

SM1011

Thick Cylinder

Bench-mounted machine to allow students to do stress and strain tests on a thick-walled cylinder

Works with
VDAS[®]



Screenshot of optional VDAS[®] software



- Ideal for student use and classroom demonstrations
- For comprehensive analysis of the stresses and strains in a thick-walled cylinder, under internal pressure
- Experiment results compared with Lamé predictions
- High-quality electrical-resistance precision strain gauges measure cylinder strains
- Includes built-in microprocessor-controlled display of strain measurements
- Mounted on sturdy base to form compact product, ideal for use on a workbench
- Self-contained, hand-operated hydraulic pressurising system for accurate pressure control
- Completely self-contained – needs no other parts

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
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- An ISO 9001 certified company
- VDAS is a registered trademark of TecEquipment Ltd



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Thick Cylinder

Description

TecEquipment's Thick Cylinder apparatus allows students to examine radial and hoop stresses and strains in the wall of a thick cylinder. They can then compare experiment results with the theoretical Lamé predictions. It clearly shows the principles, theories and analytical techniques, and provides effective, practical support to studies.

A sturdy base contains all parts of the Thick Cylinder apparatus. This forms a compact product, ideal for use on a workbench.

The apparatus consists of a thick-walled aluminium cylinder, held in a robust frame. The cylinder is in two halves, cemented together. One face of the joint has an eccentric shallow groove that contains ten strain gauges at precise radii and orientation. These gauges measure the radial and hoop strains. Jointing cement fills the groove. Strain gauges on the inner and outer walls of the cylinder measure longitudinal and circumferential strains.

The cylinder contains oil. To stress the cylinder, students use a hydraulic hand-pump to pressurise the oil.

To perform experiments, students set the gauges to zero and use the pump to pressurise the cylinder. They take readings at several stages while increasing the pressure. The results can be taken by hand using the in-built display and pressure gauge and plotted by hand. Alternatively, they can use TecEquipment's optional Versatile Data Acquisition System (VDAS®) to capture the data and plot the relevant graphs and export data. They then compare their results with calculations made using theory.

A user guide is supplied with the Thick Cylinder apparatus. The guide includes full details of the equipment, detailed experiment procedures, theory and results.

For quick and reliable tests, TecEquipment's optional VDAS® gives accurate real-time data capture, monitoring and display, calculation and charting of all important readings on a computer (computer not included).

Standard Features

- Supplied with comprehensive user guide
- Five-year warranty
- Manufactured in accordance with the latest European Union directives

Recommended Ancillaries

- Bench-mounted version of the Versatile Data Acquisition System (VDAS-B)

Experiments

- Radial and hoop strains throughout the cylinder wall
- Radial and hoop stress distribution in the wall
- Longitudinal stress and strain at the outer surface
- Circumferential stress and strains at the inner and outer surfaces
- Comparison with Lamé predictions
- Principal stresses and maximum shear stress
- Appraisal of accuracy of location of strain gauges

Essential Services

Electrical supply:

Single Phase 100 VAC to 230 VAC
50 Hz to 60 Hz

Operating Conditions

Operating environment:

Well ventilated laboratory environment

Storage temperature range:

-25°C to +55°C (when packed for transport)

Operating temperature range:

+5°C to +40°C

Operating relative humidity range:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Sound Levels

The measured sound pressure level of this apparatus is less than 70 dB(A).

Specifications

Dimensions: 700 mm x 400 mm x 370 mm

Nett weight: 30 kg

Bench space needed: 1 m x 0.6 m

Oil: Castor oil

Cylinder material: Aluminium alloy

Nominal cylinder dimensions: 203 mm long, 150 mm outside diameter, 37 mm inside diameter

Pressure: Displayed by Bourdon gauge, with output for VDAS®

Strain: Measured by electrical resistance gauges and displayed digitally, with output for VDAS®

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infoWERK is a leading expert in the development of eLearning courseware, learning system solutions, teaching and AV equipment.

Furthermore infoWERK is the representative and system integrator of "TecQuipment".

TecQuipment is one of the global leaders in technical teaching equipment for engineering. If you are interested in one of TecQuipment's products feel free to contact us at:



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