

LELAND®

GAS CYLINDER SERIES



HIGH PRESSURE GAS FILLED DISPOSABLE CYLINDERS

1.0cc to 1000cc INTERNAL CAPACITY

Approved and in service gas cylinder products meeting
MIL-PRF-25369, MIL-C-601G, AS601, MIL-C-16385, MIL-C-52053,
USCG/UL1191, DOT 39, ASTM, FAA/TSO C13, cGMP and USP requirements

Leland Limited Incorporated is an ISO 9001-2000 registered company and a member of the Compressed Gas Association

● **Table 3 Quick Reference Guide:** GASES, GRADES AND RELATIONSHIPS

Liquified Gases	CO2	N2O	LPG	SF6	Comment
Fill Ratio Max %	75%	80%	40%	90%	UL = 75% max
Non-Flammable	Yes	Yes	No	Yes	-
Flammable	No	No	Yes	No	-
Oxidizer	No	Yes	No	No	-
Expansion Rate per Gram	500cc	440cc	300cc	340cc	32F @ 1 atmosphere
Welded Closure Available	Yes	No*	No	Yes	*Early 2007
Temperature of Liquid	F	F	F	F	-
Industrial Grade	Std	Std	Std	Std	-
Food/Beverage Grade	Yes	Yes	No	No	-
Medical Grade	Yes	Available	No	No	Contact us
Vapor Pressure at 0F	300 psi	280 psi	40 psi	110 psi	Based on max fill ratio
Vapor Pressure at 70F	850 psi	940 psi	125 psi	310 psi	Based on max fill ratio
Vapor Pressure at 140F	3170 psi	3810 psi	310 psi	780 psi	Based on max fill ratio
Max Handling Temperature	120F	120F	120F	120F	Based on max fill ratio

Gases	N2	Ar	O2	He	Comment
Filling Pressure - Max PSI	3,000	3,000	3,000	3,000	Varies based on cylinder
Non-Flammable	Yes	Yes	Yes	Yes	-
Flammable	No	No	No	No	-
Oxidizer	No	No	Yes	No	-
Expansion Rate per Gram	800cc	560cc	700cc	560cc	32F @ 1 atmosphere
Welded Closure Available	Yes	Yes	No*	Yes	*Early 2007
Temperature of Liquid	F	F	F	F	-
Industrial Grade	Std	Std	Std	Std	-
Food/Beverage Grade	Yes	Yes	Yes	-	-
Medical Use	Available	Available	Yes	-	Contact us
Max Handling Temperature	120F	120F	120F	120F	-

This table is a reference guide to help you think about the type of gas you may require. We offer virtually any gas or blend there is; but generally, not toxic gases, as we place the safety of our employees (and you) as a high priority. Please contact us for detailed information about a specific cylinder, as there are many factors that affect the quantity and pressure of the stored gas in our cylinders.

● Piercing Pins and Unique Cylinder Attachments




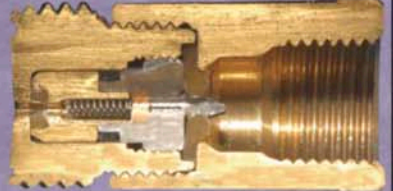








Diagram 3	Puncture Pin Explanation	Diagram 4
	The shape and style of a puncture pin relates to its intended use. Diagram 3 shows a typical life jacket style pin where the user will advance the pin into the puncture cap. Diagram 4 shows what a puncture pin should look like if the cylinder is advanced onto the pin. A seal is required in both situations to prevent gas leakage.	
Diagram 5	Cylinder Attachment	Diagram 6
	The most common method to attach the cylinder is by means of a thread. The advancing cylinder strikes the puncture pin shown in diagram 6. Another method used in the life jacket industry is a bayonet fitting attached to the threaded end. Bayonets allow quick and positive engagement as shown in diagram 5. The ergonomics of your product will be important design input criteria for the cylinder and how the user is expected to replace it.	

Table 1 Quick Reference Guide: SIZING BY CYLINDER DIAMETER

Size Range				Neck Configurations						
REF #	φ" Body Diameter		Volume Range cc							
1	0.374	1.0-1.77	1.0-1.7	0.287	-	-	-	-	-	-
2	0.732	2.5-3.25	10-15	0.287-0.344	3/8-24 UNF	-	-	-	-	BOT
2A	0.735	2.5-3.26	10-20	0.287-0.345	3/8-24 UNF	-	-	-	-	-
3	0.735	3.45-3.90	20-23	0.322-0.364	3/8-24 UNF	-	-	-	-	BOT
4	1.000	3.70-5.50	28-43	0.464-0.625	3/8-24 UNF	1/2-20 UNF	5/8-18 UNF	-	-	BOT
5	1.181	4.65-9.80	49-100	0.322-0.625	3/8-24 UNF	1/2-20 UNF	5/8-18 UNF	-	5/8-18 O2	BOT
6	1.125	4.97-6.00	40-50	0.464-0.750	-	1/2-20 UNF	5/8-18 UNF	3/4-16 UNF	-	-
7	1.380	5.5-10.00	80-160	*	-	1/2-20 UNF	-	-	-	-
8	1.500	4.50-5.50	74*	*	-	1/2-20 UNF	5/8-18 UNF	-	-	-
9	1.575	5.10-5.60	95-100	0.464-0.750	-	1/2-20 UNF	5/8-18 UNF	3/4-16 UNF	5/8-18 O2	-
10	1.960	5.00-24.0	130-850	*	-	1/2-20 UNF	-	-	-	-
11	2.360	6.50-24.0	280-1250	*	-	1/2-20 UNF	-	-	-	-



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
*Other lengths and configurations may be available upon request. tech@LelandLtd.com

Table 2 Sealing Cap Guide: TYPE AND ENERGY NEEDED

Cylinder Reference	Cap Type	Cap Name	Force Required* for Gas Release - (Nf)	Thickness (Inches)	Outside Diameter	Notes
1	Puncture	II	160 max	0.0078	0.287	-
2,3,4,5	Puncture	Cn1	220 - 340	0.0090	0.260	MIL Flat
2, 3, 4, 5	Puncture	Cn1R	120 - 200	0.0080	0.260	Safety
2, 3, 4, 5	Puncture	Cn1L	260 max	0.0070	0.260	Low Force
2, 2A, 3, 4, 5	Puncture	Cn1D	-	0.0075	0.260	Air Gun
2, 3, 4, 5	Puncture	Cn2	260 - 300	0.0075	0.300	Flat
2, 3, 4, 5	Puncture	Cn2D	-	0.0094	0.330	-
2, 3, 4, 5	Break off	Cn2P	-	-	0.300	BOT
4, 5, 6, 7, 8, 9	Puncture	Cn3	260 - 300	0.0110	0.400	Flat
4, 5, 6, 7, 8, 9	Puncture	CN3L	260 max	0.0080	0.400	Low Force
4, 5, 6, 7, 8, 9	Puncture	Cn3RD	270 - 360	0.0110	0.400	Safety
4, 5, 6, 7, 8, 9	Puncture	Cn4R	340 - 440	0.0140	0.480	Safety
4, 5, 6, 7, 8, 9	Puncture	Cn4RD	340 - 370	0.0130	0.480	Safety
2, 3, 4, 5	Puncture	Cn25	-	0.0100	0.330	MIL Flat
2, 3, 4, 5	Puncture	Cn25R	-	0.0090	0.330	Safety
4, 5, 6, 7, 8, 9	Puncture	Cn45	250 - 320	0.0100	0.400	MIL Flat
4, 5, 6, 7, 8, 9	Puncture	Cn74	300 - 400	0.0120	0.400	MIL Flat
5, 7, 10, 11	Puncture	LB	260 max	0.0090	0.400	Low Force

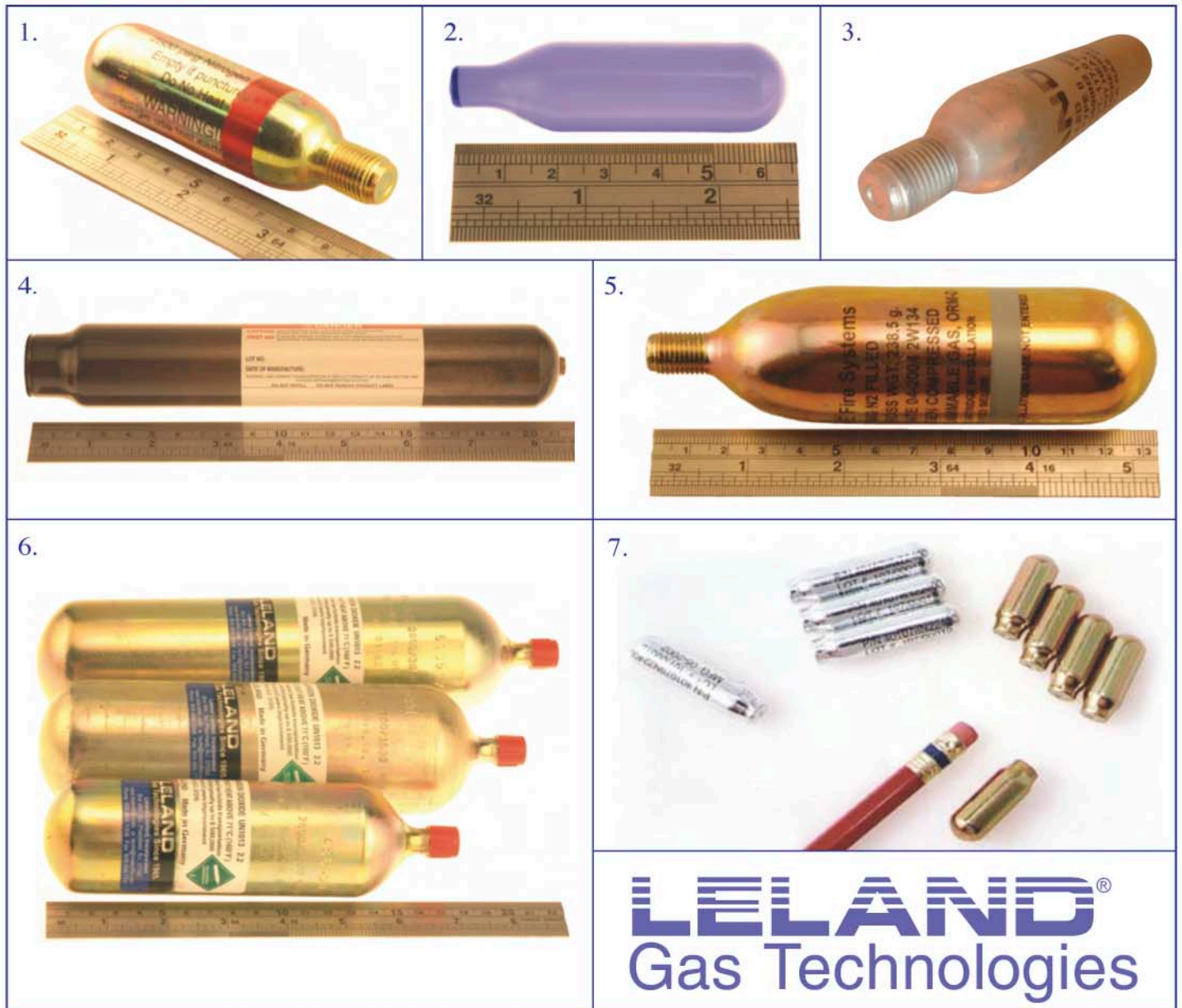
If puncture force is not indicated, please contact us for more information

*Per requirements of UL1191. A Newton of force (Nf) can be converted to pounds of force by multiplying by 0.2248. The UL1191 test method is a very good indicator of the force needed to puncture a cap and the total energy requirement. You can obtain the UL document by contacting UL directly: CustomerService.RTP@us.ul.com

Diagram 1	Explanation 1
	These are examples of some sealing caps, which are available to close off the end of a gas filled cylinder. We offer technical support to assist you in the proper selection of these options.
Diagram 2	Explanation 2
	This cylinder is fitted with an innovative break off tip (BOT) sealing cap. Applications requiring low work energy to release the gas can benefit from our technology. It is not for everyone though, as special care and handling is required due to the sensitive nature of this gas release mechanism.

● Mass Production of Special Needs

Photos below are not actual size.
However, indication of scale is shown where possible.



LELAND®
Gas Technologies

Leland is about gas technologies. The ability to put gases into unique disposable cylinders safely and effectively is our goal. Most of our cylinders are mass produced at rates as high as 40 finished units per minute. It takes planning and a commitment to the specialized equipment necessary to make these cylinders. Here are seven examples of our cylinder range.

1. This Nitrogen filled cylinder is charged to 2700 psi and welded closed for zero leakage. The 1/2-20UNF2A threaded neck and 100 hour rated Leland SuperZinc coating make it common in many applications.
2. A crimp closure is common to lock in the gas when it has oxidizer properties, such as Oxygen and Nitrous Oxide. Your application requirements may necessitate this type of closure. Please contact us so we can help you decide what type of closure is right for you.
3. The indentation in this cap was a military design to prevent the puncture pin in the inflation assembly from touching the cap surface prematurely during high g takeoffs and landings by fighter pilots. We can design specialized puncture caps to accommodate virtually any situation. All tools are produced in house.
4. Ever wonder what a side curtain airbag cylinder looks like? This cylinder is custom made for a top auto maker. We have DOT approval for Ultra High Pressure (UHP) cylinders with filling pressures of over 6,000 psi.
5. A 98cc internal (water) capacity cylinder is about as large as you can go before the need to seek a DOT approval. This distinction is important to applications that require normal UPS style shipping without costly hazardous materials fees. The Leland web site has more specific information about safety and shipping.
6. We regularly make disposables with an internal capacity of 1000cc. When filled with CO₂, that translates to a gas mass of 670g. All our cylinder products over 110cc are DOT approved as NRC containers. We have tooling for several common diameters and welcome custom requests.
7. "Small as a pencil eraser" was our vision in 2001 to accommodate the needs of the medical industry for drug delivery devices. These are very strong little cylinders with <1.5cc of water capacity. We often fill them with liquid CO₂ or N₂ to pressures of up to 2750 psi.

GAS HANDLING PRODUCTS BY LELAND®



Variable and Fixed Pressure Regulators and Valves
for our cylinders can be off the shelf or custom engineered.



SIMPLE AND EFFECTIVE
PUNCTURE DEVICES ARE AVAILABLE



GAS DISPENSING VALVES
FOR MANY APPLICATIONS



LELAND®
Gas Technologies Since 1965.

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Rev 10/06

● **Table 4 Quick Reference Guide:** 1.0cc to 1000cc INTERNAL CAPACITY

COMMON GAS FILLED CYLINDERS: We typically mass produce these cylinders and have some stock available from our South Plainfield Plant. If you do not see what you are looking for please call us as many configurations and gas fills are available but not shown due to space limitations. See www.LelandLtd.com

Leland Part No.	Body Diameter	Overall Length	Neck Type	Water Vol (cc)	Gas Type	Gas Weight(g)	Special Note
40106	0.375"	1.00"	0.287"	1.0	CO2	0.75	-
40106IIN22750	0.375"	1.00"	0.287"	1.0	N2	0.123	2750 psi
40107	0.375"	1.50"	0.287"	1.5	CO2	1.0	-
40107IIN22200	0.375"	1.50"	0.287"	1.5	N2	0.271	2200 psi
40105	0.732"	2.52"	0.338"	10	CO2	8.0	Safety Cap
80121	0.735"	2.54"	3/8"-24	10	CO2	8.0	-
81121	0.735"	3.25"	3/8"-25	14	CO2	12.0	-
42221	0.745"	3.24"	0.287"	14	CO2	12.0	Air Gun Type
81123Z	0.860"	3.48"	3/8"-24	20	CO2	12.0	PFD
82122Z	0.860"	3.48"	3/8"-25	20	CO2	16.0	-
42104	0.858"	3.43"	0.322"	20	CO2	15.5	-
84201Z	1.00"	4.05"	1/2"-20	30	CO2	20.0	-
84203Z	1.00"	4.05"	1/2"-20	30	CO2	23.0	-
84204Z	1.00"	4.72"	1/2"-20	35	CO2	24.0	-
84121Z	1.00"	4.14"	3/8"-24	33	CO2	25.0	-
25369I	1.125"	4.97"	3/4"-16	40	CO2	26.0	-
25369II	1.00"	5.50"	1/2"-20	43	CO2	29.0	-
25369IIN21500	1.00"	5.50"	1/2"-20	43	N2	4.9	1500 psi
85202Z	1.00"	5.50"	1/2"-20	44	CO2	33.0	-
85204Z	1.125"	5.50"	1/2"-20	49	CO2	35.0	-
25369III	1.125"	5.50"	1/2"-20	49	CO2	35.0	-
86121Z	1.18"	4.65"	3/8"-24	50	CO2	38.0	-
86202Z	1.18"	4.65"	1/2"-20	50	CO2	38.0	-
89060	1.18"	6.80"	1/2"-20	81	CO2	60.0	-
87202Z	1.18"	5.43"	1/2"-20	60	CO2	45.0	-
89075	1.18"	8.07"	1/2"-20	100	CO2	75.0	-
89086	1.38	7.48"	1/2"-20	114	CO2	86.0	-
52053CO2	1.50"	4.50"	1/2"-20	74	CO2	59.0	-
52053N2	1.50"	4.50"	1/2"-20	74	N2	17.4	3000 psi
87201	1.57"	5.11"	1/2"-20	95	CO2	60.0	-
87204	1.57"	5.11"	1/2"-20	95	CO2	68.0	-
88100Z	1.57"	5.27"	5/8"-18	98	CO2	74.0	Safety Cap
88123	1.57"	5.27"	5/8"-18	98	N2	18.0	2700 psi

DOT39 NRC Approved Note: Special requirements apply to ground and air shipments
We can adjust lengths to your requirements. Nitrogen and Argon are also available to 2600 psi.

89120	1.97"	7.00"	1/2"-20	215	CO2	120	-
89135	1.97"	7.00"	1/2"-20	215	CO2	135	-
89150	1.97"	7.40"	1/2"-20	230	CO2	150	-
89200	1.97"	9.25"	1/2"-20	300	CO2	200	-
89230	1.97"	10.47"	1/2"-20	350	CO2	230	-
89280	1.97"	12.40"	1/2"-20	425	CO2	280	-
89231	2.36"	8.15"	1/2"-20	365	CO2	230	-
89250	2.36"	8.85"	1/2"-20	400	CO2	250	-
89265	2.36"	8.85"	1/2"-20	400	CO2	265	-
89290	2.36"	9.80"	1/2"-20	460	CO2	290	-
89440	2.36"	13.46"	1/2"-20	670	CO2	440	-
89670	2.36"	19.45"	1/2"-20	1000	CO2	670	-

Didn't see what you need? Questions? Just pick up the phone and we'll assist you.
(908) 561-2000 You may also e-mail your questions to tech@LelandLtd.com