Types of Heating And Cooling Coils

Fin & Tube Heat Exchangers

Fin and tube heat exchangers are used extensively for heating and cooling air. They consist of one or more rows of finned tubes connected to headers and mounted within a sheet metal casing with flanged ends suitable for duct mounting.

The heating elements are normally manufactured with copper tubes / aluminium tubes, with the extended surfaces, or fins, being of aluminium or sometimes copper. The most common type of finning arrangements are the rectangular fins.

Heating coils may be used with hot water or steam as the heat transfer media whilst frost pre-heaters usually have electric heating elements.

Cooling coils are classified as being either of the water or the direct expansion type depending on the media flowing through the tubes.

A heating coil is shown below.
In WATER COILS, hot or chilled water or brine circulates through the tubes of the coil either emitting or absorbing sensible heat as the air flows over the fins attached to the outside surfaces. Usually the flow of water and air are in opposite directions to each other, this being known as counter-flow heat exchanger. This configuration gives maximum heat transfer.

**Direct Expansion Coils (Evaporator Coils)**

In the direct expansion coil (DX), or evaporator, a refrigerant evaporates inside the tubes of the coil, as shown below.

Latent heat is absorbed by the air stream from the refrigerant as the refrigerant evaporates. With this type of coil, as with steam, there is no distinction made between parallel and counter-flow since the surface temperature is more uniform owing to the refrigerant in the tubes boiling at a constant temperature.

When direct expansion coils are used they become the evaporator of the refrigeration cycle, and may be termed either ‘dry’ or ‘flooded’. In the ‘dry’ DX coil only a sufficient quantity of refrigerant is introduced
to operate in the predominantly vapour state. In the ‘flooded’ DX coil most of the coil is filled with liquid refrigerant and although this is more efficient, it is not used so much in air-conditioning since the additional refrigerant is expensive.

Evaporator coils come in a variety of shapes and sizes, depending on the type of installation, the amount of cooling capacity needed, and the manufacturer. They are constructed of a combination of aluminium finned copper tubing or aluminium finned aluminium tubings. The copper / aluminium tubing runs perpendicular to the aluminium fins, making U-turns back and forth until the desired coil size is achieved. Added cooling capacity without an increase in length and width is accomplished by adding more rows of copper / aluminium tubing.

All evaporator coils must have a drain pan to collect the water that condenses as the air flowing across the coil cools. The water can drain away by gravity or be pumped away.

The cooling effect that takes place inside the coil requires a pressure drop in the refrigerant. This drop can be accomplished in a number of ways: capillary tube, piston or orifice, or thermostatic expansion valve.

A capillary tube is a thin copper tube of predetermined length into which the compressed liquid refrigerant is pumped. The length of the tubing causes the pressure drop and subsequent cooling effect of the refrigerant.
A piston or orifice blocks the flow of refrigerant and forces it through a tiny hole, creating the needed pressure drop.

A **thermostatic expansion valve** meters the flow of refrigerant to meet the cooling demand of the coil. It determines this demand by way of a sensing bulb attached to the outlet tube on the coil. Because it can meter the flow to meet demand, the expansion valve can keep the coil at optimum cooling potential.

Because the cooling coil is an integral part of the air distribution system, its geometry — size, number of rows, fin spacing, and fin profile — contributes to the airside pressure drop and affects the sound power level of the fans. (Fan power needed to circulate air through the duct system may warrant extra sound attenuation at the air handler.)

**SPECIFICATIONS FOR EVAP AND CONDENSING COILS**

**Packaging & Delivery**

Packaging Detail: Customerized Packing

Delivery: Special 3-5 days Or 10-15 Days
delivery is available

**Specifications**

1. Fin Condenser Coil
2. Customerized available
3. Work Pressure: 0.2~3.1MPa
4. Fin space: 1.2~3.5mm
5. Diameter: 7.00mm / 7.94mm / 9.52mm / 12.7mm

<table>
<thead>
<tr>
<th>Item</th>
<th>Fin Condenser Coil Type</th>
<th>Operation medium</th>
<th>Operation pressure (MPa)</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Φ9.52/Φ12.7 Copper tube with aluminium fin</td>
<td>Cold/hot water</td>
<td>≤1.6</td>
<td>Used for combined air handling unit, fan coil etc air conditioning devices</td>
</tr>
<tr>
<td>3</td>
<td>Φ9.52 Copper tube with aluminium fin</td>
<td>Brine</td>
<td>≤1.6</td>
<td>Used for heat transfer in cold storage and all kinds of low temperature systems</td>
</tr>
<tr>
<td>4</td>
<td>Φ9.52/Φ7.94/Φ7 Ethylene glycol</td>
<td></td>
<td>≤1.6</td>
<td>Used of energy recovery and low temperature system devices</td>
</tr>
<tr>
<td></td>
<td>Copper tube with aluminium fin</td>
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<tr>
<td>6</td>
<td>Φ9.52/Φ7.94/Φ7 Copper tube with aluminium fin</td>
<td>R22</td>
<td>≤1.9</td>
<td>Used for industry and commerce air conditioning system</td>
</tr>
<tr>
<td>7</td>
<td>Φ9.52/Φ7.94/Φ7 Copper tube with aluminium fin</td>
<td>R407C</td>
<td>≤1.9</td>
<td>Used for industry and commerce air conditioning system</td>
</tr>
<tr>
<td>8</td>
<td>Φ9.52/Φ7.94/Φ7 Copper tube with aluminium fin</td>
<td>R134a</td>
<td>≤3.1</td>
<td>Used for vehicle and vessel</td>
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