

OPTICAL THICKNESS GAUGE 157/137 Series

Non-contact thickness measurement with the reliable accuracy required for the most meaningful test results.

Precise thickness information is critical in the development and production of a variety of materials. To address this need, Bristol Instruments offers a family of Optical Thickness Gauge products that employ proven interferometer-based technology to accurately measure material thickness. This technique also measures multiple layers simultaneously with exceptional long-term repeatability. This performance makes these products ideal for applications such as:

- **Medical Balloon Catheters:**
measures wall thickness of body, neck, and cone
- **Medical Tubing:**
measures wall thickness, outer diameter, and inner diameter
- **Contact and Intraocular Lenses:**
measures center thickness and sagittal height
- **Optical Components and Lens Assemblies:**
measures individual components and lens stack thickness
- **OLED, AMOLED, and LCD Displays:**
measures total and individual layer thickness including laminating adhesives



KEY FEATURES

- Thickness is measured to an accuracy as high as $\pm 0.1 \mu\text{m}$.
- Exceptional long-term measurement repeatability as good as $\pm 0.02 \mu\text{m}$.
- Measurement confidence level of $\geq 99.7\%$.
- Traceable to NIST standards.
- Continuous calibration with a built-in intrinsic standard of length.
- Unmatched stability virtually eliminates thermal drift.
- Broad measurement range of $35 \mu\text{m}$ to 28mm .
- Measures thickness from one side without damage or deformation.
- Up to 15 layers can be measured simultaneously.
- Straightforward operation with PC using USB or Ethernet interfaces.
- Windows-based software is provided to control measurement parameters and to report thickness data.
- Automatic data reporting using LabVIEW, .NET, or custom programming eliminates the need for a dedicated PC.
- Optional fully integrated optical switch allows for up to eight test stations with a single instrument.

It's Our Business to be Exact!

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SPECIFICATIONS

157/137 Series

MODEL	157	137	137LS
THICKNESS MEASUREMENT			
Method	Non-contact optical interferometry		
Range ¹	35 μm - 8 mm (1.37 - 315 mils)		35 μm - 28 mm (1.37 - 1102 mils)
Accuracy ^{2, 3}	$\pm 0.1 \mu\text{m}$	$\pm 1.0 \mu\text{m}$	
Repeatability ^{4, 5}	$\pm 0.02 \mu\text{m}$ (without averaging)	$\pm 0.05 \mu\text{m}$ (without averaging)	
Traceability	Verified with NIST certified gauge blocks		
Display Resolution	0.01 μm		
Units	mm, μm , mils		
MEASUREMENT RATE			
	20 Hz		5 Hz
INSTRUMENT INTERFACE			
	USB and Ethernet with Windows-based OTG display software Ethernet can be used for network connection allowing instrument access to up to 8 clients Library of commands for LabVIEW, .NET, and custom programming		
COMPUTER REQUIREMENTS ⁶			
	PC running Windows 7, 8, or 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device		
OPTICAL SWITCH ⁷			
Capacity	Integrated 1 x 8 fiber switch		
Switch Time ⁸	1 ms		
ENVIRONMENTAL ⁹			
Warm Up Time	None		
Temperature	15°C to +30°C (-10°C to +70°C storage)		
Pressure	500 – 900 mm Hg		
Humidity	$\leq 90\%$ R.H. at + 40°C (no condensation)		
DIMENSIONS AND WEIGHT			
Dimensions (H x W x D)	3.5" x 17.0" x 15.0" (89 mm x 432 mm x 381 mm)		
Weight	17 lbs (7.65 kg)		
POWER REQUIREMENTS			
	90 - 264 VAC, 47 - 63 Hz, 80 VA max		
WARRANTY			
	3 years, includes parts and labor		

- (1) Physical thickness assuming an index of refraction of 1.5. Physical thickness is equal to optical thickness divided by the index of refraction.
- (2) Defined as measurement uncertainty, or maximum thickness error, with a confidence level of $\geq 99.7\%$.
- (3) Uncertainty over the entire operational environmental conditions.
- (4) Standard deviation for a 60 minute measurement period.
- (5) Dependent on the reflectivity of the material under test at the probe wavelength of 1.3 μm . Specification is given at 4% reflectivity. When reflectivity is lower, repeatability is reduced to a worst case of about $\pm 0.15 \mu\text{m}$.
- (6) Required for initial optical probe alignment and use with the Windows-based OTG display software. Not required for measurement.
- (7) Integrated fiber optic switch included with models 157-8 and 137-8.
- (8) Switch time has no effect on the measurement rate of the 157-8 and 137-8 systems.
- (9) Characteristic performance, but non-warranted.



Bristol Instruments reserves the right to change the detail specifications as may be required to permit improvements in the design of its products. Specifications are subject to change without notice.