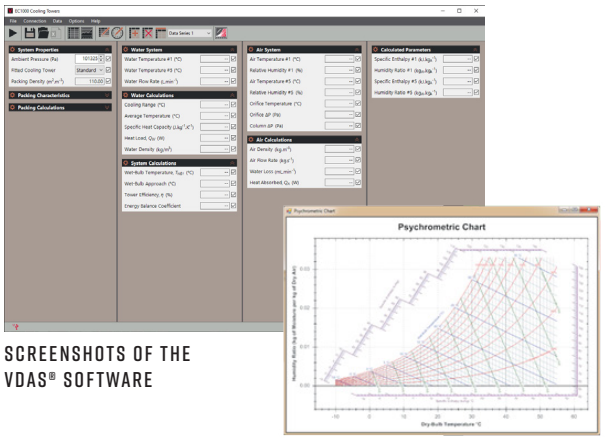
COOLING TOWERS

VDAS® ONBOARD EC1000V

Benchtop apparatus that demonstrates the operation characteristics of an evaporative cooling tower.



SCREENSHOTS OF THE VDAS® SOFTWARE

SHOWN WITH THE PACKING CHARACTERISTICS COLUMN (ED1000D)

KEY FEATURES

- Includes TecQuipment's Versatile Data Acquisition System (VDAS® Onboard) for live displays of air temperatures and relative humidity using a psychrometric chart
- Measures evaporated water loss for a complete understanding of the cooling process
- Includes one column with packing for immediate experimentation potential
- Three extra interchangeable columns containing different packing densities and arrangements, further extend experimental capabilities
- An optional interchangeable column with no packing demonstrates free-fall cooling
- All columns have clear sides for a full view of the heat transfer process
- Variable water and air flow controls to maximise heat transfer experiments

LEARNING OUTCOMES

How key variables affect the performance of a cooling tower, including:

- Variation of water flow rate
- Variation of air flow rate
- Packing density and arrangement
- Variation of water temperature
- Energy and mass balance

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COOLING TOWERS

VDAS® ONBOARD EC1000V

DESCRIPTION

This low-maintenance, benchtop product contains a heated water tank, a pump, a ducted fan and an instrument panel. Each cooling column fits securely to the heated water tank.

An electronic controller ensures a constant heated water temperature throughout the tests. The centrifugal pump delivers the heated water to a spray nozzle at the top of the column. The water sprays into the column, passing over 'packing' inside the column and returning to the heated water tank. The fan directs air upwards through the column in counter flow to the water, extracting the heat. Electronic sensors measure the air and water flow, humidity, pressures and temperatures at key points, shown on clear, multiline displays. This gives all measurements needed to understand the evaporative cooling tower operation. Controls for the fan and water circuits allow the students to adjust the flow rates for a full range of experiments. A clear tube above the heated water tank allows the user to measure the water lost to evaporation.

The Cooling Towers apparatus comes with one tower as standard, for base experimentation. For comparison and additional experiments, TecQuipment offer four optional cooling columns. Two have different internal design or 'packing density' for a comparison of cooling performance. The third column has the same dimensions as the first three but has no packing. This column can show free-fall cooling (a spray tower). It also allows the user to insert other packing materials (not supplied). The fourth column measures the effectiveness of evaporation cooling at three intermediate stages during the water-to-air heat transfer.

Each column is of high-grade clear acrylic material. This allows the user to see the complete process including the water distribution and packing arrangement.

The equipment does not need a computer, as the displays show all the measurements. However, TecQuipment has included the powerful VDAS® Onboard. When connected to a suitable computer (not provided), VDAS® collects and displays accurate, real-time data quickly and easily. It also displays live psychrometric charts.

STANDARD FEATURES

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

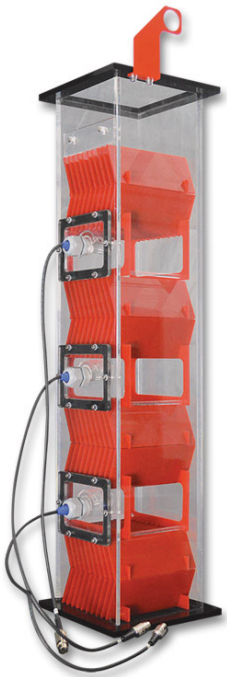
RECOMMENDED ANCILLARIES

- Cooling Column Type A (EC1000a)
- Cooling Column Type B (EC1000b)
- Empty Cooling Column (EC1000c)
- Packing Characteristics Column (EC1000d)

EC1000A

EC1000B

EC1000C



EC1000D

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COOLING TOWERS

VDAS® ONBOARD EC1000V

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

STORAGE TEMPERATURE RANGE:

–25°C to +55°C (when packed for transport)

OPERATING TEMPERATURE RANGE:

+5°C to +30°C

OPERATING RELATIVE HUMIDITY RANGE:

Maximum: 70% up to 31°C
decreasing linerly to 50% at 40°C

For best results < 55%

SOUND LEVELS

Less than 70 dB(A)

ESSENTIAL SERVICES

BENCH SPACE NEEDED:

1030 mm x 620 mm plus space for a suitable computer if using the integrated VDAS®

ELECTRICAL SUPPLY: (SPECIFY ON ORDER)

Single Phase, 220 - 240 VAC, 50 / 60 Hz,10 A

Or

Two Phase, 220 - 240 VAC, 50 / 60 Hz, 10 A

WATER SUPPLY (TO FILL THE WATER TANK):

Distilled (or de-ionised) water:
10 L initial fill and up to 2 L/hour during running.

VENTILATION:

Unit must be placed in a well ventilated room

VDAS® SOFTWARE

PC (not supplied) , please see VDAS® for PC specification.

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:

1016 mm wide x 620 mm front to back x 1180 mm high with a cooling tower fitted and 70 kg.

COOLING COLUMNS:

All have internal dimensions of 150 mm x 150 mm

- Column included as standard:

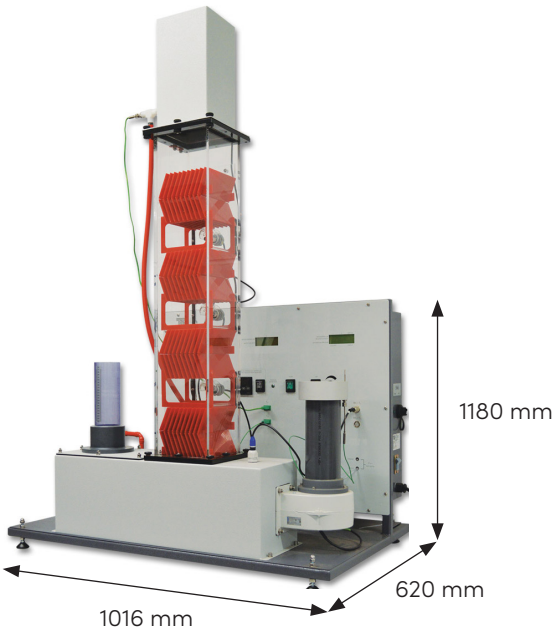
  506 mm x 210 mm x 210 mm and 6.3 kg
  Packing density: 110 m^2/m^3
- EC1000a: Cooling Column Type A

  506 mm x 210 mm x 210 mm and 5.6 kg
  Packing density: 77 m^2/m^3
- EC1000b: Cooling Column Type B

  506 mm x 210 mm x 210 mm and 8.4 kg
  Packing Density: 200 m^2/m^3
- EC1000c: Empty Cooling Column

  506 mm x 210 mm x 210 mm and 3.6 kg
- EC1000d: Packing Characteristics Column

  792 mm x 210 mm x 210 mm and 9.5 kg



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