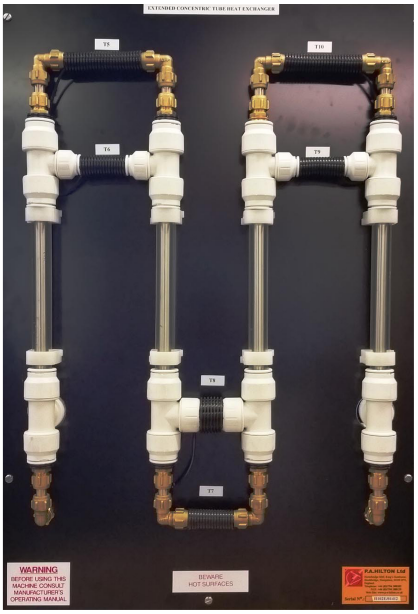
# EXTENDED CONCENTRIC TUBE HEAT EXCHANGER
## H102E




**Year 1**
study

### Features

- Extended version of the H102A Concentric Tube Heat Exchanger
- 3 pairs of intermediate points giving 10 thermocouples in total

### Description

The H102E concentric tube heat exchanger demonstrates the basic principles of heat transfer. The H102E is designed for use with the Heat Exchanger Service module H102. Two pairs of concentric tubes are arranged in series in a double U format to reduce the overall length and to provide three mid position measuring points. The heat exchanger is mounted on its own Frame.

In normal operation, hot water passes through the ‘HOT OUT’ braided hose and self-sealing coupling into the inner stainless tube. It then flows through the heat exchanger and leaves. Cold water flows from the ‘COLD OUT’ hose through the annulus between the clear plastic tube and the inner stainless tube. With the hot water in the inner tube, losses from the system to the outside are minimised while still allowing students to see the construction of the unit. As the cold stream warms above the ambient temperature however there will be some external losses.

The midway points of both hot and cold streams are fitted with thermocouples to measure the stream temperatures. Miniature thermocouple plugs take these signals to the temperature indicator.

### Related laws

- Mechanical Engineering
- Nuclear Engineering
- Chemical Engineering
- Control and Instrumentation

- Plant and Process Engineering
- Building Services
- Engineering Physics
- Refrigeration
- Marine Engineering

## Learning capabilities

- To demonstrate indirect heating or cooling by transfer of heat from one fluid stream to another when separated by a solid wall (fluid to fluid heat transfer).
- To perform an energy balance across a concentric tube heat exchanger and calculate the overall efficiency at different fluid flow rates.
- To demonstrate the differences between counter-current flow (flows in opposing directions) and co-current flows (flows in the same direction) and the effect on heat transferred, temperature efficiencies and temperature profiles through a concentric tube heat exchanger.
- To determine the overall heat transfer coefficient for a concentric tube heat exchanger using the logarithmic mean temperature difference to perform the calculations (for counter-current and co-current flows).
- To investigate the effect of changes in hot fluid and cold fluid flow rate on the temperature efficiencies and overall heat transfer coefficient.
- To investigate the effect of driving force (difference between hot stream and cold stream temperature) with counter-current and co-current flow.

## Technical Specification

- Inner Tube Material: Stainless steel
- Inner Tube: Ø12mm Outside diameter
- Inner Tube Wall Thickness: 1mm
- Outer Tube Material: Clear Acrylic
- Outer Tube: Ø22mm Inside Diameter
- Outer Tube Wall Thickness: 3mm

## Essential Ancillaries

- H102

## What’s in the Box?

- 1 x H102E
- Instruction manual
- Packing List
- Test sheet

## You might also like

- H102A

## Essential Services

- H102

## Ordering information

To order this product, please call PA Hilton quoting the following code:
H102E