CONCENTRIC TUBE HEAT EXCHANGER

H102A

Year 1
study

Features

- Cross Connection prevention
- Co-current (Parallel)
- Counter-current (opposite direction)
- Self Sealing Hoses

Description

Two separate concentric tubes are arranged in parallel in a U format to reduce the overall length and to provide a mid-position measuring point. The heat exchanger is mounted on the H102 panel fascia and retained by locking pipe clips. In normal operation, hot water from the heater and pump passes through the ‘HOT OUT’ braided hose and self-sealing coupling into the inner stainless steel 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 steel 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. Compression fittings provide a liquid seal between the stainless steel tubes and the outer annulus. This also allows the stainless steel tubes to be removed for cleaning if necessary. Six thermocouples measure hot and cold inlet, mid-point and exit temperatures.

Related Laws/Applications

- 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
- Total heat transfer area: approximately 24000mm2

Essential Ancillaries

- HEAT EXCHANGER SERVICE UNIT - H102

What's in the Box?

- 1 x H102A
- Instruction manual
- Packing List
- Test sheet

You might also like

- EXTENDED CONCENTRIC TUBE HEAT EXCHANGER - H102E

Essential Services

- HEAT EXCHANGER SERVICE UNIT - H102

Ordering information

To order this product, please call PA Hilton quoting the following code:
CONCENTRIC TUBE HEAT EXCHANGER - H102A