ASME STORAGE CONTAINERS

DETERMINING PROPANE VAPORIZATION CAPACITY

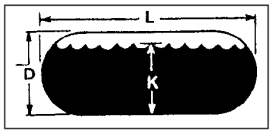
"Rule of Thumb" Guide for Asme LP Gas Storage Containers

Where:

"D" = Outside diameter in inches

"L" = Overall length in inches

"K" = Constant for percent volume of liquid in container



PERCENTAGE OF CONTAINER FILLED	K EQUALS	PROPANE VAPORIZATION CAPACITY AT 0° F. (IN BTU/HR)†
60	100	D x L x 100
50	90	D x L x 90
40	80	D x L x 80
30	70	D x L x 70
20	60	D x L x 60
10	45	D x L x 45

† These formulae allow for the temperature of the liquid to refrigerate to -20° F. (below zero), producing a temperature differential of 20° F. for the transfer of heat from the air to the container's "wetted" surface and then into the liquid. The vapor space area of the vessel is not considered, its effect is negligible.

VAPOR CAPACITIES FOR OTHER AIR TEMPERATURES

(Multiply the results obtained with the above formulae, by one of the following factors for the prevailing air temperature.)

PREVAILING AIR TEMPERATURE	MULTIPLIER
-15° F	0.25
-10° F	0.50
-5° F	0.75
0° F	1.00
+5° F	1.25
+10° F	1.50
+15° F	1.75
+20° F	2.00

USEFUL INFORMATION ABOUT LP GAS*

	PROPANE	BUTANE
Formula	C_3H_8	C_4H_{10}
Boiling Point, ° F	–44	32
Specific Gravity of Gas (Air = 1.00)	1.50	2.01
Specific Gravity of Liquid (Water = 1.00)	0.504	0.582
Pounds per Gallon of Liquid at 60° F	4.20	4.81
BTU per Gallon of Gas at 60° F	90502	102032
BTU per Pounds of Gas	21548	21221
BTU per Cubic Foot of Gas at 60° F	2488	3280
Cubic Feet of Vapor at 60° F / Gallons of Liquid at 60° F	36.38	31.26
Cubic Feet of Vapor at 60° F / Pounds of Liquid at 60° F	8.66	6.51
Latent Heat of Vaporization at Boiling Point BTU / Gallon	773.0	808.0
Combustion Data:		
Cubic Feet Air Required to Burn 1 Cubic Foot Gas	23.86	31.02
Flash Point ° F	–155	N/A
Ignition Temperature in Air, ° F	920–1120	900–1000
Maximum Flame Temperature in Air, ° F	3625	3615
Limits of Inflammability		
Percentage of Gas in Air Mixture: At Lower Limit – % At Upper Limit – %	 2.15 9.6	 1.55 8.6
Octane Number (ISO – Octane = 100)	100-110	92

*Commercial quality. Figures shown in this chart represent average values.

VAPOR PRESSURES OF LP GASES

TEMPERATURE (°F)	APPROXIMATE PRESSURE (PSIG)	
	PROPANE	BUTANE
– 40	1.3	
– 30	5.5	
– 20	10.7	
–10	16.7	
0	23.5	
10	31.3	
20	40.8	
30	51.6	
40	63.3	3.0
50	77.1	6.9
60	92.5	11.5
70	109.3	17.0
80	128.1	22.0
90	149.3	29.0
100	172.3	37.0
110	197.3	46.0

CONVERSION UNITS

MULTIPLY	BY	TO OBTAIN
PRESSURE		
Atmospheres	14.70	Pounds per Square Inch
Atmospheres	407.14	Inches Water
Inches of Mercury	1.133	Feet of Water
Inches of Mercury	0.4912	Pounds per Square Inch
Inches of Water	0.0735	Inches of Mercury
Inches of Water	5.204	Pounds per Square Foot
Inches of Water	0.0361	Pounds per Square Inch
Inches of Water	0.5781	Pounds per Square Inch
Pounds per Square Inch	0.06804	Atmospheres
Pounds per Square Inch	2.036	Inches of Mercury
Pounds per Square Inch	2.307	Feet of Water
Pounds per Square Inch	27.67	Inches of Water
METRIC		
Atmospheres	1.0332	Kilograms per Square Centimeter
Grams per Square Centimeter	0.0142	Pounds per Square Inch
Kilograms per Square Centimeter	14.22	Pounds per Square Inch
Kilograms per Square Meter	0.2048	Pounds per Square Foot
Pounds per Square Inch	0.7031	Kilograms per Square Centimeter
LENGTH		
Centimeters	0.3937	Inches
Feet	304.8	Millimeters
Feet	30.48	Centimeters
Feet	0.3048	Meters
Inches	25.40	Millimeters
Inches	2.540	Centimeters
Kilometer	0.6214	Miles
Meters	39.37	Inches
Meters	3.281	Feet
Meters	1.094	Yards
Miles (statute)	1609.0	Meters
Miles (nautical)	1853.0	Meters
Yards	91.44	Centimeters
Yards	0.9144	Meters
VOLUME		
Cubic Feet	1728	Cubic Inches
Cubic Feet	7.4805	Gallons (US)
Gallons	0.1337	Cubic Feet
Gallons	231.0	Cubic Inches
Gallons (US)	0.83267	Gallons (Imperial)
Gallons (Imperial)	1.20095	Gallons (US)
METRIC		
Cubic Centimeter	0.06103	Cubic Inch
Cubic Feet	28.316	Liters
Gallons (US)	3.785	Liters
Liters	0.03531	Cubic Feet
Liters	0.2642	Gallons (US)
Liters	1.057	Quarts (US)
Liters	2.113	Pints (US)
Pints (US)	0.4732	Liters
MISCELLANEOUS		
BTU	0.252	Calories
Calories	3.968	BTU
Decitherm	10,000	BTU
Kilogram	2.205	Pounds
Kilowatt Hour	3412	BTU
Ounces	28.35	Grams
Pounds	453.5924	Grams
Pounds	0.4536	Kilograms
Therm	100,000	BTU