HT SERIES

This Armfield accessory has been designed to demonstrate the laws of radiant heat transfer and radiant heat exchange using light radiation to complement the heat demonstrations, where the use of thermal radiation would be impractical.

Combined Convection and Radiation – HT14
Computer-Controlled Combined Convection and Radiation – HT14C

Heated Cylinder with Guard – HT14

Hardware Description

The equipment consists of a centrifugal fan with a vertical outlet duct. At the top of the duct there is a heated cylinder. The mounting arrangement for the cylinder in the duct is designed to minimise loss of heat by conduction to the wall of the duct.

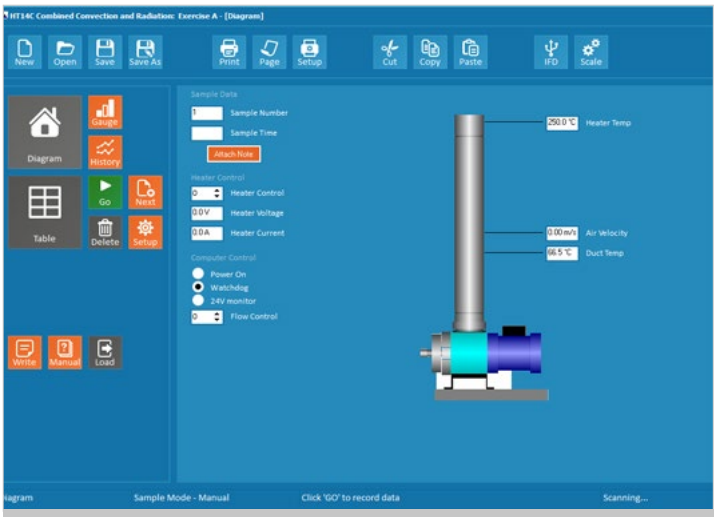
The surface of the cylinder is coated with heat-resistant paint which provides a consistent emissivity close to unity. A K-type thermocouple (T10) attached to the wall of the cylinder, at mid position, enables the surface temperature to be measured under the varying operating conditions.

A variable-speed fan blows air through the outlet duct and a vane-type anemometer within the fan outlet duct enables the air velocity in the duct to be measured. On the HT14C the fan is a variable-speed fan with electronic control.

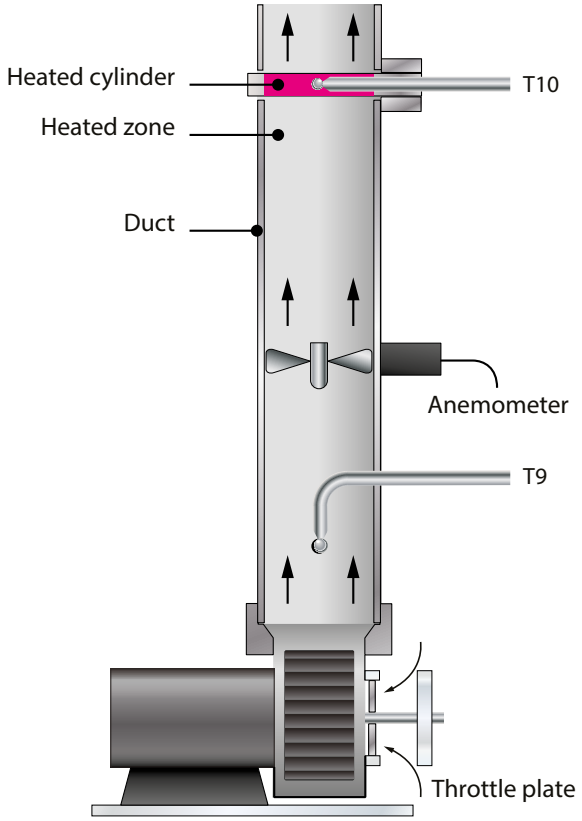
On HT14 a manually adjustable throttle plate permits the air velocity to be varied. A K-type thermocouple (T9) in the outlet duct allows the ambient air temperature to be measured upstream of the heated cylinder.

Experimental Capabilities

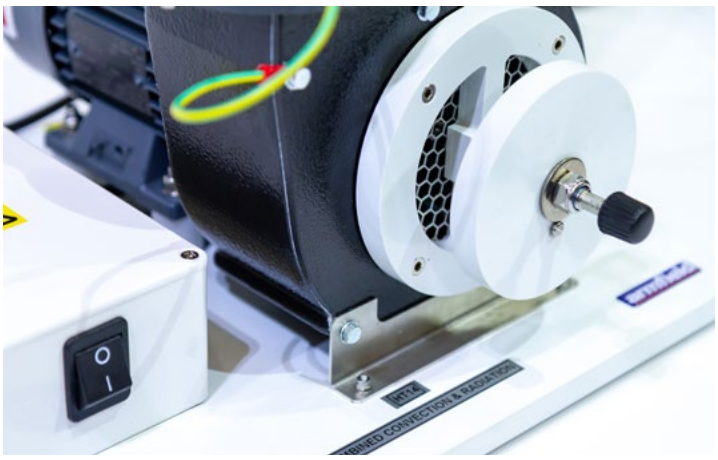
- Determining the combined heat transfer (Q radiation + Q convection) from a horizontal cylinder in natural convection over a wide range of power inputs and corresponding surface temperatures
- Measuring the domination of the convective heat transfer coefficient Hc at low surface temperatures and the domination of the radiation heat transfer coefficient Hr at high surface temperatures
- Determining the effect of forced convection on the heat transfer from the cylinder at varying air velocities



HT14 mimic diagram



Schematic diagram showing construction of HT14



Requirements

Scale

1Ph | HT 10XC

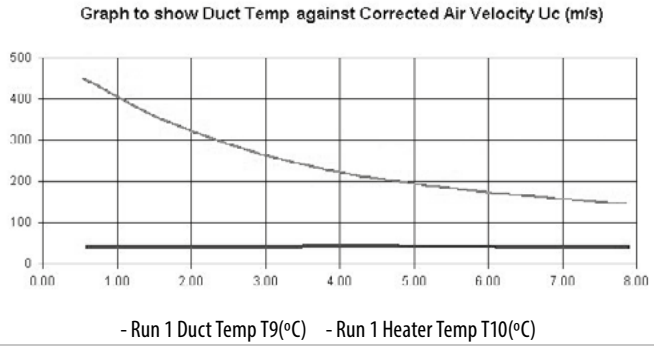
All electrical requirements are obtained from the service unit.
NOTE: the supply rating of the HT14/HT14C must be the same as that of the HT10XC it is used with:
See ordering codes for specific requirements

Essential accessories

HT10XC Computer-Controlled Heat Transfer Service Unit

Ordering specification

- A small-scale accessory to introduce students to the principles of combined convection (free and forced) with radiation from a horizontal heated cylinder
- Comprises a heated cylinder mounted in a vertical air duct, with a fan at the base of the duct, which can be used to provide a variable air flow over the cylinder
- Heater rating 100W at 24V DC
- K-type thermocouples measure the air temperature upstream and the surface temperature of the cylinder
- On the computer-controlled unit, the air flow is electronic out the need for tools
- A comprehensive instruction manual is included



Typical result showing the effect of changing the air velocity obtained using Armfield educational software

Overall dimensions

Model	HT14	HT14C
Length	0.35 m	0.49 m
Width	0.30 m	0.44 m
Height	1.20m	1.20m
Packed and crated shipping specifications		
Volume	0.1m^3	0.2m^3
Gross weight	9kg	13kg

Ordering codes

HT14-A	230V / 1ph / 50Hz
HT14C-A	230V / 1ph / 50Hz
HT14-B	115V / 1ph / 60Hz
HT14C-B	115V / 1ph / 60Hz
HT14-G	230V / 1ph / 60Hz
HT14C-G	230V / 1ph / 60Hz