SUBJECT: Installation Considerations for Ultra™ Commercial and SlimFit™ Boilers

Ultra™ Commercial and SlimFit™ boilers are designed and built to comply with American Society of Mechanical Engineers-Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1) requirements. ASME CSD-1 is the commercial boiler control standard adopted by most states. Special attention by the design engineer and contractor is needed is ensure the boiler installation is compatible with the required boiler controls. These boilers have high and low gas pressure switches with the required manual reset functions.

Historically, the high gas pressure switch is installed after the second gas safety shut off valve. Because the Ultra Commercial and SlimFit boilers operate with negative gas pressure, the historical location for the high gas pressure switch does not provide any function. A high gas pressure switch set at zero will lock-out every time the boiler shuts down and it would not be able to be reset.

The other permissible location in CSD-1 for the high gas pressure switch is before the first gas safety shut off valve. This location subjects the high gas pressure switch to the fluctuations in gas pressure from the appliance gas pressure regulator as that regulator reacts to changes in both the upstream and downstream gas pressure. A lock-up type regulator is required to help prevent these gas pressure fluctuations from exceeding the boiler certification limit of 14-inches water column (W.C.) of pressure. A lock-up type regulator should prevent the downstream pressure from exceeding 5-inches W.C. above the operating set point or 150% of the operating pressure set point, whichever is higher. The lock-up type regulators are tested at near maximum flow capacity of the regulator and at the high side of the spring range. When the regulator is oversized or when the set point is at the middle of the spring range or at the low side of the spring range, the regulator may not be able to hold the gas pressure under the pressure rise stated above. The selected gas regulator should have an operating set point of 4 to 4.5-inches W.C. Select the spring range that is as low as possible while meeting this operating condition. The maximum flow capacity of regulator should be as close as possible to the maximum flow required for the attached boiler. Consider contacting the regulator manufacture for the proper regulator and spring selection.

When a lock-up type regulator is properly selected, and installed per the manufacturer's instructions, the regulator should maintain a pressure below 10-inches W.C. A regulator that is installed to manufacturer's instruction is NOT a regulator that is installed to fit into existing gas piping with minimum changes. The correct minimum lengths of proper diameter straight pipe before and after the regulator must be provided. The addition of elbows and other fittings may result in increased gas pressure that causes the high gas pressure switch to trip and lock-out.

Another installation issue that can result in high gas pressure is the selection of an incorrect boiler system operating control. A boiler control system that causes the boiler to shut down at high fire is incorrect. A boiler control system that causes multiple boilers to shut down at the same time, while they are at high fire, is even worse. These boiler control systems are incorrect because they cause a momentary pressure spike that can be 2.5 to 4.5-inches W.C. higher than the final pressure after the regulator locks-up. The momentary spike is due to stopping the boiler while there is a high gas flow. There may not be a spike when the boilers shut off at low fire. It is best to use the boiler control system to control multiple boiler operation. When selecting an alternative control, make sure it is a modulating boiler control that shuts the boiler down on low fire.