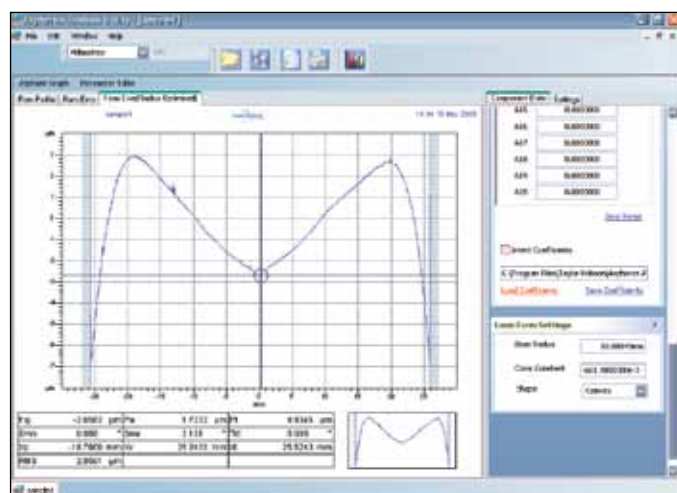
The Form Talysurf PGI 840 has been developed specifically for the optics industry. Every aspect of manufacture is to the highest possible level which results in unparalleled system performance.

- 120mm Traverse unit with 0.25 μ m \ 120mm straightness
- 8mm Gauge range, 0.8nm vertical resolution
- 16mm Gauge range possible with 120mm stylus arm
- 2nm RMS noise floor provides market-leading optics surface finish measurement capability
- Extensive Range of Optional Accessories, including styli for demanding applications

Aspherics Analysis Software

Taylor Hobson's recently launched Aspherics Analysis Software incorporates a number of new features expressly designed to meet the needs of Aspherics Optics Manufacturers, including:

- Aspheric Form Analysis
- User Selectable Radius Optimisation and λ s Filter
- Report Generation Capability
- SAG Tables
- Astigmatism Analysis
- Derived Coefficients Module (optional)
- Asphero-Diffractive Analysis (optional)



For more details of the Form Talysurf PGI 840, please contact your local Taylor Hobson sales agent, or go to our website.



Specification PGI 840

| Horizontal Performance | | Environment |
|--|--|-------------|
| Traverse length - X Max / Min | 120 mm / 0.1 mm (4.7 in / 0.004 in) | |
| Measuring speeds ¹ | 0.1 mm/s, 0.25 mm/s, 0.5 mm/s & 1 mm/s (0.004 in/s, 0.01 in/s, 0.02 in/s & 0.04 in/s) | |
| Traverse speeds | 10 mm/s max (0.39 in/s max) | |
| Data sampling interval in X (high) | 0.125 µm over 120mm length (5 µin over 4.7 in length) | |
| Data sampling interval in X (standard) | 0.125 µm [0.1 mm to 15 mm length] (5 µin [0.004 in to 0.6 in]) 0.25 µm [15 mm to 30 mm length] (10 µin [0.60 in to 1.2 in]) 1 µm [30 mm to 120 mm length] (40 µin [1.20 in to 4.7 in]) | |
| Straightness error [Pt] (X = length) ² | 250nm/120mm or [50 + 1.7X] nm (10µin/4.7in or [2 + 1.7X] µin) | |
| Vertical Performance | | |
| Nominal measuring range (Z) | 8mm [60mm stylus arm] (0.31 in [2.36 in]) 16mm [120mm stylus arm] (0.62 in [4.72 in]) | |
| Resolution (Z) ³ | 0.8nm @ 8mm range (0.03 µin @ 0.31 in) range | |
| Range to resolution ratio | 10,000,000 : 1 | |
| Stylus arm length, tip size, force | 60mm arm, 2µm radius conisphere diamond stylus, 1mN force 120mm arm, 0.5mm radius ball, 20mN force | |
| Z axis nonlinearity (Z=gauge displacement) | (0.07 + 0.03 Z [mm]) µm (3 + 30 Z [inches]) µin - after calibration ⁴ | |
| Repeatability of Z axis indication (flat surface - diamond stylus) | 0.1 µm (4 µin) ⁵ | |
| Repeatability of Z axis indication (curved surface - diamond stylus) | 0.08 µm (3 µin) ⁶ | |
| Repeatability of Z axis indication (curved surface - ball stylus) | 0.12 µm (4.5 µin) ⁶ | |
| System Performance ³ | | |
| Form Error - Pt ⁷ (ball calibration radius) | Max 0.15 µm @ 80 mm (6 µin @ 3.15 in) Typically less than 0.1 µm @ 80 mm (4 µin @ 3.15 in) | |
| System noise - RMS ⁸ | 2nm (0.08µin) | |
| Radius measurement uncertainty ⁹ | 0.1 - 80 mm (0.004 - 3.15 in) = 1 - 0.005% of nominal 80 - 1000 mm (3.15 - 39.4 in) = 0.005 - 0.1% of nominal 1000 - 2000 mm (39.4 - 78.7 in) = 0.1% of nominal | |
| Inclination measurement uncertainty | 0.5 arc minute uncertainty (+ / - 35° maximum range) | |
| Dimensions L x D x H (granite base) | 760 x 500 x 120 mm (30 x 20 x 4.7 in) | |
| Dimensions L x D x H (traverse unit) | 410 x 130 x 225 mm (16 x 5.2 x 8.9 in) | |
| Weight (traverse unit) | 13.5 Kg (30 lbs) | |

Environment

Storage temperature
5°C to 40°C (41°F to 104°F)

Storage humidity
10% to 80% Relative,
non condensing

Operating temperature
18°C to 22°C (64°F to 72°F)

Temperature gradient
< 2°C (< 3.6°F) per hour

Operating humidity
45% to 75% Relative,
non condensing

Maximum RMS floor vibration
2.5µm/s (100µin/s) at < 50Hz
5.0µm/s (200µin/s) at > 50Hz

Electrical supply

Supply type
Alternating supply, singlephase
with earth (3-wire system)

Instrument and computer voltage
90V - 130V or 200V-260V
(switch selectable)

Frequency
47Hz to 63Hz

Supply voltage transients - width
EN 61000 - 4 - 4 : 1995

Power consumption
500VA

Safety
EN 61010 - 1 : 2001

EMC
EN 61000 - 6 - 4 : 2001
EN 61000 - 6 - 1 : 2001

Laser classification
Class 1 product to EN 60825-1 (2001)
Continuous wavelength (CW) output
< 1mW Max power for the laser
< 50µW Max power for the product

The above technical data is for measurements taken in a metrology laboratory controlled environment: 20°C ± 1°C (68°F ± 1.8°F), draft free, and isolated from low frequency floor borne vibration. Uncertainties and maximum permissible errors (MPEs) are at 95% confidence in accordance with recommendations in the ISO Guide to the expression of uncertainty in measurement (GUM:1993). All errors are expressed as MPEs.

- For surface texture measurements, speeds of 0.5mm/s (0.02in/s) and less are recommended.
- Measured over a glass flat nominally parallel to the traverse datum using a 60mm arm with a diamond stylus (speed = 1mm/s, LS Line analysis, primary filter λs = 2.5mm).
- Using a 60mm arm with a diamond stylus.
- Measurements up and down a 35° angled slope over 80% of the gauge range, using a 60mm arm with a diamond stylus.
- Repeated measurements over a glass flat that is nominally parallel to the datum [10mm traverse length, primary filter λs = 0.025mm].

- Repeated measurements over an 80mm radius glass standard [primary filter λs = 0.25mm].
- From a repeat measurement on the calibration artifact over 75% of the gauge range (LS Arc analysis, primary filter λs = 0.25mm).
- Measured over a glass flat nominally parallel to the traverse datum using a 60mm arm with a diamond stylus (speed = 0.1mm/s, Gaussian roughness filter, 0.08mm cut-off, 30:1 bandwidth).
- Assumes a calibration artifact of perfect radius.

NOTE: Taylor Hobson pursues a policy of continual improvement due to technical developments. We therefore reserve the right to deviate from catalog specifications.