

Oxygen Coolers

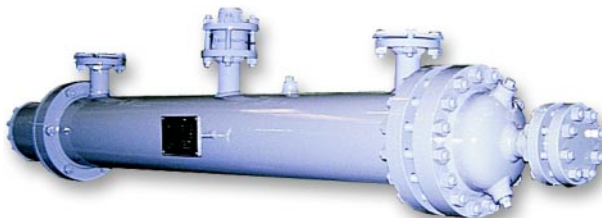
In the Air Separation business, air is segregated into its component gases, generally oxygen, nitrogen and argon. Commercially pure oxygen is an important component in steel production, microchip manufacturing, various chemical processes and a wide range of industrial manufacturing processes. Oxygen is used as a gas or liquid, and is supplied via pipeline, large storage silos, or portable pressurized bottles.

The air separation process separates the main component gases in a column based on their molecular weight. As the individual component gas is drawn from the column, it must be compressed via a compressor to reduce volumetric storage space and prepare the gas for transport or liquification. This process produces "heat of compression" due to the molecules moving closer together. In the case of oxygen, specially designed compressors are used. For compressor efficiency reasons, it is important the gas component be cooled prior to each subsequent stage of compression via an intercooler. Also, after the final stage of compression, the gas must be cooled via an aftercooler for safety reasons.

Due to the potential danger of an explosive reaction that might be caused due to the presence of hydrocarbons or other contaminants, heat exchangers processing oxygen require special design and manufacturing considerations.

API Heat Transfer uses a Basco BEP shell & tube heat exchanger for oxygen service. Our design puts the oxygen in the tubes because unlike the shell, the tubes can be properly cleaned and inspected prior to shipment. Tubes are rigorously cleaned with a solvent under special clean conditions, and then checked under a black light to ensure no remaining hydrocarbon or other contaminants are present. After final testing, most oxygen duty heat exchangers are shipped with a nitrogen purge to avoid recontamination.

The Basco BEP design provides greater heat transfer surface in a given shell diameter due to our floating tubesheet design. Designs to 3000 psi are available. For oxygen applications, only oxygen-clean gaskets are used on the tube side, never packing. A variety of construction materials can be used but generally 90/10 CuNi is used for the tubes to prevent ignition from sparking where the gas velocity is relatively high and a non-ferrous or steel tubesheet. Water-cooled shells are typically carbon steel. Frequently a relief valve or rupture disc is added to the shell side to protect the unit in the unlikely event of a tube rupture.



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