

## RETARDATION, THICKNESS AND WARPAGE ANALYSIS OF LCD AND OTHER GLASS MATERIALS

The Exicor GEN6-TW birefringence measurement system is an easy-to-use and highly sensitive instrument for measuring linear birefringence, thickness and warpage in flat, parallel-surface optical materials. The system includes a motion control system that enables the user to scan an area of a flat transmissive sample and create a birefringence/thickness/warpage map.

### Quick Specifications:

Retardation Resolution/Repeatability:

0.001nm /  $\pm 0.01$  nm (Retardation < 1 nm) or  $\pm 1\%$  (Retardation > 1 nm)

Thickness Sensor Resolution/Repeatability:

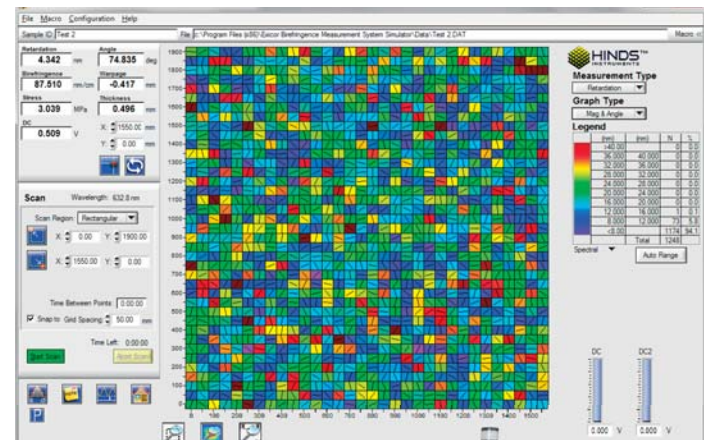
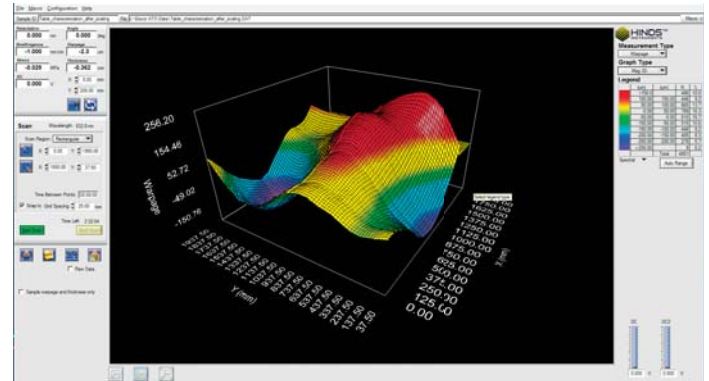
$0.1 \mu\text{m} / \pm 2 \mu\text{m}$

Warpage Repeatability:

$\pm 5 \mu\text{m}$

### Important Features

- ◆ Small footprint – Minimizes the factory floor space required for the equipment
- ◆ Robust Automation – Quality stages and hardware maximize uptime
- ◆ Solid Service Support – Support and spare parts centers throughout the world
- ◆ Flexible Software – Optimized GUI software. Custom features and DLL interface available
- ◆ Low Maintenance Design - Easy access to components for service



Top: Warpage map; Bottom: Magnitude and Angle map



Reinforced steel frame

**SPECIFICATIONS****GENERAL**

System Footprint	214 cm x 281 cm
Service Access Footprint	335 cm x 400 cm (60 cm access on all sides)
Console Footprint	53 cm x 62 cm

**SAMPLE TABLE**

Table Dimensions	210 cm x 190 cm
Measurement Hole Dimensions	Circular, 12 mm diameter
Measurement Hole Spacing	50 mm between holes
Layout	32 columns x 40 rows, 1280 holes total

**MEASUREMENT CAPABILITY - RETARDATION**

Retardation Range	0.005nm to 120 nm
Resolution <sup>1</sup>	0.001 nm
Repeatability <sup>1</sup>	±0.01 nm (Retardation < 1 nm) or ± 1% (Retardation > 1 nm)
Angular Resolution/Repeatability <sup>1</sup>	0.01° / ± 0.1° (Retardation > 1nm)
Background Noise Level	0.1nm (without sample)
Maximum Sample Size	1600 mm x 2000 mm
Maximum Scan Area	1550 mm x 1950mm
Measurement Time	up to 100 pps, retardation only ≈4 seconds with Thickness and Warpage active
Modulation Frequency	50 kHz
Wavelength	633 nm
Spot size	~1 mm nominal
Demodulation Analysis Technique	Hinds Instruments Signaloc™ Lock-in Amplifiers
Measurement Units	nm (retardation), ° (angle)
Differential Stress Units	Psi or MPa (not concurrently)

**MEASUREMENT CAPABILITY - THICKNESS AND WARPAGE**

Thickness Sensor Resolution/Repeatability	0.1 μm / ± 2 μm
Warpage Repeatability	±5 μm
Thickness Sensor Range	0 ~ 3 mm
Measurement Time <sup>2</sup>	≈ 4 seconds

<sup>1</sup> Typical performance at 5nm retardation<sup>2</sup> Measurement time: Based on the standard operating mode that measures both the retardation and the thickness/warpage in the same scan. Based on 50mm grid setting, which is the spacing between measurement holes on the Sample Table.