



Photoelastic Analysis Apparatus (SMT-SM-18)

Photoelasticity is a proven method of analysing and recording mechanical stresses and strains in components. It is used both for quantitative measurements and for demonstrating complex stress states. The components used are models made of a transparent, photoelastically sensitive plastic, which becomes optically birefringent under mechanical load. SMT-SM-18 is used to conduct photoelastic experiments on plane, transparent plastic models. The models are subjected to load by external forces, and they are radiated by circular polarised light. An analyser analyses the light penetrating the body. The experimental setup comprises the separate components: a light source, two linear polarising filters (polariser and analyser), two quarter-wave filters, a frame in which the models are attached and subjected to load. The light source optionally permits coloured stress patterns with white light or a light/dark representation with monochromatic light.

TECHNICAL SPECIFICATIONS

Specifications:

- Produce the mechanical stress curves through photoelastic experiments.
- 2 linear polarising filters (polariser and analyser).
- 2 quarter-wave filters for generating circular polarised light.
- All filters have 360° angle scale and indicate the main optical axis.
- Filters mounted on roller bearings and can be pivoted.
- White light produced by a fluorescent tube and two incandescent bulbs.
- Monochromatic light (yellow) generated by sodium vapour lamp.
- Frame cross-members can be vertically adjusted.
- Pressure or tensile forces generated by a threaded spindle.
- Finished polycarbonate (PC) models available as accessories for the demonstration.



Technical data:

- Light source:
 - Lamp box with white diffuser.

- For white light.
 - 1 fluorescent tube TL-E 32W/33 (colour: 33).
 - 2 incandescent bulbs, candle lamp, frosted E14, 230V, 25W.
- For monochromatic light (yellow).
 - 1 sodium vapour lamp SOX 35, 35W.
- Filter, mounted in glass, diameter: \varnothing 425mm:
 - 2 polarising filters (dark olive).
 - 2 quarter-wave filters (uncoloured).
- Frame: WxH: 600x750mm.
- 230V, 50Hz, 1 phase.
- Dimensions and weight:
 - LxWxH: 800x600x750mm.
 - Weight: approx. 50kg.

Experiments:

- Together with the accessories or your own models:
 - Generate plane stress states in various models under load: bending, tensile load and compressive load.
 - Investigate stress distributions with linear or circular polarised light.
 - Interpret photoelastic fringe patterns: stress concentrations, zero points, neutral strands, areas of constant stress and stress gradients.
 - Graphically and computationally determine the stresses.