EVACUATION OF A CLOSED VESSEL

The example below, as well as the graph showing the expansion factor **(F)**, is computed assuming that the pump is evacuating a closed, dry vessel. No leaks or presence of moisture have been considered.

Example:
The volume of a tank including connecting piping is 750 ft^3. Initial atmospheric pressure is 760 mm HgA (Torr). Vacuum level required is 24" HgV (150 Torr). The amount of gas to be removed from the vessel can be calculated by using the following formula:

$$Q = V \times Ln\ (P_1/P_2)$$

in which...

Q	=	Total amount of air to be removed
V	=	Volume of reservoir plus connecting piping
P_1	=	Initial pressure
P_2	=	Required pressure

Solution:

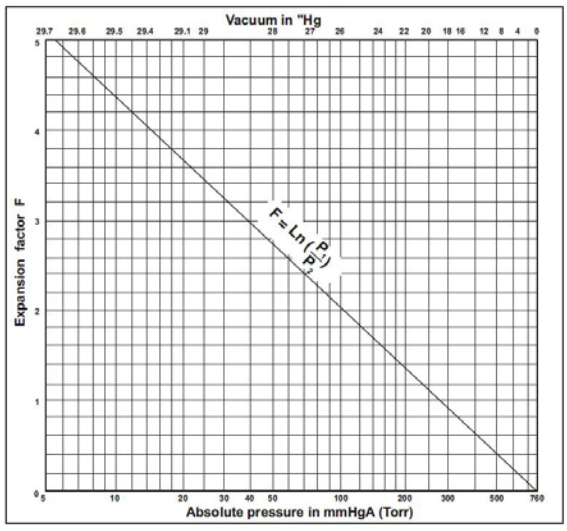
$$Ln\ (P_1/P_2) = Ln\ (760/150) = Ln\ (5.067) = 1.62$$

When using the graph, enter horizontal scale at 150 Torr and read expansion factor **(F)** 1.62 on vertical scale.

The total amount of air to be removed to reduce the pressure inside the vessel from atmospheric pressure to a vacuum level of 24" HgV is 750 x 1.62 = 1,215 ft^3. If evacuation is required in three minutes, the average pump capacity should be:

$$1{,}215/3 = 405\ ACFM$$

Select a pump with this capacity.



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