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NEWSLETTER #32 - WHAT IS AN ALTITUDE GAUGE ON A HYDRONIC (HOT WATER) BOILER?

On hydronic heating boiler they will often call the pressure/temperature gauge an *altitude/pressure/temperature gauge*. So does that mean we can read the elevation of our facility on this gauge? No, pressure is converted to elevation or lift. Altitude or lift relates to how high the water pushed up in the heating system. In other words, if my highest heating unit is 23 foot above the boiler we will have to create 10 psi of pressure to lift water that high. It is the reverse of water pressure created by elevation.

How is pressure created by the elevation of water? Because of the density and weight of water, pressure is exerted as water is pulled downward by gravity. For example, scuba divers encounter greater and greater pressures as they dive deeper in a body of water. The same is true when water is elevated above the surface of the Earth. For example, water in a vertical city water pipe inside a high-rise building will have more pressure at the bottom than at the top of the pipe. When referring to the pressure exerted at the bottom (or at some specified elevation) of a body of water in this way, the phrase "column of water" is often used. A column of water is water of some specified depth or height. The pressure due to a column of water depends only on the elevation, not the shape of the container. For example, the pressure in psi at the bottom of a 24" pipe that is 100' tall and full of water will be the same as the pressure in psi at the bottom of a 2" pipe that is 100' tall and full of water.

What would the read at the bottom of a column 1 foot high? The pressure due to the weight of the water is 0.433 psi. This pressure is additive. That is, it increases by 0.433 psi for every additional foot of water. For example, the force exerted at the bottom of a column of water 2' high is 0.866 psi ($0.433 \text{ psi/ft} \times 2' = 0.866 \text{ psi}$). Municipal water towers use this principle to produce water pressure without requiring pumps to run continuously.

How high is a column of water that exerts 1 psi at the bottom?

$$\text{water column} = P + 0.433$$

$$\text{water column} = 1 \text{ psi} \div 0.433 \text{ psi/ft}$$

$$\text{water column} = \mathbf{2.309 \text{ ft}}$$

How much pressure is found at the bottom of a column of water 125'-0" high?

$$P = \text{water column} \times 0.433$$

$$P = 125 \text{ ft} \times 0.433 \text{ psi/ft}$$

$$P = \mathbf{54.125 \text{ psi}}$$

Be Safe!

Upcoming Training Schedule:

Albuquerque, NM – 40 Hour Boiler Recertification – November 14 - 18, 2011

Phoenix, AZ – Boiler Operator Training – November 29, 2011

Phoenix, AZ – 40 Hour Boiler Recertification – January 9 – 13, 2012

**Lawrence, KS – at Haskell Indian Nations University – 40 Hour Boiler Recertification
January 23 – 27, 2012**

**Lawrence, KS – at Haskell Indian Nations University – 80 Hour Boiler Certification
January 30 – February 10, 2012**

***Call us at #623-847-4788 or visit us online at www.EmersonBoiler.com
for more information!!!***

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