City of Vacaville
Community Development
Building Division

Gas Load Calculations

DETERMINE PROPER SIZE

Proper sizing of the pipe is important so that each gas appliance receives enough gas to perform properly. Each appliance has a minimum input demand in BTUs per hour. Each type of pipe material also has a different flow rates. The chart below gives some examples of typical BTU demands from table 12-1. To properly determining the pipe size for your job, consult the 2016 CPC, chapter 12. When providing gas load calculations, the current codes and tables must be documented in your submittal.

To convert from BTUs to cubic feet per hour divide BTU/1100 (example: 50,000 BTU by 1100 = 45.5 cubic feet of gas per hour). See the example on page 2 to help further illustrate this. To get BTU from cubic feet, multiply cubic x feet 1100 (45.5 cubic feet x 1100 = 50,000 BTU.)

APPROVED GAS PIPING FITTING MATERIALS

Approved materials are described in section 1208.5. Metallic pipe, metallic tubing and plastic pipe, tubing and fittings are samples of approved materials. Copper, brass and aluminum alloy piping shall not be used except under certain conditions as outlined in section 1208.5.2.3 and section 1208.5.2.4. Use of materials under section 1208.5.2.3 or 1208.5.2.4 will require the submittal of an alternate materials request and Building Official approval.

CUTTING PIPE

If you are cutting metallic pipe or tubing, you must ream the cut of your pipe so you maintain the full inside diameter of the pipe and be clear of cutting burrs and defects in the structure and/or threading per section 1208.5.5.

SPECIAL INSTRUCTIONS

Joints, fittings, and unions shall comply with section 1208.5.8 and 1208.5. When concealed within the building connections shall comply with section 1210.3. Each gas appliance must have an accessible, approved manual gas shut off with a non-displaceable valve member per section 1211.5.

TESTING

A pressure test, provided by applicant, is required per the 2016 CPC, section 1213. Test pressure shall be measured with a manometer or with a pressure-measuring device designed and calibrated to read, record, or indicate a pressure loss due to leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made. Mechanical gauges used to measure test pressures shall have a range such that the highest end of the scale is not greater than five times the test pressure.

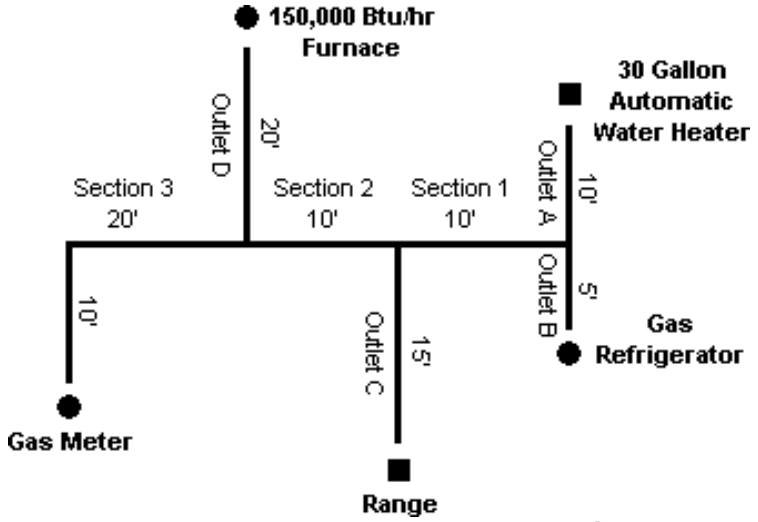
INSPECTION

When the installation and testing your system for leaks is complete, call the inspection request line at (707) 999-7113 to schedule an inspection. The inspector will need to see the complete system being tested. You must supply the test gauge as described above. The system must be under test when the inspector arrives.

Minimum Demand of Typical Gas Appliances in BTUs Per Hour, per table 12-1	
Appliance	**Demand in BTU/hour**
Barbecue (residential)	40,000
Domestic Clothes dryer	35,000
Domestic Gas Range	65,000
Domestic Recessed Oven Section	25,000
Fireplace Log Lighter (residential)	80,000
Instantaneous (4 gal/minute)	285,000
Storage Water Heater up to 30 gallon tank	35,000
Storage Water Heater, 40 to 50 gallon tank	50,000

> Example: (See figure 1216.1.1)

Problem: Determine the required pipe size of each section and outlet of the piping system shown.



> Solution: (See TABLE 1216.2, SCHEDULES BY PIPE TYPE)

1. Maximum gas demand of outlet A-30,000 BTU per hour/1100 BTU per cubic foot = 27 cubic feet per hour.
   Maximum gas demand of outlet B-3,000 BTU per hour/1100 BTU per cubic foot = 3 cubic feet per hour.
   Maximum gas demand of outlet C-65,000 BTU per hour/1100 BTU per cubic foot = 59 cubic feet per hour.
   Maximum gas demand of outlet D-150,000 BTU per hour/1100 BTU per cubic foot = 136 cubic feet per hour.

2. The length of pipe from the gas meter to the most remote outlet (outlet A) is 60 feet.

3. Using the column marked 60 feet on the size of gas pipe charge:
   Outlet A, supplying 27 cubic feet per hour, requires one-half inch pipe. Section 1, supplying outlets A and B, or 30 cubic feet per hour requires one-half inch pipe. Section 2, supplying outlet A, B and C, or 89 cubic feet per hour requires three-quarter inch pipe. Section 3, supplying outlets A, B, C, and D, or 225 cubic feet per hour, requires one-inch pipe.

4. Using the column market 60 feet: Outlet B supplying 3 cubic feet per hour requires one-half inch pipe. Outlet C, supplying 59 cubic feet per hour, requires one-half inch pipe.

5. Using the column marked 50 feet: Outlet D, supplying 136 cubic feet per hour, requires three-quarter inch pipe.