

Heat Transfer Training Systems

Educational Training Equipment for the 21st Century

Bulletin 685-6C

H-6856 Cross-Flow Heat Exchanger

Purpose

The Hampden **Model H-6856** Cross-Flow Heat Exchanger has been developed to permit students to investigate the heat transfer phenomena occurring in flow over tubes arranged individually or in banks. Air is used as the working fluid and is forced to flow over electrically heated tubes housed in an air duct. The student will be able to monitor heater wattage, heater temperature, and air temperature; while measuring the air velocity in the duct.

Description

This unit comes complete with a Experiment and Instructor's manual covering basic theory and operation of the unit. The student will be able to experimentally determine the following:

1. Film coefficient for air;
2. Overall heat transfer coefficient for laminar, transitional and turbulent flows of:
 - a. single cylinders;
 - b. cylinders arranged in rows:
 - (i) normal to the flow;
 - (ii) perpendicular to the flow;
 - c. cylinders arrange in banks:
 - (i) normal to the flow;
 - (ii) perpendicular to the flow;
3. Unsteady state heat transfer;
4. Flow profiles within the duct;

Specifications

This unit also comes complete with a 24" long air duct which has a working cross-section of 5" x 5" and is constructed out of 16-gauge sheet metal. This air duct includes a clear Lexan® full-length observation port and provisions for mounting the pitot tube positioner and electric heaters. The air duct is permanently mounted on a 14 gauge formed base which is 30"W x 24"D. Also mounted on this base is an instrument case. This case is 16"H x 12"W x 9-1/2"D and, in addition to the previous mentioned items, it also houses the thermocouple selector switch, AC main circuit breaker, on-off switches and pilot lights.

Components include:

- Pitot Tube
- Manometers (2)
- Pitot Tube Positioner
- Surface Temperature Probe
- Analog Thermometer
- Wattmeter
- Electric Heater Elements with Variable Autotransformer Control
- Centrifugal Fan with Variable Autotransformer Speed Control

Options

H-6856-CDL Computer Data Logging

This option configures the unit with dual thermocouples and digital meters with analog outputs to allow remote data acquisition. One interface package consisting of National Instruments I/O modules is provided for interfacing with a PC computer through the USB port. Computer is included. LabVIEW® control software and templates for LabVIEW® control software are included.

H-6856-10 Finned Tube Plate

H-6856-20 Local Heat Transfer Element

H-6856-30 Parallel Flow Heat Exchanger



Model H-6856 Cross-Flow Heat Exchanger
Dimensions: 87"H x 28"W x 28"D
Shipping Weight: 500 lbs.

Services Required

Electrical: 120VAC-1Ø-20A-60Hz



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

Hampden
ENGINEERING CORPORATION