

**Is an ASME stamped water boiler with a Maximum Allowable Pressure Rating of 160 psi better than a an ASME stamped water boiler with a lower pressure rating?**

The answer is that higher pressure is better, but only if it is required.

Every 2.31 feet of vertical piping equals one psi of pressure pushing down due to the weight of the water. If the hydronic system piping extends above a heating boiler by 200 feet, then pressure exerted on the boiler by the weight of the water in the piping is equal to about 86 psi. As a rule, a boiler relief valve is selected that is rated about 15% greater than the actual pressure in order to prevent the nuisance opening of the valve due to slight pressure fluctuations and the mechanical pressure added by building and boiler circulators. ASME construction rules also require the Maximum Allowable Working Pressure of a boiler to be equal to or greater than the pressure relief rating of the valve. In this example, a boiler with a MAWP of 100 psi and a relief valve rated at 100 psi would be sufficient.

The table below relates the maximum height of the hydronic system piping to the required MAWP of the boiler and the required relief valve setting. The 15% “overage” factor is built into these numbers. For a height of 217 feet, for example, a 125 psi relief valve would be selected along with a boiler with a minimum MAWP of 125 psi.

<b>MAWP of Boiler and Relief Valve Rating</b>	50 psi	75 psi	100 psi	125 psi	150 psi	160 psi
<b>Maximum Height of Hydronic Piping</b>	98 ft	147 ft	196 ft	245 ft	294 ft	314 ft

Simply put, “if the installation doesn’t have the piping height, it doesn’t require a higher pressure rating.”

Regardless, human intuition strongly suggests that a higher pressure rated boiler is still “safer” or more “heavy-duty” than a boiler with a lower pressure rating. The facts are that as long as the ASME stamped boiler with the lower pressure rating is suitable for the installation according to the piping height, there is no reason to consider it less safe. Nor is it less durable because ASME designs are capable of withstanding many times their MAWP ratings. If the boiler has a MAWP adequate for the installation, the water pressure cannot in any way damage the boiler or shorten its operational life.

The design, weld and material thickness requirements for ASME section IV boilers have a safety factor of 4 times the MAWP, meaning that a vessel stamped for 125 psi MAWP would not theoretically rupture until it experienced a pressure of 500 psi. Such pressure build up is impossible due to the relief valve setting and because many other components in the hydronic piping system, such as gaskets, seals and components, would fail long before the pressure reached 500 psi.

All boilers that are ASME stamped to section IV are subjected to a factory pressure test that is equal to 1.5 times the MAWP of the vessel. This is not a strength test. The test is only designed to detect leaks in welds and mechanical joints, and a test pressure 1.5 times greater than the vessel will experience in the installation is deemed sufficient for this purpose.

***To summarize, if a boiler specification indicates a relief valve setting of 125 psi, for example, there is no valid application, safety or quality reason to require a boiler with a higher MAWP.***