TD1003

Radiant Transfer Experiments

Shows the laws of radiant transfer from heat and light sources

Works with VDAS®

Typical screenshot of the VDAS® software

- A self-contained bench-top unit to demonstrate the laws of radiant transfer
- Simple to use and needs no tools - all interchangeable parts fit and slide on an aluminium frame. A separate box includes controls and displays of experiment readings.
- Uses a safe, low-voltage heat source and thermopile (heat flux sensor) for radiant heat transfer experiments
- Includes plates of different heat absorption properties and apertures for extra experiments in heat transfer
- Uses a safe, low-voltage 'integrating sphere' light source and lux meter (light meter) for light transfer experiments
- Includes different optical filters for extra experiments in light transfer
- Can connect to TecQuipment's Versatile Data Acquisition System (VDAS®)

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- An ISO 9001 certified company
- VDAS is a registered trademark of TecQuipment Ltd

TecQuipment

TD1003 Radiant Transfer Experiments

Description

The equipment has two parts; an aluminium Experiment Frame and a Control Box. The frame holds all the experiment parts and allows the user to slide the parts along easily for experiments of transfer over distances. The Control Box contains the electrical controls and displays of the measured readings.

The user fits different parts to the frame to measure the radiant transfer from light and heat sources.

The heat source uses a variable low-voltage electric heater on a flat plate, creating a black body heat source of variable temperature. A thermocouple measures the heat source temperature. A moveable thermopile measures the heat radiation from the heat source at varying distances. TecQuipment include plates with different apertures, surface finishes and thermocouples. They allow extra experiments that show how surface finish affects emissivity and absorptivity, and the area factor for heat transfer.

The light source uses a low voltage lamp inside an integrating sphere to create a diffuse light. Students can rotate the light source through a range of angles (shown on a protractor scale) for experiments in light direction. A moveable Lux Meter measures the light radiation from the light source at varying distances. TecQuipment includes different optical filters (coloured, neutral density and infra-red block). They allow extra experiments that show how optical filters affect light transfer.

A clear, multiline digital display on the Control Box shows temperatures and light or heat radiation.

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

Recommended Ancillaries

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

Experiments

Heat

- Inverse Square Law (or Lambert's Distance Law/Area Law). Showing radiation is inversely proportional to distance squared.
- Stefan-Boltzmann Law. Showing the relationship between radiation and source temperature.
- Kirchhoff's Law. Showing that a body with good emissivity also has good absorptivity.
- Area Factor. Showing that radiation transfer depends on the exposed area of the radiant source.

Light

- Inverse Square Law (or Lambert's Distance Law/Area Law). Showing radiation is inversely proportional to distance squared.
- Lambert's Direction Law (or Cosine Law). Showing that radiation is proportional to the cosine of the angle between the emitter and the receiver.
- Transmittance and Absorbance. Showing that optical filters can reduce light intensity.

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:
Approximately 1500 mm wide x 500 mm front to back, plus space for a computer if you have the optional VDAS.

Electrical Supply:
100 VAC to 240 VAC 50 Hz to 60 Hz

Technical Details

Nett Dimensions and Weights
Experiment Frame Assembled: 1300 mm long x 300 mm front to back x 300 mm high.

Control Box: 600 mm wide x 350 mm front to back x 190 mm high.

Total nett weight including accessories: 25 kg

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