



## Thermodynamics

**TD212**

## Modified Four-Stroke Diesel Engine

***A four-stroke, single-cylinder diesel engine with modified cylinder head and crank, for use with TecEquipment's Small Engine Test Set (TD200)***



- For safe and effective studies and demonstrations of a four-stroke, single-cylinder diesel engine
- For use with TecEquipment's Small Engine Test Set (TD200)
- Modified for use with optional Pressure (ECA101) and Crank Angle (ECA102) Transducers and Engine Cycle Analyser (ECA100)
- Wide range of investigations possible
- Quickly and accurately mounts on the test bed
- Includes colour-coded fuel tank with quick-release couplings

# TD212

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## Description

High-quality and cost-effective four-stroke, single-cylinder diesel engine for use with TecEquipment's Small Engine Test Set (TD200). Adapted specially for education to enable effective laboratory testing and demonstrations, the engine includes an exhaust thermocouple, a half-coupling to link to the test bed dynamometer and all essential hoses and fittings. In addition, each engine includes a colour-coded fuel tank with self-sealing couplings. The couplings ensure the engine can be connected and disconnected quickly and efficiently with minimum loss or spillage of fuel. For convenience and safety, the fuel tank can be removed for filling or for storage in a fuel locker when not in use. Removing the fuel tank also prevents unauthorised use of the equipment.

The engine has a modified cylinder head and crank. These allow use with the Cylinder Head Pressure Transducer (ECA101 available separately) and the Crank Angle Encoder (EA102 available separately). These can then connect to the Engine Cycle Analyser (ECA100 available separately) to extend the range of experiments possible.

The engine is mounted on a sturdy precision bed plate. The bed plate has dowels and slots which align and locate it accurately with the dynamometer test set. This minimises the time spent replacing one engine with another.

## Standard Features

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

## Experiments

When used with TecEquipment's Small Engine Test Set (TD200), investigations into the performance and characteristics of a four-stroke diesel engine, including:

- Torque, speed and power relationship
- Brake mean effective pressure
- Engine performance curves
- Air and fuel consumption
- Volumetric and thermal efficiencies
- Willans line

When used with TecEquipment's Small Engine Test Set (TD200), Cylinder Head Pressure Transducer (ECA101), Crank Angle Encoder (ECA102) and Engine Cycle Analyser (ECA100), students can investigate further features including:

- Plotting p- $\theta$  and p-V diagrams
- Engine cycle analysis
- Indicated mean effective pressure
- Indicated power
- Comparison of brake and indicated mean effective pressures
- Mechanical efficiency of the engine

## Essential Base Unit

- Small Engine Test Set (TD200)

## Recommended Ancillaries

- Engine Cycle Analyser (ECA100)
- Cylinder Head Pressure Transducer (ECA101)
- Crank Angle Encoder (ECA102)

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### Operating Conditions

*Operating environment:*

Well ventilated 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

*Noise levels:*

The noise level produced by this engine may exceed 70 dB, therefore **TecEquipment strongly recommends the use of suitable ear defenders.**

### Specifications

*Dimensions:*

Nett: height 450 mm x width 400 mm x depth 350 mm

Packed: 0.15 m<sup>3</sup>

*Weight:*

Nett: 35 kg

Packed: 50 kg

*Fuel:*

Diesel to minimum specifications EN590, BS2869 A1/A2 or ASTM D 975 - 1D/2D

*Engine capacity:*

232 cc

*Power and Torque:*

3.75 kW and 10.8 Nm at 3000 rev.min<sup>-1</sup>

*Speed:*

Governed to 3200 to 3400 rev.min<sup>-1</sup>

*Cooling:*

Air cooled

**Note: All values stated are approximate and subject to variation.**

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