Technical Notes
011

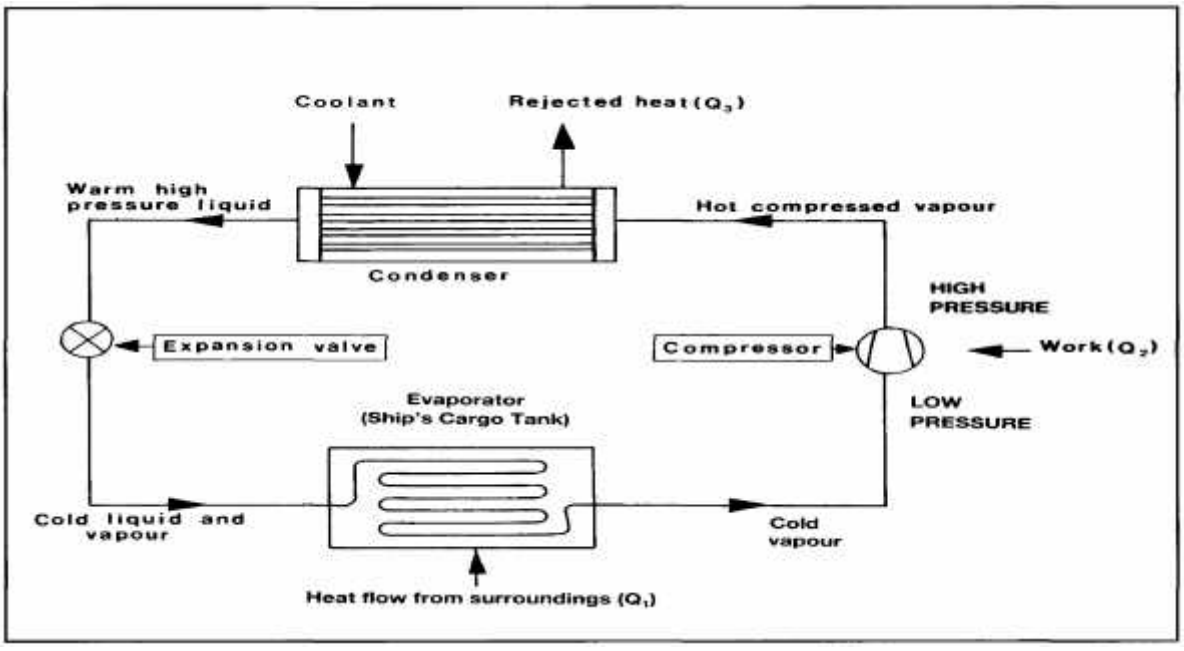
Exceeding Expectations

LPG… How Cool Is That?

Liquefied petroleum gas, also called LPG, GPL, LP Gas, liquid petroleum gas or simply propane or butane, is a flammable mixture of hydrocarbon gases used as a fuel in heating appliances motor fuel, cooking and refrigeration. It is increasingly used as an aerosol propellant and a refrigerant, replacing chlorofluorocarbons in an effort to reduce damage to the ozone layer. When specifically used as a vehicle fuel it is often referred to as autogas.

LPG has to be kept either refrigerated or under pressure to remain liquid. Our industry first became aware of LPG's when losses were detected from storage tanks and realized light ends (LPG) were being lost to the atmosphere. Inspection companies were realizing there was less gasoline volume on static volumes then originally gauged. With this in mind, the industry decided to separate these lighter components and begin storing and selling "gases" as well as gasoline. The next challenge was to figure out how to capture those vapors and store them in a liquid state. It was soon determined LPG's could be stored either by cooling the product or storing the LPG's at a high pressure.

In LPG storage, a refrigeration system is used to keep the LPG's in a liquid state so gases can be transported from one port to another with minimal loss. Below is a simplified diagram of how a compressor system works.



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Vapors are drawn from the cargo tanks by a compressor. By lowering the pressure in the cargo tanks, the liquid in the tank begins to boil. This boil-off is the cooling effect of the cargo. The vapors that have been drawn from the cargo tanks are then compressed up to 15 times the pressure they were drawn from.

After the compressor increases the pressure of the vapor (X 15), the pressure is released through a small opening into a large condenser. The condenser is a collection tank for re-liquefied cargo. Inside the condenser there are coils, similar to a radiator, that sea water flows through. When the vapors are released from this small opening into this larger chamber at about 1 bar of pressure, the vapors cool down rapidly. The coils inside the condenser have sea water running through them to cause condensation to form on the coils and drip into a holding tank. The liquid in the holding tank is then returned to the bottom of the cargo tanks at the same temperature of the cargo or slightly warmer.

compressor (left)

condenser (below)

The LPG industry has come a long way. Today transportation of propane and butane throughout the world is a normal practice and with the discovery of more gas deposits through shale gas exploration, it is a practice that is here to stay.

Due to increasing LPG demand, AmSpec recently relocated its Chemical and LPG facility to a larger “state of the art” headquarters in Seabrook, Texas to better serve our customer's needs. If you have any questions or need require expert LPG inspection, we can be reached at (281) 291-7432 or email LPG@amspecllc.com

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