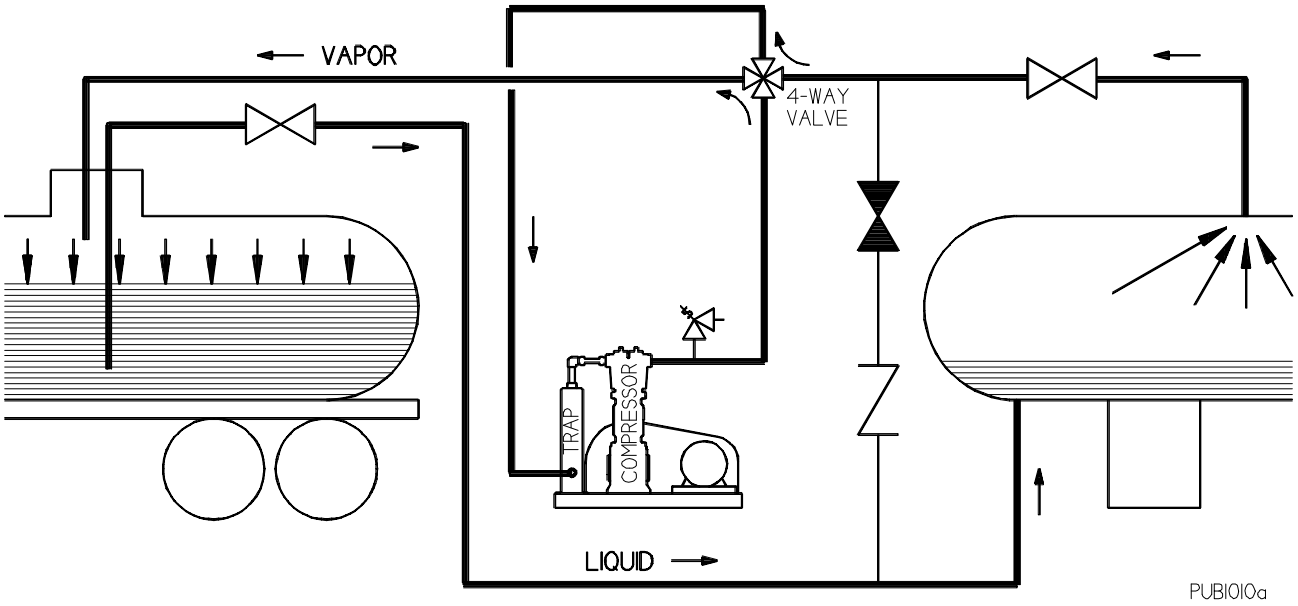
LIQUEFIED GAS TRANSFER WITH A COMPRESSOR

Due to the fact that liquefied gasses boil so easily, using liquid pumps to transfer these products can be troublesome. Also, a liquid pump can only remove the liquid, leaving the vessel full of vapors which can amount to 3% of the total tank capacity.

Liquefied gasses are often transported in rail tank cars with openings on the top of the tank. A liquid pump will have a difficult time unloading a rail tank car - it will be noisy, have short seal and vane life, and will typically unload only 80-85% of the tank car's capacity. A compressor will easily transfer over 99% of the rail car's contents to a storage tank.

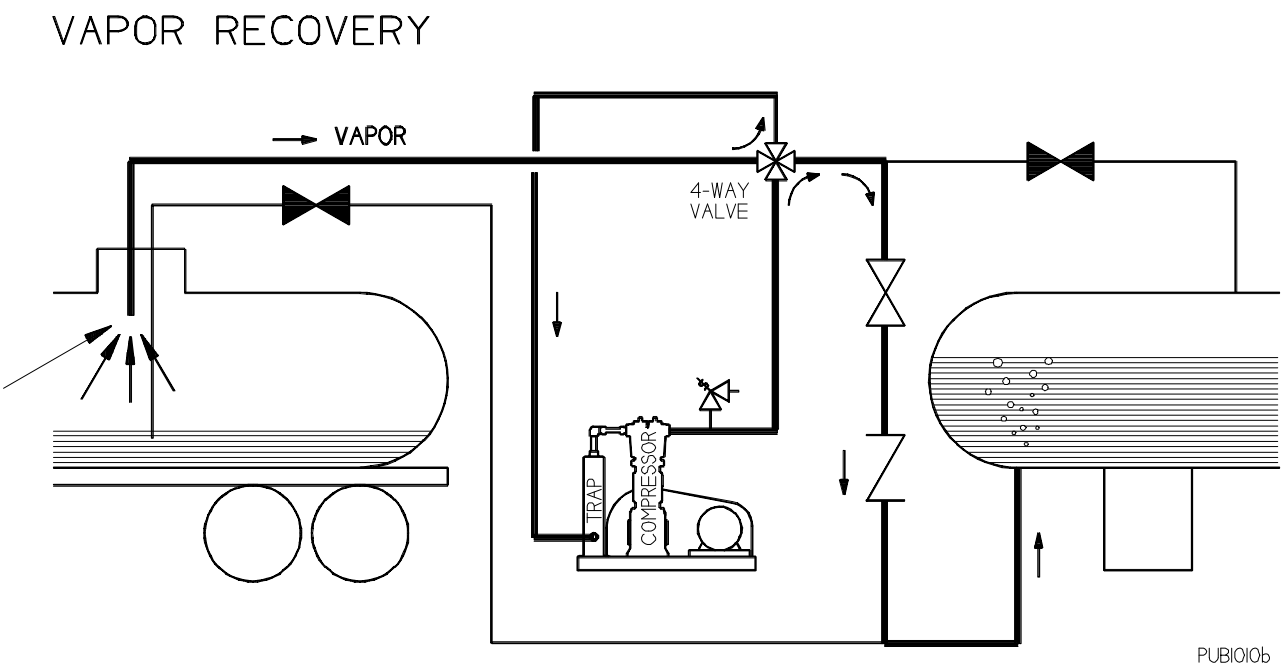
LIQUID TRANSFER



< ---------- 20 - 30 psi Differential ---------- >

LIQUID TRANSFER

The suction of the compressor is connected to the vapor section of the storage tank (the tank to be filled), and the compressor's discharge is connected to the vapor section of the rail tank car (the vessel to be emptied). A line connects the liquid sections of the two vessels. Vapors are then drawn off the top of the storage tank, compressed slightly, and discharged into the top of the rail tank car. This transfer of vapor will slightly decrease the pressure in the storage tank and slightly increase the pressure in the rail tank car. The pressure difference between the two vessels will force liquid from the rail tank car into the storage tank.



VAPOR RECOVERY

After all the liquid has been pushed out of the tank car, the connections to the compressor are reversed so that its suction is connected to the rail tank car. The compressor's discharge is routed to the liquid section of the storage tank. The liquid line connecting the two vessels during the liquid transfer operation is closed. The compressor then pulls the remaining vapors out of the rail tank car and pushes them into the liquid section of the storage tank. The operation is normally stopped when the rail tank car falls to 25-30% of the starting vapor pressure.

SIZING THE COMPRESSOR

Compressors handling products such as propane or anhydrous ammonia will generally transfer 5 to 6 gpm per CFM piston displacement (11 to 13 lpm per m^3/h) in well designed systems. As an example, a size 361 (or 362) compressor at 785 rpm has a piston displacement of 33.7 CFM (57.3 m^3/hr) and will typically transfer 168 to 200 gpm (630 to 745 lpm). Compressors on lower vapor pressure products like butane or sulfur dioxide will have lower transfer rates. Blackmer can easily provide detailed computer performance calculations for individual applications when requested.