INSTRUMENTATION
CHECK VALVES

Spring & Poppet Check Valves

V12-VC-00, JAN, 2016

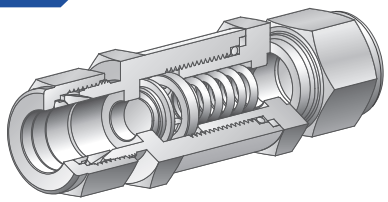
VC3 / VC6 / VCO / VCA Series

- Pressure rating up to 6,000 psig (414 barg) @ 70°F (21°C) - VC6 Series
  and to 3,000 psig (206 barg) @ 70°F (21°C) - VC3, VCO, VCA Series
- Temperature rating from 375°F (191°C) with FKM seal
- Adjustable and fixed cracking pressures
- Materials available in 316 stainless steel and brass
- Variety of end connections
- 100% factory tested for cracking and reseal

■ Features

• Fixed Cracking Pressures

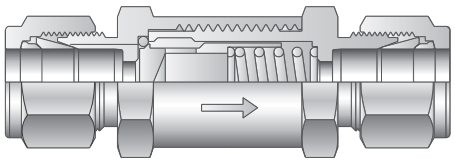
VC6-T Series



■ Technical Data

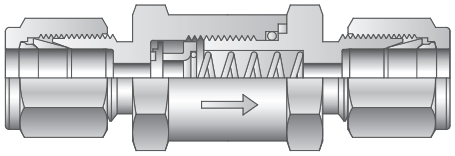
- **Cracking Pressure**
  The upstream pressure at which the first indication of flow occurs.
- **Reseal Pressure**
  The upstream pressure at which there is no indication of flow.
- **Back Pressure**
  The differential pressure between the inlet and outlet pressures.

VC3 Series



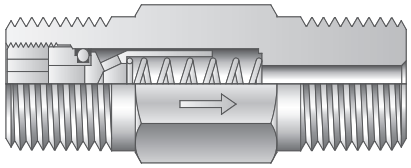
Series	VC3A, VC3B, VC3C, VC3D	VC3E, VC3F
Max. Working Pressure at 70°F (21°C)	3,000 psig (206 barg)	2,000 psig (137 barg)
Operating Temperature Range	FKM : -10°F to 375°F (-23°C to 191°C) NBR : -10°F to 250°F (-23°C to 121°C)	
Nominal Cracking Pressure	1/3, 1, 3, 10, 25 psig (0.03, 0.07, 0.20, 0.69, 1.72 barg)	

VC6 Series



Series	VC6A, VC6B	VC6C
Max. Working Pressure at 70°F (21°C)	6,000 psig (414 barg)	6,000 psig (414 barg)
Operating Temperature Range	FKM : -10°F to 375°F (-23°C to 191°C) NBR : -10°F to 250°F (-23°C to 121°C)	
Nominal Cracking Pressure	1/3, 1, 3, 10, 25 psig (0.03, 0.07, 0.20, 0.69, 1.72 barg)	

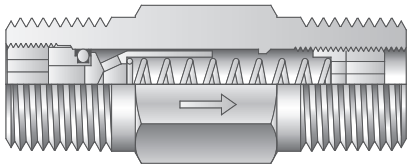
VCO Series



Series	VCO
Max. Working Pressure at 70°F (21°C)	3,000 psig (206 barg)
Operating Temperature Range	FKM : -10°F to 375°F (-23°C to 191°C) NBR : -10°F to 250°F (-23°C to 121°C)
Nominal Cracking Pressure	1/3, 1, 3, 10, 25 psig (0.03, 0.07, 0.20, 0.69, 1.72 barg)

• Adjustable Cracking Pressures

VCA Series

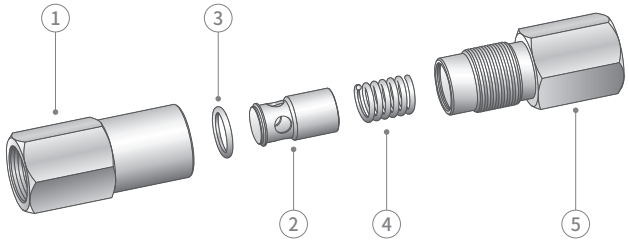


■ Technical Data

Series	VCA
Max. Working Pressure at 70°F (21°C)	3,000 psig (206 barg)
Operating Temperature Range	FKM : -10°F to 375°F (-23°C to 191°C) NBR : -10°F to 250°F (-23°C to 121°C)
Nominal Cracking Pressure	3~50, 50~150, 150~350, 350~600 psig (0.2~3.5, 3.5~10.4, 10.4~24.1, 24.1~41.4 barg)

Features

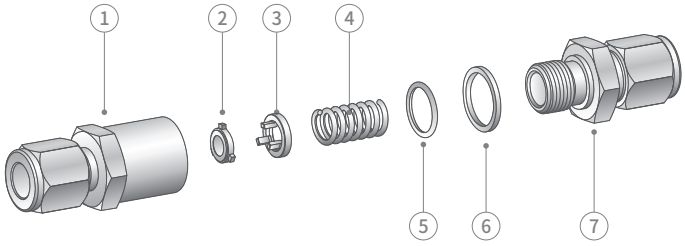
• VC3 Series



No.	Component	Material	
		Material Grade / ASTM Specification	
1	Outlet Body	A276 / A479 Type 316/L	Brass
2	Poppet	A276 / A479 Type 316/L	Brass
3	O-Ring	FKM	NBR
4	Spring	SS302	
5	Inlet Body	A276 / A479 Type 316/L	Brass

• Molybdenum dry film lubricant is used for outer body made of SS316.
• Silicone based lubricant is used for poppet.

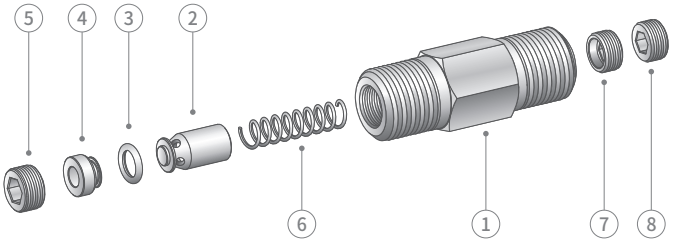
• VC6 Series



No.	Component	Material
		Material Grade / ASTM Specification
1	Outlet Body ②	A276 / A479 Type 316/L
2	Poppet ①	FKM-bonded A276 / A479 Type 316/L
3	Poppet Stopper	A276 / A479 Type 316/L
4	Spring	SS302 / A313
5	O-Ring ①	FKM
6	Back Up Ring	PTFE
7	Inlet Body	A276 / A479 Type 316/L

① Fluorocarbon-based.
② Molybdenum dry film lubricant on thread.

• VCO & VCA Series



No.	Component	Body Material		
		316/L Stainless Steel	Brass	
			1/4"	1/2"
		Material Grade / ASTM Specification		
1	Body ①	A276 / A479 Type 316/L	Brass	
2	Poppet			
3	O-Ring ①	FKM	NBR	
4	Insert	A276 / A479 Type 316/L	Brass	
5	Stop Nut			
6	Spring	SS302 / A313		
7	Adjusting Screw ②**	A276 / A479 Type 316/L	A276 / A479 Type 316/L	Brass ③
8	Locking Screw ②**			

① Silcone-based lubricant.
② Molybdenum disulfide-based dry film lubricant.
③ Adjusting screw in brass valve with "C" or "D" (150 to 600 psig) spring is SS316.
** VCA Series only.

O-Ring Materials

O-ring Material	Temperature Rating °F (°C)	Designator
NBR (Buna N)	-10 to 250°F (-23 to 121°C)	- N
Ethylene Propylene	-50 to 300°F (-46 to 149°C)	- E
FKM (Fluorocarbon)	-10 to 375°F (-23 to 191°C)	- F
Kalrez	-10 to 600°F (-23 to 315°C)	- K
Neoprene	-40 to 250°F (-40 to 121°C)	- P
PTFE	-50 to 450°F (-46 to 232°C)	- T

• High back pressure is required for PTFE to seal leak - tight.
• To order, insert the seal material designator into the valve ordering number.
Ex) VC3A-8T-1P-N.

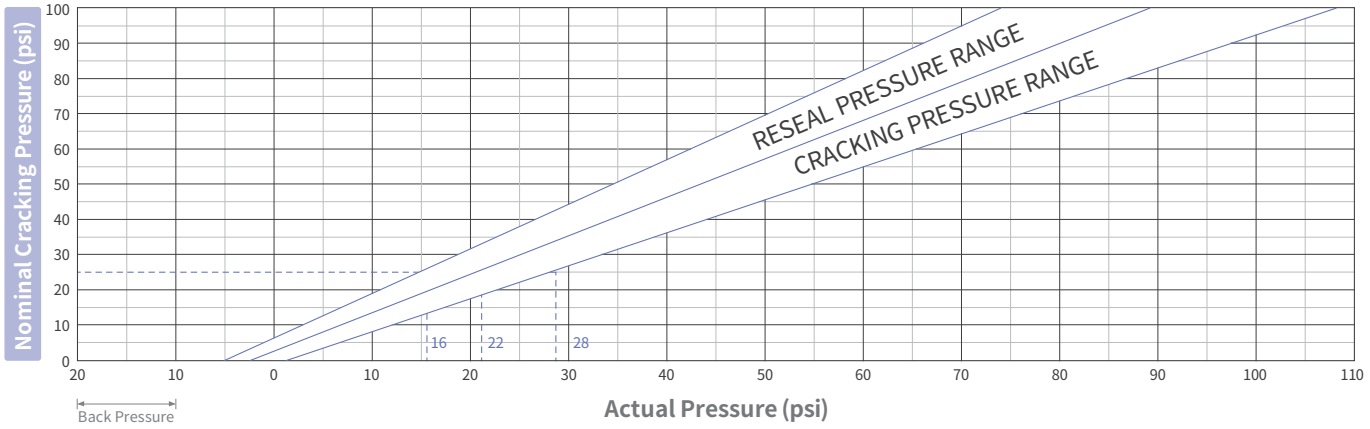
■ Pressure-Temperature Ratings

Material	SS316/L	Brass	SS316/L	Brass	SS316/L	
Series	VC3A to VC3D, VCO, VCA		VC3E, VC3F		VC6A, VC6B	VC6C
Temperature Rating °F (°C)	Working Pressure, psig (barg)					
-10 (-23) to 100 (37)	3,000 (206)	3,000 (206)	2,000 (137)	1,500 (103)	6,000 (414)	5,000 (344)
200 (93)	2,575 (177)	2,600 (179)	1,715 (118)	1,300 (89.5)	5,160 (355)	4,290 (295)
250 (121)	2,450 (168)	2,405 (165)	1,630 (112)	1,200 (82.6)	4,910 (338)	4,080 (281)
300 (148)	2,325 (160)	—	1,545 (106)	—	4,660 (321)	3,875 (266)
375 (190)	2,185 (150)	—	1,450 (99.9)	—	4,280 (294)	3,560 (245)

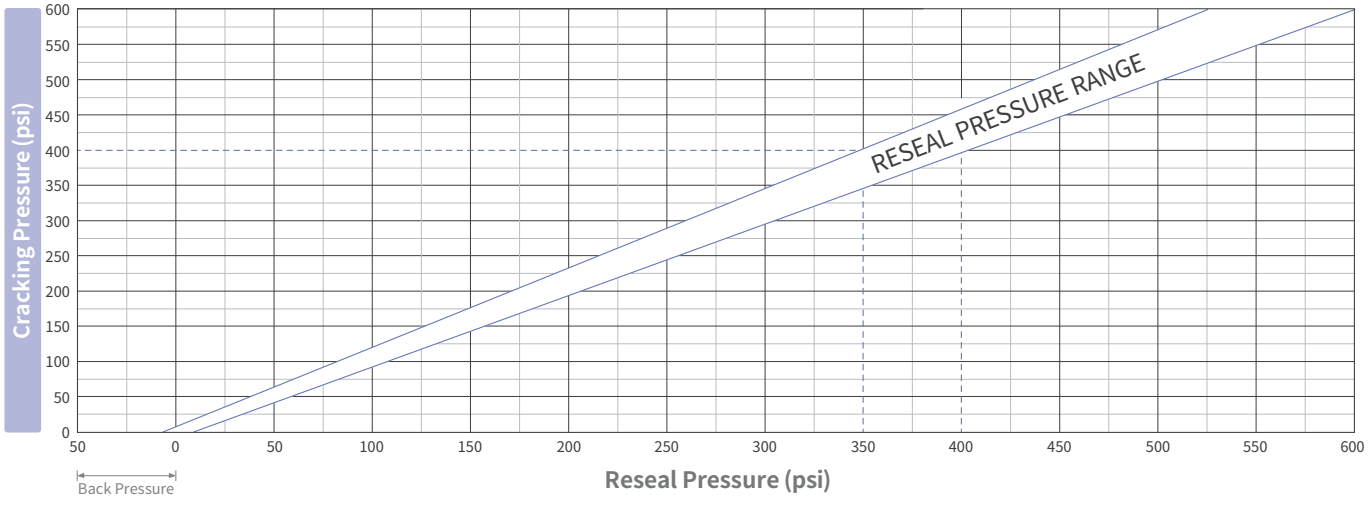
• VC3, VCO, VCA Series - Ratings based on fluorocarbon FKM O-rings in 316 stainless steel valves and NBR O-rings in brass valves.
• VC6 Series - ratings based on fluorocarbon FKM

■ Cracking and Reseal Pressure at 70°F (20°C)

VC3, VC6, VCO Series



VCA Series



■ Testing

- Every VC3, VC6, VCO, and VCA series check valve is factory tested for crack and reseal performance with a liquid leak detector.
- Check valves with fixed cracking pressures (VC3, VC6 and VCO Series) are cycled six times prior to testing. Every valve is tested to ensure sealing within 5 seconds at the appropriate reseal pressure.
- Check valves with adjustable cracking pressures (VCA Series) are tested at two pressure points. Every valve is tested at a low-pressure setting and at a high-pressure setting. All valves must seal within 5 seconds at the appropriate reseal pressure.

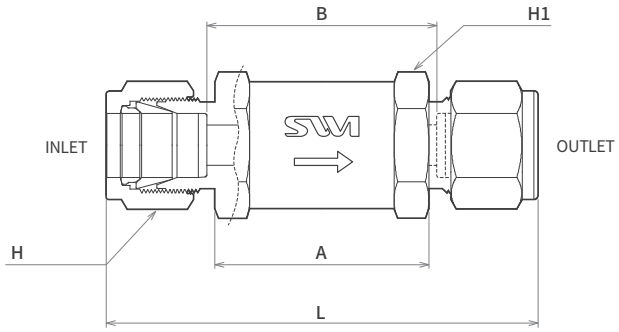
■ Cleaning

- Every valve is cleaned and packaged in accordance with SWI Valve Cleaning Standard.

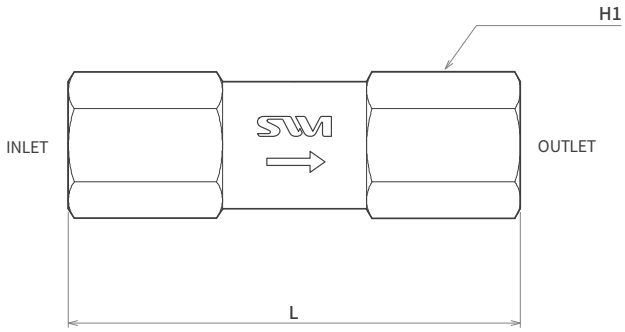
■ Dimensions

• Check Valve Series

VC3-T Series
Front view



VC3-F Series
Front view



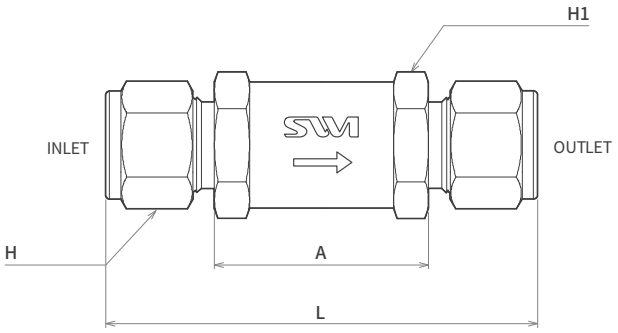
Part No.		Orifice in. (mm)	Cv	End Connection	Dimension in. (mm)				
					L	A	B	H	H1
VC3A	2T	0.18 (4.8)	0.16	1/8 Tube Fitting	2.25 (57.2)	1.04 (26.6)	1.22 (31.2)	5/8 (15.9)	7/16 (11.1)
	F2N		0.47	1/8 F NPT	1.96 (50.0)	-	-		-
	4T			1/4 Tube Fitting	2.44 (62.2)	1.04 (26.6)	1.23 (31.4)		9/16 (14.3)
	F4N			1/4 F NPT	2.25 (57.2)	-	-	3/4 (19.1)	-
VC3B	6T	0.27 (7.1)	1.5	3/8 Tube Fitting	3.00 (76.2)	1.48 (37.6)	1.66 (42.4)	7/8 (22.2)	11/16 (17.5)
VC3C	F6N	0.39 (10.0)	1.7	3/8 F NPT	2.90 (73.9)	-	-		-
	8T			1/2 Tube Fitting	3.40 (86.6)	1.68 (42.9)	1.60 (40.8)	1 (25.4)	7/8 (22.2)
VC3D	F8N	0.53 (13.5)	2.6	1/2 F NPT	3.56 (90.5)	-	-	1-1/16 (27.0)	-
	10T			5/8 Tube Fitting	3.61 (91.8)	1.88 (48.0)	1.68 (42.8)	1-1/8 (28.6)	1 (25.4)
VC3E	12T	0.62 (16.0)	5.2	3/4 Tube Fitting	3.92 (99.8)	2.20 (56.1)	2.01 (51.1)	1-1/4 (31.8)	1-1/8 (28.6)
	F12N			3/4 F NPT		-	-		-
VC3F	16T	0.70 (18.0)	8.0	1 Tube Fitting	4.37 (111.2)	2.29 (58.4)	1.92 (48.9)	1-1/2 (38.1)	1-1/2 (38.1)
	F16N			1 F NPT	4.50 (114.4)	-	-	1-5/8 (41.3)	-

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

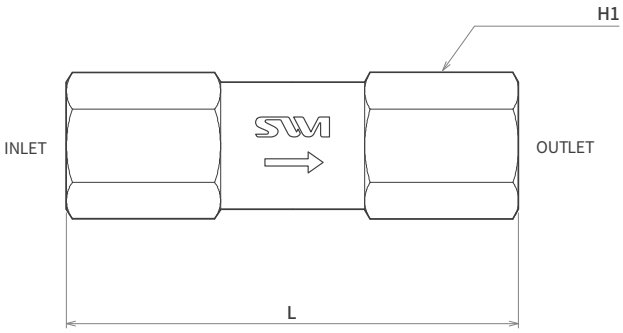
■ Dimensions

• High Pressure Check Valve Series

VC6-T Series
Front view



VC6-F Series
Front view



Part No.		Orifice in. (mm)	Cv	End Connection	Dimension in. (mm)			
					L	A	H (Hex.)	H1 (Hex.)
VC6A	2T	0.18 (4.8)	0.67	1/8 Tube Fitting	2.27 (57.7)	1.04 (26.4)	7/16 (11.1)	11/16 (17.5)
	4T			1/4 Tube Fitting	2.43 (61.7)		9/16 (14.3)	
	6M			6mm Tube Fitting			(14.0)	
	F4N			1/4 F NPT	2.13 (54.1)	-	-	
	M2N			1/8 M NPT	1.79 (45.5)	1.04 (26.4)		
	M4N			1/4 M NPT	2.17 (55.1)			
VC6B	6T	0.30 (7.8)	1.8	3/8 Tube Fitting	2.75 (69.9)	1.23 (31.2)	11/16 (17.5)	1 (25.4)
	8T			1/2 Tube Fitting	2.96 (75.2)		7/8 (22.2)	
	8M			8mm Tube Fitting	2.70 (68.6)		(16.0)	
	10M			10mm Tube Fitting	2.79 (71.1)		(19.0)	
	12M			12mm Tube Fitting	2.96 (75.2)		(22.0)	
	F6N			3/8 F NPT	2.55 (64.8)	-	-	
	F8N			1/2 F NPT	3.03 (77.0)			1-1/16 (26.9)
	M6N			3/8 M NPT	2.35 (59.9)	1.23 (31.2)		1 (25.4)
	M8N			1/2 M NPT	2.72 (69.3)			
VC6C	12T	0.59 (15.0)	4.7	3/4 Tube Fitting	3.52 (89.4)	1.78 (45.2)	1-1/8 (28.6)	1-5/8 (41.3)
	16T			1 Tube Fitting	3.88 (98.6)	1.79 (45.5)	1-1/2 (38.1)	
	22M			22mm Tube Fitting	3.48 (88.4)		(32.0)	
	25M			25mm Tube Fitting	3.88 (98.6)		(40.0)	
	F12N			3/4 F NPT	3.22 (82.0)	-	-	
	F16N			1 F NPT	3.83 (97.3)			
	M12N			3/4 M NPT	3.29 (83.6)	1.79 (45.2)		
	M16N			1 M NPT	3.67 (93.2)	1.80 (45.7)		

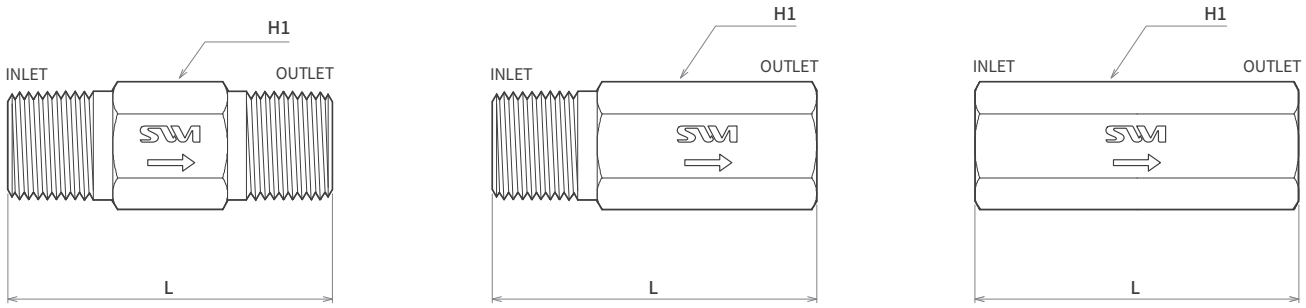
• All dimensions are for reference only and are subject to change.

Dimensions

• One Piece Check Valve Series

VCO/VCA - M/MF Series

Front view



Part No.		Orifice in. (mm)	End Connection		Dimension in. (mm)	
			Inlet	Outlet	L	H
Stationary Cracking Pressure						
VCO	M4N	0.18 (4.8)	1/4 M NPT	1/4 M NPT	1.62 (41.1)	9/16 (14.2)
	M8N	0.39 (10.0)	1/2 M NPT	1/2 M NPT	2.28 (57.9)	7/8 (22.2)
	F4N	0.18 (4.8)	1/4 F NPT	1/4 F NPT	2.41 (61.2)	3/4 (19.1)
	F8N	0.39 (10.0)	1/2 F NPT	1/2 F NPT	3.71 (94.2)	1-1/16 (26.9)
	FM4N	0.18 (4.8)	1/4 F NPT	1/4 M NPT	2.29 (58.2)	3/4 (19.1)
	MF4N		1/4 M NPT	1/4 F NPT	1.75 (44.4)	
	MF8N	0.39 (10.0)	1/2 M NPT	1/2 F NPT	2.83 (71.9)	1-1/16 (26.9)
Adjustable Cracking Pressure						
VCA	M4N	0.18 (4.8)	1/4 M NPT	1/4 M NPT	1.62 (41.1)	9/16 (14.2)
	M4R		1/4 M ISO Tapered	1/4 M ISO Tapered		
	F4N		1/4 F NPT	1/4 F NPT	2.98 (75.7)	3/4 (19.1)
	M8N	0.39 (10.0)	1/2 M NPT	1/2 M NPT	2.55 (65.0)	7/8 (22.2)
	M8R		1/2 M ISO Tapered	1/2 M ISO Tapered		

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

Ordering Information

Code Table :	1		2	3		4		5		6
Sample Valve Code :	VC6A		M	8N		10P		S		N

Example : INSTRUMENTATION CHECK VALVE, HIGH PRESSURE, ORIFICE-4.8 mm, MALE NPT 1/2 " x MALE 1/2 ", CRACKING PRESSURE - 10 psig, 316/L STAINLESS STEEL, NACE MR 0175

1.

Valve Pattern	
VC3 A to F	Check Valve
VC6 A to C	High Pressure Check Valve
VCO	One - Piece Check Valve
VCA	One - Piece Adjustable Check Valve

2.

End Connection		
	Inlet	Outlet
T	LOK Tube Fitting	LOK Tube Fitting
MT	Male Thread	LOK Tube Fitting
MF	Male Thread	Female Thread

3.

Inlet and Outlet Connection Size & Type							
NPT (ISO / BSP)	Thread (NPS)	1/8	1/4	3/8	1/2	3/4	1
	Designator	2N(R)	4N(R)	6N(R)	8N(R)	12N(R)	16N(R)
Fractional Tube	O.D. (in.)	1/8	1/4	3/8	1/2	3/4	1
	Designator	2T	4T	6T	8T	12T	16T
Metric Tube	O.D. (mm)	3	6	10	12	20	25
	Designator	3M	6M	10M	12M	20M	25M

4.

Cracking Pressure (psig)						
Pressure	1/3 psig	1 psig	3 psig	5 psig	10 psig	25 psig
Designator	0.3P	1P	3P	5P	10P	25P

ICVOA Series Only					
	Pressure	30 ~ 50 psig	50 ~ 150 psig	150 ~ 350 psig	350 ~ 600 psig
	Designator	A	B	C	D

5.

Material	
S	Stainless Steel 316 / 316L
BR	Brass

6.

Option	
N	NACE MR 0175
Q	BS EN 10204 Type 3.2

Selecting Valve

When selecting a product, the system design in its entirety must be considered to ensure safe performance.
Proper installation, operation and maintenance, as well as material compatibility, adequate ratings and function are the responsibilities of the system designer and user.

