

## PS-100 Polarimeter / Polariscope Systems FOR OBSERVATION AND MEASUREMENT OF RESIDUAL STRESS AND BIREFRINGENCE



The PS-100 polarimeter is available in numerous models. Each can be easily adapted with accessories and special components to suit almost any application (see next page for pictures of typical configurations).

**PS-100-BS** - the basic system, comprising a polarized illuminator with a 7.5 in x 7.5 in (190 mm x 190 mm) sample stage, Senarmont analyzer mounted on a 12" (300 mm) heavy-duty post, fluorescent tube light source and vertical light path. Plane polarization only.

**PS-100-SF** – Same as PS-100-BS, but with both plane and circular polarization and swing-out accessory mount for holding compensators or tint plates. (Pictured above)

**PS-100-1011** – Analyzer is separate and mounted on a tripod for heavy or large samples. Illuminator field of view is 10 in x 11 in (254 mm x 280 mm) Horizontal light path. Available with either plane or circular polarization.

**PS-100-LF** – Same as above, but with illuminator field of view of 16 in x 20 in (400 mm x 500 mm). Circular polarization only.

Visit [www.strainoptics.com](http://www.strainoptics.com) for a complete product listing.

The PS-100 product line is modular to suit a wide variety of applications in evaluating residual stress, strain and birefringence in transparent and translucent materials. Uses range from simple inspection and interpretation of photoelastic colors to precise quantitative measurements using analyzer rotation or compensation techniques.

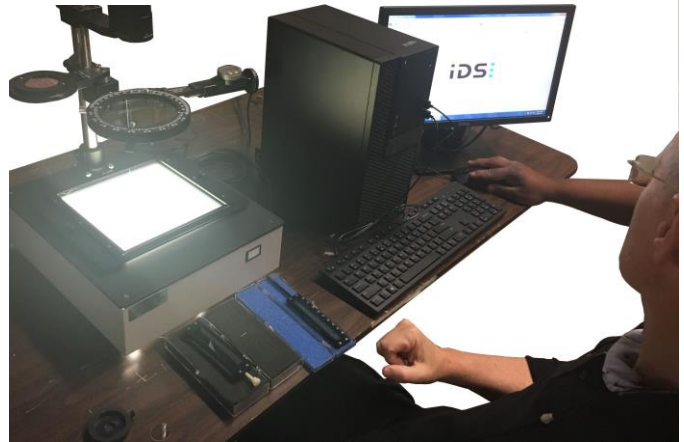
- Verify annealing state of glass or plastic containers, tubing, lenses, lamps, etc.
- Measure optical retardation in order to calculate stress or birefringence using plane or circular polarization
- Study distribution and magnitude of compressive and tensile stresses in float glass, glass seals, quartz, and advanced materials, as well as in molded and sheet plastics
- Comply with worldwide polarimetry standards and test methods, including ASTM C148, F218, and D4093

### *PS-100 Polarimeters may be fitted with:*

- Single-wedge (Babinet) or double-wedge (Babinet-Soleil) compensators
- A full-wave tint plate or monochromatic filter
- Microscopes with rack-and-pinion mounting and choice of magnification options
- Industrial CCD cameras with macro-video zoom lenses for displaying magnified high-resolution images on LCD monitors, either stand-alone or via IEEE 1394 to PC
- A high-intensity, regulated DC fiberoptic light source, adjustable from 0-150 W
- Vibration-dampening "boom stands" for samples under high magnification and cantilevered designs for out-sized samples
- Strainoptics' DIAS-1600 Digital Image Analysis System for automatic measurement of low-order stress and birefringence
- Custom fixturing and immersion cells for special sample geometries

## PS-100 Polariscopes/Polarimeter TYPICAL CONFIGURATIONS

**PS-100-DIGIVIDEO** with USB digital camera, 20:1 zoom lens, SA-100 analyzer, and imaging software. Also shown at right are software-configured PC, an SWF-100-LP wavelength filter, and a DWC-100 Babinet Soleil compensator (sold separately).



**PS-100-BS**, Plane Polarization



**PS-100-SF**, Plane & Circular Polarization (convertible)



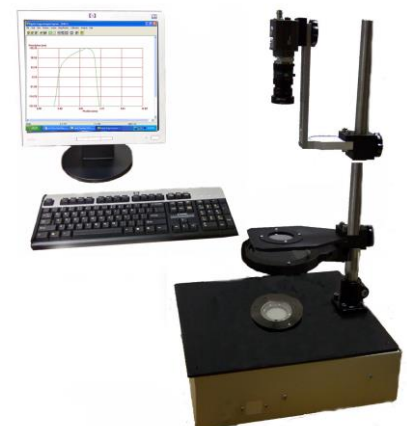
**PS-100-1011**, Horizontal Light Path Plane or Circular Polarization (not both)



**PS-100-LF**, Horizontal Light Path Plane Polarization Only



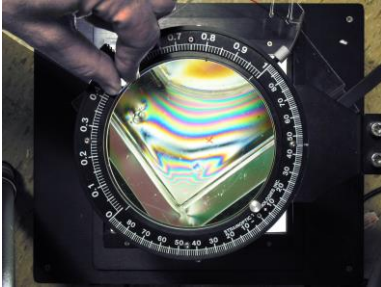
**PS-100-MW** Polarizing Microscope with Single-Wedge Compensator And 70mm diameter sample stage



**DIAS-1600** Digital Stress Analyzer w/ PS-100 Polarimeter & PC. PC loaded with video frame grabber & IA software.

# PS-100 Components and Accessories

## Analyzers



With the exception of the PS-100-MW system (which features a fixed analyzer/compensator design), Strainoptics polarimeters are equipped with a 115 mm diameter, rotatable analyzer and precision quarter-wave plate, enabling measurement using the “Analyzer Rotation” Method of stress measurement. The PS-100-BS models (plane polarization) are supplied with an A-100 analyzer with a fixed quarter-wave plate. The PS-100-SF models are supplied with an SA-100 analyzer with a two-position quarter-wave plate that allows for analyzer rotation measurements using either plane (Senarmont) or circular (Tardy) polarization.

A dual-scale dial offers a fractional fringe readout, graduated in 0.01 increments in addition to rotation angle (+90 to -90). Measurement sensitivity is +/-5 nm of optical retardation.

## Compensators

A compensator is a measuring device providing direct quantitative readout of stress birefringence. Placed in series with the observed item, it adds an equal retardation of opposite sign to the specimen. This nulls the retardation causing a zero order (black) fringe to appear at the point of measurement, at which time a reading can be taken from the compensator's calibrated scale or dial readout. This reading can then be used to easily calculate the optical retardation at the measurement point. Compensators may also be used to identify the nature (tensile or compressive) and the direction of stresses in the specimen. A calibration certificate is included with every compensator.



The **Model LWC-100** is a single-wedge (Babinet), variable-field compensator (0-2500 nm) that may be handheld or inserted into the Accessory Mount option on the PS-100 polarimeter (Accessory mount is standard on the Model PS-100-SF.) Sensitivity: 10 nm.



The **Model DWC-100** is a double-wedge (Babinet Soleil) compensator with a dial readout that features a uniform field of retardation that makes it ideal for applications with high stress gradients. Requires Accessory Mount. Standard range 2500 nm; with optional range extender: 5000 nm. Sensitivity: 5 nm.



The **Model MWA-100** is a single-wedge (Babinet), variable-field compensator that is most often used with a polarizing microscope (PS-100-MW) for measurement of edge stresses and laminar stresses (surface compression and mid-plane tension) in glass. Sensitivity: 5 nm. Model MWA-100-HS is available for applications requiring higher sensitivity (3-4 nm).

## Accessories



There are many accessories available for the PS-100 line of polarimeters, ranging from monochromatic filters (pictured at left) and full-wave tint plates to microscopes, micrometer stages, and camera adapters. See [www.strainoptics.com](http://www.strainoptics.com) for a complete listing.

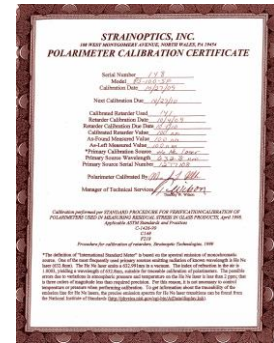
Optional SWF-100-LP  
“Swing-Out” Filter

**Strainoptics' engineers are always available to discuss your specific application in order to design a system that is perfect for you.**

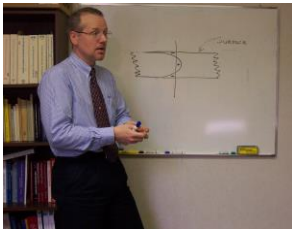


# Calibration and Certification

Each PS-100 polarimeter is factory calibrated and comes with a certificate of traceable calibration according to ASTM Procedure C1426. Strainoptics offers annual or periodic recalibration services as required. A certified CAL-GAGE reference standard is also available to enable customers to self-certify their instrument.



# Testing and Training Services



Surface stress, edge stress, and other laboratory residual stress testing services are available from Strainoptics using equipment and test methods in accordance with ASTM and NIST standards. Strainoptics also provides training programs free to customers at our facility in North Wales, PA, or on a fee basis at a customer's location.

# Other Strainoptics Products

In addition to the PS-100 polarimeters, Strainoptics manufactures a complete range of manually operated and PC-based instrumentation. These include on-line stress scanners for float glass production, GASP® surface stress polarimeters, visual and automatic edge stress meters, specialized instruments for measuring stress and light transmission in automotive glass, roller wave gauges for measuring reflective distortion in architectural tempered glass, and simple strain viewers (polariscopes) for visual inspection using photoelastic evaluation. Custom inquiries are always welcome. For more information, please visit our website or call.



GASP Polarimeter



GES-100 Edge Stress Meter



RWG Roller-Wave Gauges



UV Lamps



SCA1500 Float Line Stress Scanner



VRP-100 Reflective Polarimeter



PES-100 Edge Stress Measurement System

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