

Dual Circuit Aftercoolers

Cryogenic Air Separation is a process in which large volumes of air are taken from the atmosphere, compressed, cooled, liquified then separated into its major components by distillation. After the air is compressed, impurities such as water vapor must be removed. In the past, part of this removal process was accomplished with a tower water cooled heat exchanger, a chilled water cooled heat exchanger and a moisture separator connected in series. This resulted in a system that required a significant amount of space and a complicated piping arrangement that resulted in a high airside pressure drop.

For improved performance, API Heat Transfer has combined the air cooler, air chiller and moisture separator into one compact vessel. The combined design results in reduced overall space requirements, reduced external piping costs and complexities, and reduced airside pressure drop.

The air cooler and air chiller utilize API Heat Transfer's Basco Type ES Extended Surface Plate Fin heat transfer surface. This is a unique, patented, compact plate fin design that offers several advantages over standard shell and tube heat exchangers. For one, the ES heat exchanger maximizes the heat transfer surface per unit volume of space resulting in significantly more compact designs. Second, the gas inlet and outlet nozzles can be located almost anywhere along the shell. This feature simplifies piping systems and allows the ES to be readily adaptable to existing requirements.

The Dual Circuit Heat Exchanger can be supplied with an optional internal moisture separator capable of separation efficiencies up to 99% for particles 3.0 micron and larger. The moisture separator can be a vane type separator, a mesh type separator or a combination of both types. With the ES heat exchanger, the cooling water temperature rise is not limited to the air outlet temperature. This allows for designs that require less cooling water resulting in cost savings for our customers. The ES heat exchanger is also capable of approach temperatures as close as 5°F.

The generous flow areas, once through the bundle flow path and the absence of baffles inherent in the Basco Type ES heat exchanger design all contribute to minimize air side pressure drop. This minimal pressure drop results in lower overall power requirements for the customer. In most cases, pressure drops of less than 1.0 psi are possible with the Type ES dual circuit heat exchanger and integral moisture separator.

API Heat Transfer's Dual Circuit Aftercoolers are available for gas flows up to 140,000 scfm and design pressures up to 600 psig. The Aftercooler shell and bonnets can be fabricated from any commercially available and weldable material, but are typically supplied in carbon steel. The Type ES heat transfer surface is available in aluminum, coated aluminum and copper.



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