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# FUEL GAS PIPE SIZING AND INSTALLATION



COMMUNITY DEVELOPMENT DEPARTMENT—345 N. EL DORADO STREET—STOCKTON, CA 95202—(209) 937-8561

[www.stocktongov.com/CDD/building](http://www.stocktongov.com/CDD/building)

## **PERMIT REQUIREMENTS:**

- A permit is required when installing new gas piping or when altering an existing gas line.
- Permits are issued to either the property owner with a completed Owner/Builder form or to a California licensed contractor with a current City of Stockton Business License.
- Permits can be obtained at the Community Development Department Permit Center.
  - Located at 345 N. El Dorado St, Stockton, CA 95202
  - Office hours are from 8:00 a.m. to 4:30 p.m. Monday through Friday, closed alternate Fridays.
- A copy of the Permit Application, Owner/Builder Form, and Construction/Demolition Recycling Form can be downloaded at <http://www.stocktongov.com/government/departments/permitCenter/buildBro.html>
- Plans are *usually* not required for residential installations. However, gas pipe sizing calculations may be required to verify that the gas piping is sized per the minimum code requirements. (See the following example on page 3.) The calculations, if required, should be made available at the time of permit issuance.

## **INSTALLATION REQUIREMENTS:**

Gas piping systems shall be designed and installed to meet the minimum requirements set forth in Chapter 12 of the 2013 California Plumbing Code.

- Acceptable materials:
  - Standard weight Schedule 40 wrought iron or steel (galvanized or black)
  - Corrugated stainless steel tubing (exterior, installed by certified technicians)
  - Polyethylene plastic pipe (exterior, underground only)
- When installed underground, metallic gas piping shall be factory coated with approved materials to protect against corrosion and all fittings and joints wrapped as per code. Underground piping shall have no less than 18 inches of cover, or 12 inches where external damage to the pipe is unlikely. Plastic piping shall always have no less than 18 inches of cover and shall be buried with a corrosion-resistant tracer wire (not less than AWG 14) to facilitate locating.
- Piping shall be supported with metal pipe hooks, metal pipe straps, metal bands, metal brackets, metal hangers, or building structural components; approved for the size of piping; spaced accordingly.
- **Gas piping is not allowed underground below any building or structure unless specifically approved by the Building Department.**
- Required shutoff valves must be accessible and installed within 6 feet of the appliance it serves. When a connector is used, the valve shall be installed upstream of the connector.
- When flexible connectors are used, they shall be of a minimum practical length and not pass through any walls, ceilings, floors, cabinets, and not used in concealed locations.

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## **INSPECTION REQUIREMENTS:**

Up to (3) inspections may be required for gas piping installations. It is the responsibility of the permit holder or authorized person doing the work to provide and install a temporary pressure gauge, pressurize the system, and schedule the inspections.

- Gas Piping – Code 420
- Gas Test – Code 465
- Gas Service – Code 770
- **Gas Piping:** Typically referred to as a rough inspection, occurs after the piping system has been installed but prior to it being covered or concealed, or any fixture being attached. This inspection will check for proper pipe size, material, and installation.
- **Gas Test:** All gas piping systems shall be pressure tested at least once during the inspection process. The gas piping system shall be pressurized using air, CO<sub>2</sub>, or nitrogen and shall stand a pressure of not less than 10 psi and shall hold that pressure for no less than 15 minutes with no perceptible drop in pressure. Plastic piping must stand a pressure of not less than 60 psi. The inspector must witness the pressure test to confirm there is no leakage.
- **Gas Service:** Typically referred to as a final inspection, occurs after the piping system has been installed and covered or concealed but before fixtures, appliances, or shutoff valves have been attached. Where plastic underground pipe is installed, the inspector will check for a permanently attached metal tag on the customer side of the gas meter stating, “Plastic Yard Piping.”
- Inspections may be scheduled by calling the 24-hour inspection line at (209) 937-8560. All inspections must be scheduled at the latest by 4:00 p.m. on the business day prior to the requested inspection.

## **GAS PIPE SIZING:**

Gas pipe needs to be sized correctly in accordance with the 2013 California Plumbing Code Section 1216.0. The gas pipe can be sized by following the example in this handout based on the known characteristics of the gas supplied in the Stockton area. See below:

- Gas Supplier: Pacific Gas and Electric
  - Specific gravity = 0.60
  - Btu per cubic foot = 1,000
  - Standard delivery pressure = ¼ psi or 7 inch water column

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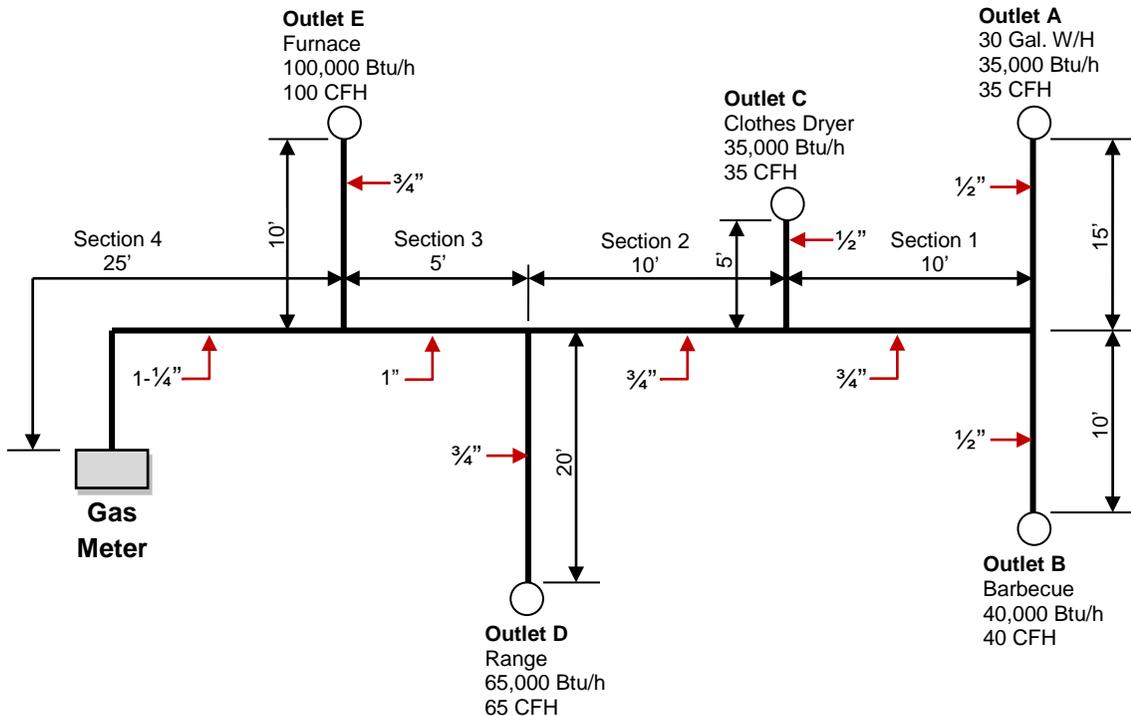
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## EXAMPLE EXERCISE FOR SIZING GAS PIPE



### Problem:

Determine the required pipe size of each section and outlet of the piping system shown in the above figure based on the known characteristics of the gas being supplied. To figure CFH (cubic feet per hour) of natural gas, divide the Btu/h input rating of an appliance by 1,000 (Btu per cubic foot of supplied gas). The type of pipe used will be Schedule 40 Metallic.

### Solution:

- (1) Determine the maximum input gas demand for each appliance by using Table 1208.4.1 or from the actual name plate of the appliance.
- (2) Determine the length of pipe from the gas meter to the most remote outlet (Outlet A) = 65 feet.
- (3) Use the row from Table 1216.2(1) marked 70 feet [no row for actual length 65 feet] to determine the pipe sizes feeding individual appliances:
  - Outlet A – demand load of 35 CFH – minimum pipe size is  $\frac{1}{2}$ "
  - Outlet B – demand load of 40 CFH – minimum pipe size is  $\frac{1}{2}$ "
  - Outlet C – demand load of 35 CFH – minimum pipe size is  $\frac{1}{2}$ "
  - Outlet D – demand load of 65 CFH – minimum pipe size is  $\frac{3}{4}$ "
  - Outlet E – demand load of 100 CFH – minimum pipe size is  $\frac{3}{4}$ "
- (4) Use the row from Table 1216.2(1) marked 70 feet to determine the pipe sizes for each Section feeding more than one appliance:
  - Section 1 – serves Outlets A and B – total demand load of 75 CFH – minimum pipe size is  $\frac{3}{4}$ "
  - Section 2 – serves Outlets A, B, and C – total demand load of 110 CFH – minimum pipe size is  $\frac{3}{4}$ "
  - Section 3 – serves Outlets A, B, C, and D – total demand load of 175 CFH – minimum pipe size is 1"
  - Section 4 – serves all Outlets – total demand load of 275 CFH – minimum pipe size is 1-1/4"

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### APPROXIMATE GAS INPUT FOR TYPICAL APPLIANCES (Based on 2013 CPC Table 1208.4.1)

APPLIANCE	INPUT (Btu/h)	CFH
<b>Space Heating Units</b>		
Warm air furnace		
Single family	100,000	100
Multifamily, per unit	60,000	60
Hydronic boiler		
Single family	100,000	100
Multifamily, per unit	60,000	60
<b>Space and Water Heating Units</b>		
Hydronic boiler		
Single family	120,000	120
Multifamily, per unit	75,000	75
<b>Water Heating Appliances</b>		
Water heater, automatic storage		
30 to 40 gallon tank	35,000	35
Water heater, automatic storage		
50 gallon tank	50,000	50
Water heater, automatic instantaneous		
Capacity at 2 gallons per minute	142,800	142.8
Capacity at 4 gallons per minute	285,000	285
Capacity at 6 gallons per minute	428,400	428.4
Water heater, domestic, circulating or side-arm	35,000	35
<b>Cooking Appliances</b>		
Range, freestanding, domestic	65,000	65
Built-in oven or broiler unit, domestic	25,000	25
Built-in top unit, domestic	40,000	40
<b>Other Appliances</b>		
Refrigerator	3,000	3
Clothes dryer, Type I (domestic)	35,000	35
Gas fireplace direct vent	40,000	40
Gas log	80,000	80
Barbeque	40,000	40
Gaslight	2,500	2.5

### SCHEDULE 40 METALLIC PIPE (Based on 2013 CPC Table 1216.2(1))

GAS: NATURAL INLET PRESSURE: LESS THAN 2 psi PRESSURE DROP: 0.5 in. w.c SPECIFIC GRAVITY: 0.60						
	PIPE SIZE (inch)					
NOMINAL	1/2	3/4	1	1-1/4	1-1/2	2
LENGTH (feet)	CAPACITY IN CUBIC FEET OF GAS PER HOUR					
10	172	360	678	1390	2090	4020
20	118	247	466	957	1430	2760
30	95	199	374	768	1150	2220
40	81	170	320	657	985	1900
50	72	151	284	583	873	1680
60	65	137	257	528	791	1520
70	60	126	237	486	728	1400
80	56	117	220	452	677	1300
90	52	110	207	424	635	1220
100	50	104	195	400	600	1160
125	44	92	173	355	532	1020
150	40	83	157	322	482	928
175	37	77	144	296	443	854
200	34	71	134	275	412	794
250	30	63	119	244	366	704

#### NOTES:

1. The preceding graphic is just an example. You should always refer to Chapter 12 of the 2013 California Plumbing Code for specific requirements.
2. Where specific appliances have been selected, use the gas input information from the manufacturer.
3. Refer to Tables 1216.2(1)-(36) of the 2013 California Plumbing Code for differences in gas type, piping material, and pressure information from those shown in the table above.
4. If installing a new gas line directly off the meter for a new appliance, choose the correct pipe size from the table above based on length of the new pipe run and the appliance gas requirements. Coordinate with manufacturer's specifications whenever possible.