Lochinvar®

High Efficiency Boiler

Natural Gas Regulator

Selection Guide

BGR-Guide 3/2021

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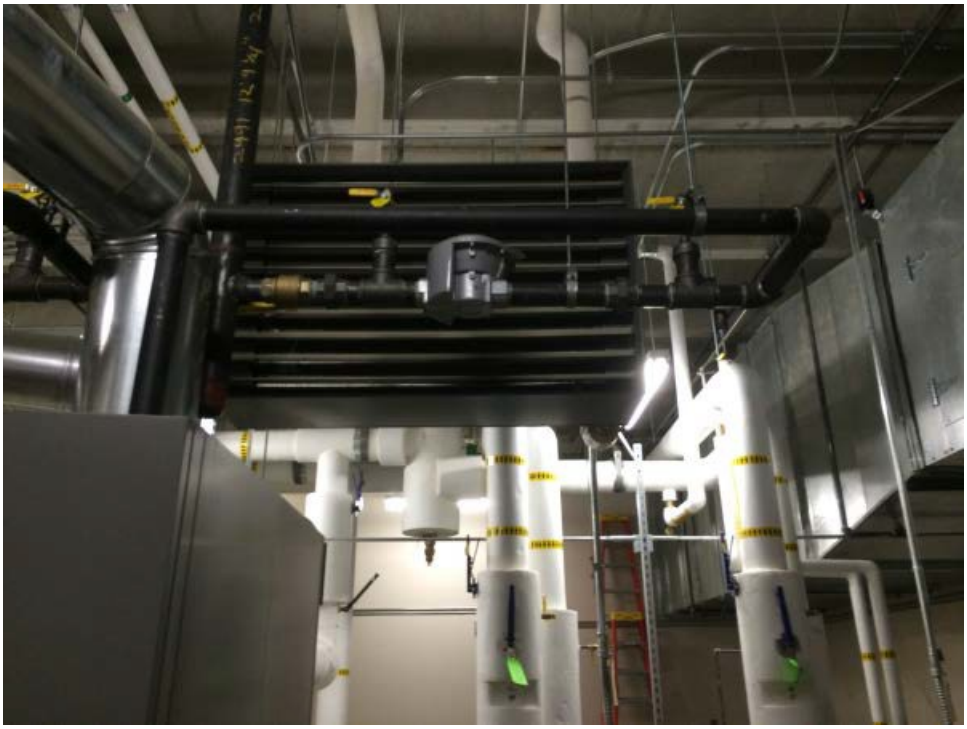
Regulator Selection 3/2021

1. Determine the following information for the installation:
    a. Appliance gas connection size (inches)
    b. Minimum gas supply pressure to regulator
    c. Maximum gas supply pressure to regulator
    d. Maximum input rate of appliance
    e. Minimum input rate of appliance (Btu/hr)
2. Calculate the gas flow rates for the appliance:
    a. High Fire Flow (Flow = Rate /1000)
    b. Low Fire Flow (Flow = Rate /1000)
    c. Required Capacity = High Fire Flow x 1.25
3. A number of factors should be considered when selecting a regulator:
    a. Regulators must be selected to comply with all local, state, provincial, and national codes, laws, regulations and ordinances.
    b. Ensure that the gas supply pressure to the inlet of the regulator is not higher than the maximum inlet pressure rating for that regulator.
    c. In installations where supply pressure to the inlet of the regulator exceeds 14”w.c., a 100% Lockup Regulator is required to prevent excessive pressure from bleeding across the regulator during no flow conditions.
    d. Regulator vents are designed to allow the diaphragm to move as needed to respond to changes in the gas supply system. In installations that would require excessively long regulator vent lines over 15 feet, consider selecting a regulator that employs vent limiting to allow the regulator to be installed without an external vent. Consult the regulator manufacturer to determine the maximum effective regulator vent length.
    e. In installations where variations in pressure to the inlet of the regulator are anticipated consider selecting a direct acting “balanced valve” regulator. Such pressure variations can be expected in cases with undersized or lengthy piping upstream of the regulator, cases with highly variable gas flow rate in the system as might be expected with multiple high turndown boilers, or cases with low gas supply pressure to the building.
    f. Select a regulator spring with an outlet pressure range centered around 7”w.c. (for natural gas) as best as possible. Avoid operating a regulator near the extremes of the pressure range for the selected spring. A spring with a smaller outlet pressure range will typically provide the more accuracy, however a spring with too small of an outlet pressure range can cause instability problems.
    g. Select a regulator that allows the required orientation for an installation.
4. Start by selecting a suitable gas regulator with a connection size equal to the appliance gas connection size. Consider a regulator outlet pressure of 7.0" w.c. Determine the following information for the regulator:
    a. Regulator Capacity
    b. Regulator Minimum Capacity as specified or based on regulator turndown

5. Validate the regulator sizing:
    a. Match the regulator to the pipe size of the gas train to the boiler.
    b. Mount the regulator 8 to 10 feet away from the boiler and minimize the number of elbows to 3. This will keep the pressure drop under 1" W.C. between the regulator and the boiler
    c. If the Regulator Capacity is greater than or equal to the Required Capacity and the Regulator Minimum Capacity is less than the Low Fire Flow, then the selected regulator is sized appropriately for the application.
    d. If the Regulator Capacity is less than the Required Capacity, you may select a regulator that is up to one connection size larger than the appliance gas connection size and repeat Step 4. If the new regulator does not meet the requirements in Step 5 (a), you must select a different regulator type and repeat Step 4 starting with a regulator with the same connection size as the appliance gas connection size.
    e. If the Regulator Minimum Capacity is greater than the Low Fire Flow, you may select a regulator that is up to one connection size smaller than the appliance gas connection size and repeat Step 4. If the new regulator does not meet the requirements in Step 5, you must select a different regulator type and repeat Step 4 starting with a regulator with the same connection size as the appliance gas connection.
    f. Change the controls to modulate the boiler to low fire before shutting the burner off.
6. If the regulator connection size does not match the appliance gas connection size and is larger than 1 diameter, consider selecting a regulator with remote pressure sensing to allow the regulator to control based on the same pipe size as the appliance gas connection. If you go up 1 size in diameter bell up immediately after the regulator.
7. In cases with high gas supply pressure to the inlet of the regulator, a suitable regulator may not be available that can reach low fire flow rate. In this case, a second regulator may be required to step down to an intermediate gas pressure.
8. Never pressure test the regulator at more than 10 PSIG or damage may occur.



Installation Example

Pre-Selected Line Pressure Governor Regulators for Crest Boilers

Notice: When using the Worker-Monitor regulator pair (*OPD model), the upstream regulator should be set at a pressure 70% higher than the downstream regulator. For example, if the downstream regulator is set at 7” w.c., the upstream regulator should be set at 12” w.c.

Crest Model	Gas Connection Size	Lochinvar Part Number	Regulator Inlet Pressure	Regulator Base Model Number	Regulator Connection Size
0751	1-1/4"	100269922	10 in w.c. - 2 PSI	31153	1-1/4"
0751	1-1/4"	100320058	2 PSI - 10 PSI	31153OPD	1-1/4"
1001	1-1/4"	100269922	10 in w.c. - 2 PSI	31153	1-1/4"
1001	1-1/4"	100320058	2 PSI - 10 PSI	31153OPD	1-1/4"
1251	1-1/2"	100269923	10 in w.c. - 2 PSI	31154	1-1/2"
1251	1-1/2"	100320059	2 PSI - 10 PSI	31154OPD	1-1/2"
1501	1-1/2"	100269923	10 in w.c. - 2 PSI	31154	1-1/2"
1501	1-1/2"	100320059	2 PSI - 10 PSI	31154OPD	1-1/2"
1751	1-1/2"	100269923	10 in w.c. - 2 PSI	31154	1-1/2"
1751	1-1/2"	100320059	2 PSI - 10 PSI	31154OPD	1-1/2"
2001	1-1/2"	100269923	11 in w.c. - 2 PSI	31154	1-1/2"
2001	1-1/2"	100320059	2 PSI - 10 PSI	31154OPD	1-1/2"
2501	2"	100269924	10 in w.c. - 2 PSI	31155	2"
2501	2"	100320060	2 PSI - 10 PSI	31155OPD	2"
3001	2"	100269924	10 in w.c. - 2 PSI	31155	2"
3001	2"	100320060	2 PSI - 10 PSI	31155OPD	2"
3501	2"	100269924	10.5 in w.c. - 2 PSI	31155	2"
3501	2"	100320060	2 PSI - 10 PSI	31155OPD	2"
4001	2-1/2"	100269925	10 in w.c. - 2 PSI	31156	2-1/2"
4001	2-1/2"	100320061	2 PSI - 10 PSI	31156OPD	2-1/2"
5001	2-1/2"	100269925	11.5 in w.c. - 2 PSI	31156	2-1/2"
5001	2-1/2"	100320061	2 PSI - 10 PSI	31156OPD	2-1/2"
6001	3"	100320057	11.5 in w.c. - 2 PSI	31157	3"
6001	3"	100320062	2 PSI - 10 PSI	31157OPD	3"