

FOR OBSERVATION AND EVALUATION OF RESIDUAL STRESSES IN TRANSPARENT AND TRANSLUCENT MATERIALS



Residual stresses are introduced by nearly every manufacturing process, including molding, extrusion, thermoforming, or joining with dissimilar materials. If not controlled, stresses can cause costly product failures due to surface cracking, warpage, delamination, and structural weakness.

Timely evaluation of residual stresses in pre- or post-production QC can prevent defective products from reaching the field, assist in improving process controls, and aid in the R&D of new products.

How It Works.

Polariscopes operate on the proven optical property of birefringence. This phenomenon causes a stressed transparent or translucent material such as glass or plastic to display a characteristic range of colors when viewed in polarized light (the photoelastic effect). When properly interpreted, photoelastic colors can indicate both the magnitude and direction of residual stresses. They also indicate when stress is not present, which is useful for verification of annealing. The procedure is fast, non-destructive, and does not require a high level of operator skill.

Strainoptics offers several standard models of strain viewers, ranging from a small, portable unit to large, modular instruments that may be free-standing, installed on a wall, on a tabletop, or even on a production line.

← SV-2000 Large-Field Strain Viewer

The SV-2000 strain viewer features a large polarized illuminator and attached stationary analyzer with a field of view of 16 in x 20 in (400 mm x 500 mm). The analyzer is attached with rugged 80/20® extruded aluminum and allows for the inspection of large parts or multiple parts at a time. Circular polarization eliminates the need for special orientation of samples due to isoclinics, or dark lines that are characteristic of plane polariscopes. These lines can obscure areas of interest on the sample and interfere with evaluation.

Note: When the characterization of stresses (tension vs. compression) is desired but unknown, plane (linearly) polarized models are available at no additional charge. Specify **SV-2000-P** or **SV-1000-P**.

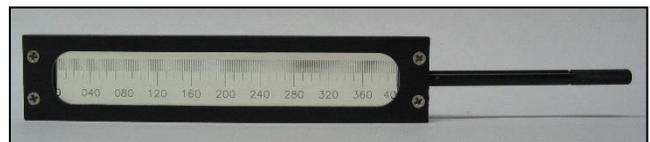
SV-1000 Medium-Field Strain Viewer.

The SV-1000 strain viewer features a 10 in x 11 in (254 mm x 280 mm) field of view with a separate analyzer to allow for inspection of samples too large to fit within the SV-2000's placement area. For vertical setup (horizontal light path) only.



Compensator:

Strain Viewers can be used to make **quantitative** measurements when used with a Babinet-compensator such as the **Strainoptics** LWC-100 (shown below & in use with SV-2000 at top left). The LWC-100 can be used with any polariscope to measure optical retardation (up to 2000nm) and calculate residual stresses through the thickness of transparent or translucent materials.



Strainoptics™

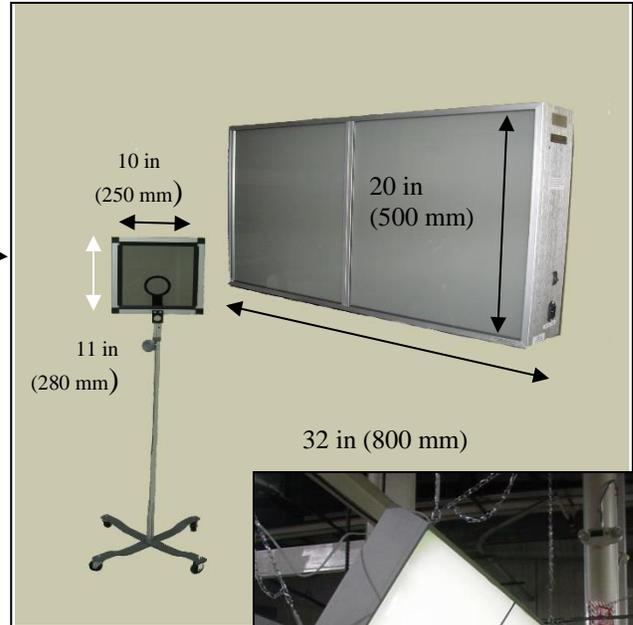
Strain Viewers (Polariscopes)

Bulletin SV2018

Strainoptics also offers a series of Rolling Strain Viewers (RSVs) that have very large viewing areas in any one of our standard sizes or in any **custom** size you require. RSVs are suitable for very large products such as automotive windshields, glass panels, large plastic sheets, or large molded parts.

SERIES RSV STRAIN VIEWERS

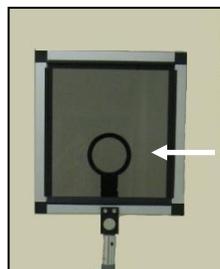
Model No.	Viewing Area (H x W)
RSV-1620	16 in x 20 in (400 x 500 mm)
RSV-1640	16 in x 40 in (400 x 1000 mm)
RSV-1680	16 in x 80 in (400 x 2000 mm)
RSV-2032	20 in x 32 in (500 x 800 mm)
RSV-2064	20 in x 64 in (500 x 1600 mm)



ACCESSORIES:

As shown on Page 1, the **Strainoptics** LWC-100 is a Babinet-type compensator that can be used in conjunction with a strain viewer to measure optical retardation quantitatively (of up to 2000nm).

Strainoptics also offers a similar device, the **FC-100** fringe comparator, which provides a visual reference to assist in color interpretation.



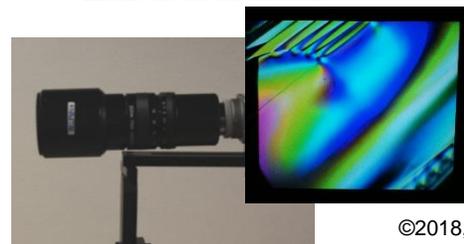
The **RPLP-100** full-wave tint plate adds color to enhance visual observation in low-stress samples (see below)



The **SWF-100** standard wavelength filter (left) assists in visualizing orders of magnitude of stress (fringes) in areas of high stress density. May be ordered as either a handheld accessory or attached to analyzer.



Strainoptics strain viewers may also be fitted with a video camera and zoom lens for displaying magnified images on a color monitor. A USB digital camera option allows for PC storage of images. Depending on the strain viewer model, the camera may be mounted either on a rolling tripod or attached to the analyzer.



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