C-LOK

C-LOK Instrument Valve Co.,Ltd.

Sample Cylinders

Contents

Materials

Standard C-LOK cylinders are available in 304 and 316 stainless steel in both DOT and non-DOT ratings. Monel cylinders are standard as non-DOT.
Special cylinders may be ordered in monel, carbon steel, nickel and inconel. Contact C-LOK factory for information

Design

C-LOK sampling cylinders are designed and manufactured to stringent Wondestructive Testing specifications to provide long performance life and maximum safety to the user.
The cylinders are fabricated from seamless tubing with increased wall thickness in the threaded area which prevents expansion when valves are installed. Completely formed ends maximize strength and eliminate potential leak paths. Internal sandblasting smoothes surface imperfections and removes foreign particles.
Single and double ended cylinders are available as standard in a variety of capacities from 40 milliliters to 1 gallons.

Features

- Body made of seamless tubing provides consistent wall thickness, size,and capacity.
- Cold-formed female NPT threads provide greater strength. Cylinder ends come in 1/8", 1/4", and 1/2" NPT female connections.
- Heavy-wall end connections provide strength and resist flaring. Full-penetration gas tungsten arc-weld construction provides leak--ight sample containment.
- Sizes from 40 cm^3 to 3785 cm^3(1 gal)
- Working pressures up to 5000 psig (344 bar)
- 304L and 316L and Alloy 400 stainless steel materials resist intergranular corrosion.
- Each cylinder is hydrostatically tested to at least 5/3 the working pressure.

Single-Ended Cylinders

- 150, 300, and 500 cm^3 size meet a varity of sampling needs.
- 304L stainless steel construction resists intergranular corrosion.

Testing

DOT-4B cylinders are hydrostatically proof tested at 1000 pisig (69 bar) minimum.

Double-Ended Cylinders

- Sizes from 40 to 3785 cm^3 (1 gal)
- Working pressures up to 5000 pisg (344 bar)
- 304L and 316L stainless steel materials resist intergranular crorrsion.

Testing

Each cylinders is hydrostatically tested to at least 5/3 the working pressure.
DOT-3E 1800/TC-SU6158-124 cylinders are hydrostatically proof tested at 3050 psig (210 bar)
DOT-3A 1800 AND 5000/TC-3ASM 124 AND 344 cylinders are marked with a serial number.
Volumetric expansion of each cylinder during hydrostatic testing must be within the limist set by DOT Specifiction 3A and TC Specification 3ASM.
DOT-3A 1800/TC-3ASM-124 cylinders are hydrosstaically proof tested at 3000 pisg (206 bar) minimum.
DOT-3A 5000 cylindersare hydrostatically proof tested at 8333 pisg (574 bar) minimum.
DOT-E7458 1800 cylinders are hydrostatically proof tested at 3000 psig (206 bar). All testing of DOT-E7458 cylinders is witnessed by a DOT-approved independent inspection agency.

Pressure-Temperature Ratings

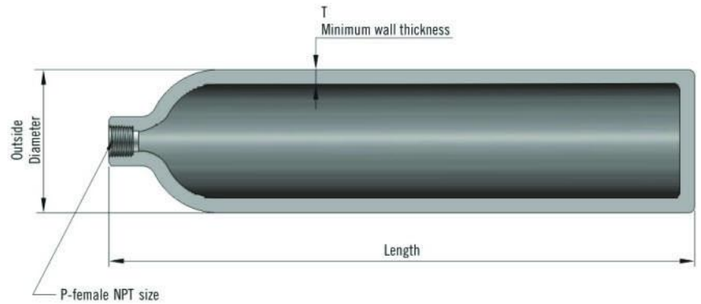
Material	316L SS	316L SS, 304L SS	Alloy 400	316 SS	304L SS
DOT Specification	3A 5000	3E1800: 316L,all sizes, and 304L, 40 to 500 cm 3A 1800: 304L,1000 to 3785 cm3	E7458	—	4B 500
Temperature,℃(℉)	Working pressure, psig (bar)				
-65(-53)to 100(37)	5000(344)	1800(124)	1800(124)	1000(68.9)	500(34.4)
200(93)	3960(272)	1360(93.7)	1580(108)	840(57.8)	500(34.4)
300(148)	3570(245)	1230(84.7)	1490(102)	760(52.3)	500(34.4)
400(204)	3290(226)	1130(77.8)	1430(98.5)	700(48.2)	500(34.4)
500(260)	3060(210)	1050(72.3)	1420(97.8)	650(44.7)	500(34.4)
600(315)	2920(201)	1000(68.9)	1420(97.8)	620(42.7)	500(34.4)
650(343)	2870(197)	980(67.5)	1420(97.8)	610(42.0)	500(34.4)
700(371)	2810(193)	970(66.8)	1420(97.8)	590(40.6)	500(34.4)
750(398)	2750(189)	950(65.4)	1410(97.1)	580(39.9)	500(34.4)
800(426)	2700(186)	930(64.0)	—	570(39.2)	500(34.4)
850(454)	2640(181)	—	—	560(38.5)	500(34.4)

Ratings limited to 300 (148℃) max with PTFE internal coating.
Ratings may be limited by individual country government regulations.

How To Order

To order a C-LOK sampling cylinder, specify the model number based on capacity required, single or double end connections, and end connection size.

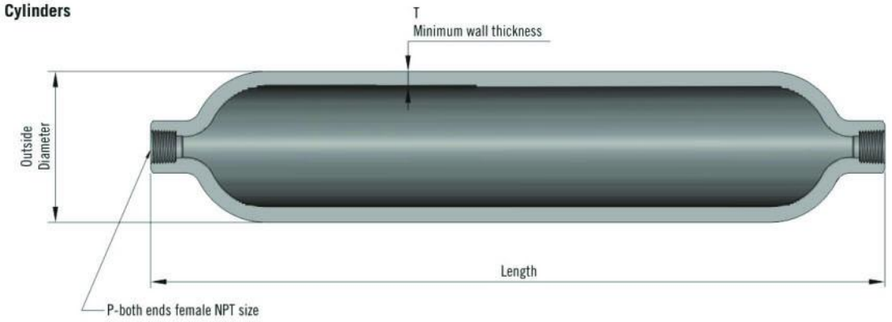
Single-Ended Cylinders



Ordering Information, Technical Date, and Dimensions

Material Grade/Cylinder Specification	Pressure Rating psig(bar)	Internal Volume $cm^3 \pm 5\%$	P in.	Ordering Number	Dimensions, (in.mm)			Weight lb(kg)
					Outside Diameter	Length	Minimum wall thickness	
Single-Ended								
304L SS/ DOT-4B	500 (34.4)	150	1/4	4L-SEN4-150	2.00 (50.8)	4.88 (124)	0.093 (2.4)	1.1 (0.50)
		300		4L-SEN4-300		8.62 (219)		1.8 (0.82)
		500		4L-SEN4-500		13.6 (345)		2.7 (1.2)

Double-Ended Cylinders



Ordering Information, Technical Date, and Dimensions

Material Grade/Cylinder Specification	Pressure Rating psig(bar)	Internal Volume $cm^3 \pm 5\%$	P in.	Ordering Number	Dimensions,in.(mm)			Weight lb(kg)
					Outside Diameter	Length	Minimum wall thickness	
Double-Ended								
304L SS/ DOT-3E 1800 TC-SU6158 124	1800 (124)	40	1/8	4L-DEN2-40	1.25(31.8)	3.88(98.6)	0.070(1.8)	0.31(0.14)
		50	1/4	4L-DEN4-50	1.5(38.1)	3.75(95.2)	0.093(2.4)	0.38(0.17)
		75		4L-DEN4-75		4.94(125)		0.62(0.28)
		150		4L-DEN4-150	2.00(50.8)	5.25(133)		0.94(0.43)
		300		4L-DEN4-300		8.94(227)		1.6(0.73)
		400		4L-DEN4-400		11.4(290)		2.1(0.95)
		500		4L-DEN4-500		13.8(351)		2.6(1.2)
304L SS/ DOT-3A 1800 TC-3ASM 124	1800 (124)	1000	1/4	4L-DEN4-1000	3.50(88.9)	10.9(277)	0.180(4.6)	6.5(2.9)
			1/2	4L-DEN8-1000				
		2250	1/4	4L-DEN4-2250	4.00(102)	17.2(437)	0.206(5.2)	14(6.4)
			1/2	4L-DEN8-2250				
		3785 (1 gal)	1/4	4L-DEN4-1GAL		26.7(678)		21(9.5)
			1/2	4L-DEN8-1GAL				
316L SS/ DOT-3E 1800 TC-SU6158 124	1800 (124)	150	1/4	6L-DEN4-150	2.00(50.8)	5.25(133)	0.093(2.4)	0.94(0.43)
		300		6L-DEN4-300		8.94(227)		1.6(0.73)
		500		6L-DEN4-500		13.8(351)		2.6(1.2)
316L SS/ DOT-3E 1800 TC-SU6158 124	5000 (344)	150		6L-50DN4-150	1.90(48.2)	8.00(203)	0.240(6.1)	3.0(1.4)
		300		6L-50DN4-300		14.5(368)		5.6(2.5)
		500		6L-50DN4-500		23.5(597)		9.1(4.1)
Alloy 400/ DOT-E7458	1800 (124)	150		M-DEN4-150	2.00(50.8)	5.25(133)	0.093(2.4)	0.94(0.43)
		300		M-DEN4-300		8.94(227)		1.8(0.82)
		500		M-DEN4-500		13.8(351)		2.9(1.3)

Overpressure Protection

Compressed gas cylinders must be equipped with pressure rellef devices in accordance with United States DOT.

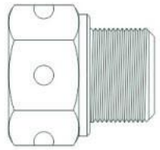
regulations and CGA Pamphlet S-1.1. The CGA pamphlet lists devices that can be used with specific gases. It also contains information on other types of pressure relief devices.

⚠ Be sure to used correct pressure-relief device for the gas being used.

⚠ Proer filling of the cylinder according to DOT in preventing overpressurization.

Rupture Disc Units

C-LOK rupture disc nuits protect sample cylinders from overpressurization by venting the cylinder contentsto a body that is threaded into a valve body or a rupture disc tee and sealed by an elastomer O-ring. The rupturedisc can be easily replaced without removing the valve or the tee from the cylinder.



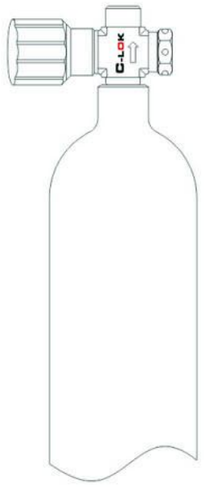
Materials of Construction

Component	Material Grade/ASTM Specification
Body, inlet ring	316L/A479 or A213
O-ring	Fluorocarbon FKM
Rupture disc	Alloy 600/B168

Ordering Information

Nominal Burst Pressure at 70°F (20°C)	Ordering Number
2850 psig±150 psig 196 bar±10.3 bar	SS-RDK-16-2850
1900 psig±100 psig 130 bar±6.8 bar	SS-RDK-16-1900

Nonrotating-Stem Needle Valves with Rupture Disc Units



Ordering Information Dimensions

End connections		Flow Pattern	Valve Ordering Number	Orifice in. (mm)
Inlet	Outlet			
With 2850 psig (196 bar) Rupture Disc				
1/4 in. male NPT	1/4 in. female NPT	Straight	SS-16DK-M4-F4-2	0.218 (5.5)
1/2 in. male NPT		Angle	SS-16DK-M4-F4-A-2 SS-16DK-M8-F4-A-2	
With 1900 psig (130 bar) Rupture Disc				
1/4 in. male NPT	1/4 in. female NPT	Straight	SS-16DK-M4-F4-1	0.218 (5.5)
1/2 in. male NPT		Angle	SS-16DK-M4-F4-A-1 SS-16DK-M8-F4-A-1	

Dimensions are for reference only and subject to chang.

For more information, see C-LOK Nonrotating-Stem Needle Valves catalog.
Other C-LOK valves are available for use with sample cylinders. Contact your authorized C-LOK sales and service representative for details.

Rupture Disc Precautions

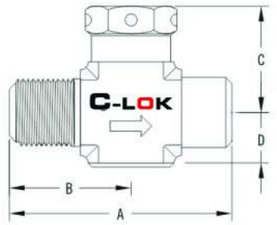
1. Do not use rupture disc devices in a location where the release of the cylinder contents might create ahazard. The ruputre disc vents to the atmosphere through six redial holes in the body. Pressure is released suddenly with a loud noise, and gases escape at high velocity.
2. Know the burst pressure. (This rating is marked on the end face of the ruputre disc unit, as required by CGA Pamphlet
3. Be sure the maximum burst pressure does not exceed the cylinder test pressure.
4. Be sure the minimum burst pressure is at least 40% higher than the cylinder filling pressure.
5. Inspect rupture disc regularly. The strength of rupture disc deteriorates with time due to temperature, corrosion, and fatigue. Pulsating pressure, vacuum/pressure cycling, heat, and corrosive fluids and atomspheres can reduce the disc's burst pressure.
6. Do not use rupture disc to protect vessels with volumes greater than 3 gal (11355cm^3) for compressed gases or 1 1/2 gal (5677cm3) for liquefied gases.
7. Provide suitable means to isolate the sample cylinder from the system in case the rupture disc bursts while taking a sample.
8. In cylinders with liquefied gases, a small temperature increase during transportation or storage will cause the liquid to expand and may cause the rupture disk to release its contents. See local regulations and other appropriate guidelines for safe filling limits for your application.

Rupture Disc Tee

These compact assemblies are designed for use with various C-LOK valves. Tee are made of 316 stainless steel. Each tee includes a rupture disc unit.

Ordering Information Dimensions

End connections		Ordering Number	Dimensions, in. (mm)			
Inlet	Outlet		A	B	C	D
With 2850 psig (196 bar) Rupture Disc						
1/4 in. male NPT	1/4 in. female NPT	SS-RT-M4-F4-2	1.88 (47.7)	1.06 (26.9)	0.94 (23.9)	0.50 (12.7)
1/2 in. male NPT		SS-RT-M8-F4-2	2.19 (55.6)	1.22 (31.0)	1.19 (30.2)	0.56 (14.2)
With 1900 psig (130 bar) Rupture Disc						
1/4 in. male NPT	1/4 in. female NPT	SS-RT-M4-F4-1	1.88 (47.7)	1.06 (26.9)	0.94 (23.9)	0.50 (12.7)
1/2 in. male NPT		SS-RT-M8-F4-1	2.19 (55.6)	1.22 (31.0)	1.19 (30.2)	0.56 (14.2)



Options and Accessorise

TFE Coating

Internal TFE coating, which provides a non-stick surface to aid in cleaning, can be supplied in any sample cylinder. To order, suffix-T to the cylinder Ordering Number.
Example: 4L-DEN4-300-T

Electropolishing

Electropolishing provide a clean interal surface with a high degree of passivation.
To order, add-EP to the cylinder ordering number.
Example: 4L-DEN4-300-EP

Roll Stamping Or Lase Etching

Cylinders can be furnished roll stamped or laser etched to meet specific identification requirements, such as company name. address, serial number, or order number. We will not mark cylinders with the intended contents.

Roll stamping-Customized roll stamping, such as company name, address, serial number, order number, location used, etc, is available on all WHITEY Sample cylinders. Roll stamping of DOT-3E cylinder is done on the body portion of the cylinder. DOT-3A cylinders are roll stamped on the crown portion of the cylinder.
To order, suffix-RS to the cylinder Ordering Number and include the information you wish roll stamped.
Example: 6L-DEN4-500-RS plus information.

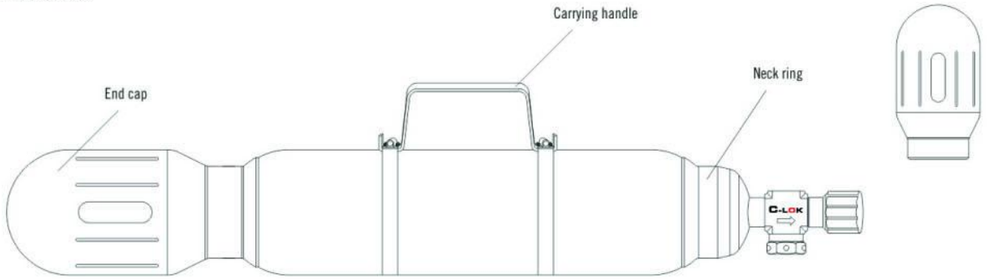
Laser Etching-To order, add-LE to the cylinder ordering number, followed by the specific information.
Example: 4L-DEN4-300-LE Company Name and Address
This information will be laser etched on the cylinder wall.

Cylinder with the above options conform to DOT sepcifications.

Neck Rings & End Caps

Available for 2250cc and 1gallon sample cylinders,neck rings and end caps protect valves against damage. Both are manufacture from cadmium plated carbon steel.The neck ring is peened to the cylinedr neck and the end cap screws onto the neck ring.These
accessries are delivered factory assembled.They can only be used with angle pattern valves.

To order end caps and neck rings on both ends of the cylinder,suffix C to the cylinedr Ordering Number.
Example:4L-DEN8-2250C



Carrying Handle

This accessory provides a convenient way to carry sample cylinders.The handle is made from 304 stainless steel and is available for use on 400 cm and larger cylinders,as well as 300 cm cylinders rated to 5000 psig(344 bar).

To order a sample cylinder to be shipped with a carrying hand,add H to the cylinder ordering number
Example:4L-DEN4-300H

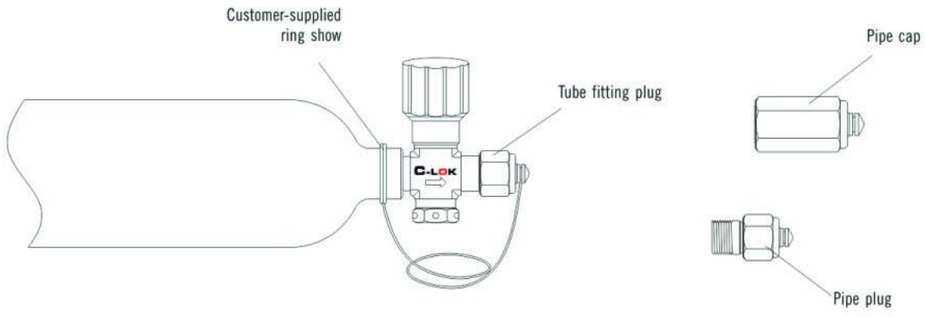
To order a carrying handle as separate component,use of the following ordering number:

Cylinder OD in. (mm)	Ordering Number
1.9, 2 (48.2, 50.8)	FC-5K-CH-2"
3.5, 4 (88.9, 102)	FC-5K-CH-4"

To order a 2250 or 3785 cm (1 gal) sample cylinder with factory-assembled end caps and neck rings to be shipped with a carrying handle, add CH to the cylinder ordering number.
Example: 4L-DEN8-2250CH

Caps and Plugs

Caps and plugs protect C-LOK tube fitting or NPT end connections on valves during cyinder transport.
Contact your authorized C-LOK representative for details.



Outage Tubes

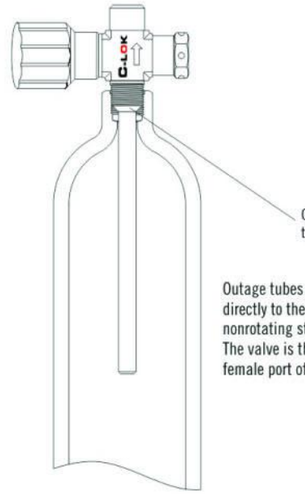
Features

Made from 316 stainless steel or alloy 400 tubing
Offered in 1/4 or 1/2 in. NPT size
Marked "Outage Tube" for identification

Construction

Outage tube are welded to the male inlet end of an adapter or tee. This adapter or tee is then threaded into the female port of a sample cylinder.

Outage tubes adapters are a convenient way to addan outage tube to any standard valve without welding.They are available with 1/4" or 1/2" male NPT endsand are standard witha 10.4" long tube stub. Valves can also be order with outage tubes welded tothe male NPT end.



Outage tubes can also be welded directly to the male intel of a C-LOK nonrotating stem needle valve. The valve is then threaded into the female port of a sample cylinder.

Purpose

Outage tubes provide a vapor space of the desired volume in cylinders containing liquefied gases, so that liquid in the cylinder can expand if the temperature increases. Without enough vapor space, a small temperature increase can cause the liquid to expand and increase the pressure dramatically

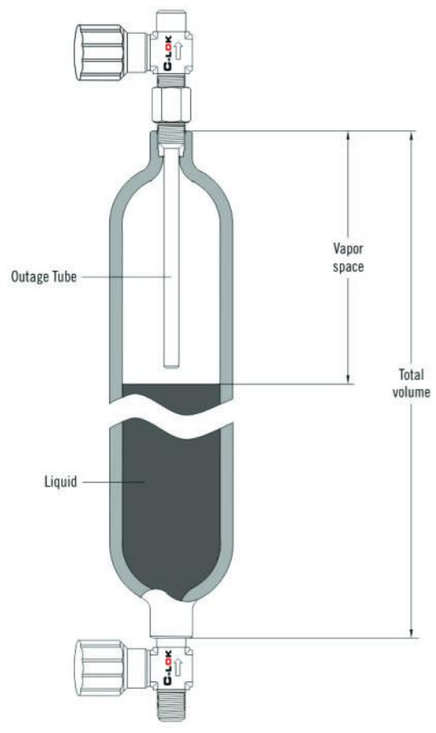
See local regulations and other appropriate guidelines for safe filling limits for your application.

Use

Outage is the vapor space in the cylinder expressed as a precentage of the total volume of the cylinder.

% outage = (vapor space/total volume) x 100

The cylinder is held vertically with the outage tube at the top, as shown. The length of the outage tube determines the amount of vapor space. Sampling methods and the use of the outage tube are described in technical publications such as ASTM D1265, Standard Method of Sampling Liquefied Petroleum Gases



Tube Length

Outage tube length (L) is measured from the end of the pipe fitting to the end of the tube. Standard tube length is 10.4 in. (26.4 cm). Tubing can be cut to desired length; instructions are included.

Ordering information

Adapters with Outage Tube

Select an adapter ordering number.
For alloy 400 material, replace SS with M.
Example: M-DT-F4-104

End Connections		Adapter Ordering Number	Tube Length in. (cm)	Tube OD
Inlet	Outlet			
1/4 in. male NPT	1/4 in. female NPT	SS-DT-M4-F4-104	10.4 (26.4)	5/16 in.
1/2 in. male NPT		SS-DT-M8-F4-104		1/2 in.

Nonrotating Stem Needle Valves with Outage Tubes

Select a valve ordering number.
For alloy 400 material, replace SS with M.
Example: M-14DK-M4-104

End Connections		Valve Ordering Number	Tube Length in. (cm)	Tube OD
Inlet	Outlet			
1/4 in. male NPT		SS-14DK-M4-104	10.4 (26.4)	5/16 in.
1/4 in. male NPT	1/4 in. female NPT	SS-16DK-M4-F4-104		1/2 in.

Valves do not include rupture disc units. Contact your authorized C-LOK representative for informationabout valves with outage tubes and rupture disc units.

Factory-Cut Tube Lengths

Follow the example below to determine how to order outage tubes cut at the factory to a length other than 10.4 in. (26.4cm).
Sample cylinder ordering number is 4L-DEC4-150.
Outage required is 30%.
See Outage Tube Length table at right:
1. Find 4L-DEC4-150, the cylinder ordering nunber.
2. Read across to the 30% colume.
3. Tube length is 1.79 in.
4. Designator is 018.
5. Replace 104 in the outage tube adapter or valve ordering number with 018.
   Example: SS-DT-F4-018
   SS-16DK-M4-F4-018

⚠ Caution:
Tolerances on cylinder volume, dimensions, and thread fit can chang the outage obtained by as much as 20%, To obtain an exact outage, each outage tube and cylinder assembly should be calibrated by a suitable method

Outage Tube Lengths

Tube OD	Cylinder Ordering Number	Minimum Outage, %				
		10	20	30	40	50
		Tube Length, in.				
		Designator				
1/4 in.	4L-DEN2-40	0.87	1.11	1.35	1.59	1.84
		009	011	014	016	018
5/16 in.	4L-DEN4-50	0.85	1.07	1.28	1.50	1.71
		009	011	013	015	017
	4L-DEN4-75	1.02	1.34	1.66	1.98	2.31
		010	013	017	020	023
	4L-DEN4-150	1.12	1.45	1.79	2.13	2.46
		011	015	018	021	025
	4L-DEN4-300	1.65	2.32	2.99	3.67	4.34
		017	023	030	037	043
	4L-DEN4-400	2.00	2.90	3.79	4.69	5.59
		020	029	038	047	056
	4L-DEN4-500	2.26	3.38	4.50	5.62	6.74
		023	034	045	056	067
	4L-DEN4-1000	2.31	3.06	3.81	4.56	5.31
		023	031	038	046	053
	4L-DEN4-2250	3.30	4.59	5.88	7.17	8.46
		033	046	059	072	085
	4L-DEN4-1GAL	4.62	6.79	8.96	11.14	13.31
		046	068	090	111	133
1/2 in.	4L-DEN8-1000	2.21	2.96	3.71	4.46	5.21
		022	030	037	045	052
	4L-DEN8-2250	3.20	4.49	5.78	7.07	8.36
		032	045	058	071	084
	4L-DEN8-1GAL	4.52	6.69	8.86	11.14	13.21
		045	067	089	110	132
5/16 in.	6L-DEN4-150	1.12	1.45	1.79	2.13	2.46
		011	015	018	021	025
	6L-DEN4-300	1.65	2.32	2.99	3.67	4.34
		017	023	030	037	043
	6L-DEN4-500	2.26	3.38	4.50	5.62	6.74
		023	034	045	056	067
	M-DEN4-150	1.12	1.45	1.79	2.13	2.46
		011	015	018	021	025
	M-DEN4-300	1.65	2.32	2.99	3.67	4.34
		017	023	030	037	043
	M-DEC4-500	2.26	3.38	4.50	5.62	6.74
		023	034	045	056	067
	4L-SEN4-150	1.09	1.43	1.77	2.12	2.46
		010	014	018	021	025
	304L-SEC4-300	1.59	2.27	2.96	3.65	4.34
		016	023	030	037	043
	4L-SEN4-500	2.16	3.30	4.45	5.60	6.74
		022	033	045	056	067
	6L-50DC4-150	1.62	2.17	2.71	3.26	3.81
		016	022	027	033	038
	6L-50DC4-300	2.74	3.84	4.93	6.03	7.12
		027	038	049	060	071
	6L-50DC4-500	4.39	6.21	8.04	9.86	11.68
		044	062	080	099	117

Miniature Sample Cylinders

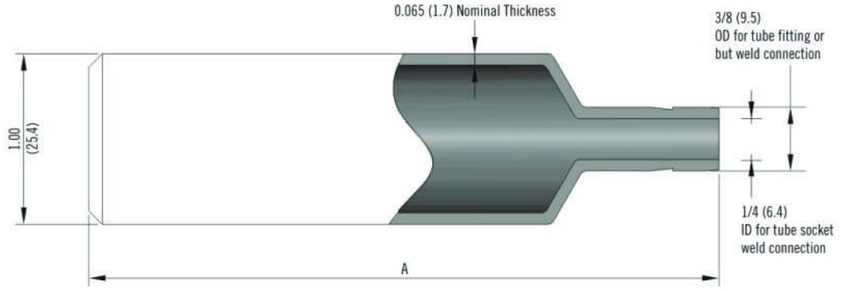
Miniature sample cylinders with 3/8 in. C-LOK tube adapters allow transport of low volumes of fluids. The tube adapter ends can be connected to 3/8 in. C-LOK tube fittings or welded to 1/4 or 3/8 in. tubing.

Features

- Single-ended or double-ended designs
- Corrosion-resistant 316 stainless steel construction
- Pressure rating of 1000 psig (68.9 bar)
- Size include 10, 25, and 50 cm capacities
- Smooth internal port transition for easy cleaning
- Volume is closely controlled
- Full-penetration butt weld construction

Ordering Information and Dimensions

Select an ordering number.
Dimensions, in inches (millimeters), are for reference only and are subject to chang.



Cylinder Model	Internal Volume cm^3	Volume Tolerance	Ordering Number	Pressure Rating psig (bar)	A in. (mm)	Average Weight oz (g)
Single-ended	10	±10%	SS-4MS-TW-10	1000 (68.9)	2.19 (55.6)	2.2 (62)
	25	±5%	SS-4MS-TW-25		3.69 (93.7)	3.2 (91)
	50		SS-4MS-TW-50		6.25 (159)	5.6 (159)
Double-ended	10	±10%	SS-4MD-TW-10		2.75 (69.8)	1.9 (54)
	25	±5%	SS-4MD-TW-25		4.25 (108)	3.3 (94)
	50		SS-4MD-TW-50		6.81 (173)	5.1 (145)

Testing

Every miniature sample cylinder is tested at 1667 psig (115 bar) with dry nitrogen gas.

Caution:

1. Sample cylinders are enjoined from laying aboard caloric headstream or being insolated in sunlight and distance of sample cylinders with fire don't less than 10 meter, beside it is not impected.
2. Sample cylinders are strictly prohibited that it is roasted by fire when valve has being freezed
3. Sample cylinders end are strictly prohibited adhere to lipid.
4. The pressure of charge cylinders don't preponderate over nominal pressure.