

# Gland Steam Condenser Package

Although gas turbine power plants are becoming more popular, the most common means of producing electrical power remains the steam turbine. Steam is produced by several means including the fission reaction of Uranium 235 in a nuclear power plant, burning of fossil fuels such as oil, gas, or coal, or by tapping the hot gases from the earth's interior with a geothermal plant. The potential energy of the steam produced is used to make electricity.

The best way of converting the steam's potential energy into electricity is to pass the steam through a steam turbine. The steam turbine uses the steam to spin a shaft. It does this by many changes of direction and pressure through turbine blades or "buckets", similar to how a child's pinwheel operates. Once the turbine shaft is spinning, the kinetic energy of rotation turns an electrical generator (much like a motor running in reverse) to produce electricity. The electricity is then sent to a grid where it is distributed to businesses and households.

Our focus for this application is the point where the rotating shaft exits the steam turbine casing. At this point, atmospheric air is on one side of the casing and high or low- pressure steam is on the other side. High-pressure steam exists at one end of the turbine and steam under vacuum exists at the other end. Seals are used to keep the steam in and the air out, however some leakage occurs. If this leakage went unchecked, the moisture would create a humid, dripping environment resulting in rust of the equipment. Also, air would get into the turbine casing and reduce the condenser vacuum, and thus reduce the efficiency of the overall cycle.

To prevent rust and loss of efficiency, a Gland Steam Condenser Package is incorporated into the power plant. Operating on a continuous basis, API Heat Transfer's Gland Steam Condenser Package pulls a slight vacuum on the turbine shaft seals by means of vacuum pumps, centrifugal blowers, or steam ejectors. This allows capture of the leaked steam and air mixture. Once captured, the steam is condensed in a shell and tube condenser. The condensate drains out the bottom while the air is pulled out the top. The condensed steam is then sent back to the steam cycle with the other condensate. API includes instrumentation to monitor process conditions including the amount of vacuum, the outlet air temperature, and whether the condensate is draining.

API Heat Transfer has designed and manufactured a wide variety of Gland Steam Condenser Packages in almost every possible configuration. Generally, we supply these systems to the major steam turbine OEMs. Our ability to supply the complete system sets us apart from many manufacturers who only manufacture the condenser. Next time you are in a power plant, take a look at the gland condenser system. Chances are it is an API Heat Transfer system.



**API Heat Transfer**

2777 Walden Avenue • Buffalo, NY 14225 • (716) 684-6700 • Fax (716) 684-2129  
email: [sales@apiheattransfer.com](mailto:sales@apiheattransfer.com) • [www.apiheattransfer.com](http://www.apiheattransfer.com)

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