

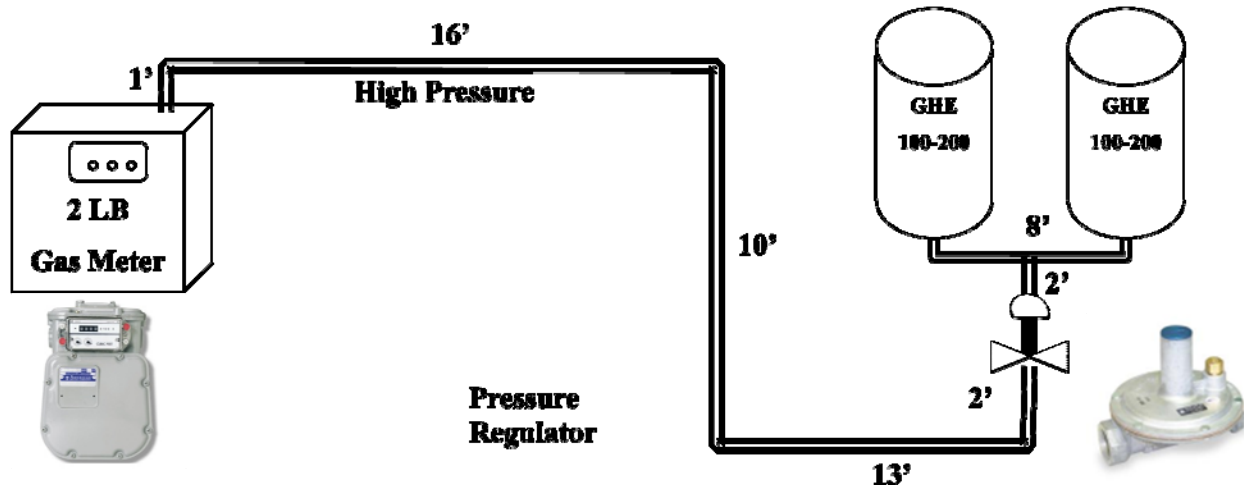


Gas Pipe Sizing for Commercial Gas Water Heaters

When troubleshooting commercial gas water heaters, the gas supply or fuel train is essential to the combustion process. To determine if your gas pipe sizing is adequate, measure the inlet gas pressure at the gas control valve. Write down the static pressure (main burner is OFF); then start the water heater and after two minutes note the dynamic pressure (main burner is ON). Typically, there should be no more than 1 to 1 ½ inches w.c. pressure drop. If there is more than a 1 ½-inch pressure drop, the gas pipe size from the gas meter or pressure regulator may be too small. Here is how to check:

1. Note the BTU input of the water heater.
2. Starting at the gas valve, measure the pipe size and distance from the gas valve to the next location in the fuel supply.
3. The next location may be:
 - a. Change in pipe size
 - b. Pressure regulator
 - c. Gas meter
4. Continue this process until you have reached the gas meter.
5. Add up all the straight pipe runs (we are not going to worry about sizing for elbows for now).
 - a. Remember, your fittings, elbows and “T” must be the same pipe size as the straight pipe.
6. Then compare to your gas pipe-sizing chart and see if it will support the BTU load from the pressure regulator to the gas water heater.

Example #1:

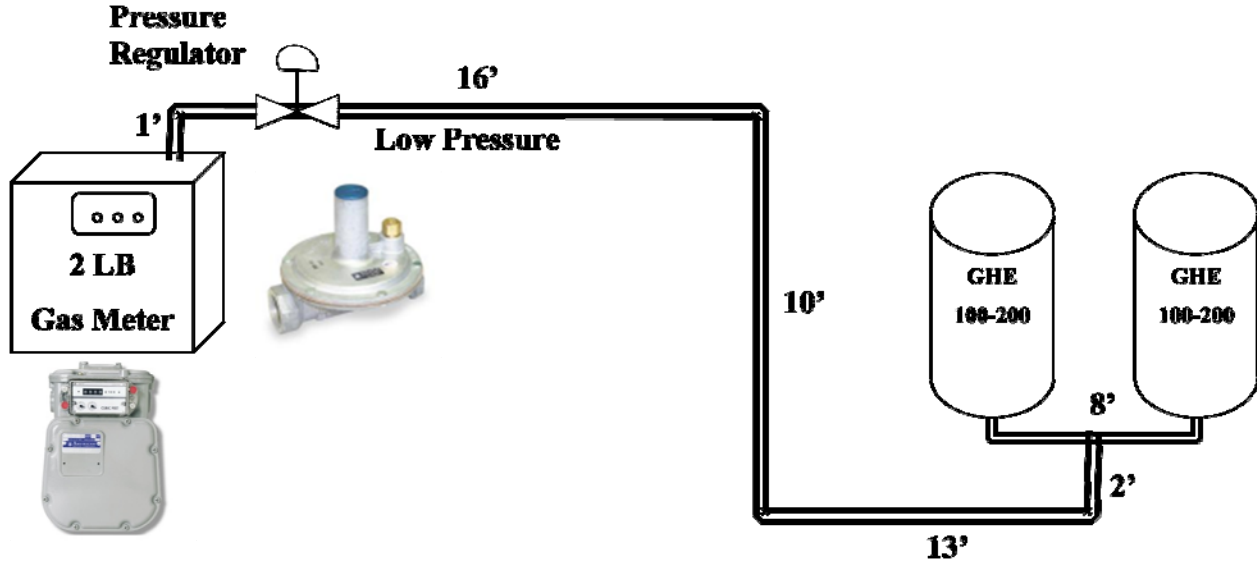


High-pressure side is no problem. We carry 2 psi the entire 41 feet to the pressure regulator. The pressure regulator reduces the pressure to the rating specified on the rating plate. In this case, it is 10" w.c. natural gas. Then we have 2 feet of pipe from the regulator to the piping “T”; and another 4 feet to each water heater. The water heater system input rating is 400,000 BTU for both heaters. If you check the pipe-sizing chart, the pipe size from the pressure regulator to the water heaters is 1 inch minimum.



Gas Pipe Sizing for Commercial Gas Water Heaters

Example #2: (pressure regulator has been moved away from the water heaters)



High-pressure side is no problem. We carry 2 psi to the pressure regulator. The pressure regulator reduces the pressure to the rating specified on the rating plate. In this case, it is 10" w.c. natural gas. Then we have 49 feet of pipe from the regulator to the water heaters. The water heater input rating is 400,000 BTU for both heaters. If you check the pipe-sizing chart, the pipe size from the pressure regulator to the water heaters is 1 ¼ inch minimum.

TABLE 2
For U.S. Installations
Maximum Capacity of Pipe in Cubic Feet of Gas per Hour for Gas Pressures of
0.5 psig or Less and a Pressure Drop of 0.3 Inch Water Column
Based on a 0.60 Specific Gravity Natural Gas; If 1.5 Specific Gravity L.P. Gas is used, multiply capacity by 0.63

Nominal Iron Pipe Size, Inches	Internal Diameter Inches	Length of Pipe, Feet													
		10	20	30	40	50	60	70	80	90	100	125	150	175	200
1/2	.622	132	92	73	53	56	50	46	43	40	38	34	31	28	26
3/4	.824	278	190	152	130	115	105	96	90	84	79	72	64	59	55
1	1.049	520	350	285	245	215	195	180	170	160	150	130	120	110	100
1 1/4	1.380	1,050	730	590	500	440	400	370	350	320	305	275	250	225	210
1 1/2	1.610	1,600	1,100	890	750	670	610	560	530	490	460	410	380	350	320
2	2.067	3,050	2,100	1,650	1,450	1,270	1,150	1,050	990	930	870	780	710	650	610
2 1/2	2.469	4,800	3,300	2,700	2,300	2,000	1,850	1,700	1,600	1,500	1,400	1,250	1,130	1,050	980
3	3.068	8,500	5,900	4,700	4,100	3,600	3,250	3,000	2,800	2,600	2,500	2,200	2,000	1,850	1,700
4	4.026	17,500	12,000	9,700	8,300	7,400	6,800	6,200	5,800	5,400	5,100	4,500	4,100	3,800	3,500