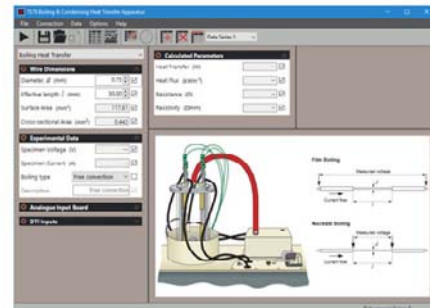




VDAS® TE78

## FILMWISE AND DROPWISE CONDENSATION AND BOILING

Bench-top apparatus with control and instrumentation unit that demonstrates heat transfer during different boiling and condensing processes.



SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE



### KEY FEATURES

- Bench-mounting apparatus that shows heat transfer during different boiling and condensing processes
- Includes digital display of temperatures, flow rate and power
- Has a glass vessel, so that students can see what is happening
- Demonstrates nucleate, film and sub-cooled boiling
- Works with TecEquipment's optional Versatile Data Acquisition System (VDAS®) for automatic data acquisition
- Shows condensation on different surface finishes
- Shows filmwise and dropwise condensation

# FILMWISE AND DROPWISE CONDENSATION AND BOILING

## DESCRIPTION

Gives students an understanding of heat transfer during boiling and condensing. The equipment heats and condenses water, and includes a separate control module with a digital display.

Heating and condensing takes place inside a partially filled glass vessel. A heater coil heats the water.

For boiling heat transfer experiments, students adjust the current in a resistant wire heater element in the water. The temperature of the wire reaches significantly higher than 100°C.

Students watch the boiling process and note the different boiling processes. They note the free convection (before boiling) and the other stages (during boiling). These include:

- Sub cooled boiling – where small bubbles form and rise.
- Nucleate boiling – where large bubbles form and rise.
- Film boiling – unstable and stable, where a vapour blanket forms and heat transfer by radiation becomes important.

For condensing heat transfer experiments, water condenses on two water-cooled vertical cylinder specimens. The cooling water flow rate and its temperature change at each cylinder helps students to find the heat transfer.

To show the effect of surface finish on heat transfer, one specimen has a gold plating and the other has an oxidised finish. They show clearly the difference between filmwise and dropwise condensation.

## STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Manufactured in accordance with the latest European Union directives
- ISO9001 certified manufacturer

## RECOMMENDED ANCILLARIES

- VDAS-B – bench-mounted version of the Versatile Data Acquisition System

## LEARNING OUTCOMES

- Boiling heat transfer
- Condensing heat transfer

## ESSENTIAL SERVICES

### ELECTRICAL SUPPLY:

230 VAC 50 Hz to 60 Hz 13 A single-phase or two phase.

### CLEAN DEIONIZED WATER:

Approximately 10 litres of clean, deionised water.

(6.5 Litres for the boiling heat transfer experiments and an additional 3.5 Litres for the condensing heat transfer experiments).

## 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.

## SPECIFICATION

TecEquipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specification without prior notice.

### NETT DIMENSIONS AND WEIGHT:

Main unit: 800 mm x 400 mm x 850 mm and 55 kg

Control cabinet: Approximately 500 x 550 x 400 mm and 25 kg

### PACKED DIMENSIONS AND WEIGHT:

Packed product: 0.71 m<sup>3</sup> and 160 kg

### BULK HEATER POWER:

2.5 kW

### CONDENSING CYLINDERS:

One gold plated, one oxidised

Outside diameters 15 mm, effective lengths 100 mm