



Different plate exchangers in detail

Electronic Console

SPECIFICATIONS

This unit is used to study the phenomenon of heat transfer in convection in a crossed flow.

Anodized aluminium structure and panels in painted steel. Main metallic elements in stainless steel.

Diagram in the front panel with similar distribution to the elements in the real unit.

Mouth bell input of resistant stainless steel resistant to the corrosion.

Vertical air tunnel of stainless steel of rectangular section (65 x 170 mm.) and 1200 mm. of length. It is resistant to the corrosion. This tunnel has a rectangular central opening of 200 x 150 mm., placed in a longitudinal way, that is good to insert the different plates with the tubes in the current of air and to carry out the applicable experiments. The plates are fixed by two supports of stainless steel.

Flange of joining elastic tunnel-fab with band.

Centrifugal fan. Air flow adjustable.

Temperature sensors, "J" type.

Inclined manometer.

Active element (heating resistance). It is a cylinder of thick walls heated electrically. Their nominal dimensions are of 15.8 mm. of diameter and 50mm. of length. The element incorporates only one thermoelectric couple. Electrical power: 700W.

Single tube plate exchanger:

A thick plate with a central perforation of 16 mm. of diameter to install the active element (heating resistance). This plate can be installed in the air tunnel in order to study the behaviour of one single tube in the traverse current.

Tube bundle plate exchanger:

A thick plate with 27 fixed tubes of approximately 16 mm. of diameter and 60 mm. of length, placed in an equilateral triangle. The tubes are placed in six lines and there is a removable tube next to the center of each line. This can be substituted by the active element (heating resistance) to measure the effect of the lines of adjacent tubes on the heat transfer velocity of the active element.

Electronic Console:

Metallic box.

Connections for temperature sensors. Selector for temperature sensors. Digital display for temperature sensors.

Fan speed regulator. Heating resistance regulator.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

OPTIONAL (not included in the standard supply):

TIFCB/A. Local Heat Transfer Element.

A thick plate with a central perforation that allows carrying the element of direct transmission (TDC). The plate consists of a knurled and graduated control that allows rotating the TDC in a circumferential way, in order to study the gradual variation of the convection coefficient inside the exchanger.

TIFCB/F. Finned Tube Plate Exchanger.

A plate with 10 copper tubes with fluted surface. The plate has four lines of fluted tubes, so that the tubes are disposed in an equilateral triangle with distances of 30 mm. among the centers, and there is a removable fluted tube next to the center of each line. This can be substituted by the heating element, which integrates a thermocouple to measure the heat transfer velocity.

EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

- 1.- Investigation of convection processes.
- 2.- Determination of the heat transfer for a single tube.
- 3.- Determination of the heat transfer for a bench of tubes.
- 4.- Determination of the average heat transfer in a bench of tubes.
- 5.- Deduction of the relationship among the numbers of Nusselt, Reynolds and Prandtl.
- 6.- Effect produced by the external fins in the heat transfer process.
- 7.- Determination of the heat transfer for a bench of tubes with fins.
- 8.- Relationship between Nusselt's and Reynolds's numbers using the element TDC.
- 9.- Determination of local variation in the transmission coefficient of convective heat.
- 10.- Comparison of heat transfer for different heating elements.
- 11.- Comparison between different heating elements.

REQUIRED SERVICES

-Electrical supply: single-phase, 220-110V / 50-60Hz.

DIMENSIONS & WEIGHTS

TIFCB:

Unit: -Dimensions: 900 x 450 x 2000 mm. approx.

-Weight: 100 Kg. approx.

Electronic Console: -Dimensions: 490 x 330 x 310 mm. approx.

-Weight: 10 Kg. approx.

OPTIONAL PLATE EXCHANGERS

- TIFCB/A. Local Heat Transfer Element.

A thick plate with a central perforation that allows carrying the element of direct transmission (TDC). The plate consists of a knurled and graduated control that allows rotating the TDC in a circumferential way, in order to study the gradual variation of the convection coefficient inside the exchanger.

- TIFCB/F. Finned Tube Plate Exchanger.

A plate with 10 copper tubes with fluttered surface. The plate has four lines of fluttered tubes, so that the tubes are disposed in an equilateral triangle with distances of 30 mm. among the centers, and there is a removable fluttered tube next to the center of each line. This can be substituted by the heating element, which integrates a thermocouple to measure the heat transfer velocity.

* Specifications subject to change without previous notice, due to the convenience of improvements of the product.



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