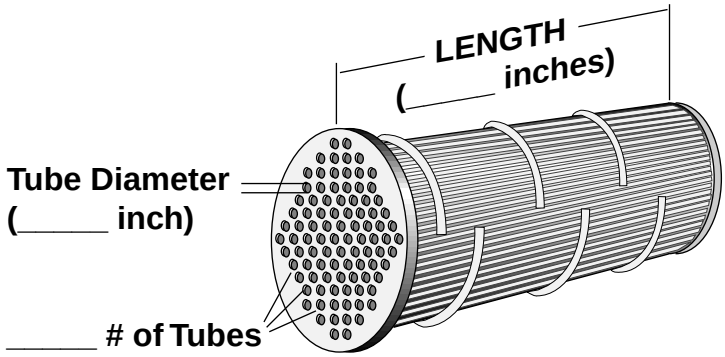
# REPLACEMENT HEAT EXCHANGERS – SHELL AND TUBE

It is very easy to use a Kelvion Heat Exchanger to replace a Shell/Tube Heat Exchanger. There are two ways to select a Kelvion heat exchanger to replace a shell/tube heat exchanger. Both methods provide exact or improved performance selection.

**Method A. Heat Transfer Surface Method**

This method uses a near exact way of matching the heat transfer surface area of the heat exchanger, which defines the nominal performance of the unit. Because Kelvion units perform 20% to 80% better than shell/tube type heat exchangers, on a heat transfer surface basis, a 20% to 80% safety factor embedded in this method. This method works for almost any type of fluid to fluid and steam to fluid heat exchangers.




Step 1 Count the number of tubes in the shell/tube heat exchanger

**# of tubes = _____**

Step 2 Measure the external diameter of the tube(s).

**OD Diameter of bare tube is: (.25", .375", .5", .625", .75", .875" or _____)**

*If the tubes have fins or protrusions, call your FlatPlate representative.*

Step 3 Measure the length of the tube(s) from end sheet to end sheet. (If U-tube bundle, then use overall length of U-tube bundle.)

**Length of tubes = _____ inches**

Step 4 Multiply:

#tubes____ **x** Diameter of tube_____(inches) **x 3.14 x** Tube Length_____(inches) **x .0069** (ft2/in2) **x 1.2 Safety factor**

**= _____"Sq. Feet" of Heat Transfer Surface**

Step 5 Based on the "Sq Feet" Column below, select the corresponding Kelvion Model

| **Hydronic Model** 5x12 models | **Sq Feet Surface** |
|---|---|
| FP5x12L-4 (3/4" MPT) | 0.8 |
| FP5x12L-6 (3/4" MPT) | 1.5 |
| FP5x12L-8 (3/4" MPT) | 2.3 |
| FP5x12-10 (3/4" MPT) | 3.1 |
| FP5x12-12 (3/4" MPT) | 3.8 |
| FP5x12-14 (3/4" MPT) | 4.6 |
| FP5x12-16 (3/4" MPT) | 5.4 |
| FP5x12-20 (1" MPT) | 6.9 |
| FP5x12-24 (1" MPT) | 8.4 |
| FP5x12-30 (1" MPT) | 10.7 |
| FP5x12-30 (1-1/4" MPT) | 10.7 |
| FP5x12-36 (1" MPT) | 13.0 |
| FP5x12-40 (1" MPT) | 14.6 |
| FP5x12-40 (1-1/4" MPT) | 14.6 |
| FP5x12-50 (1" MPT) | 18.4 |
| FP5x12-50 (1-1/4" MPT) | 18.4 |
| FP5x12-60 (1-1/4" MPT) | 22.2 |
| FP5x12-70 (1-1/4" MPT) | 26.1 |
| FP5x12-80 (1-1/4" MPT) | 29.9 |

| **Hydronic Model** 10x20 models | **Sq Feet Surface** |
|---|---|
| FP10x20-20 (1-1/2" MPT) | 23.6 |
| FP10x20-24 (1-1/2" MPT) | 28.9 |
| FP10x20-30 (1-1/2" MPT) | 36.8 |
| FP10x20-40 (1-1/2" MPT) | 49.9 |
| FP10x20-50 (2" MPT) | 63.0 |
| FP10x20-60 (2" MPT) | 76.1 |
| FP10x20-70 (2" MPT) | 89.3 |
| FP10x20-80 (2" MPT) | 102.4 |
| FP10x20-90 (2-1/2" MPT) | 115.5 |
| FP10x20-100 (2-1/2" MPT) | 128.6 |
| FP10x20-110 (2-1/2" MPT) | 141.8 |
| FP10x20-120 (2-1/2" MPT) | 154.9 |
| FP10x20-130 (2-1/2" MPT) | 168.0 |
| FP10x20-140 (2-1/2" MPT) | 181.1 |
| FP10x20-150 (2-1/2" MPT) | 194.3 |
| FP10x20-160 (2-1/2" MPT) | 207.4 |
| FP10x20-170 (2-1/2" MPT) | 220.5 |
| FP10x20-180 (2-1/2" MPT) | 233.6 |
| FP10x20-190 (2-1/2" MPT) | 246.8 |
| FP10x20-200 (2-1/2" MPT) | 259.9 |

For Steam, CuNi-Cupronickel, and Brass Shell/Tube Replacements, or Sea water, Swimming Pool water and installations with Questionable water quality, substitute FlatPlate's MP Series Marine for the Kelvion model#.

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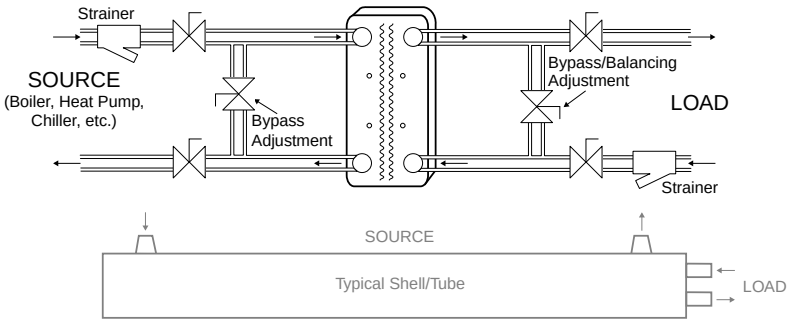
Step 6 **Installation** - The most important item is that the fluid pressure drop of the new installation, closely matches (+/- 20%) that of the (former) shell/tube installation, so that the pump performance and fluid flow remains the same. Make sure bypass balancing valves are installed on all fluid circuits to the heat exchanger (boiler and secondary side, (excluding steam lines)), then adjust for proper pressure drop across the heat exchanger, which matches the pressure drop across the (former) shell/tube heat exchanger. This ensures a good installation and excellent operation and performance, and customer satisfaction.




## Method B. Design Condition Method

The standard design and selection method of a heat exchanger is based on “Design Conditions”. This heat exchanger can then be selected from one of the SELECTION charts in this catalog, or computer selected. The following information is required for a computer selection:

**Hot Side A**

| | |
|---|---|
| Fluid | _____(Water, or, %Glycol, or Fluid Type) |
| Temperature IN | ____ ˚F (or ˚C) |
| Temperature OUT | ____ ˚F (or ˚C) |
| Flow Rate | _____GPM (or L/min) |
| Fouling Factor | (.0002 standard) |
| Maximum allowable Pressure drop | _____psid |

**Cold Side B**

| | |
|---|---|
| Fluid | _____(Water, or, %Glycol, or Fluid Type) |
| Temperature IN | ____ ˚F (or ˚C) |
| Temperature OUT | ____ ˚F (or ˚C) |
| Flow Rate | _____GPM (or L/min) |
| Fouling Factor | (.0002 standard) |
| Maximum allowable Pressure drop | _____psid |

**Total Heat Transfer**_____BTUH (or KW)

**NOTE: When Replacing a SHELL/TUBE heat exchanger, the Kelvion unit will be 1/2 to 1/5th the size and weight of the Shell/tube, for the exact same performance and design conditions. This is due to the compact construction of the Kelvion design.**