LP-Gas Properties

Based on commercial quality. Figures represent average values.

	Propane	Butane
Formula	C3H8	C4H10
Boiling point F.	-44°	32°
Specific gravity - gas (air = 1.00)	1.53	2.00
Specific gravity - liquid (water = 1.00)	0.51	0.58
Lbs./gallon - liquid @ 60°F.	4.24	4.81
BTU/gallon - gas @ 60°F.	91690	102032
BTU/lb. - gas	21591	21221
BTU/ft.^{3}- gas @ 60°F.	2516	3280
Ft.^{3} of vapor @ 60°F./gal. of liquid @ 60°F.	36.39	31.26
Ft.^{3} of vapor @ 60°F./lb. of liquid @ 60°F.	8.547	6.506
Latent heat of vaporization @ boiling point BTU/gal.	785.0	808.0
Combustion data:		
Ft.^{3} air required to burn 1 ft.^{3} gas	23.86	31.02
Flash point, F.	-156	N.A.
Ignition temperature in air, F.	920-1020	900-1000
Maximum flame temperature in air, F.	3595	3615
Limits of inflammability % of gas in air mixture: At lower limit - % At upper limit - %	 2.4 9.6	 1.9 8.6
Octane number (ISO-octane=100)	100+	92

Converting Volumes of Gas

(CFH to CFH or CFM to CFM)

Multiply Flow of	By	To Obtain Flow Of
Air	.707 1.290.808	Butane Natural Gas Propane
Butane	1.414 1.826 1.140	Air Natural Gas Propane
Natural Gas	.775 .547.625	Air Butane Propane
Propane	1.237 .874 1.598	Air Butane Natural Gas

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	.4912	pounds per square inch
Inches of water	.0735	inches of mercury
Inches of water	5.204	pounds per square foot
Inches of water	.0361	pounds per square inch
Inches of water	.5781	ounces per square inch
Pounds per square inch	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 sq. centimeter
Grams per sq. centimeter	.0142	pounds per square inch
Kilograms per sq. centimeter	14.22	pounds per square inch
Kilograms per square meter	.2048	pounds per square foot
Pounds per square inch	.07031	kilograms per sq. centimeter

Vapor Pressures of LP-Gas

	Approximate Pressure (PSIG)	
Temp (°F)	**Propane**	**Butane**
-40	3.6	
-30	8.0	
-20	13.5	
-10	20.0	
0	28.0	
10	37.0	
20	47.0	
30	58.0	
40	72.0	3.0
50	86.0	6.9
60	102.0	11.5
70	120.0	16.5
80	140.0	22.0
90	165.0	29.0
100	190.0	37.0
110	220.0	46.0

Vaporization Rate

This chart shows the vaporization rate of 100 Lb. propane cylinders in terms of the temperature of the liquid and the wet surface area of the container. When the temperature is lower or the container has less liquid in it, vaporization rate is lower.

Lbs. Of Propane	Maximum Continuous Draw in BTU/Hr.				
	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	236,000
70	83,000	122,000	160,000	199,000	214,000
60	75,000	109,000	140,000	176,000	192,000

Lbs. Of Propane	Maximum Continuous Draw in BTU/Hr.				
	0° F.	**20° F.**	**40° F.**	**60° F.**	**70° F.**
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	68,000	83,000	92,000
10	28,000	38,000	49,000	60,000	66,000

Order Online: www.teecoproducts.com
e-mail: info@teecoproducts.com

Sacramento, CA (800) 225-6621
Auburn, WA (800) 426-9456
Rapid City, SD (800) 843-8660

Pressure Relief Valves

Inspection, Testing and Replacement

All relief valves should regularly be inspected to check for contamination and corrosion. If any debris in the valve cannot be totally removed or there is evidence of contamination, the valve must be replaced. Always wear eye protection when examining relief valves under pressure. Never look directly into a relief valve under pressure. NFPA Pamphlet 58, Appendix D, recommends that relief valves on containers of more that 2000 gallons water capacity be tested at approximately 10 year intervals.

Small relief valves used on small DOT cylinders and small ASME tanks should be inspected each time the container is filled and be replaced at least every 10 years. The compact design, high pressure settings, and aging of the synthetic rubber seat discs could result in erratic operation of the valve after a number of years.

Protective Caps

All relief valves must be continuously protected by proper fitting protective caps. Ice, mud, debris and contamination can prevent the valve from opening or, if the valve opens, can prevent the valve from resealing properly. NFPA Pamphlet 58 requires the continuous use of protective caps.

Flow Rate Restriction

Flow rates in the charts are for bare relief valves. The addition of deflectors, pipe-away adapters and piping will restrict the flow. To properly protect any container, the total system flow must be sufficient to relieve pressure at the pressure setting of the relief valve in accordance with the codes.

Short adapters and deflectors designed by RegO®for use with specific valves will restrict the flow only 2 to 5%. **Use only RegO adapters on RegO valves.**

Adapters with sharp 90° turns will reduce flow dramatically. These should never be used because they can cause the relief valves to chatter and eventually destroy themselves. Long pipeaways with several changes of direction can reduce flow substantially. For more information consult Teeco.

Excess Flow Valves

Periodical Inspections for Excess Flow Valves

Excess flow valves should be tested and proven at the time of installation and at periodic intervals not to exceed one year. **CAUTION**: Testing an excess flow valve in the summer when tank pressures are high will not prove that the same valve will also function under low pressure conditions in the winter. Once a year testing should be conducted during the winter. The tests should include a simulated break in the line by the quick opening of a shut-off valve at the farthest point in the piping the excess flow valve is intended to protect. If the excess flow valve closes under these conditions, it is reasonable to assume that it will close in the event of accidental breakage (clean break) of the piping at any point closer to the excess flow valve.

National LP-Gas Association Safety Bulletin Number 113-78 States: "In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating. This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained. The exact procedure used may vary with the installation, advisability of gas discharge and availability of equipment. "In general, most testing makes use of the fact that excess flow valves are 'surge sensitive' and will close quicker under sudden, flow surge than under steady flow. A sufficient surge can often be created by using a quick open/close valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

"A test involving venting gas to the atmosphere is hazardous and may be impractical or illegal.

"Any test of any excess flow valve will not prove that the valve will close in an emergency situation. This test will only check the valve's condition and the flow rate sizing for those test conditions."

An Explanation and Warning

An excess flow valve is a spring-loaded check valve which will close only when the flow of fluid through the valve generates sufficient force, or differential pressure, to overcome the power of the spring holding it open. Each valve has a closing rating in gallons per minute and CFH/air.

The selection of a proper closing rating is critical. It requires a technical understanding of the flow characteristics of the piping system, including restrictions of the piping and other valves and fittings downstream of the excess flow valve.

System designers and operating people must understand why an excess flow valve, which remains open in normal operations, may fail to close when an accident occurs. **Warning**: A downstream break in piping or hoses may not result in sufficient flow to close the valve.

Proper Installation

Since excess flow valves depend on flow in order to close, the line downstream of the excess flow valve should be large enough not to excessively restrict the flow. If he piping is too small, unusually long, or restricted by too many elbows, tees and other fittings, consideration should be given to the use of larger size pipe fittings.

An excess flow valve in a pump suction line cannot be expected to close in the case of a clean break in the line beyond the pump, as the pump constitutes too great a restriction, even if running.

Good piping practice dictates the selection of an excess flow valve with a rated closing flow of approximately 50 percent greater than the anticipated normal flow. This is important because valves which have a rated closing flow very close to the normal flow may chatter or slug closed when surges in the line occur during normal operation, or due to the rapid opening of a control valve.

All installations must be in accordance with NFPA standards 54 and 58, as well as state, provincial and local regulations.

Ducting

Furnace Selection and Extended Plenum Duct Sizing

The size of the extended plenum (use standard duct) is as shown when the furnace is located:

Heat Load (BTU)	Located One End of Building	Building Divided 1/3 and 2/3	Furnace Middle Of Building
0-56,000	14 x 8	10 x 8 & 10 x 8	(2) 10 x 8
57-80,000	16 x 8	10 x 8 & 12 x 8	(2) 10 x 8
81-108,000	22 x 8	10 x 8 & 14 x 8	(2) 12 x 8
109-132,000	26 x 8	10 x 8 & 16 x 8	(2) 16 x 8
133-160,000	30 x 8	12 x 8 & 22 x 8	(2) 16 x 8

NOTE: If air conditioning is to be used at the present or in the future, the cooling load must be computed and duct size selected on the basis of the larger size indicated, shown below.

Maximum Applicable Cooling Unit

The size of the extended plenum in inches is as shown when the cooling unit is located:

Cooling Load	Blower Capacity (CFM)	Located One End of Building	Building Divided 1/3 and 2/3	Located Middle Of Building
0 - 24,000	2 Ton (720)	16 x 8	10 x 8 & 12 x 8	(2) 10 x 8
25-36,000	3 Ton (1080)	22 x 8	10 x 8 & 14 x 8	(2) 12 x 8
37-60,000	5 Ton (1800)	30 x 8	12 x 8 & 22 x 8	(2) 16 x 8

Return Grille and Return Duct Sizing

Single return. Use **one** of size shown.

Furnace Output (BTU)	Grill Size in Free Area	Duct Size
to 56,000	216 sq. in.	16” x 8” or 1 joist space
to 80,000	270 sq. in.	16” x 8” or 2 joist spaces
to 108,000	405 sq. in.	26” x 8” & 10” x 8” or 2 joist spaces
to 132,000	450 sq. in.	30” x 8” or 2 joist spaces
to 160,000	540 sq. in.	(2) 20” x 8” or 3 joist spaces

Two returns. Use **two** of size shown.

Furnace Output (BTU)	Grill Size in Free Area	Duct Size
to 56,000	108 sq. in.	16” x 8” or 1 joist space
to 80,000	162 sq. in.	16” x 8” or 2 joist spaces
to 108,000	216 sq. in.	26” x 8” or 2 joist spaces
to 132,000	244 sq. in.	30” x 8” or 2 joist spaces
to 160,000	285 sq. in.	(2) 20” x 8” or 3 joist spaces

NOTE: When multiple returns are used, a preferred return system provides for a return from each room (except that air usually is not returned from the kitchen or bathrooms).
In the return system maintain air volume equal to or greater than air volume of the supply duct system, and use same duct sizing as for single or two-return system.

Orifice Capacities for LP-Gas

An orifice chart can only be a guide because of varying temperatures and barometric pressures from day to day in various localities. From the below drill sizes, it may be necessary to make adjustments for the most satisfactory operating conditions.
Rates based on 2500 BTU/ft.^{3}, manifold pressure 10.5” water column.

Wire Gauge Drill Size	Rate Ft.^{3}/hr.	
80	.49	1250
79	.57	1454
78	.69	1760
77	.87	2219
76	1.06	2703
75	1.20	3060
74	1.37	3494
73	1.56	3978
72	1.70	4335
71	1.83	4667
70	2.14	5457
69	2.31	5891
68	2.60	6630
67	2.78	7089
66	2.97	7574
65	3.35	8543
64	3.52	8976
63	3.72	9486
62	3.92	9996

Wire Gauge Drill Size	Rate Ft.^{3}/hr.	
61	4.15	10,583
60	4.35	11,093
59	4.57	11,654
58	4.80	12,240
57	5.08	12,954
56	5.90	15,045
55	7.37	18,794
54	8.23	20,987
53	9.61	24,506
52	10.92	27,835
51	12.23	31,187
50	13.32	33,966
49	14.45	36,848
48	15.70	40,035
47	16.78	42,789
46	17.75	45,263
45	18.31	46,961
44	20.10	51,255
43	21.55	54,953

Wire Gauge Drill Size	Rate Ft.^{3}/hr.	
42	23.87	60,869
41	25.00	63,750
40	26.10	66,555
39		72,600
38		79,775
37		85,900
36		98,650
35		110,560
34		117,850
33		124,440
32		132,500
31		137,370
30		144,540
29		155,000
28		177,600
27		198,000
26		212,160
25		223,200
24		232,560

Wire Gauge Drill Size	Rate Ft.^{3}/hr.	
23		240,520
22		248,640
21		255,200
20		265,240

Altitude Corrections

The specifications shown on this chart for orifice sizes are pressures from sea level to approximately 3500 ft. above sea level. For altitudes from 3500 ft. to 5000 ft., use one drill size larger, (approximately .002” dia.). From 5000 ft. to 6500 ft., use two drill sizes larger, (approximately 004” dia.). Above 6500 ft., use two or three drill sizes larger.

Paint Specifications

Coverage Data
Square foot coverage varies because of difference in the solids content of each product required to obtain necessary dry film thickness.
Surface protection is directly related to care in preparation before painting and the dry film thickness of coating. A minimum of 4.5 mils on exterior of tanks and spreaders is required.
Excessive "sweating" of tanks and unusual damp environment requires greater depth of the paint film to retard water in the form of vapor from reaching the surface beneath.
LP-Gas Tanks

Allow for paint lost or wasted during spray application, usually 15%. Products and amounts required shown in gallons.

Anhydrous Ammonia Tanks - Exterior

Tank Gallons	Sq. Ft.	L-1920	—146	—150
30,000	2,000	8 gallons	8 gallons	8 gallons
18,000	1,250	5 gallons	5 gallons	6 gallons
12,000	1,160	4½ gallons	4½ gallons	4½ gallons
1,000	225	1 gallon	1 gallon	1 gallon
350	80	3 per gallon	3 per gallon	3 per gallon
Coverage (sq. ft./gal.)		300	315	300

LP-Gas Tanks

Tank Gallons	Sq. Ft.	5LV	S-7LV	—146	—150	1000	1151	L-122LV	Equipment Enamels
30,000	2,000	8 gallons	8 gallons	8 gallons	8 gallons	7 gallons	7 gallons	7 gallons	Depends upon kind of surface
18,000	1,250	6 gallons	6 gallons	6 gallons	6 gallons	5 gallons	5 gallons	5 gallons	
12,000	1,160	5 gallons	5 gallons	5 gallons	5 gallons	4 gallons	4 gallons	4 gallons	
1,000	225	1 gallon	1 gallon	1 gallon	1 gallon	1 gallon	1 gallon	1 gallon	
500	116	2 per gallon	2 per gallon	2 per gallon	2 per gallon	3 per gallon	3 per gallon	3 per gallon	
250	56.6	4 per gallon	4 per gallon	4 per gallon	4 per gallon	6 per gallon	6 per gallon	6 per gallon	
100 lb. cyl.		18 per gallon	18 per gallon			22 per gallon	22 per gallon	20 per gallon	
Coverage (sq. ft./gal. @ 1 mil)7		755	755	800	660	645	585	855	862
Dry film thickness (mils)		2.3	2.3	2.3	2.2	1.25	1.0	3.0	1.8-2.2

Wire Sizing

This wire size diagram shows wire size requirements for given horsepower at various wire lengths and voltages for single phase circuits.

When considering 3-phase circuits, it is safe to assume that the horsepower may be increased to double the amount shown for 230 volt single phase for each wire size at the various given lengths.

Wire Size For 115 & 230 Volt Single Phase Circuits								
Distance-Motor To Fuse Or Meter Box-Feet								
Motor	**100 ft**		**200 ft**		**300 ft**		**500 ft**	
HP	115V	230V	115V	230V	115V	230V	115V	230V
1/4	#14	#14	#10	#12	#8	#10	#6	#8
1/3	#12	#14	#10	#12	#6	#10	#4	#8
1/2	#10	#12	#8	#10	#6	#8	#4	#6
3/4	#10	#12	#6	#10	#4	#8	#2	#6
1	#8	#10	#6	#8	#4	#6		#4
1 1/2	#4	#10	#4	#8		#6		#4
2		#8		#6		#4		#2
3		#8		#6		#4		#2
5		#6		#4		#2		#0

Order Online: www.teecoproducts.com
e-mail: info@teecoproducts.com

Sacramento, CA (800) 225-6621
Auburn, WA (800) 426-9456
Rapid City, SD (800) 843-8660

TEECO PRODUCTS, INC.

General Information

Tap Drill Sizes, Calculated Data, Formulas

Tap Drill Sizes

Machine Screw Sizes	Drill
0-80	3/64”
1-56	54
1-64	53
1-72	53
2-56	50
2-64	50
3-48	47
3-56	45
4-32	45
4-36	44
4-40	43
4-48	42
5-36	40
5-40	38
5-44	37
6-32	36
6-36	34
6-40	33
7-30	31
7-32	31
7-36	1/8”
8-30	30

Machine Screw Sizes	Drill
8-32	29
8-36	29
8-40	28
9-24	29
9-30	27
9-32	26
10-24	25
10-28	23
10-30	22
10-32	21
12-24	16
12-28	14
12-32	13
14-20	10
14-24	7
16-18	3
16-20	7/32”
16-22	2
18-18	B
18-20	D
20-16	G
20-18	17/64”

Machine Screw Sizes	Drill
20-20	I
22-16	9/32”
22-18	L
24-16	5/16”
24-18	O
26-14	21/64”
26-16	R
28-14	T
28-16	23/64”
30-14	V
30-16	25/64”

Bolt Threads Size	Drill
1/16”-64	3/64
5/64”-60	1/16”
3/32”-48	49
7/64”-48	43
1/8”-32	3/32”
1/8”-40	38

Bolt Threads Size	Drill
9/64”-40	32
5/32”-32	1/8”
11/64”-32	9/64”
3/16”-24	26
3/16”-32	22
13/64”-24	20
7/32”-24	16
15/64”-24	10
¼”-20	7
¼”-28	3
5/16”-18	F
5/16”-24	1
3/8”-16	5/16”
3/8”-24	Q
7/16”-14	V
7/16”-20	25/64”
1/2”-12	27/64”
1/2”-13	27/64”
1/2”-20	29/64”
9/16”-28	1/64”
9/16”-18	33/64”

Bolt Threads Size	Drill
5/8”-11	17/32”
5/8”-18	37/64”
11/16”-11	19/32”
11/16”-16	5/8”
3/4”-10	21/32”
3/4”-16	1/16”
13/16”-10	23/32”
7/8”-9	49/64”
7/8”-14	13/16”
15/16”-9	53/64”
1”-8	7/8”
1”-14	15/16”
11/8“-7	63/64”
11/8“-12	13/64”
1¼”-7	17/64“
1¼”-12	111/64“
13/8“-6	113/64”
13/8“-12	118/64”
1½”-6	111/32“
1½”-12	127/64“
15/8“-5½	127/64”

Bolt Threads Size	Drill
13/4”-5	19/16“
17/8“-5	111/16”
2”-4½	125/32“

Pipe Thread Sizes	Drill
1/8”-27	11/32”
¼”-18	7/16”
3/8”-18	37/64”
1/2”-14	23/32”
3/4”-14	59/64”
1”-11½	15/32“
1¼”-11½	1½”
1½-11½	147/64”
2”-11½	27/32“
2½”-8	25/8“
3”-8	3¼”
3½”-8	3¾”
4”-8	4¼”

Calculated Data

Diameter (Inches)	Circumference	Area (Sq. Inches)
2	6.283	3.141
3	9.424	7.068
4	12.56	12.566
5	15.70	19.635
6	18.84	28.274
7	21.99	38.484
8	25.13	50.265
9	28.27	63.617
10	31.41	78.539
12	37.69	113.09
14	43.98	153.93
16	50.26	201.06
18	56.54	254.46
20	62.83	314.16
22	69.11	380.13
24	75.39	452.39
26	81.68	530.93
28	87.96	615.75
30	94.24	706.86
32	100.5	804.24
34	106.8	907.92
36	113.0	1017.8
38	119.3	1134.1
40	125.6	1256.6

Formulas

Diameter multiplied by 3.1416 = circumference.

Circumference multiplied by .3183 = diameter.

Radius multiplied by 6.2831 = circumference.

Square of the diameter multiplied by .7854 = area.

Diameter multiplied by .8862 = side of equal square.

Area of rectangle = length multiplied by breadth.

Doubling the diameter of a circle increases its area four times.

Doubling the diameter of a circle multiplies the circumference by 2.

Side of a square multiplied by 1.128 = diameter of a circle of equal area.

Surface of a sphere = diameter multiplied by 3.1416.

Area of a triangle equals base multiplied by one-half the altitude.

Area of a sector of a circle equals one-half the length of the arc multiplied by the radius of the circle.

Order Online: www.teecoproducts.com
e-mail: info@teecoproducts.com

Sacramento, CA (800) 225-6621
Auburn, WA (800) 426-9456
Rapid City, SD (800) 843-8660

Thread Specs - Inlet Connections

NGT and NPT Threads

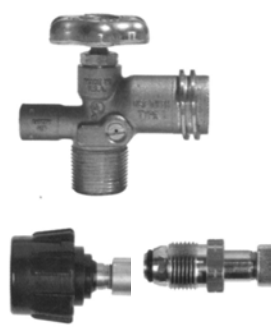
The NGT (National Gas Taper) thread is the commonly used valve-to-cylinder connection. The male thread on the valve has about two more threads at the large end than the NPT in order to provide additional fresh threads if further tightening is necessary. Additionally, the standard 3/4" NGT valve inlet provides the greater tightness at the bottom of the valve by making the valve threads slightly straighter than the standard taper of 3/4" per foot in NPT connections. In all other respects NPT and NGT threads are similar.

Thread Specs - Outlet Connections

The CGA (Compressed Gas Association) outlets are standard for use with various compressed gases. The relation of one of these outlets to another is fixed so as to minimize undesirable connections. They have been so designed to prevent the interchange of connections which may result in a hazard.

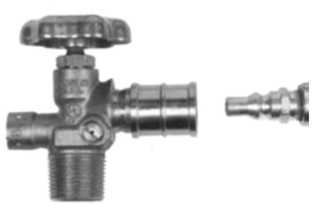
Type I Outlet

This connection is designed to mate with either a 1-15/16" Female ACME or a Male POL (CGA510). It complies with the ANSI Z21.58 Standard for Outdoor Cooking Appliances and the Can/CGA-1.6 Standard for Container Corrections. A back check assembly in the outlet is designed to prevent gas flow until a leak free connection is made with an inlet adapter. These standards apply to barbecue grill cylinders manufactured after October, 1994.



Type II Outlet

This connection is designed to mate withe the Quick Connect Male plug that complies with the ANSI Z21.58 Standard for Outdoor Cooking Appliances and the Can/CGA-1.6 Standard for Container connections. A back check assembly in the outlet is designed to prevent gas flow until a leak free connection is made with the inlet adapter. These standards apply to barbecue grill cylinders manufactured after October, 1994.



3/8"-18 NPT Thread Connection

This connection also is used for vapor or liquid withdrawal. It has a 3/8" diameter thread, and 18 threads per inch, National Pipe Taper Outlet form.

CGA 182, or SAE Flare

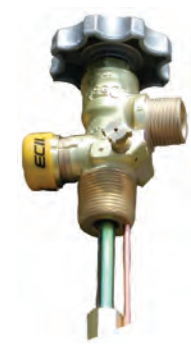
This connection assures a leak-tight joining of copper tubing to brass parts without need for brazing or silver soldering. The common size used on LP-Gas valves and fittings is 3/8"

SAE (Society of Automotive Engineers) flare. Although this connection is referred to as a 3/8", because 3/8" O.D. tubing is used, the thread actually measured 5/8".

The specifications are .625—18 UNF—2A-RH-EXT, which means .625" diameter thread, 18 threads per inch, Unified Fine Series Class 2 Tolerances, right-hand, external thread.

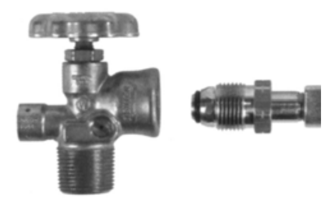
CGA 555

CGA 555 is the standard cylinder valve outlet connection for liquid withdrawal of butane and/or propane. Thread specification is .903"—14 NGO—LH—EXT, which means .903" diameter thread, 14 threads per inch, National Gas Outlet form, left-hand external thread.



CGA 510 or POL

Most widely used in this industry, POL is the common name for the standard CGA 510 connection. Thread specification is .885"—14 NGO-LH-INT, meaning .8852880 3450 diameter thread, 14 threads per inch, National Gas Outlet form, left-hand internal thread. RegO POL outlet connections for LP-Gases conform to this standard.



Purging Containers

A very important step which is often overlooked by LP-Gas dealers is the importance of properly purging new LP-Gas containers. Attention to this important procedure will promote customer satisfaction and greatly reduce service calls on new installations.

Both ASME and DOT specifications require hydrostatic testing of vessels after fabrication. This is usually done with water. Also, before charging with propane, the vessel will contain the normal amount of air. Both water and air are contaminants and they seriously interfere with proper operation of the system and connected appliances. If not removed, they will result in costly service calls and needless expense far exceeding the nominal cost of proper purging.

Order Online: www.teecoproducts.com
e-mail: info@teecoproducts.com

Sacramento, CA (800) 225-6621 | Auburn, WA (800) 426-9456 | Rapid City, SD (800) 843-8660

Container Flanged Installation

The opening in the tank flange should be machined with a 1/4”-45° chamfer at the outer edge. The thread should be tapped one or two turns large as checked by a plug gauge. This and the undersize thread on the valve should permit the valve to be installed so that its outer face is at least flush with the outer edge of the flange. The valve is screwed into this opening by fitting a1/4” flat metal piece into the slot and turning until hand tight. A lubricant may be used, but a cutting compound is not necessary since this joint does not have to be gas tight. If any difficulty is experienced in “making up” the valve to fit flush, as indicated, the thread in the tank flange can be tapped. Design and construction of tank and flange must be in accordance with the appropriate section of the ASME Pressure Vessel Code.

Flanged Installation Dimension Specifications

Key	Description	A3400L4 A3500L4 A3500N4 A3500P4	A3400L6 A3500R6 3500T6 A3500V6	A4500Y8
A	Valve size (NPT)	2”	3”	4”
B	Tank opening	3-1/2”	4-1/2”	5-1/2”
C	Thickness (min.)	1”	1¼”	1-3/8”
D	Outside diameter	6-1/2”	8¼”	10”
E	Pipe Thread (NPT)	2”	3”	4”
F	Bolt Circle Dia./# Holes	5” (8)	6-5/8” (8)	7-7/8” (8)
G	Bolt Hole Thread	5/8”-11NC-2	3/4”-10NC-2	3/4”-10NC-2
H	Bolt Hole Depth	3/4”	1”	1-1/8”

Discharge Chart

Chart A — Minimum Required Rate of Discharge for LP-Gas Pressure Relief Valves Used on ASME Containers

From NFPA Pamphlet #58, Appendix D (1986).

Minimum required rate of discharge in cubic feet per minute of air at 120% of the maximum permitted start-to-discharge pressure for pressure relief valves to be used on containers other than those constructed in accordance with Interstate Commerce Commission specification.

Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air
20 or less	626	85	2050	150	3260	230	4630	360	6690	850	13540	1500	21570
25	751	90	2150	155	3350	240	4800	370	6840	900	14190	1550	22160
30	872	95	2240	160	3440	250	4960	380	7000	950	14830	1600	22740
35	990	100	2340	165	3530	260	5130	390	7150	1000	15470	1650	23320
40	1100	105	2440	170	3620	270	5290	400	7300	1050	16100	1700	23900
45	1220	110	2530	175	3700	280	5450	450	8040	1100	16720	1750	24470
50	1330	115	2630	180	3790	290	5610	500	8760	1150	17350	1800	25050
55	1430	120	2720	185	3880	300	5760	550	9470	1200	17960	1850	25620
60	1540	125	2810	190	3960	310	5920	600	10170	1250	18570	1900	26180
65	1640	130	2900	195	4050	320	6080	650	10860	1300	19180	1950	26750
70	1750	135	2990	200	4130	330	6230	700	11550	1350	19780	2000	27310
75	1850	140	3080	210	4300	340	6390	750	12220	1400	20380		
80	1950	145	3170	220	4470	350	6540	800	12880	1450	20980		

Surface area =Total outside surface area of container in square feet.

When the surface area is not stamped on the name plate or when the marking is not legible, the area can be calculated by using one of the following formulas:

1. Cylindrical container with hemispherical heads. Area (in sq. ft.) = overall length (ft.) x outside diameter (ft.) x 3.1416.
2. Cylindrical container with semi-ellipsoidal heads. Area (in sq. ft.) = overall length (ft.) + .3 outside diameter (ft.) x outside diameter (ft.) x 3.1416.
3. Spherical container. Area (in sq. ft.) = outside diameter (ft.) squared x 3.1416.

Flow Rate CFM Air = Required flow capacity in cubic feet per minute of air at standard conditions, 60ºF. and atmospheric pressure (14.7 psia).

The rate of discharge may be interpolated for intermediate values of surface area. For containers with total outside surface area greater than 2000 square feet, the required flow rate can be calculated using the formula, Flow Rate—CFM Air = 53.632 $A^{0.82}$. Where A = total outside surface area of the container in square feet.

Valves not marked “Air” have flow rate marking in cubic feet per minute of liquefied petroleum gas. These can be converted to ratings in cubic feet per minute of air by multiplying the liquefied petroleum gas ratings by the factors listed below. Air flow ratings can be converted to ratings in cubic feet per minute of liquefied petroleum gas by dividing the air ratings by the factors listed below.

Air Conversion Factors

Container Type	100	125	150	175	200
Air Conversion Factor	1.162	1.142	1.113	1.078	1.010

Q7

NOTES