Strain-viewers, or strain viewers, 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, these 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. Full operating instructions, including color photos, are included with each instrument.

Residual strains or stresses are introduced by nearly every manufacturing process, including molding, thermoforming, extrusion, or joining with dissimilar materials. If not controlled, they are often the cause of 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 research and development of new products.

**How It Works.**

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.

Available accessories include the LWC-100 compensator for obtaining quantitative measurements, video camera with zoom lens, full-wave tint plate, fringe order color comparator, and standard wavelength filter. See page two of this bulletin for more details on these accessories, or ask your Strainoptics representative.

**SV-2000C Large-Field Strain Viewer.**

The SV-2000C 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). A sample placement area of 9 in (225 mm) between the illuminator and analyzer allows inspection of large parts or multiple small parts at one time, depending on whether the instrument is set up vertically or horizontally. 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.

**SV-1000C Medium-Field Strain Viewer.**

The SV-1000C 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.

Note: When required, such as when the characterization of stresses (tension vs. compression) is desired, but not known, plane (linearly) polarized models are available at no additional charge. Specify SV-2000P or SV-1000P.

**RSV Series Very Large-Field Strain Viewers.**

The RSV Series Strain Viewers are suitable for inspection of very large products, such as automotive windscreens, glass panels, large plastic sheets and molded parts. Standard models are described on the next page. Custom sizes are also available.
SERIES RSV STRAIN VIEWERS

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Viewing Area (H x W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSV-1620</td>
<td>16 in x 20 in (400 x 500 mm)</td>
</tr>
<tr>
<td>RSV-1640</td>
<td>16 in x 40 in (400 x 1000 mm)</td>
</tr>
<tr>
<td>RSV-1680</td>
<td>16 in x 80 in (400 x 2000 mm)</td>
</tr>
<tr>
<td>RSV-2032</td>
<td>20 in x 32 in (500 x 800 mm)</td>
</tr>
<tr>
<td>RSV-2064</td>
<td>20 in x 64 in (500 x 1600 mm)</td>
</tr>
</tbody>
</table>

Accessories

The LWC-100 is a Babinet-type compensator that can be used with any Strainoptics strain viewer to obtain quantitative measurements of optical retardation (0-2000 nm) that can be used to calculate residual stress through the thickness of transparent or translucent materials. A similar device, the FC-100 fringe comparator, provides a visual reference to assist in color interpretation.

The SWF-100 standard wavelength filter 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.

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

Strainoptics strain viewers may also be fitted with a CCD color 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.