

# Heat Transfer Training Systems

Educational Training Equipment for the 21st Century

Bulletin 685-8C

## H-6858

### Laminar/Viscous Flow Heat Transfer Demonstrator

#### Purpose

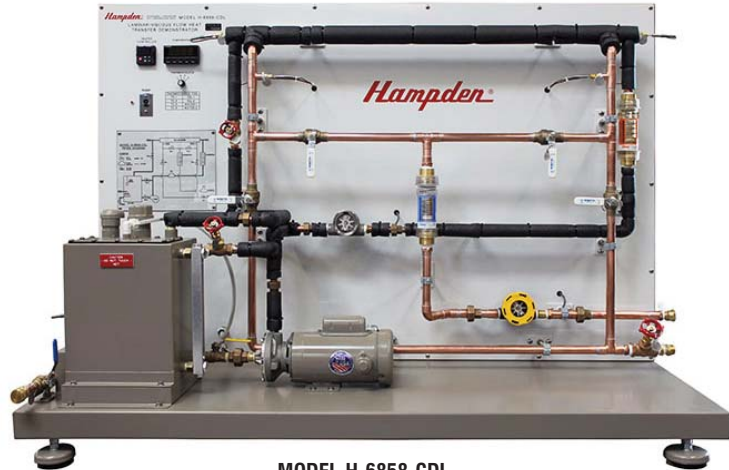
The Hampden **Model H-6858** Laminar/Viscous Flow Heat Transfer Demonstrator has been developed to investigate the fundamental principles of heat transfer as applied to a tube-in-tube heat exchanger. The apparatus permits the student to move from classroom theory to a hands on application with all of the nuances that it entails. The student shall measure the variables that affect the overall heat transfer coefficient. The "cold" and "hot" fluid flow rates are measured. The unit can be configured to operate as either a parallel flow or counter-flow heat exchanger. By varying the fluid flow rates, laminar, transitional or turbulent flow conditions can be created.

#### Description

Thermocouples are located in the fluid streams for accurate measurement of the fluid temperatures. Furthermore, the surface temperature of the metal tube is provided for in both passes. The unit is equipped with a mixing vessel which allows either the temperature of the "hot" or "cold" fluid to be accurately controlled. This, in effect, allows the temperature gradient between the two fluids to be varied over a wide range. The Reynolds number can be varied below 2000.

#### Experiment Capabilities

The student manual that accompanies the unit details the relevant theory; analytical and graphical analysis techniques; and experimental procedures. The analytical techniques include log mean temperature difference effects.



**MODEL H-6858-CDL**  
Dimensions: 40-1/8"H x 59-3/4"W x 28"D  
Shipping Weight: 605 lbs

#### Specifications

- Base and Panel:**  
Steel, finished in Epoxy enamel
- Water/Oil Heat Exchanger:**  
Tube-in-Tube
- Flowmeters:**  
Rotameter type with (2)
- Pump:**  
Circulator with On-Off Control
- Oil Heater:**  
Variable Temperature Control with On-Off Control
- Oil Tank:**  
Vented
- Digital Temperature Indicator:**  
Type T with 4 point Transfer Switch
- Thermocouples:**  
Type T (5)
- Cold Water Control:**  
Valve
- Protection:**  
Main Circuit Breaker with Indicator Light
- Manual:**  
Experiment and Teacher's Manuals

#### Services Required

- Electrical:**  
120V AC-1Ø-60Hz

#### Computer Data Logging

This feature adds dual thermocouples and flow transmitters into the system. One interface package containing National Instruments I/O modules is provided for interfacing into a PC computer through the USB port.

Computer is included. LabVIEW® control software and templates for LabVIEW® control software are included.

Specify **Model H-6858-CDL**. ♦



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All Hampden units are available for operation at any voltage or frequency

**Hampden**  
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