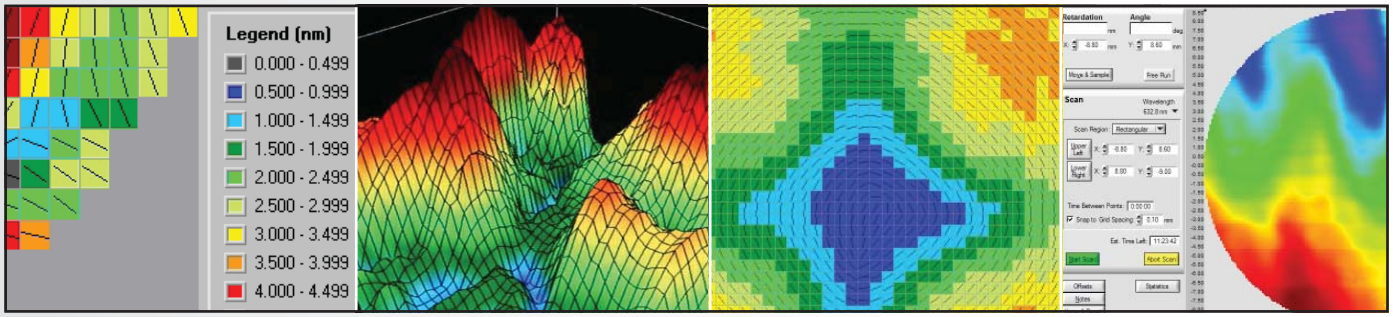
Exicor® birefringence measurement technology, introduced in 1999 with the model 150AT, provides leading edge customers with the world's most technically advanced, production-worthy capability for measuring birefringence.

Unprecedented sensitivity in the Exicor systems is a product of Hinds Instruments' PEMLabs™ Techology that pioneered the ultra-low birefringence photoelastic modulator (PEM). The award winning sensitivity of Exicor is enhanced by the modulation purity of the PEM, a result of the resonant nature of the modulator. The modulation frequency of the PEM is 50 kHz, providing fast measurement capability. The unique design of the dual detector optical system, in conjunction with PEM science, provides a valued feature: no moving parts in the optical system. The absence of moving components produces high mechanical reliability as well as repeatability of measurements and allows magnitude and angle to be measured simultaneously.

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

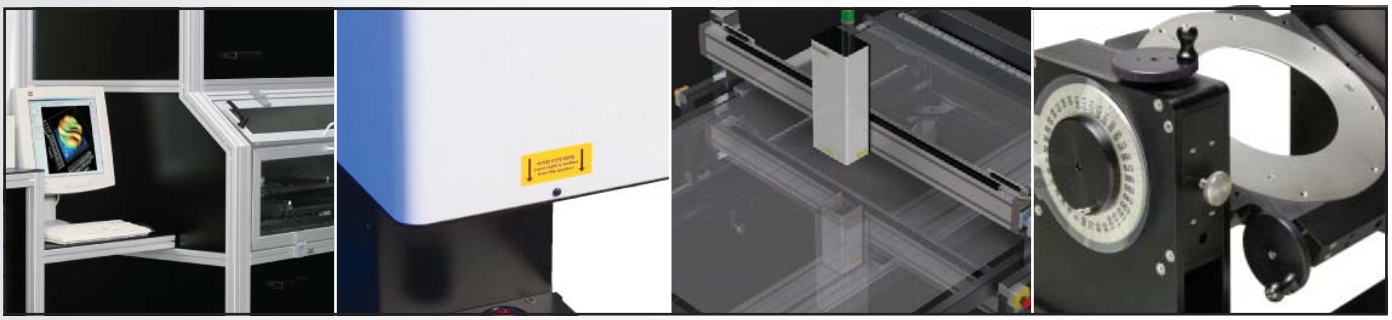
A unique design (patents pending) eliminates moving parts in the optical train and avoids the necessity to switch between measurement angles. A HeNe laser beam is polarized and then modulated by the PEM. The modulated beam is transmitted through the sample and divided by a beam-splitting mirror. Each 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.



EXICOR® Birefringence Measurement Systems

	High Sensitivity	Extended Range	Spectroscopic
	¼ Wave Systems	½ Wave Systems	ATS Systems
Retardation Range, nm	0.005 to 100+	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 / ± 0.008	0.001 / ±0.015	0.001 / ± 0.025
Fast Axis Angle	0.01°/ ±0.05°	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	~ 1 mm typical	Variable, 1-3 mm
MODELS			
150AT	✓	✓	✓
250AT	✓	✓	✓
450AT	✓	✓	Contact Hinds
GEN5 LCD	✓		
GEN6 LCD	✓		
MT	✓		
MT-3		✓	✓
MT-4	Contact Hinds	Contact Hinds	
DUV	Contact Hinds	Contact Hinds	
DUV193	Contact Hinds	Contact Hinds	



EXICOR Birefringence Measurement Systems

The Exicor Story

For years, crossed polarizers represented the state-of-the-art in birefringence measurement that was available to researchers as well as quality control professionals. While this 1 or 2 nm level of sensitivity was sometimes sufficient, “pixel” quantification, metrology level repeatability and statistical data analysis capabilities were missing. Scientists at Hinds Instruments, drawing on more than two decades experience with photoelastic modulation technology, applied this relatively fast (50 kHz), non-mechanical, virtually pure sinusoidal “polarization switcher” to the birefringence measurement challenge. The result, now patented, was a two- and sometimes three-fold increase in the order of magnitude improvement in measurement sensitivity when compared to traditional measurement methods. This technology has been extensively published and documented. The turnkey Exicor system has made birefringence measurement intuitive and simple. And the first of it’s kind software allows for multiple views and statistical analysis of birefringence data.

1998. Development of PEM-based Birefringence Measurement System for low-level residual birefringence in optical materials.

1999. Introduction of Exicor™ Birefringence Measurement System providing breakthrough low-level (0.005 nm) birefringence capability.

2000. Exicor receives the CLEO 2000 New Product Award.

2001. Exicor, model 150AT, receives the 2000 Photonics Circle of Excellence Award.

2001. Exicor receives the 2001 R&D 100 Award.

2003. Exicor DUV wins the 2003 R&D 100 Award.

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