Dry Air Cooler

Dry air coolers are used in closed cooling water systems to dissipate the heat load of a process when the process water supply temperature can be higher than 4°C above the dry bulb ambient temperature.

Warm water carrying heat from the equipment being cooled is pumped through the finned coils of the dry air cooler. Ambient air is drawn across the external surfaces of the coils by a number of fans. Heat is transferred from the cooling water into the atmospheric air and water re-circulates through the process to remove further heat in a continuous process.

Models to remove heat loads from less than 20 kW to over 1000 kW duty.
Each cooler sized to suit the process' specific requirement.
Cools water to 4°C above dry bulb ambient temperature.
Totally enclosed circuit avoiding problems with water contamination.
Low maintenance costs.
No water loss.
Low noise.
Forced or induced draft.
Propeller or centrifugal fans.
Special materials for aggressive fluids or corrosive environments.
Adiabatic cooling arrangements for even lower temperatures.
Technical Data

Design

There are three general arrangements of dry air cooler. The horizontal cooler has a coil supported on legs with the fans drawing air vertically upwards across the coil with a vertical discharge. The vertical cooler is supported in an A frame with the fans drawing air horizontally across the coil and a horizontal discharge. The Vee cooler range has the coil mounted at a 60° angle with the fans horizontally mounted at the top of the frame. Air is drawn horizontally across the coil and is then discharged vertically. These can be supplied as a complete or a half vee. Each of the above configurations can be fitted with spray nozzles to enhance cooling in high ambient conditions (adiabatic cooling).

Noise

The operating noise of the cooler is directly related to the speed of the fans. Typical examples are:-

- 300 RPM - for extremely noise sensitive site locations
- 450 RPM - for noise sensitive site locations
- 700 RPM - for general industrial site locations with slightly lower noise requirements
- 900 RPM - for general industrial site locations
- 1400 RPM - for general industrial site locations

The use of the slower speed fan increases the size of the cooler for a particular duty and increases its cost.

Coilblocks

The coils on the standard cooler are manufactured from ⅜, ½, ⅝ outside diameter seamless copper tubes expanded into aluminium fins with either 1 or 2 mm fin spacing as standard. The tube headers are fabricated from seamless copper tube with inlet and outlet connections either threaded or flanged to BS4504 PN16. If necessary, the standard fins can be coated with epoxy paint for additional protection in coastal areas. In highly corrosive environments where aluminium is not suitable, the copper tubes are fitted with either magnesium alloy, copper or copper electro tinned fins. Alternatively, coil tubes, fins and headers can be supplied in stainless steel or titanium.

Fans

Propeller type fans, manufactured from plastic or galvanised mild steel, are used to pull air across the coil blocks. The standard fan housing and casing are in aluzinc but these can be supplied in other materials, such as stainless steel, to resist against adverse environments. A close mesh guard is fitted to each fan. The fan motors are totally enclosed air cooled with protection to IP54 suitable for a 380/415 volts 3 phase 50/60 Hz. Each motor has its individual isolator, which are all wired back to a common terminal box.

Framework

The support structure is fabricated from heavy gauge steel and the casing from steel sheet with an aluzinc or galvanised protective coating. These are supplied in an unpainted finish unless otherwise specified. Cooler can be supplied with all stainless steel support structures.

Frost Protection

If the dry air cooler is mounted outside in an area where it will be exposed to frost, an antifreeze solution, such as a mixture of ethylene glycol and water, must be used. The concentration of this solution will affect the cooling duty of the cooler and the pressure drop across it. It is important that this is taken into account when the design criteria is drawn up and the model of dry air cooler is selected.