

Product Name :
Stress and Strain Analysis Membrane

Product Code :
ALABS-A169-011

ALTEC™

Description :

Stress and Strain Analysis Membrane

In experimental stress and strain analysis, strain gauges are used to determine stresses and strains in components and structures. The maximum stresses and strains are key variables in terms of the structure, and ultimately dictate the design of a component. Strain gauges provide the means required to evaluate mechanical stress and strains. The experimental unit can be used to measure the deflection and strain of a disc under different pressure loads. For the purpose, a thin disc - also termed a membrane or diaphragm - is clamped into place and subjected to pressure. A cylinder with a hand-operated piston generates pressure in a maintenance-free hydraulic system. This pressure is indicated on a gauge. Strains on the surface of the membrane are recorded by strain gauges. The layout of the strain gauges at optimally selected points provides a comprehensive view of the stresses and strains all over the disc. The maximum stresses and strains are calculated, applying the appropriate equations of elasticity. To assist and visualise evaluation of the experiment, the measurement data can be imported into the application software. At the same time, the deflection of the membrane is measured by a dial gauge. The dial gauge can be moved along a cross-arm, enabling measurements to be taken at any radius. The well-structured instructional material sets

out the fundamentals and provides a step-by-step guide through the experiments.

Specification:

1. Investigation of the deflection and strain of a thin disc under internal pressure
2. Strain gauge configured as half-bridge
3. Strain gauges measure the radial and hoop strain
4. Dial gauge with scale, adjustable mounting
5. Measurement of deflection possible at any radius
6. Hydraulic cylinder with hydraulic pump to generate pressure
7. Hermetically sealed hydraulic system, maintenance-free
8. Multi-pin connector for measurement amplifier FL 151 provided

Technical Data:

Aluminium disc

- outer diameter: $d=230\text{mm}$
- diameter used in experiment: $d=200\text{mm}$
- thickness: 3mm

Strain gauge application

- 8 strain gauges: half-bridges, $350\ \Omega$
- gauge factor: $2,00 \pm 1\%$
- supply voltage: 10V

Dial gauge

- $0 \dots 20\text{mm}$, graduations: $0,01\text{mm}$

Pressure gauge

- $0 \dots 1\text{bar}$, accuracy: class 1.0

System pressure: max. $0,6\text{bar}$



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