BIREFRINGENCE MEASUREMENT

EXICOR® 150AT

PRODUCT BULLETIN

Hinds Instruments' Exicor Birefringence Measurement system Model 150AT is the work horse platform of the Exicor® birefringence measurement system family of products. This system is designed for inspection and testing of semiconductor wafers and photomasks. Its benchtop design and intuitive automated scanning software make it well-suited for routine evaluation of semiconductor wafers and photomasks.

LEADING EDGE SENSITIVITY AND REPEATABILITY

Using Hinds Instruments' patented Photoelastic Modulator (PEM) technology, the system provides the highest levels of birefringence sensitivity available today. In addition, the PEM provides high-speed operation, modulating at a 50 kHz rate. Leading edge sensitivity and repeatability easily provide subnanometer levels of birefringence measurement, critical to many applications.

DESIGNED FOR SIMPLE, STRAIGHT FORWARD OPERATION

An optical sample as large as 6" x 6" (larger sizes optional) can be characterized manually or automatically mapped and graphically displayed. Once a sample is placed on the translation stage, intuitive software guides the operator through the step measurement process. User interface software calculates the retardation value and fast axis angle and displays them in a variety of formats. The software also provides file management and calibration features.

Applications

♦Semiconductor Wafer Inspection:
Performs full-field birefringence distribution measurements on silicon wafers and silicon carbide (SiC) wafers with diameters ≤150mm. Effectively identifies stress-induced birefringence characteristics from processes like cutting, grinding, and epitaxial growth, helping evaluate material lattice integrity and process stability.

♦ Photomask Quality Assessment:
Conducts high-resolution birefringence uniformity scans for photomasks of all kinds. Detects optical performance deviations caused by material defects or processing stress, contributing to photolithographic pattern transfer accuracy.

Significant Features

- Unprecedented sensitivity in low-level birefringence measurement
- Simultaneous measurement of birefringence magnitude and angle
- Precision repeatability
- High-speed measurement
- Automatic mapping
- Photoelastic modulator technology
- Simple, user-friendly operation

EXICOR® BIREFRINGENCE MEASUREMENT SYSTEMS

EXICOR® 150AT

PRODUCT BULLETIN

SPECIFICATIONS

	Extended Range	Spectroscopic
	½ Wave Systems	ATS Systems
Retardation Range, nm	0.005 to 300+	0.005 to 300+ (Red) 0.005 to 250+ (Green) 0.005 to 200+ (Blue)
Resolution / Repeatability		
Retardation, nm	0.001 / ±0.015	0.001 / ± 0.025
Fast Axis Angle	0.01°/ ±0.07°	0.01°/ ±0.07°
Measurement Rate/Time	Up to 100 pps / Sample Dependent	Up to 10 pps / Sample Dependent
Spot Size	~ 1 mm typical	Variable, 1-3 mm

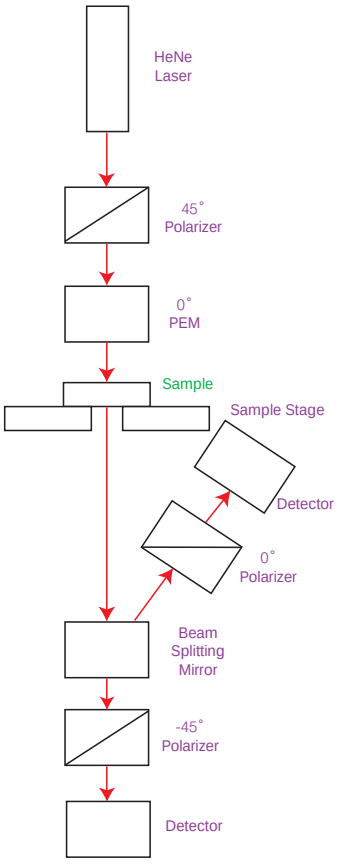
Specifications presented are based on 633nm laser source unless otherwise noted. Custom wavelengths are available from DUV (>150nm) to NIR (<1550nm). Typical system wavelengths available are 157nm, 193nm, 248nm, 355nm, 405nm, 436nm, 455nm, 470nm, 505nm, 530nm, 546nm, 617nm, 625nm, 632.8nm, 660nm, 850nm, 1064nm, 1310nm and 1550nm

1. Up to 0.8nm, 1% thereafter 2. Up to 1.5nm, 1% thereafter 3. Up to 2.5nm, 1% thereafter

Exicor 150AT measures retardation integrated along an optical path through the optical sample under investigation. It is designed to measure and display both the magnitude and fast axis orientation of the samples optical retardation.

A unique design eliminates moving parts in the optical train and avoids the necessity to switch between measurement angles. A HeNe laser beam is polarized and then modulated by the PEM. The modulated beam is transmitted through the sample and divided by a beam-splitting mirror. Each beam passes through a combination of an analyzer, optical filter, and photodetector. The electronic signals are processed through a lock-in amplifier that provides very low level signal detection.

A software algorithm, developed by Hinds Instruments, converts the signal levels from the electronics module into parameters from which linear birefringence can be determined. The computer selects from two inputs, allowing sequential measurements from the two signal channels. The data is analyzed, and then retardation magnitude and axis angle are displayed and stored in a file. When operated in the automated mapping mode, the x-y translation stage will move the sample to the next predetermined measurement location. Results are displayed instantaneously in user-specified formats.



High Sensitivity Configuration

Hinds Instruments, Inc | 7245 NE Evergreen Pkwy | Hillsboro, OR 97124 | USA
T: 503.690.2000 | Fax: 503.690.3000 | sales@hindsinstruments.com

www.hindsinstruments.com