



Tesca Steam Motor & Energy Conversion Test Kit 32458 is a mobile laboratory-scale steam plant for experiments in thermodynamic principles.

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). 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 connect to a digital temperature display to measure and display temperatures at key points in the test set. A throttling calorimeter allows students to measure the dryness fraction of the steam.

Two mechanical gauges show the boiler and engine inlet pressures. A meter shows the electrical power supplied to the heaters in the boiler.

Detailed Operation & Maintenance Manual is provided along with the trainer.

### 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

Note: Specifications are subject to change.

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instruments needed for experiments

### Technical Specifications

- Motor power: approximately 90 W at 2000 rev.min<sup>-1</sup>
- Boiler: Electrically heated by two independently-switched Immersion heaters. Maximum experiment pressure approximately 350 kPa (set by 400 kPa pressure relief safety valve)
- Throttling calorimeter and thermocouple to measure the dryness fraction of the steam
- Dynamometer and display unit for motor speed and power measurement
- Pressure gauges for boiler and engine (motor) inlet pressures.
- Thermocouples and display for steam and cooling water temperatures
- Power meter for heater power input.
- Calibrated vessel with stopwatch and thermometer for condensate (steam flow) measurement. Water (solvent) is circulated using a centrifugal pump, using a 50 litre capacity feed tank.
- A comprehensive instruction manual is supplied which details the necessary installation, commissioning and maintenance procedures.

### Experiment Capabilities

- Steam plant performance, including the Rankine Cycle Analysis and the Willans Line
- Marcet Boiler Experiment on saturated steam (pressure temperature relationship)

### Required Services

- Cool, clean mains water supply and drain: Maximum 150 litres/hour (2.5 Litres/minute) and with low mineral content.
- Electrical supply: 220 to 240 VAC single phase, 50/60 Hz 32 A