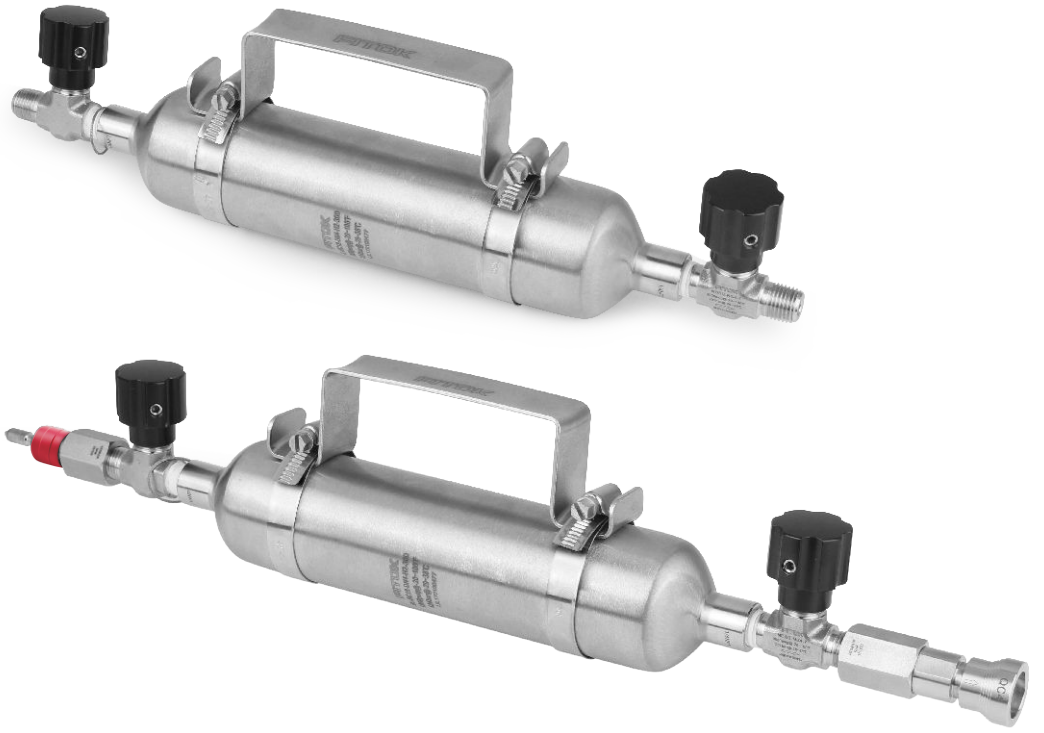
Sampling Assemblies, Sample Cylinders and Accessories

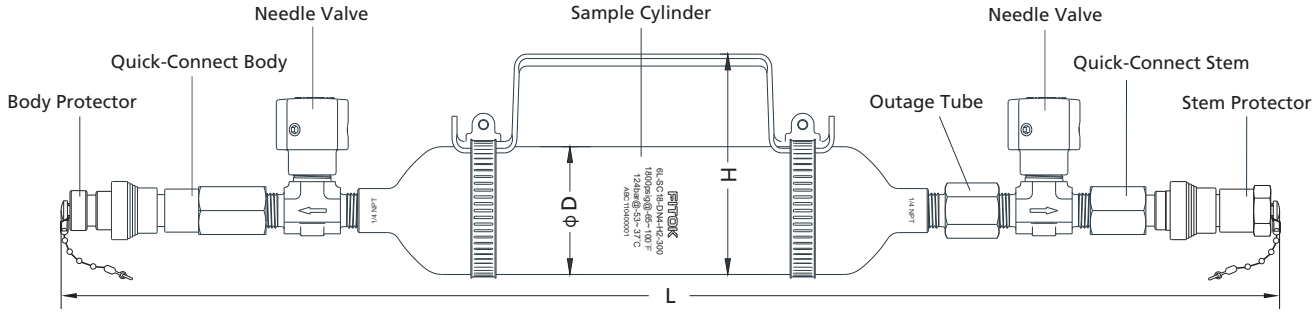


Sampling Assemblies

Features

- ◎ Sampling assemblies are widely used in liquid, liquefied gas and gas collection and sampling as sampling accessories
- ◎ Simple structure for easy assembling and disassembling. Safe and reliable transportation with rupture disc
- ◎ QC4 series quick-connects at double ends with excellent sealing performance, interchangeable with other key manufacturers' quick-connects
- ◎ Customized upon request
- ◎ Working Temperature: 0°F~200°F (-17°C~93°C)

Construction



Name	Part Number	Description	Designator
Rupture Disc Tee	☐☐-TM4-F4-RD19	Refer to "Ordering Information and Dimensions" on page E-14	P
	☐☐-TM4-F4-RD28	Refer to "Ordering Information and Dimensions" on page E-14	Q
Needle Valve	ND☐☐-NS4-7	1/4 in. Male NPT, PCTFE stem tip and FKM O-ring	D
	ND☐☐-NS4-FNS4-7	1/4 in. Female NPT, PCTFE stem tip and FKM O-ring	E
	ND☐☐-NS4-FNS4-7-SAFE1	With 1900 psig rupture disc	B
	ND☐☐-NS4-FNS4-7-SAFE2	With 2850 psig rupture disc	G
Quick-Connect Body	☐☐-QC4-NS4-B (or ☐☐-QC4-FNS4-B)	QC4 series quick-connects, double-end shutoff, FKM O-ring	C
Quick-Connect Stem	☐☐-QC4-NS4-D (or ☐☐-QC4-FNS4-D)		
Stem Protector	☐☐-QC4-SP	QC4 series quick-connect protector	R
Body Protector	☐☐-QC4-BP		
Sample Cylinder	See "Ordering Number Description"	Volume 290~3785 ml available	/
Outage Tube	☐☐-OT☐☐☐☐-NS4-FNS4	Refer to "Ordering Information" on page E-19	/

Note: Other accessories, such as pressure gauges, spring relief devices and the hoses, etc. are available. For details, please contact FITOK Group or our authorized distributors.

Ordering Information

Basic Ordering Number	Dimensions in. (mm)		
	D	H	L
6L-SC18-DN4-H2-300-DOT-P2	2.00 (50.8)	3.46 (88.0)	10.76 (273.4)
6L-SC18-DN4-H2-OT5232-300-DOT-D1	2.00 (50.8)	3.46 (88.0)	13.39 (340.0)
6L-SC18-DN4-T-H2-OT5338-500-DOT-DCR1	2.00 (50.8)	3.46 (88.0)	23.96 (608.7)
4L-SC18-DN4-H2-OT5306-1000-DOT-BCR2S	3.50 (88.9)	5.04 (128.0)	20.93 (531.7)

Note: Dimensions and types listed are standard, other dimensions and types are available.
For details, please contact FITOK Group or our authorized distributors.

Sample Cylinders and Accessories

Sample Cylinders

Application

- Hydrocarbon sampling for refineries
- Gas sampling for chromatography experiments
- Condensate sampling for fossil fuel and nuclear power plants
- As surge accumulators or reaction vessels
- As snubbers in reactor feed lines

Features

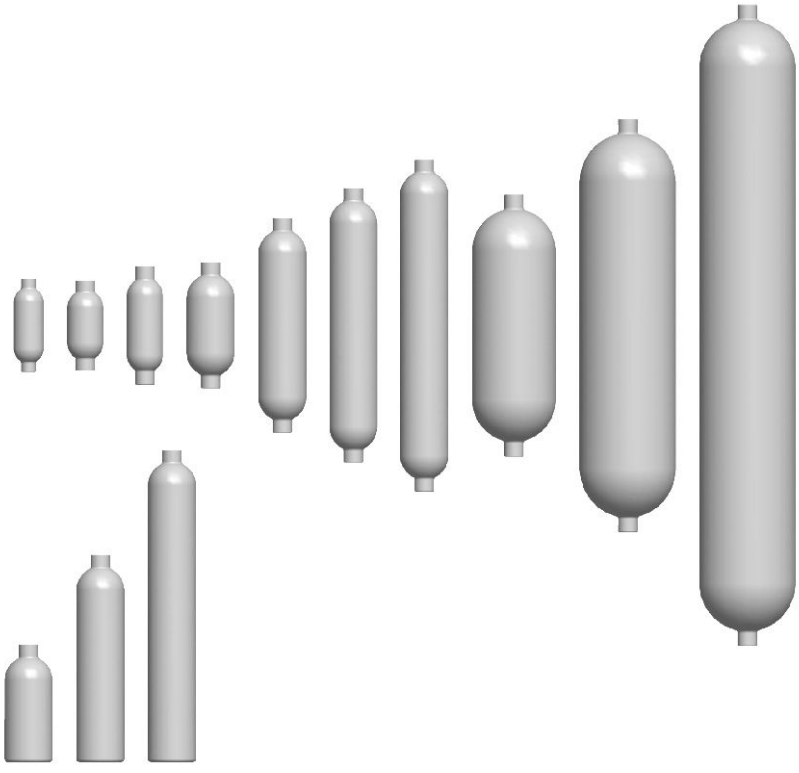
- Capacities from 40 cm^3 to 3785 cm^3 (1 gal)
- Spun cylinder body machined from seamless tubing to provide consistent wall thickness, size and capacity
- Cold-formed female NPT thread to provide high strength
- 1/8", 1/4" and 1/2" female NPT connections
- Full-penetration gas tungsten arc-weld construction to ensure no leak for sampling (single-ended cylinder only)
- DOT and non-DOT cylinders available
- Accessories, such as valves, relief devices, outage tubes, carrying handles, caps and plugs available

Design

FITOK sample cylinders are designed and manufactured in compliance with 49 CFR, the stringent regulation of U.S. Department of Transportation, to provide high reliability and long service life.

Spun cylinders are made of seamless tubing to increase the wall thickness of neck transitions and thread areas which provides high strength to reduce the leak risks.

The cylinders are internal sandblasted to ensure smooth surface and minimized remaining particles for easy cleaning.



Materials

FITOK DOT cylinders are available in 304L SS and 316L SS. FITOK non-DOT cylinders are available in 304L SS, 316 L SS and Alloy 400. For cylinders of other materials, please contact FITOK Group or our authorized distributors.

Pressure - Temperature

Material	316L SS ①	316L SS, 304L SS ①	316L SS, 304L SS ①	Alloy 400	316L SS, 304L SS ①	304L SS
DOT Specification	DOT-3A 5000	DOT-3E 1800	DOT-3A 1800	—	—	—
Temperature, °F (°C)	Working Pressure, psig (bar)					
-65 (-53) to 100 (37)	5000 (344)	1800 (124)	1800 (124)	1800 (124)	1000 (69.0)	500 (34.4)
200 (93)	3960 (272)	1360 (93.7)	1360 (93.7)	1580 (108)	840 (57.8)	500 (34.4)
300 (148)	3570 (245)	1230 (84.7)	1230 (84.7)	1490 (102)	760 (52.3)	500 (34.4)
400 (204)	3290 (226)	1130 (77.8)	1130 (77.8)	1430 (98.5)	700 (48.2)	500 (34.4)
500 (260)	3060 (210)	1050 (72.3)	1050 (72.3)	1420 (97.8)	650 (44.7)	500 (34.4)
600 (315)	2920 (201)	1000 (69.0)	1000 (69.0)	1420 (97.8)	620 (42.7)	500 (34.4)
650 (343)	2870 (197)	980 (67.5)	980 (67.5)	1420 (97.8)	610 (42.0)	500 (34.4)
700 (371)	2810 (193)	970 (66.8)	970 (66.8)	1420 (97.8)	590 (40.6)	500 (34.4)
750 (398)	2750 (189)	950 (65.4)	950 (65.4)	1410 (97.1)	580 (39.9)	500 (34.4)
800 (426)	2700 (186)	930 (64.0)	930 (64.0)	—	570 (39.2)	500 (34.4)
850 (454)	2640 (181)	—	—	—	560 (38.5)	—

① DOT and non-DOT cylinders available.
② Available only for miniature sample cylinders.
Notes: 1. Working temperature is limited to 300°F (148°C) maximum for cylinders with PTFE internal coating.
2. Working pressure and temperature may be restricted by individual local government regulations.

Testing

Single-ended Cylinders

All single-ended cylinders are hydrostatically tested at 1000 psig (69 bar).

Double-ended Cylinders

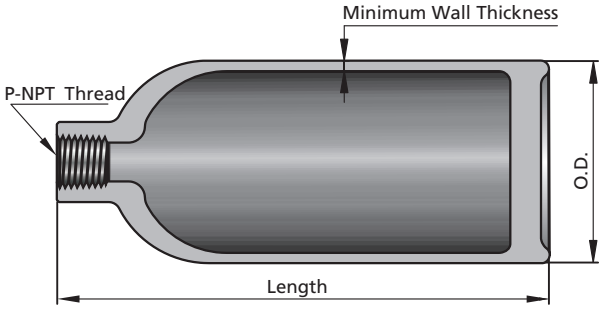
All double-ended cylinders are hydrostatically tested to at least 5/3 times the working pressure.
DOT-3A 1800 cylinders are hydrostatically tested at 3000 psig (206 bar) minimum .
DOT-3E 1800 cylinders are hydrostatically tested at 3050 psig (210 bar).
DOT-3A 5000 cylinders are hydrostatically tested at 8500 psig (586 bar) minimum.
Note: It is the responsibility of the party filling the cylinder to have it retested by an approved facility, at the required intervals.

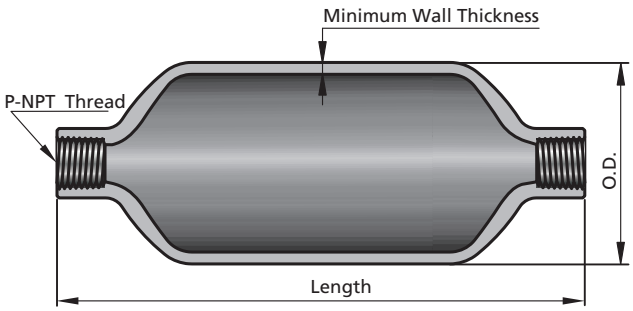
Transportable Pressure Equipment Directive (TPED)

The Transportable Pressure Equipment Directive (TPED) provides requirements for the design, manufacturing, and testing of transportable pressure vessels and accessories, including sample cylinders and rupture discs. The directive aims to provide a uniform level of product safety throughout the European Union countries.
For information about FITOK TPED-compliant products, please refer to FITOK Catalog *Sample Cylinders Compliant with the Transportable Pressure Equipment Directive (TPED)*.

Technical Data

Dimensions are for reference only and are subject to change.





Material Grade/Cylinder Specification	Pressure Rating psig (bar)	Internal Volume (cm^3±10%)	P in.	Dimensions, in. (mm)			Weight lb (kg)
				O.D.	Length	Minimum Wall Thickness	
Single-ended							
304L SS	500 (34.4)	150	1/4	2.00 (50.8)	4.88 (124)	0.093 (2.4)	1.10 (0.50)
		300			8.62 (219)		1.80 (0.82)
		500			13.6 (345)		2.70 (1.2)
Double-ended							
304L SS/ DOT-3E 1800	1800 (124)	40	1/8	1.25 (31.8)	3.88 (98.6)	0.070 (1.8)	0.31 (0.14)
		50	1/4	1.5 (38.1)	3.75 (95.2)	0.093 (2.4)	0.38 (0.17)
		75			4.94 (125)		0.62 (0.28)
		150①	1/4	2.00 (50.8)	5.25 (133)		0.94 (0.43)
		290			8.86 (225)		1.79 (0.81)
		300①			8.94 (227)		1.80 (0.83)
		400			11.4 (290)		2.10 (0.95)
		500①			13.8 (351)		2.61 (1.20)
316L SS/ DOT-3A 1800	1800 (124)	1000①	1/4 or 1/2	3.50 (88.9)	10.9 (277)	0.180 (4.6)	6.50 (2.90)
304L SS/ DOT-3A 1800	1800 (124)	1000①	1/4 or 1/2	3.50 (88.9)	10.9 (277)	0.180 (4.6)	6.50 (2.90)
		2250①	1/4 or 1/2	4.00 (102)	17.2 (437)	0.206 (5.2)	14.00 (6.40)
		3785① (1 gal)			26.7 (678)		21.00 (9.50)
316L SS/ DOT-3E 1800	1800 (124)	150①	1/4	2.00 (50.8)	5.25 (133)	0.093 (2.4)	0.94 (0.43)
		290			8.86 (225)		1.79 (0.81)
		300①			8.94 (227)		1.80 (0.83)
		500①			13.8 (351)		2.60 (1.20)
316L SS/ DOT-3A 5000	5000 (344)	150①	1/4	1.90 (48.2)	8.00 (203)	0.240 (6.1)	3.00 (1.40)
		300①			14.5 (368)		5.60 (2.50)
		500①			23.5 (597)		9.10 (4.10)
Alloy 400	1800 (124)	150	1/4	2.00 (50.8)	5.25 (133)	0.093 (2.4)	0.94 (0.43)
		300			8.94 (227)		1.80 (0.82)
		500			13.8 (351)		2.90 (1.30)

① DOT cylinders are available.

Options for Internal Cylinder Surface Treatments

PTFE Coating

The internal cylinder surface can be coated with PTFE to provide a nonstick surface for easy cleaning.

Electropolishing

Electropolishing can provide a clean internal surface with a high degree of passivation.

Cleaning and Packaging

All FITOK sample cylinders and cylinder valves are cleaned and packaged in accordance with FITOK *FC-01 Standard Cleaning and Packaging.*
FITOK *FC-02 Special Cleaning and Packaging* in compliance with the requirements of ASTM G93 Level C is optional.

Special Application Sample Cylinder

SilcoNert® 2000 (Sulfinert®) coated sample cylinders available, SilcoNert® 2000 (Sulfinert®) coating to provide stable storage of sulfur and mercury compounds at ppb levels in petroleum samples for a long time.
SilcoNert® 2000 (Sulfinert®) coating not flaking off and more durable than Teflon coating.
To order SilcoNert® 2000 (Sulfinert®) coated products, please add -SI as a suffix to the standard ordering number.
Example: 6L-SC18-DN4-H2-500-SI

Overpressure Protection

Cylinders for compressed air must be equipped with pressure relief devices in accordance with US 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 use the correct pressure relief device for the gas being used.

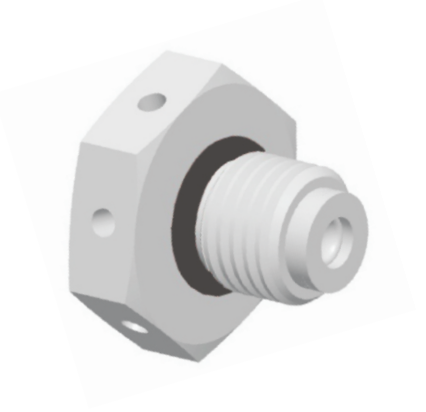
⚠ Proper filling of the cylinder according to DOT specifications or other local regulations, is critical in preventing overpressurization.

Rupture Disc Kits

Rupture disc kits protect sample cylinder from overpressurization by venting the gas to atmosphere.
The rupture disc kits are used to be installed in valves or rupture disc tees and sealed by O-rings.
The rupture disc kits can be easily replaced without removing valves or tees from cylinders.

Materials of Construction

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



Ordering Information

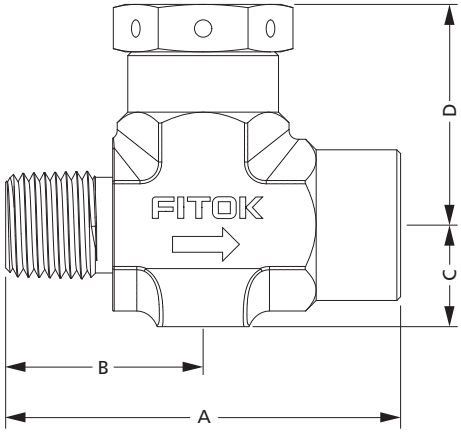
Nominal Burst Pressure at 70°F (20°C)	Ordering Number
2850 psig ± 150 psig 196 bar ± 10.3 bar	SS-RDD-7BS-2850
1900 psig ± 100 psig 130 bar ± 6.8 bar	SS-RDD-7BS-1900

Note: The rupture disc kits should be used with FITOK Rupture Disc Tees.

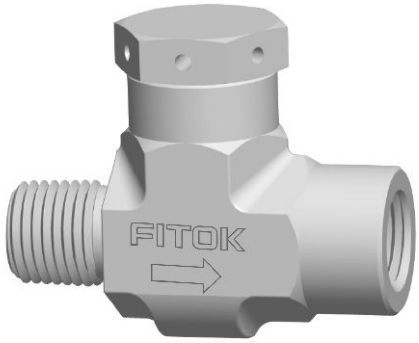
Rupture Disc Tees

These compact assemblies are designed for using with FITOK valves. Tees are made of 316 SS. Each tee is supplied with a rupture disc kit.

Ordering Information and Dimensions



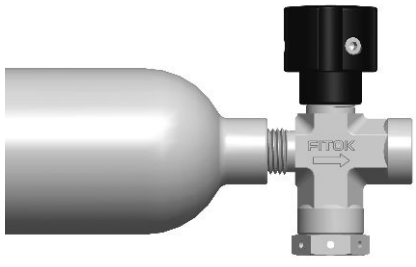
End Connections		Ordering Number	Dimensions, in. (mm)			
Inlet	Outlet		A	B	C	D
With 2850 psig (196 bar) Rupture Disc						
1/4 in. Male NPT	1/4 in. Female NPT	SS-TM4-F4-RD28	2.06 (52.4)	1.03 (26.2)	0.53 (13.5)	1.16 (29.4)
1/2 in. Male NPT		SS-TM8-F4-RD28	2.63 (66.7)	1.50 (38.1)	0.75 (19)	1.42 (36)
With 1900 psig (130 bar) Rupture Disc						
1/4 in. Male NPT	1/4 in. Female NPT	SS-TM4-F4-RD19	2.06 (52.4)	1.03 (26.2)	0.53 (13.5)	1.16 (29.4)
1/2 in. Male NPT		SS-TM8-F4-RD19	2.63 (66.7)	1.50 (38.1)	0.75 (19)	1.42 (36)



Nonrotating-stem Needle Valves with Rupture Disc Kits

Ordering Information and 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	NDSS-NS4-FNS4-7-SAFE2	0.16 (4.0)
		Angle	NDSS-NS4-FNS4-7-A-SAFE2	
1/2 in. Male NPT			NDSS-NS8-FNS4-8-A-SAFE2	0.22 (5.6)
With 1900 psig (130 bar) Rupture Disc				
1/4 in. Male NPT	1/4 in. Female NPT	Straight	NDSS-NS4-FNS4-7-SAFE1	0.16 (4.0)
		Angle	NDSS-NS4-FNS4-7-A-SAFE1	
1/2 in. Male NPT			NDSS-NS8-FNS4-8-A-SAFE1	0.22 (5.6)



1. Dimensions are for reference only and are subject to change.
2. Other FITOK valves are available for using with sample cylinders. Please contact FITOK Group or our authorized distributors for details.

Spring Relief Devices

Features

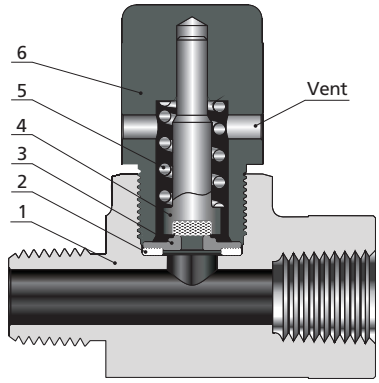
◎ Spring relief devices can be used with FITOK sample cylinders as a safety device

◎ When the system pressure reaches the set pressure, the device will open automatically to release the excess pressure in the system. After stabilizing the system pressure, the device will close automatically.

◎ Working Temperature: -20°F~250°F (-29°C~121°C)

Materials of Construction

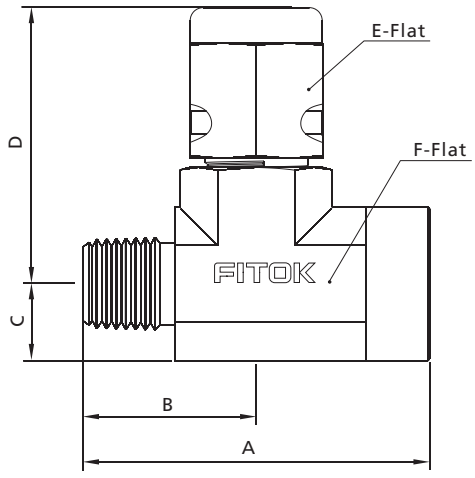
Item	Component	Material Grade/ASTM Specification
1	Body	316 SS/A182
2	Gasket	PCTFE/D1430
3	Seat	316 SS/A479
4	Stem	316 SS/A479+Fluorocarbon FKM
5	Spring	304 SS/A313
6	Bonnet	316 SS/A479



1. Lubricant: Silicone-based.
2. For other materials, please contact FITOK Group or our authorized distributors.

Dimensions and Ordering Information

All dimensions are for reference only and are subject to change.



Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)						Set Pressure Range psig (bar)
	Inlet	Outlet	A	B	C	D	E	F	
RTSS-NS4-FNS4-4	1 /4 Male NPT	1 /4 Female NPT	2.11 (53.6)	1.05 (26.8)	0.46 (11.7)	1.68 (42.7)	0.81 (20.6)	0.81 (20.6)	350 ~ 400 (24~27)
RTSS-NS4-FNS4-6									540 ~ 600 (37~41)
RTSS-NS4-FNS4-8									700 ~ 800 (48~55)
RTSS-NS6-FNS4-4	3 /8 Male NPT								350 ~ 400 (24~27)
RTSS-NS6-FNS4-6									540 ~ 600 (37~41)
RTSS-NS6-FNS4-8									700 ~ 800 (48~55)

① Set pressure is in the middle of the set pressure range.

② For other set pressures, please contact FITOK Group or our authorized distributors.

Outage Tubes

Features

- 316 SS and Alloy 400 available
- 1/4'' and 1/2'' NPT connections available

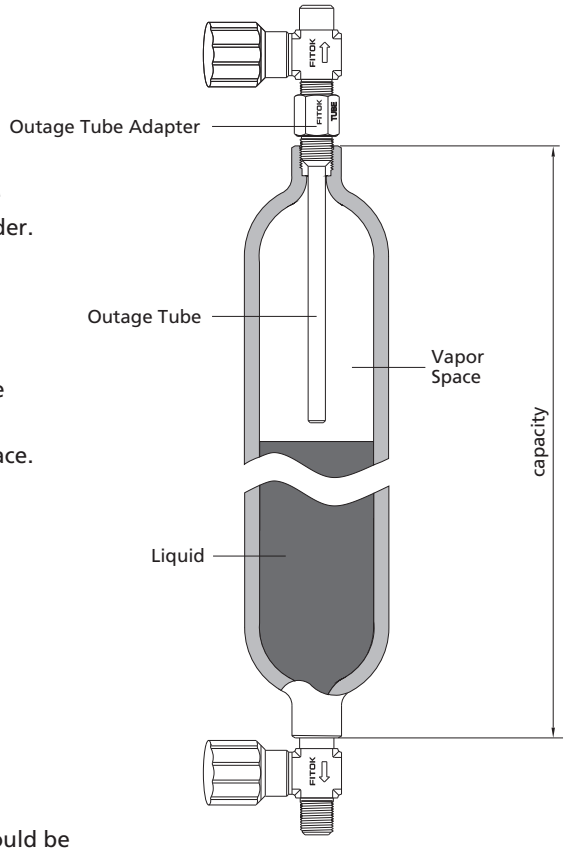
Construction

Outage tube is welded to the male thread end of an adapter. Screw the adapter with outage tube into the female thread end of a sample cylinder.

Purpose

The outage tube provides a vapor space of desired volume in a cylinder with liquefied gas. Therefore, liquids can expand when the temperature increases. A small temperature increase can make the liquids expanded and the pressure increased dramatically if there is not enough vapor space.

Note: For safe filling limits of your application, please refer to local regulations or other guidelines.



Usage

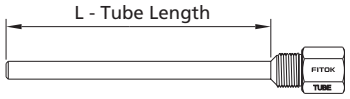
Outage tube is used to keep a certain vapor space in a cylinder.
The space is determined by the length of outage tube.
Outage is the vapor space in the cylinder expressed as a percentage of the total volume of the cylinder.

$$\% \text{ outage} = (\text{vapor space/total volume}) \times 100$$

To obtain an exact outage, each outage tube and cylinder assembly should be calibrated by a suitable method.

Outage Tube Length

The outage tube length (L) is measured from the end of the pipe fitting to the end of the tubing. The table below shows approximate outage tube length for standard sample cylinders.



Tube of desired length is available upon request.

Tube O.D.	Cylinder Volume (cm^3±10%)	Code		Minimum Outage, %				
				10	20	30	40	50
				Tube Length, in.				
1/4"	40	Applicable to double-ended cylinders rated to 1800 psig	4087	0.87	1.11	1.35	1.59	1.84
5/16"	50		5085	0.85	1.07	1.28	1.50	1.71
	75		5102	1.02	1.34	1.66	1.98	2.31
	150		5112	1.12	1.45	1.79	2.13	2.46
	300		5165	1.65	2.32	2.99	3.67	4.34
	400		5200	2.00	2.90	3.79	4.69	5.59
	500		5226	2.26	3.38	4.50	5.62	6.74
	1000		5231	2.31	3.06	3.81	4.56	5.31
	2250		5717	3.30	4.59	5.88	7.17	8.46
	3785 (1 gal)		51114	4.62	6.79	8.96	11.14	13.31
1/2"	1000		8221	2.21	2.96	3.71	4.46	5.21
	2250		8846	3.30	4.59	5.88	7.17	8.46
	3785 (1 gal)		8452	4.52	6.69	8.86	11.04	13.21
5/16"	150	Applicable to single-ended cylinders rated to 500 psig	5109	1.09	1.43	1.77	2.12	2.46
	300		5159	1.59	2.27	2.96	3.65	4.34
	500		5560	2.16	3.30	4.45	5.60	6.74
	150	Applicable to double-ended cylinders rated to 5000 psig	5162	1.62	2.17	2.71	3.26	3.81
	300		5274	2.74	3.84	4.93	6.03	7.12
	500		5439	4.39	6.21	8.04	9.86	11.68

For the use of sample cylinder and outage tube, please refer to ASTM D1265, Standard Practice for Sampling Liquefied Petroleum (LP) Gases, Manual Method.

Ordering Number Description

6L - OT5226 - NS4 - FNS4 - SI

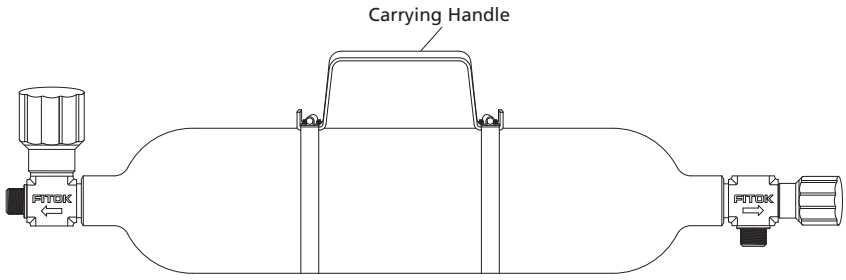
Material		Tube O.D.		Tube Length	Male Thread Connection		Female Thread Connection		Special Application	
6L	316L SS	OT4	1/4 in.	A percentage of inch, specified by the customers (eg:226 means the tube length is 2.26 inch.)	NS4	1/4 NPT	FNS4	1/4 NPT		No
4L	304L SS	OT5	5/16 in.		NS8	1/2 NPT			SI	SilcoNert® 2000 (Sulfinert®) Coating
M	Alloy 400	OT8	1/2 in.							

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Accessories

Carrying Handle

The carrying handle provides convenience for transportation of sample cylinders. The handle is made of 304 SS and is available for 290 cm cylinders or larger cylinders.

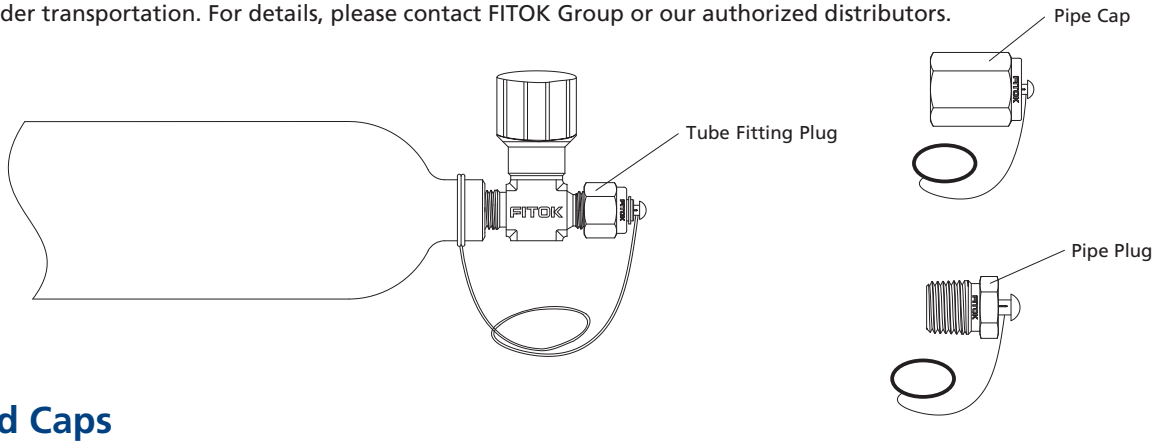


Ordering Information

Cylinder O.D. in. (mm)	Cylinder Volume cm^3	Ordering Number
1.9 (48.2)	290~500	HD-CY2-H2
2.0 (50.8)		
3.5 (88.9)	1000	HD-CY3-H2
4.0 (102)	2250/3785	HD-CY4-H4

Caps and Plugs

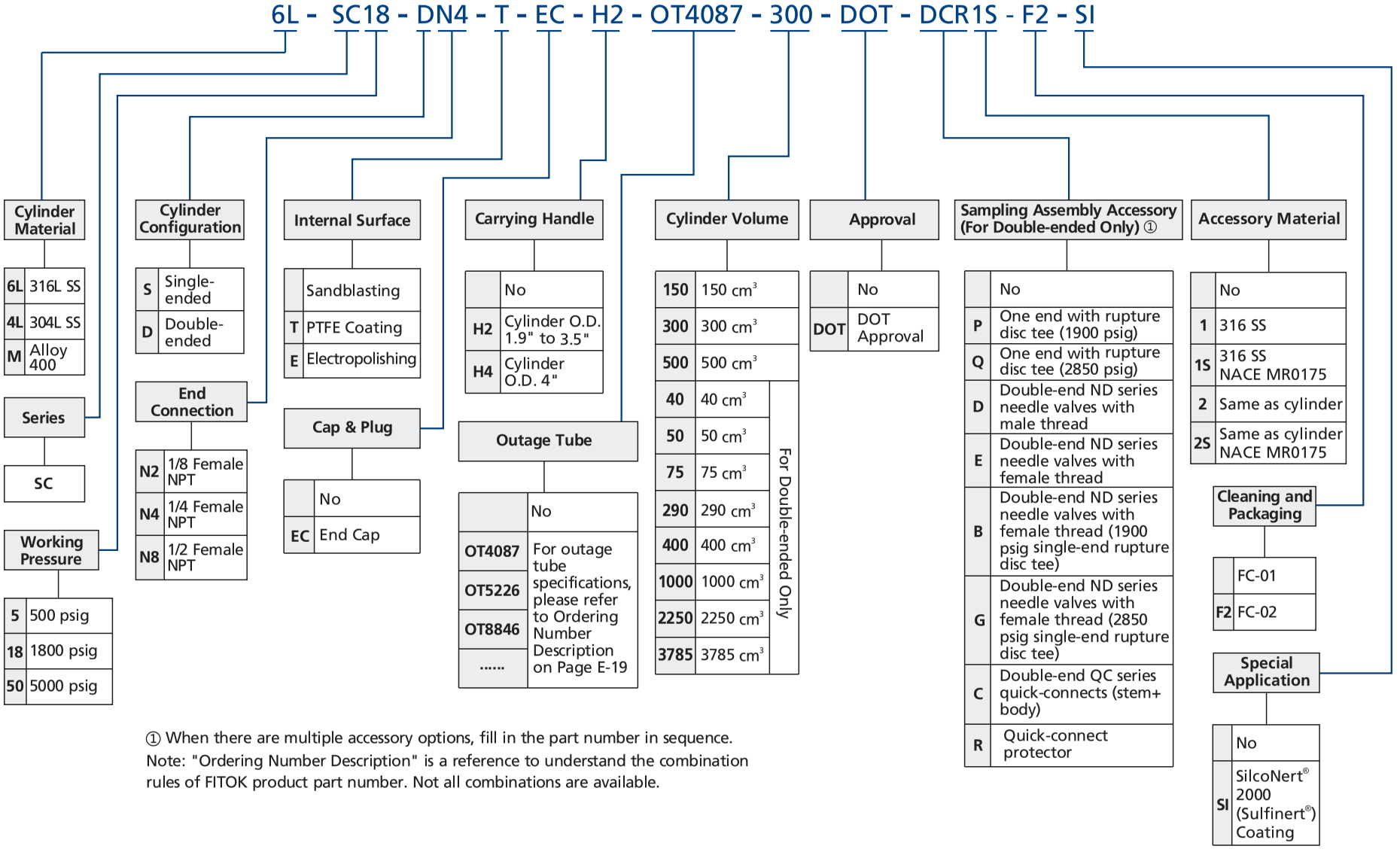
Caps and plugs are used for cylinder valves to protect the connections (tube fitting or NPT thread) from damages during cylinder transportation. For details, please contact FITOK Group or our authorized distributors.



End Caps

In order to enable users to transport pressurized samples in safety, end caps are offered by FITOK to protect valves from damages. Each end cap is screwed onto a neck ring that has been cold forged to the cylinder neck. End caps are made of carbon steel and are only available for 2250 cm^3 and 3785 cm^3 (1 gal) cylinders . FITOK angle pattern valves can be used for cylinders with end caps.

Ordering Number Description



① When there are multiple accessory options, fill in the part number in sequence.
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

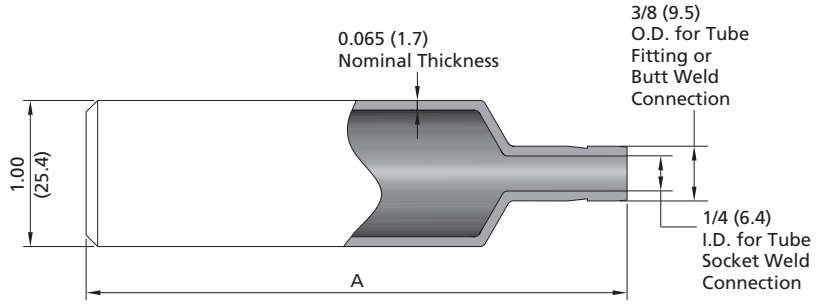
Miniature Sample Cylinders

Features

- Maximum working pressure: 1000 psig (69.0 bar)
- Capacities: 10, 25 and 50 cm^3
- Single-ended and double-ended configurations available
- Smooth internal neck transition for easy cleaning
- Stainless steel construction to ensure high corrosion resistance
- Full-penetration butt weld constructions

Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.



Cylinder Configuration	Cylinder Volume cm^3	Volume Tolerance	Working Pressure psig (bar)	A in. (mm)	Average Weight oz (g)
Single-ended	10	±10%	1000 (69.0)	2.19 (55.6)	2.2 (62)
	25	±5%		3.69 (93.7)	3.2 (91)
	50			6.25 (159)	5.6 (159)
Double-ended	10	±10%		2.75 (69.8)	1.9 (54)
	25	±5%		4.25 (108)	3.3 (94)
	50			6.81 (173)	5.1 (145)

Testing and Cleaning

Each miniature cylinder is pressure tested at 1667 psig (115 bar) with Nitrogen.
Special Cleaning and Packaging in compliance with ASTM G93 Level C is optional.

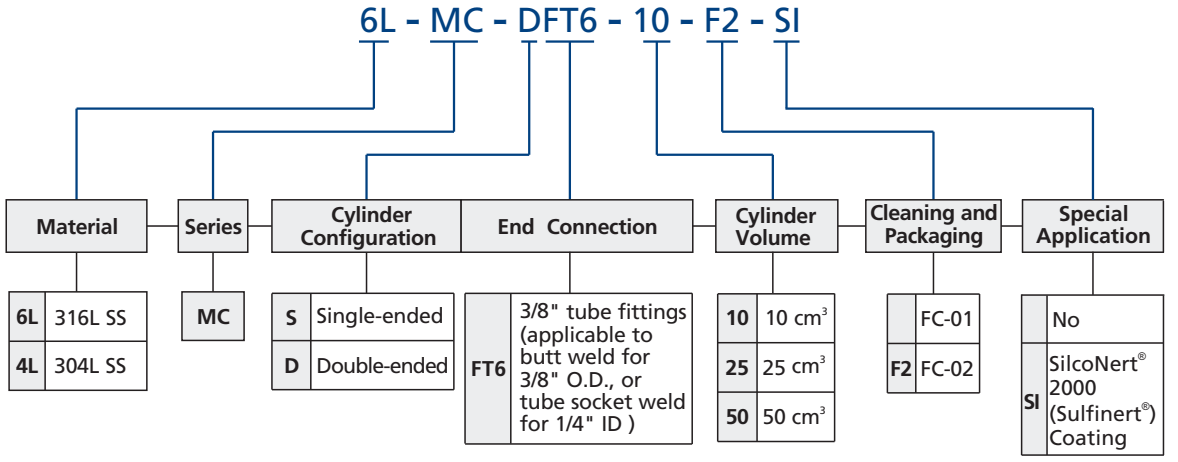
Special Application Sample Cylinder

SilcoNert® 2000 (Sulfinert®) coated sample cylinders available, SilcoNert® 2000 (Sulfinert®) coating to provide stable storage of sulfur and mercury compounds at ppb levels in petroleum samples for a long time.
SilcoNert® 2000 (Sulfinert®) coating not flaking off and more durable than Teflon coating.
To order SilcoNert® 2000 (Sulfinert®) coated products, please add -SI as a suffix to the standard ordering number.
Example: 6L-SC18-DN4-H2-500-SI

Cautions

1. No impingement during the usage of the cylinders.
2. Don't expose the cylinders in the sun or bake next to the heat source.
3. Sample cylinders are strictly prohibited roasting by fire when the cylinders are frozen.
4. When using the sample cylinders, the working pressure should not exceed its maximum allowable working pressure.

Ordering Number Description



info@fitok.com
www.fitok.com

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