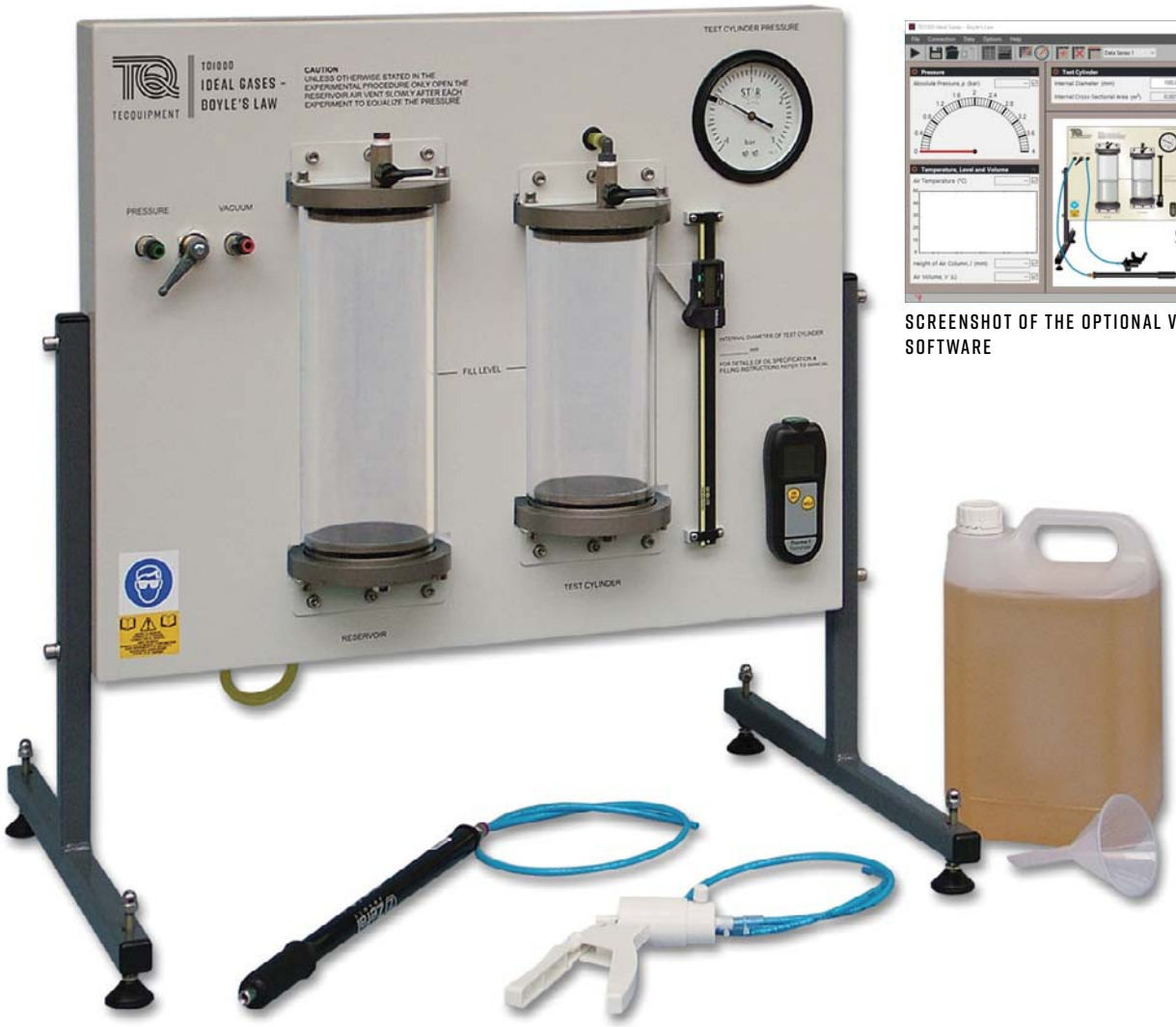
IDEAL GASES – BOYLE'S LAW

VDAS® TD1000

Benchtop apparatus that demonstrates the relationship between pressure and volume of an ideal gas at a fixed temperature.



SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE

KEY FEATURES

- A self-contained benchtop experiment, no power supply needed
- Highly visual experiment using a 'liquid piston' for reliability and accurate, repeatable results
- Simple and safe to use, needs no tools
- Includes a thermocouple and digital display to help maintain constant temperature and show how compression and decompression of a gas can affect its temperature
- Supplied with hand-operated pumps to compress or decompress the gas (air) above and below atmospheric pressure
- Can connect to TecQuipment's Versatile Data Acquisition System (VDAS®)

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TECQUIPMENT

IDEAL GASES – BOYLE'S LAW

VDAS® TD1000

DESCRIPTION

The benchtop equipment includes a back plate that holds two clear-walled cylinders containing oil (supplied). Students use hand-operated pumps (supplied) to increase or decrease the pressure in the left-hand cylinder (the reservoir) which moves a 'liquid piston' of oil in the right-hand cylinder (the test cylinder). This piston compresses or decompresses a trapped column of air in the test cylinder.

The equipment uses normal, clean, dry air, as it behaves as an ideal gas over the range of pressures used in this equipment.

A digital indicator measures the change in height of the trapped air column. When multiplied by the cross-sectional area of the column, this gives the change in volume. A mechanical pressure gauge measures the pressure of the trapped air.

A thermocouple and digital display measure the temperature of the trapped air to make sure that students maintain a constant air temperature during tests. They also help to demonstrate the change in air temperature during demonstrations.

Students maintain a constant temperature while recording the changes in volume with applied pressure. They then plot the results to prove Boyle's law.

You can do tests with or without a computer connected. However, for quicker tests with easier recording of results, TecQuipment can supply the optional Versatile Data Acquisition System (VDAS®). This gives accurate real-time data capture, monitoring and display, calculation and charting of all the important readings on a computer (computer not included).

For connection to VDAS® the apparatus includes an electronic pressure transducer, a thermocouple amplifier and a lead to connect the digital indicator to VDAS®.

STANDARD FEATURES

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

LEARNING OUTCOMES

- Demonstrations of gas temperature change during compression and decompression
- Proving Boyle's law by experiment

RECOMMENDED ANCILLARIES

- VDAS-B (bench-top version of the Versatile Data Acquisition System)

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

SOUND LEVELS

Less than 70 dB(A)

ESSENTIAL SERVICES

BENCH SPACE NEEDED:

750 mm x 520 mm

SPECIFICATIONS

TecQuipment 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:

750 mm x 750 mm x 520 mm high and 18.5 kg

Plus an additional 5 L (3.5 kg) container of oil

APPROXIMATE PACKED VOLUME AND WEIGHT:

0.4 m^3 and 25 kg

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