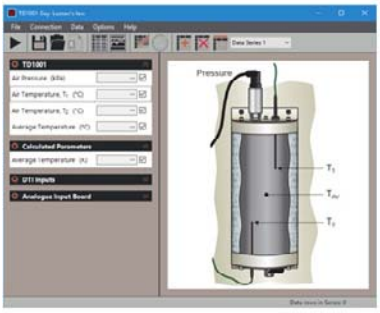
VDAS® TD1001

IDEAL GASES – GAY-LUSSAC'S LAW

Bench-top apparatus that demonstrates the relationship between pressure and temperature of a fixed volume of ideal gas.



SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE

KEY FEATURES

- Self-contained bench-top module
- Demonstrates Gay-Lussac's law relating pressure and temperature of an ideal gas (air)
- Simple and safe - needs no tools, uses low pressures and a thermally-insulated heater
- Includes thermocouples and a pressure sensor connected to a digital display
- Electronic controller to accurately regulate temperature
- Can connect to TecQuipment's Versatile Data Acquisition System (VDAS®)

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DESCRIPTION

The bench-mounting equipment includes a back plate that holds a low-pressure vessel. The vessel holds a fixed volume of air surrounded by an insulated heater, controlled by an electronic temperature controller.

A hand-operated valve at the bottom of the vessel allows students to normalise the air in the vessel to ambient conditions.

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

A thermocouple measures the temperature of the heater surface for the controller. Two thermocouples measure the temperature of the air in the vessel. A pressure transducer measures the pressure of the heated air in the vessel. A digital display shows the absolute pressure, both temperatures and their average value.

Students set the controller for the range of temperatures needed during the experiment. They then record the changes in pressure as the temperature increases and plot the results to prove Gay-Lussac's law.

The experiment can also work in reverse; students heat the vessel, open the valve to normalize the air in the vessel, then shut the valve. They then record the pressure and temperature drop as the vessel cools naturally. This gives a different starting point and results which will fall below local ambient. Due to the slow nature of natural cooling, the optional VDAS® is helpful in this test to log results automatically.

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).

STANDARD FEATURES

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

LEARNING OUTCOMES

- Demonstrates change of pressure of a fixed volume of gas during heating
- Proving Gay-Lussac's law by experiment
- The principle of a vapour pressure thermometer

RECOMMENDED ANCILLARIES

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

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

NOTE: This equipment accurately measures temperatures and pressures with respect to normal atmospheric conditions. For best results, you must use it in a laboratory with a stable temperature of around 20°C and away from direct heat sources.

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:

630 mm x 520 mm plus space for a suitable computer if you need to use the optional VDAS®

ELECTRICAL SUPPLY (DETERMINED BY ORDER):

110 VAC to 120 VAC or 220 VAC to 240 VAC

50 Hz to 60 Hz at 0.5 A

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:

630 mm x 520 mm x 600 mm high and 18 kg

APPROXIMATE PACKED VOLUME AND WEIGHT:

0.3 m^3 and 20 kg

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