EXAMPLE EXERCISE FOR SIZING GAS PIPE

NOTE:
Re-size gas pipes considering new demand for tankless water heater @ approximately 190,000 BTUH

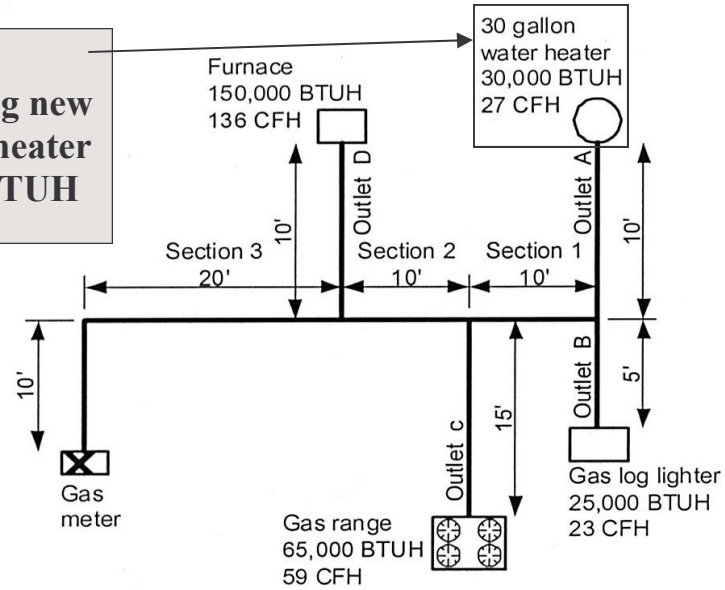

Figure A
Example Piping Layout and Appliance Demand

Table B
Minimum Demand of Typical Gas Appliances in BTUH and CFH

Appliance Note 1	BTUH	CFH
Domestic gas range	65,000	59
Domestic gas cook top	40,000	36
Domestic gas oven	25,000	23
30 gallon gas water heater	30,000	27
50 gallon gas water heater	50,000	46
Domestic clothes dryer	35,000	32
Residential fireplace gas log	25,000	23
Residential gas barbecue	50,000	46

Note 1

The demand ratings of the appliances listed in this table are minimums. Demand ratings of the actual installed appliances should be used. Most all appliances have a name plate which has the demand rating of the appliance - use the input BTUH number.

Table C
Maximum Capacity of Gas Pipe in CFH (Cubic Feet Per Hour)

Pipe Sizes	Distance from Meter to Most Remote Appliance in Feet on Each Branch												
	10	20	30	40	50	60	70	80	90	100	125	150	200
1/2"	174	119	96	82	73	66	61	56	53	50	44	40	34
3/4"	363	249	200	171	152	138	127	118	111	104	93	84	72
1"	684	470	377	323	286	259	239	222	208	197	174	158	135
1-1/4"	1,404	965	775	663	588	532	490	456	428	404	358	324	278
1-1/2"	2,103	1,445	1,161	993	880	798	734	683	641	605	536	486	416
2"	4,050	2,784	2,235	1,913	1,696	1,536	1,413	1,315	1,234	1,165	1,033	936	801
2-1/2"	6,455	4,437	3,563	3,049	2,703	2,449	2,253	2,096	1,966	1,857	1,646	1,492	1,277
3"	11,412	7,843	6,299	5,391	4,778	4,329	3,983	3,705	3,476	3,284	2,910	2,637	2,257

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Example for Determining Pipe Sizes

Problem:

Determine the required pipe size of each section and outlet of the piping system shown in Figure "A." To figure the CFH (cubic feet per hour) of natural gas, divide the BTUH (British thermal units per hour) input rating of an appliance by 1,100.

Solution:

(1) Determine the maximum input gas demand for each appliance by using Table "B" or from the actual name plate of the appliance.

(2) Determine the length of pipe from the gas meter to the most remote outlet. In this example the distance would be 60' to the water heater on Outlet "A."

(3) Using the column marked 60 feet in Table "C," determine the pipe size based on demand. Outlets "A," "B," and "C" are all either 55 or 60 feet from the meter.

Outlet "A" demand is 27 CFH with the pipe size ½ inch
Outlet "B" demand is 25 CFH with the pipe size ½ inch
Section "1" demand is 52 CFH (27 + 25) with the pipe size ½ inch
Section "2" demand is 111 CFH (27 + 25 + 59) with the pipe size ¾ inch
Section "3" demand is 247 CFH (27 + 25 + 59 + 136) with the pipe size 1 inch

(4) Using the column marked 50 feet in Table "C," determine the pipe size for Outlet "D" which is 50 feet from the meter and has a demand of 136 CFH with the pipe size ¾ inch.

NOTE: Tankless water heaters require 4 to 5 times the typical BTUH of a standard water heater. The gas line service the new unit must be sized correctly. Often a retrofit application may not have sufficient capacity to supply a tankless water heater. A new dedicated supply line may be needed.