



Picture is only for reference purpose

Key Features

- Ideal for students to gain insight into the first and second laws of thermodynamics
- Introduces students to industry-standard methods of analysing steam plant performance, including Rankine cycle analysis and using the Willans line
- Uses a simple two-cylinder steam motor and an electrically-heated boiler for easy understanding of the main parts of a steam plant
- Self-contained in a mobile frame that includes all instruments needed for experiments
- Allows students to copy the Marcet boiler experiment to prove the pressure-temperature relationship for saturated steam
- Connects to the optional Versatile Data Acquisition System (VDAS®).

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.



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Description :

A mobile laboratory-scale steam plant for experiments in thermodynamic principles. It helps students to understand:

- Thermodynamic laws of energy conservation
- Steady flow energy equation
- Thermal efficiency and the control surface
- Rankine cycle analysis
- The Willans line

A mobile frame contains all the parts of the test set. An electric pump draws from a reservoir (included) to deliver water to an electrically-heated boiler. The boiler includes a safety valve, water level gauge, and 'blow-down cock'. The boiler produces steam to turn a two-cylinder steam motor.

The used steam from the motor outlet passes through a mains water-cooled condenser, then down to a waste tank or to a measuring vessel (supplied). A stopwatch and thermometer are supplied to allow accurate measurement of the flow and temperature of the condensate (steam flow).

The equipment includes all instruments needed for the experiments. These include:

- A band-brake dynamometer with a digital torque and speed display to measure and display motor speed, torque, and power
- Thermocouples connected to a digital temperature display to measure and display temperatures at key points in the test set
- A throttling calorimeter to measure the dryness fraction of the steam
- Two mechanical gauges showing the boiler and engine inlet pressures
- A meter showing the electrical power supplied to the heaters in the boiler

For quicker tests with easier recording of results, the optional Versatile Data Acquisition System (VDAS®) can be supplied. This provides accurate real-time data capture, monitoring and display, calculation, and charting of all the important readings on a computer (computer not included).

Recommended Ancillaries

- VDAS-F (frame-mounted version of the Versatile Data Acquisition System)

Essential Services

Cool, clean mains water supply and drain:

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- Clean low mineral content water
- Temperature between 1.5°C and 15°C
- Maximum flow rate: 2.5 l/min
- Pressure between 0.2 bar and 3 bar

Electrical supply:

- 220 to 240 VAC single phase, 50/60 Hz, 32 A
or
- 220 to 240 VAC two phase, 50/60 Hz, 32 A

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

Specifications**• Dimensions:**

- Nett: 1700 mm high (assembled) x 1000 mm wide x 800 mm front to back
- Packed volume: 1.6 m³

• Weight:

- Nett: 190 kg (without water)

• Motor power:

- Approximately 90 W at 2000 rev.min⁻¹

• Boiler:

- Electrically heated by two independently-switched immersion heaters
- Maximum experiment pressure approximately 350 kPa (set by 400 kPa pressure relief safety valve)

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