LP Gas Facts

Basic information about LP Gases. Some information about LP gas and Cold weather as related to Recreational Vehicle size containers. Also information about purging and moisture. Some of the rules concerning LP containers and their inspection requirements.

Properties of LP-Gases*

Properties	**Propane**	**Butane**
Pounds per gallon	4.24	4.81
Specific gravity of gas	1.53	2.00
Specific gravity of liquid	0.51	0.58
Cu. ft. gas per gallon liquid	36.38	31.2
Cu. ft. gas per pound	8.66	6.50
BTU per gallon	91,502	102,032
BTU per pound	21,548	21,221
Boiling point in degrees F at 14.7 psia	-44°	32°
Vapor pressure at 0°F	31	0
Vapor pressure at 70°F	127	17
Vapor pressure at 100° F	196	37
Vapor pressure at 105° F	210	41
Specific Gravity of Vapor (Air = 1)	1.50	2.01
Ignition Temperature in Air, °F	920-1120	900-1000

Average LP-gas capacities (PROPANE)
(allowing 20% for vapor space)

Nominal Size	Actual Capacity in gal	Lbs. of gas	BTU's
10# cylinder (2.5 gal)	2.5 gal.	11	237,028
20# cylinder (5 gal)	4.8 gal.	20	430,960
30# cylinder (7 gal)	7.2 gal.	30	646,440
40# cylinder (10 gal)	9.2 gal.	40	861,920

Working pressure

11" Water Column = 6 1/4 ozs. per sq. in. pressure

To estimate how long your LP gas supply will last, simply total the BTU demand of all your gas appliances and the BTU capacity of your containers at 80% full. Divide container BTU capacity by total appliance demand.

**Source NFPA Pamphlet #58-1995*

Some more info on LP gas. Of particular interest to winter (cold weather) campers are the charts below regarding the available BTU's from a container of LP gas in an hour. Total the possible BTU's from your gas appliances and compare to the gas available. It may explain the mysterious winter time heating problems. This is also why your LP fueled generators don't work very well in cold weather.

LP gas and cold weather useage

65 LB. UNDERMOUNTED LP-GAS TANK
BTU AVAILABLE AT:

% FULL	$+20^0$	0^0	-5^0	-10^0	-15^0
60%	95,600	47,800	36,000	23,900	12,100
50%	86,000	43,000	32,350	21,500	11,750
40%	77,000	38,500	29,250	19,625	9,625
30%	68,000	34,000	35,500	17,000	8,500
20%	58,000	29,000	21,750	14,500	7,250
10%	43,200	21,600	16,200	10,800	5,400

30 LB. Cylinder - BTU AVAILABLE AT

% FULL	$+20^0$	0^0	-5^0	-10^0	-15^0
60%	50,400	25,200	17850	11,900	5,950
50%	45,360	22,680	17,010	11,340	5,670
40%	40,320	20,160	15,960	10,640	5,320
30%	35,280	17,640	14,630	10,220	4,410
20%	30,240	15,120	11,340	7,560	3,780
10%	22,680	11,340	8,505	5,670	2,835

20 LB. cylinder - BTU AVAILABLE AT

% FULL	$+20^0$	0^0	-5^0	-10^0	-15^0
60%	36,000	18,000	12,750	8,500	4,250
50%	32,400	16,200	12,150	8,100	4,050
40%	28,800	14,400	11,400	7,600	3,800
30%	25,200	12,600	10,450	7,300	3,150
20%	21,600	10,800	8,100	5,400	2,700
10%	16,200	8,100	6,075	4,050	2,025

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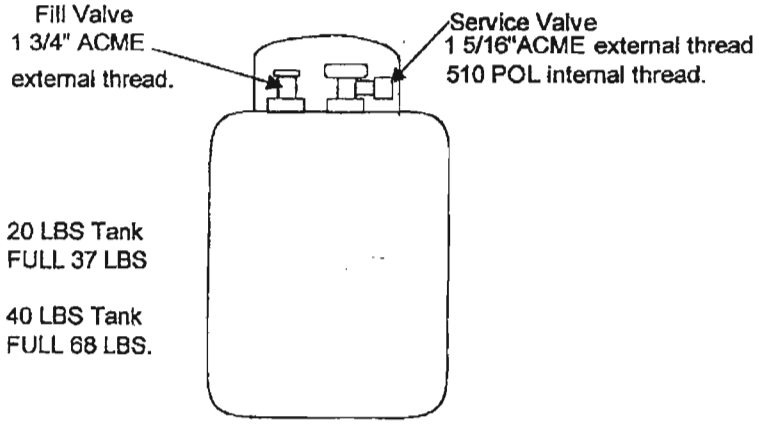
Filling Tanks

1) The tank must be purged prior to filling it with liquid propane. The purging operation consists of opening the service valve or other relief valve/port for several minutes to allow any air pressure within the tank to be relieved. After this the tank is re-pressurized with LP gas vapor and again the service valve or other relief valve/port is opened to expel any air/vapor pressure. This second step is repeated three or four times. **Do not attempt to purge the tank yourself! Purging must be done only by a qualified propane dealer.**

2) Newer tanks are equipped with an overfill protection device that prevents propane distributors from filling the tanks to more than the recommended weight/level.
Newer vertical tanks can be identified by the triangular shaped knob on the tank valve (older tanks had a 4 spoke or other style knob).
On 40# horizontal tanks the newer style tanks can be recognized by a large externally threaded 1 3/4" ACME fitting located next to the service valve. These tanks are filled through this fitting rather than through the service valve.
If the tank is older and does not have an overfill protection device, it should be filled to no more than the TARE WEIGHT (TW) stamped on the collar of the tank plus the weight of liquid propane the tank is designed for. This means that the final weight of the filled tank will be the TARE WEIGHT plus the weight of the liquid propane. As an example, a 20# vertical tank which normally has a tare weight of approximately 17 pounds would be full when the total weight of the tank and gas is 37 pounds.



NOTE: Some tanks are equipped with a single service valve with 510 POL threads.

For early LPG/LPAGA models with a single manifold:

one 20# vertical tank	30 minutes
two 20# vertical tanks	2 hours
one 40# vertical tank	2 hours
two 40# vertical or horizontal tanks	6-7 hours

For later LPG/LPAGA models with split manifolds

two 20# vertical tanks	2 hours
two 40# vertical or horizontal tanks	6-7 hours

It is normal for a light frost to develop on the outside surface of the tank depending surrounding air temperature and humidity.

100 LB. Cylinders

How Many Are Required

"Rule of Thumb" Guide for
Installing 100 Lb. Cylinders

For continuous draws where temperatures may reach 0°F. Assume the vaporization rate of a 100 lb. cylinder as approximately 50,000 BTU per hour.

$$\text{Number of cylinders per side} = \frac{\text{Total load in BTU}}{50{,}000}$$

Example:

Assume total load = 200,000 BTU/hr.

$$\text{Cylinders per side} = \frac{200{,}000}{50{,}000} = 4 \text{ cylinders per side}$$

Vaporization Rate - 100 Lb. Propane Cylinders

(Approximate)

Lbs. of Propane In Cyl.	Maximum Continuous Draw In BTU Per Hour At Various Temperatures In Degrees F.				
	0°F	20°F	40°F	60°F	70°F
100	113,000	167,000	214,000	277,000	300,000
90	104,000	152,000	200,000	247,000	277,000
80	94,000	137,000	180,000	214,000	238,000
70	83,000	122,000	160,000	199,000	214,000
60	75,000	109,000	140,000	178,000	192,000
50	64,000	94,000	125,000	154,000	167,000
40	55,000	79,000	105,000	131,000	141,000
30	45,000	66,000	85,000	107,000	118,000
20	36,000	51,000	69,000	83,000	92,000
10	28,000	39,000	49,000	60,000	66,000

This chart shows the vaporization rate of containers in terms of the temperature of the liquid and the wet surface area of the container. When the temperature is lower or if the container has less liquid in it, the vaporization rate of the container is a lower value.