WEIL-McLAIN

TECHNICAL SERVICES BULLETIN

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Subject: Gas Pressure Regulator Selection & Installation Considerations for Weil-McLain High-Efficiency Commercial Boilers

Weil-McLain High Efficiency Commercial boilers are designed and manufactured to comply with American Society of Mechanical Engineers – Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1). These boilers include high and low gas pressure switches with the required manual reset functions to prevent operation of the boiler outside of the acceptable pressure range on the incoming gas supply. Special consideration is required when selecting a pressure regulating device for a commercial boiler installation to avoid any nuisance gas supply pressure lockout conditions due to improper gas supply pressure control to the boiler. Poor supply pressure control can often be the result of selecting a gas pressure regulator that is not the correct type for the application, is not properly sized for the connected load and can also be created by conditions in the installation of the "correct" device to the system piping.

General Requirements and Pressure Regulator Selection Criteria:

As stated in the installation section of the boiler manual, a 100% lock-up type regulator is required to prevent the downstream pressure from exceeding 5 inches WC above the operating set point or 150% of the operating pressure set point, whichever is higher. A service style pressure regulator with an internal relief device (such as BelGas P202 & Itron B34R) will generally provide the best pressure control for high efficiency commercial boiler installations that utilize a fast acting gas valve.

The following information is required in order to select the proper pressure regulator for the application.

1) What type of gas (Natural Gas or LP Gas) is being supplied to the regulator?
2) What is the inlet pressure to the regulator? Note: If inlet pressure is greater than 2 PSIG, a model with an overpressure protection device (OPD) will be required.
3) What is the desired outlet pressure from the regulator
4) What is the connected load to the regulator?
5) What is the size of the piping?

When sizing the internal spring on the regulator, always choose the lowest outlet pressure range that will still meet the outlet pressure requirements needed for boiler operation in the worst-case condition. For high efficiency commercial boilers, the typical target condition is to adjust the outlet pressure of the regulator to be within 4-4.5 inches water column when the boiler is operating at maximum firing rate. Selecting a higher spring rate, where the desired outlet pressure is on the lower end of the spring control range, can lead to higher than desired overshoot conditions on the gas supply to the boiler triggering high gas pressure switch lockouts on the boiler.

Installing a vent limiter to the exhaust port of a pressure regulator will result in a slower closing speed, which is more critical when shutting off from a high demand condition. The reduced closing speed condition can create higher than desired overshoots on the gas supply to the boiler and result in high gas pressure switch lockouts. The same condition can also exist if the vent piping from the regulator is not sized properly and is too restrictive.

Installation Recommendations:

For incoming supply pressures greater than 9" WC, Weil-McLain recommends the use of a dedicated pressure regulator on the gas supply to each boiler in the system. The pressure regulator should be installed within 10-12 feet of piping distance away from the gas valve on the boiler. Incoming supply pressures less than 9" WC may not require an additional pressure control device in the system provided a 100% lock-up type regulator is used for the main supply.

A properly sized filter device must always be installed upstream of the pressure regulator to protect the device from any debris that may be present in the piping system.

Whenever possible, choose a valve body size that matches the manifold/piping supplied on the boiler. Installing a regulator with a smaller or larger body size can create unnecessary turbulence in the gas flowing through the regulator, which can negatively impact pressure control. The piping system should be designed to provide a minimum 10 pipe diameter length of smooth straight pipe flow to the inlet of the regulator and a minimum 10 pipe diameter length of smooth straight pipe flow from the outlet of the regulator. It is not acceptable to install a 90 degree elbow fitting at the inlet and/or outlet of the regulator.

Due to the many variables that exist in selecting the proper gas pressure regulator needed for a particular installation, Weil-McLain does not specify a specific brand and model pressure regulator to be used with our commercial boilers. We recommend that you contact the valve manufacturer of your choice for assistance in selecting the proper pressure regulator and to answer any questions that you may have regarding installation.

Please contact the Weil-McLain Technical Services team with any questions at (800) 654-2109, Option #2.