



# SM1008

# Diaphragm

**Bench-mounted machine to allow students to do stress, strain and deflection tests on a diaphragm**

Works with **VDAS®**



Screenshot of optional VDAS® software



- Ideal for student use and classroom demonstrations
- Measurement of effect of pressure on surface profile of a diaphragm
- Measurement of circumferential and radial strains of a diaphragm under pressure
- High-quality electrical-resistance precision strain gauges measure diaphragm 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
- T +44 115 972 2611 • F +44 115 973 1520 • E info@tecquipment.com • W www.tecquipment.com
- An ISO 9001 certified company
- VDAS is a registered trademark of TecEquipment Ltd



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## Description

The Diaphragm apparatus allows students to examine the effect of pressure on the surface profile of a diaphragm. They can also determine the distribution of circumferential and radial strains across its diameter.

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

Two heavy flanges clamp the edge of the diaphragm to provide built-in edge conditions. The area directly under the diaphragm contains oil.

Eight strain gauges are cemented to the top surface of the diaphragm in various positions and at different radii. Each strain gauge circuit is a full bridge, with high-stability resistors. The signals from each strain gauge are shown on a digital display.

A digital dial gauge is fitted to a digital position indicator. The dial gauge can be traversed across the diaphragm to measure its surface profile. Both instruments can connect to TecEquipment's optional Versatile Data Acquisition System (VDAS®).

Students use a hydraulic pump to increase the oil pressure under the diaphragm. They record the strain readings and diaphragm profile at different pressures.

The results can be taken by hand using the in-built display and pressure gauge and results plotted by hand. Alternatively, the student can use VDAS® to capture the data and plot the relevant graphs and export data.

A user guide is supplied with the Diaphragm 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

Experiments possible with this apparatus include the effect of pressure on:

- Surface profile – the results are presented as a non-dimensional curve
- Radial and circumferential strains
- Radial and circumferential strain gradients across the diaphragm

Experimental measurements are compared with theory. The student is encouraged to use their results to determine the accuracy of the location of the strain gauges.

## Essential Services

*Electrical supply:*

Single-phase 100 VAC to 230 VAC, 50 Hz to 60 Hz

## Operating Conditions

*Operating environment:*

Laboratory

*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:* 650 x 300 x 310 mm

*Nett weight:* 30 kg

*Bench space needed:* 1 m x 0.6 m

*Oil:* Castor oil

*Diaphragm material:* Aluminium alloy

*Diaphragm nominal thickness:* 3.0 mm

*Diaphragm effective diameter:* 200 mm

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

*Surface profile measurement:* By digital indicators, with output for VDAS®

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

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*innovation.*

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**infoWERK Medien & Technik GmbH**

**Martinsbühel 6 / A-6170 Zirl / Austria**

Phone: +43 (0) 5238 52099-0 / Fax: +43 (0) 5238 52099-40

E-Mail: [info@infowerk.at](mailto:info@infowerk.at) / Website: [infowerk.at](http://infowerk.at)

**Otto-Dürr-Straße 25**

**D-70435 Stuttgart, Zuffenhausen/ Germany**

Phone: +49 (0) 711 342471-0 / Fax: +49 (0) 711 342471-11

E-Mail: [info@de.infowerk.at](mailto:info@de.infowerk.at) / Website: [infowerk.at](http://infowerk.at)