Fuel Line

Fuel line size depends on the amount of fuel needed to run a unit at full load at the distance and pressure the fuel must be moved. Refer to the product Specification Sheet for the fuel consumption at full load. See NFPA No. 54 for gas pipe sizing tables and example calculations. Tables 3 and 4, following, can be used for quick reference in sizing the gas piping in the low pressure (0.5 PSIG or less) portion of the supply system. Final determination of pipe sizes must be based upon the method approved by the authority having jurisdiction. Table 3 lists the pipe sizing for propane, the major component of LP gas. Table 4 shows natural gas pipe sizing.

Approved flexible fuel hose must be used for connections at the engine to compensate for generator set movement and vibration. Most codes require a manual shutoff valve (of the indicating type) ahead of each flexible fuel hose. Also a battery-powered safety shutoff valve in each fuel supply line could be required by code.

TABLE 3. PROPANE GAS PIPE SIZING

MAXIMUM PIPE CAPACITY IN CUBIC FEET OF GAS PER HOUR
FOR A GAS PRESSURE DROP OF 0.5 INCHES OF WATER COLUMN
(11 INCHES WATER COLUMN GAS PRESSURE AT ENGINE INLET)

Nominal Iron	Length of Pipe (Feet)											
Pipe Size (Inches)	10	20	30	40	50	60	70	80	90	100	125	150
1/2	110	76	61	52	46	41	38	36	33	31	28	25
3/4	227	157	126	107	95	87	78	74	69	65	58	53
1	428	293	236	201	179	164	151	138	129	123	110	101
1-1/4	882	598	485	416	365	333	308	289	207	252	230	204
1-1/2	1323	920	743	624	567	510	472	434	409	390	346	315
2	2488	1732	1386	1197	1058	958	882	819	768	724	642	598

TABLE 4. NATURAL GAS PIPE SIZING

MAXIMUM PIPE CAPACITY IN CUBIC FEET OF GAS PER HOUR
FOR 0.5 PSIG OR LESS, AND A PRESSURE DROP OF 0.5 INCHES OF WATER COLUMN
(BASED ON A 0.60 SPECIFIC GRAVITY GAS)

Nominal Iron	Length of Pipe (Feet)												
Pipe Size (Inches)	10	20	30	40	50	60	70	80	90	100	125	150	200
1/2	175	120	97	82	73	66	61	57	53	50	44	40	35
3/4	300	250	200	170	151	138	125	118	110	103	93	84	72
1	680	465	375	320	285	260	240	220	205	195	175	160	135
1-1/4	1400	950	770	660	580	530	490	460	430	400	360	325	280
1-1/2	2100	1460	1180	990	900	810	750	690	650	620	550	500	430
2	3950	2750	2200	1900	1680	1520	1400	1300	1220	1150	1020	950	800
2-1/2	6300	4350	3520	3000	2650	2400	2250	2050	1950	1850	1650	1500	1280

Determining Fuel Tank Size

The ambient temperature effect on propane tank vaporization must be considered for vapor-withdrawal systems. Table 5 can be used for quick reference in sizing the propane tank to account for expected low ambient temperatures.

The vaporization rates are based on the average temperature over an eight-hour period. The temperature headings represent the lowest average winter temperature (the average of the daily winter low temperatures). Refer to the full load fuel consumption in the product Specification Sheet, then check the table to determine tank size.

COMBINATION GASEOUS AND GASOLINE FUEL SYSTEMS

The combination fuel system can use either a gaseous fuel or gasoline fuel to run the generator set. Conversion from one fuel to the other usually consists of shutting off one fuel supply and allowing the other fuel to flow to the carburetor. Most combination carburetors contain fuel shutoff valves and float locking devices for simple conversion. Idle and power adjustments for either fuel are also included in the carburetor for ease of maintenance. Refer to the generator set installation information included with the generator set for installation techniques.

When natural gas or propane is used in combination with gasoline, the gaseous-fuel carburetor is mounted on the air horn of the gasoline carburetor. The gasoline carburetor throttle serves both fuels.

Gasoline supply lines and tanks are conventionally designed, installed, and serviced just like straight gasoline generator sets. The gaseous fuel (natural gas or LP) installation is essentially the same as on straight gas fuel sets. The selection of valves, regulators, filter, and other components is the same as in the preceding sections with exception of the inlet pressure differences. Most codes require a battery-powered safety shutoff valve in each fuel supply line.

TABLE 5. REQUIRED PROPANE TANK SIZE IN GALLONS (LITRES) FOR INDICATED TEMPERATURES WHEN KEPT AT LEAST HALF FULL

	LOWEST AVERAGE WINTER TEMPERATURE						
WITHDRAWAL RATE	32°F(0°C)	20°F(–7°C)	10°F(–12°C)	0°F(–18°C)	–10°F(–23°C)	–20°F(–29°C)	–30°F(–34°C)
50 cfh-125,000 BTU/hr	115	115	115	250	250	400	600
(1.4 m³/hr-131.9 MJ/hr)	(435)	(435)	(435)	(945)	(945)	(1515)	(2270)
100 cfh-250,000 BTU/hr	250	250	250	400	500	1000	1500
(2.8 m³/hr-264 MJ/hr)	(945)	(945)	(945)	(1515)	(1890)	(3785)	(5675)
150 cfh-375,000 BTU/hr	300	400	500	500	1000	1500	2500
(4.2 m³/hr-395.6 MJ/hr)	(1135)	(1515)	(1890)	(1890)	(3785)	(5675)	(9460)
200 cfh-500,000 BTU/hr	400	500	750	1000	1200	2000	3500
(5.7 m³/hr-527.5 MJ/hr)	(1515)	(1890)	(2840)	(3785)	(4540)	(7570)	(13250)
300 cfh-750,000 BTU/hr	750	1000	1500	2000	2500	4000	5000
(8.5 m³/hr-791.2 MJ/hr)	(2840)	(3785)	(5675)	(7570)	(9460)	(15140)	(18925)