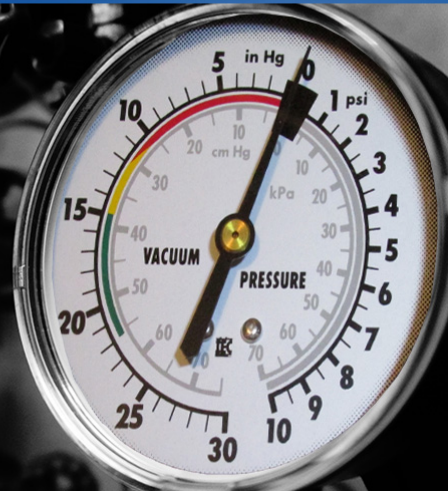


BY JIM ELSEY & The Summit Pump Team:

UNDER PRESSURE

Part I: Pressure vs. Vacuum

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The concept of vacuum mystifies some people when encountered on pump applications. Today, we hope to simplify the problem.

Pressure vs. Vacuum

Even in a vacuum there remains some pressure... it is simply a pressure at a magnitude below the surrounding atmospheric pressure. Vacuum does not necessarily mean the absence of all pressure; vacuum can be any pressure between 0 PSIA and 14.7 PSIA.

As a refresher...we offer the following points:

- Vacuum or vacuum pressure measurements are characterized as either **absolute** or **relative** (gauge).
- **Absolute** pressure is measured from zero, which means a 100% or a perfect vacuum.
- **Relative** pressure measurements are in reference to the atmospheric pressure. So if you see the word gauge or vacuum in the description it is being measured relative to atmosphere.
- **Absolute** pressure = gauge pressure + atmospheric pressure.
- **Absolute** pressure can be zero, but it can *never* be negative.

- **Absolute** pressure at sea level is usually given as 14.7 PSIA.
- Atmospheric pressure changes with elevation referenced to sea level and changes with barometric pressure (weather). If you are using gauge pressure to measure pressure or vacuum, you need to state the atmospheric pressure at the time of the measurement.

Units, Scales and Terms

In the pump world we often encounter two descriptive terms, “absolute” and/or “vacuum” assigned to the measurement scale. Further, the measurements may either be in units of inches of Mercury (in-Hg) or pounds per square inch (PSI) in absolute pressure (PSIA) or gauge pressure (PSIG).

	% Vacuum	PSIA	PSIG	in-Hg (Absolute)	in-Hg V	in-Hg G
ATMOSPHERIC PRESSURE	0%	14.7	0	29.92	0	0
		↑	↓	↑	↓	↓
“PERFECT” FULL VACUUM	100%	0	-14.7	0	29.92	-29.92

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A **perfect vacuum**, if measured in *absolute* terms is zero (0 inches Hg) but is 29.92 in-Hg V (-29.92 in-Hg G) if the measured units are deemed *relative* (vacuum or gauge).

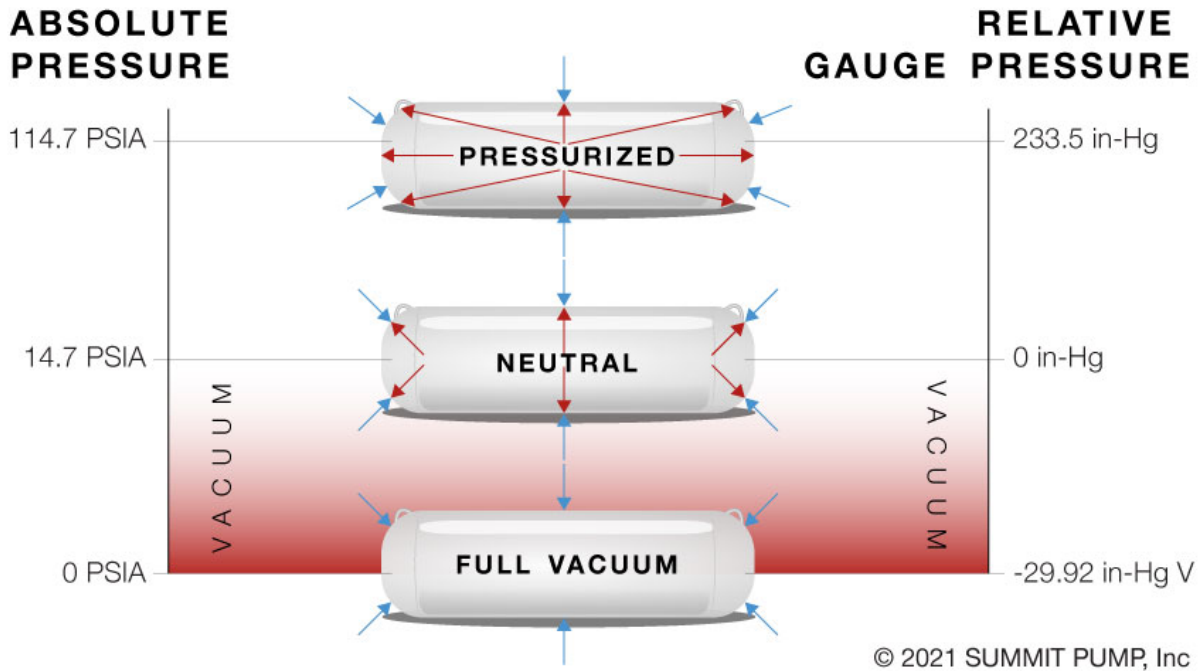
Due to the differences in these two measurement methods you need to ask the equipment owner if the parameter measurement scale is absolute or relative? The methods are 100% opposite of each other and if not properly understood can lead to some big mistakes.

Application

If we had a container at a theoretical perfect vacuum (that is, we have removed

every molecule and its components from within the vessel) then we could state that vacuum condition as 0 (zero) pressure absolute or 0 PSIA.

However, if we were to measure our perfect vacuum in inches of Mercury **Vacuum** or **inches Hg V** the reading would be 29.92 inches Hg **V** not zero PSIA as in the first part of the example.



Need More?

Stay tuned for part two in next month's 60 seconds with Summit Pump for more information. If at any point you are confused by a vacuum application in the field and not sure how to proceed, just give us a call.

Jim Elsey
& The Summit Pump Team

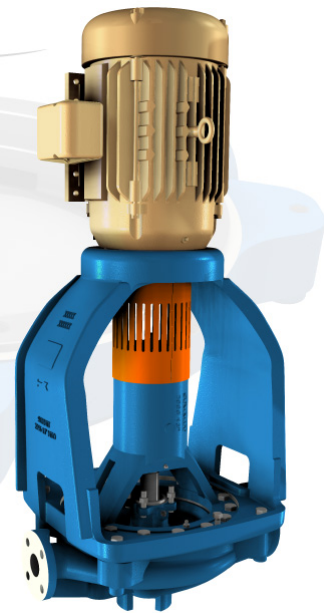







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