



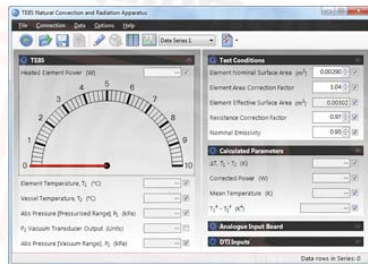
# Thermodynamics

## TE85

## Natural Convection and Radiation

**Shows students how different types of heat can transfer over a range of pressures**

Works with  
**VDAS®**



Screenshot of the optional VDAS® software



- A self-contained, mobile, compact unit for ease of use and storage
- Helps students to understand natural 'free' convection, radiation, emissivity and the Stefan-Boltzman equation
- Includes a pressure vessel to allow tests above and below atmospheric pressure
- All instruments and vacuum pump included
- Can connect to TecEquipment's optional Versatile Data Acquisition System (VDAS®) for automatic data acquisition
- Test results are accurate enough to allow extrapolation down to a complete vacuum

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- An ISO 9001 certified company
- VDAS is a registered trademark of TecEquipment Ltd

# TE85

# Natural Convection and Radiation

## Description

The Natural Convection and Radiation equipment allows the study of heat transfer at different pressures and vacuum. It shows the differences between radiation and natural 'free' convection. It allows students to find the emissivity of a surface and verify the Stefan-Boltzman equation. It also gives students an understanding of the non-dimensional characteristics using Nusselt, Grasof, Prandtl and Knudsen numbers.

A small heated element hangs in the centre of a pressure vessel. The heater has a matt black surface. Attached to its surface is a thermocouple to measure the temperature.

The vessel's inside is also black, and it has a thermocouple fitted to its wall to measure the temperature in the vessel. The vessel may be charged with compressed air up to 1 bar (gauge) or evacuated down to about 5 Pa (absolute). Students can extrapolate the results down to a total vacuum (no convection). This allows them to isolate the heat transfer by radiation.

Instruments and a digital display measure and display the temperatures, pressures and power to the element. To give accurate measurements of pressure and vacuum, the equipment has two different pressure transducers - one for pressures above atmospheric and one for pressures below atmospheric.

The equipment also includes a socket for connection to TecEquipment's VDAS. Included is a vacuum pump, and a regulator for an external compressed air supply (up to 10 bar). The system includes a pressure relief valve to protect the equipment and the user.

The equipment works with TecEquipment's Versatile Data Acquisition System (VDAS-B, not included). TecEquipment's Versatile Data Acquisition System allows accurate real-time data capture, monitoring, display, calculation and charting of all the important readings on a computer (computer not supplied).

## Recommended Ancillaries

- Versatile Data Acquisition System (VDAS-B) – a bench-mounted version of TecEquipment's Versatile Data Acquisition System

## Standard Features

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

## Experiments

- Determination of emissivity
- Verification of the Stefan-Boltzmann constant

## 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

## Essential Services

*Electrical supply:*

110 VAC to 120 VAC 50 Hz/60 Hz 6 A

or

220 VAC to 240 VAC 50 Hz/60 Hz 3 A

(please state when ordering)

**Note:** For tests with pressures above atmospheric, you also need an external supply of clean, dry compressed air at between 1.5 bar and 10 bar (not supplied).

## Specification

*Nett dimensions and weight:*

1400 mm high x 610 mm x 1250 mm and 200 kg

*Approximate packed dimensions and weight:*

1.68 m<sup>3</sup> and 225 kg

*Instruments:*

- Digital display of element power, temperatures and pressures

*Maximum working pressure:*

1.25 bar

*Maximum element surface temperature:*

200°C

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*tradition.*

*innovation.*

*integration.*

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**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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