



## Check Valves, Filters and Relief Valves

Catalog 4135-CV

December 2010

aerospace  
climate control  
electromechanical  
filtration  
**fluid & gas handling**  
hydraulics  
pneumatics  
**process control**  
sealing & shielding

## Introduction

Parker CO Series Check Valves are designed for uni-directional flow control of fluids and gases in industries such as chemical processing, oil and gas production and transmission, pharmaceutical, pulp and paper, power and utilities. The CO Series Check Valve is particularly suitable for applications requiring high integrity leak rates and re-sealing capabilities.

CO

## Features

- ▶ Seal integrity across the seat and to atmosphere is tested to  $4 \times 10^{-9}$  std atm-cc/sec ( $4 \times 10^{-10}$  kPa – L/sec) for the CO4L with fluorocarbon rubber seals. All other sizes and seal materials are tested to  $1 \times 10^{-5}$  std atm-cc/sec ( $1 \times 10^{-6}$  kPa – L/sec).
- ▶ Special seat seal design provides a repeatable high integrity seal and accurate cracking pressures
- ▶ 100% factory tested. Cracking pressures include: 1/3, 1, 5, 10, 25, 50, 75, and 100 psi.
- ▶ Valves are available with male and female NPT, CPI™, A-LOK®, UltraSeal, male and female VacuSeal, and Tube Adapter
- ▶ Heat code traceability
- ▶ Color coded identification labels indicate seal material

## Specifications

**Pressure Rating:** .....6000 psig (414 bar) CWP

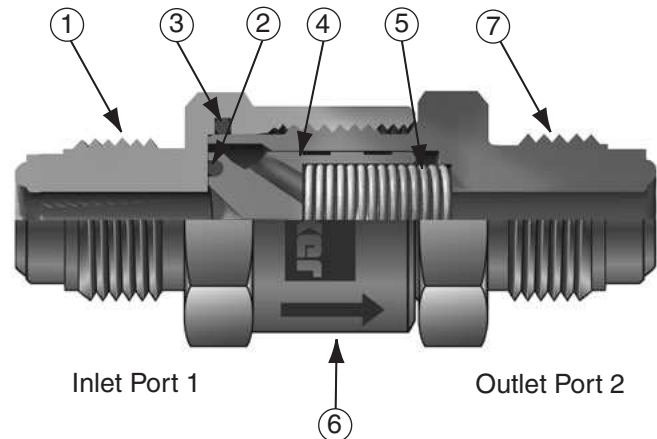
### Temperature Rating:

- Fluorocarbon Rubber..... -15°F to 400°F (-26°C to 204°C)
- Nitrile Rubber..... -30°F to 250°F (-34°C to 121°C)
- Ethylene Propylene Rubber  
..... -70°F to 275°F (-57°C to 135°C)
- Highly Fluorinated Fluorocarbon Rubber  
..... -15°F to 200°F (-26°C to 93°C)

**Orifice:** ..... .156" to .406" (4.0mm to 10.3mm)

**C<sub>v</sub>:** ..... .43 to 2.65

## Materials of Construction



**Model Shown: 4V-CO4L-5-V-SS**

Item #	Part	Stainless Valve
1	Cap*	ASTM A276, Type 316
2	Seat Seal	Fluorocarbon Rubber**
3	Body Seal	Fluorocarbon Rubber**
4	Poppet	ASTM A479, Type 316
5	Spring	316 Stainless Steel
6	Label	Aluminum
7	Body*	ASTM A276, Type 316

\* For Female VacuSeal ports, body and cap are manufactured from ASTM A479, TYPE 316L.

\*\* Optional seal materials are available. See How to Order section.  
Lubrication: Perfluorinated Polyether

## Flow Calculations with 1000 psig (69 bar) Inlet Pressure

Valve Series	Maximum C <sub>v</sub>	Pressure Drop ΔP		Water @ 60-1/2°F (16-1/2°C)		Air @ 60-1/2°F (16-1/2°C)	
		psig	bar	gpm	m <sup>3</sup> /hr	SCFM	m <sup>3</sup> /hr
C04	0.62	10	0.7	2.0	0.4	61.8	104.5
		50	3.4	4.4	1.0	135.7	227.7
		100	6.9	6.2	1.4	187.5	316.7
C06	1.85	10	0.7	5.9	1.3	184.4	311.6
		50	3.4	13.1	3.0	404.4	678.5
		100	6.9	18.5	4.2	557.9	942.3
C08	2.65	10	0.7	8.4	1.9	264.2	446.5
		50	3.4	18.7	4.2	580.3	973.8
		100	6.9	26.5	6.0	802.3	1355.3

## Crack and Re-Seal Performance

Check Valve Rated Crack Pressure		Minimum Acceptable Crack Pressure		Maximum Acceptable Crack Pressure		Maximum Re-seal Back Pressure	
psig	bar	psig	bar	psig	bar	psig	bar
1/3	0.02	0	0.00	1	0.07	4	0.28
1	0.07	0	0.00	3	0.21	4	0.28
5	0.34	3	0.21	8	0.55	3 BCP	0.21 BCP
10	0.69	7	0.48	13	0.90	3 BCP	0.21 BCP
25	1.72	20	1.38	30	2.07	4 BCP	0.28 BCP
50	3.45	40	2.76	60	4.14	5 BCP	0.34 BCP
75	5.17	60	4.14	90	6.21	7 BCP	0.48 BCP
100	6.89	80	5.52	120	8.27	10 BCP	0.69 BCP

BCP means "Below Cracking Pressure."

Cracking pressure is defined as the upstream pressure at which a detectable flow is measured.

Re-seal pressure is defined as the downstream pressure at which the check valve closes bubble-tight.

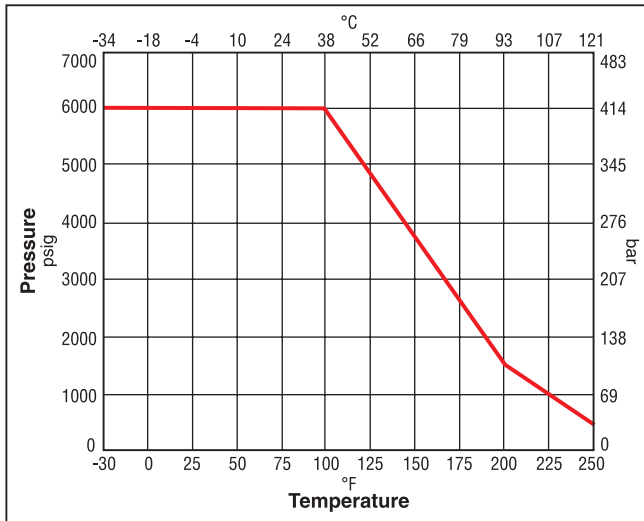
**Example:** For a valve with a spring having a rated cracking pressure of 25 psig (1.72 bar), the actual cracking pressure ranges between 20 and 30 psig (1.38 and 2.07 bar). The re-seal pressure range would be 16 to 20 psig (1.10 to 1.38 bar). Check valves having springs with rated crack pressures of 3 psig (0.21 bar) or less may require up to 4 psig (0.28 bar) back pressure to re-seal bubble-tight.

**Note:** Check valves which are not actuated for a period of time may initially crack at higher than the above crack pressure ranges.

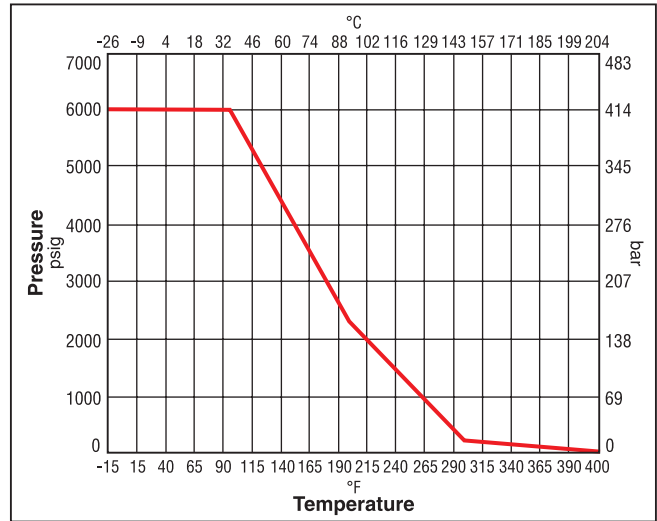
## Pressure vs. Temperature

**Note:** To determine MPa, multiply bar by 0.1

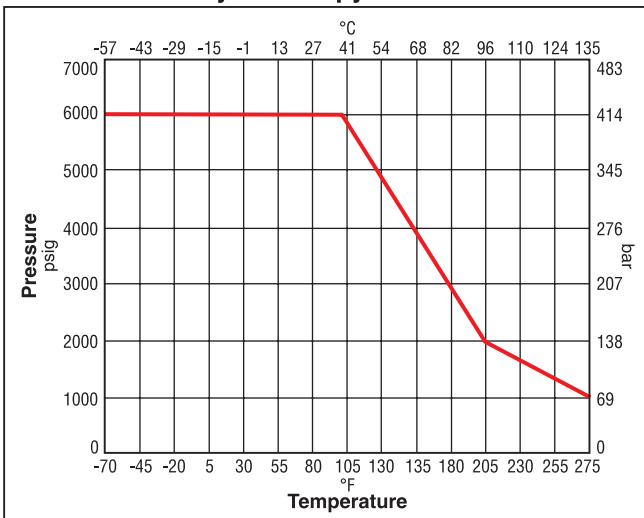
**Nitrile Seal**



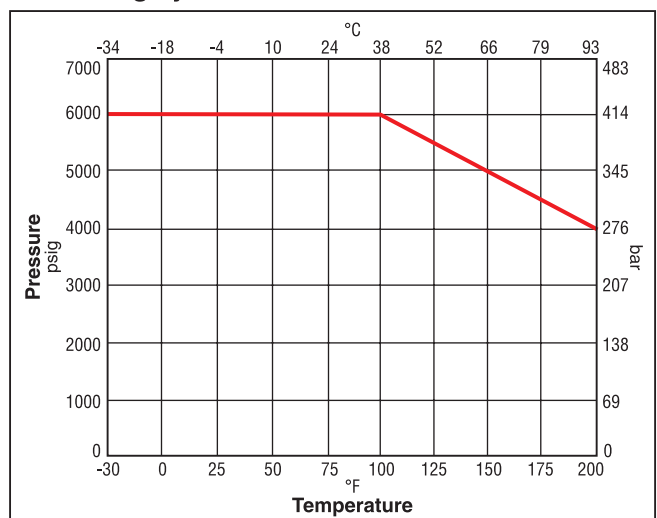
**Fluorocarbon Seal**



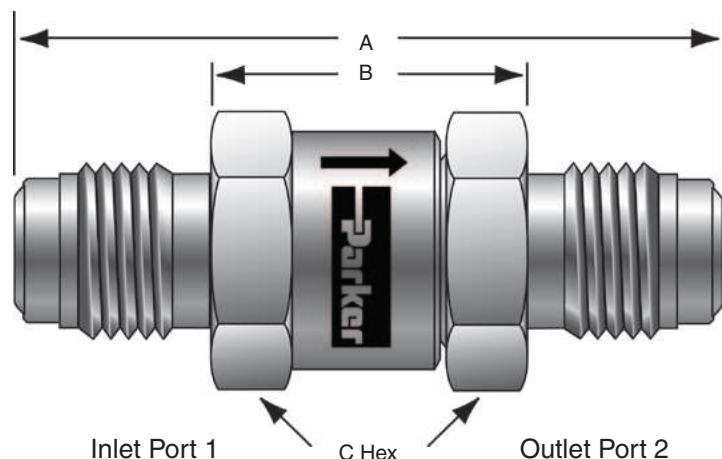
**Ethylene Propylene Seal**



**Highly Fluorinated Fluorocarbon Seal**



## Dimensions and Flow Data



D = Hex of nuts where applicable

### Model Shown: 4V-CO4L-5-KZ-SS

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

Basic Part Number	End Connections		Flow Data				Dimensions							
	Inlet Port 1	Outlet Port 2	Orifice		$C_V$	$X_T^*$	A†		B		C		D	
			Inch	mm			Inch	mm	Inch	mm	Inch	mm		
4A-CO4L-***-SS	1/4" A-LOK® Compression	1/4" A-LOK® Compression	.187	4.7	.62	.73	2.38	60.7	1.00	25.4	.750	19.1	.563	14.3
4F-CO4L-***-SS	1/4" Female NPT	1/4" Female NPT	.187	4.7	.62	.73	2.38	60.5	-	-	.750	19.1	-	-
4M-CO4L-***-SS	1/4" Male NPT	1/4" Male NPT	.187	4.7	.62	.73	2.09	53.1	.95	24.1	.750	19.1	-	-
4Q-CO4L-***-SS	1/4" UltraSeal	1/4" UltraSeal	.180	4.6	.58	.72	1.91	48.5	.98	24.9	.750	19.1	-	-
4TA-CO4L-***-SS	1/4" Tube Adapter	1/4" Tube Adapter	.156	4.0	.43	.62	2.35	59.7	1.07	27.2	.750	19.1	-	-
4V-CO4L-***-SS	1/4" VacuSeal	1/4" VacuSeal	.187	4.7	.62	.73	2.22	56.4	.98	24.9	.750	19.1	-	-
4V1-CO4L-***-SS	1/4" Female VacuSeal	1/4" Female VacuSeal	.182	4.6	.59	.75	2.67	67.8	.98	24.9	.750	19.1	.750	19.1
4Z-CO4L-***-SS	1/4" CPI™ Compression	1/4" CPI™ Compression	.187	4.7	.62	.73	2.39	60.7	1.00	25.4	.750	19.1	.563	14.3
M6A-CO4L-***-SS	6mm A-LOK® Compression	6mm A-LOK® Compression	.187	4.7	.62	.73	2.41	61.2	1.01	25.7	.750	19.1	.551	14.0
M6Z-CO4L-***-SS	6mm CPI™ Compression	6mm CPI™ Compression	.187	4.7	.62	.73	2.41	61.2	1.01	25.7	.750	19.1	.551	14.0
4M4A-CO4L-***-SS	1/4" Male NPT	1/4" A-LOK® Compression	.187	4.7	.62	.73	2.25	57.2	.98	24.9	.750	19.1	.563	14.3
4M4F-CO4L-***-SS	1/4" Male NPT	1/4" Female NPT	.187	4.7	.62	.73	2.26	57.4	1.69	42.9	.750	19.1	-	-
4M4Z-CO4L-***-SS	1/4" Male NPT	1/4" CPI™ Compression	.187	4.7	.62	.73	2.25	57.2	.98	24.9	.750	19.1	.563	14.3
6A-CO6L-***-SS	3/8" A-LOK® Compression	3/8" A-LOK® Compression	.281	7.1	1.70	.73	3.17	80.5	1.65	41.9	1.00	25.4	.688	17.5
6F-CO6L-***-SS	3/8" Female NPT	3/8" Female NPT	.328	8.3	1.85	.69	3.03	77.0	-	-	1.00	25.4	-	-
6M-CO6L-***-SS	3/8" Male NPT	3/8" Male NPT	.328	8.3	1.85	.69	2.78	70.6	1.64	41.7	1.00	25.4	-	-
6TA-CO6L-***-SS	3/8" Tube Adapter	3/8" Tube Adapter	.281	7.1	1.70	.73	3.09	78.5	1.65	41.9	1.00	25.4	-	-
6Z-CO6L-***-SS	3/8" CPI™ Compression	3/8" CPI™ Compression	.281	7.1	1.70	.73	3.17	80.5	1.65	41.9	1.00	25.4	.688	17.5
8V-CO6L-***-SS	1/2" VacuSeal	1/2" VacuSeal	.328	8.3	1.85	.69	3.57	90.7	2.06	52.3	1.00	25.4	-	-
8V1-CO6L-***-SS	1/2" Female VacuSeal	1/2" Female VacuSeal	.328	8.3	1.85	.69	3.57	90.7	1.65	41.9	1.00	25.4	1.062	27.0
M8A-CO6L-***-SS	8mm A-LOK® Compression	8mm A-LOK® Compression	.250	6.4	1.60	.68	3.15	80.0	1.69	42.9	1.00	25.4	.630	16.0
M8Z-CO6L-***-SS	8mm CPI™ Compression	8mm CPI™ Compression	.250	6.4	1.60	.68	3.15	80.0	1.69	42.9	1.00	25.4	.630	16.0
8A-CO8L-***-SS	1/2" A-LOK® Compression	1/2" A-LOK® Compression	.406	10.3	2.65	.75	3.37	85.6	1.63	41.4	1.25	31.8	.875	22.2
8F-CO8L-***-SS	1/2" Female NPT	1/2" Female NPT	.406	10.3	2.65	.75	3.60	91.4	-	-	1.25	31.8	-	-
8M-CO8L-***-SS	1/2" Male NPT	1/2" Male NPT	.406	10.3	2.65	.75	3.16	80.3	1.65	41.9	1.25	31.8	-	-
8Q-CO8L-***-SS	1/2" UltraSeal	1/2" UltraSeal	.375	9.5	2.55	.78	3.01	76.5	2.05	52.1	1.25	31.8	-	-
8TA-CO8L-***-SS	1/2" Tube Adapter	1/2" Tube Adapter	.375	9.5	2.55	.78	3.64	92.5	1.68	42.7	1.25	31.8	-	-
8V-CO8L-***-SS	1/2" VacuSeal	1/2" VacuSeal	.406	10.3	2.65	.75	3.56	90.4	2.05	52.1	1.25	31.8	-	-
8V1-CO8L-***-SS	1/2" Female VacuSeal	1/2" Female VacuSeal	.375	9.5	2.55	.78	3.65	92.7	1.73	43.9	1.25	31.8	1.062	27.0
8Z-CO8L-***-SS	1/2" CPI™ Compression	1/2" CPI™ Compression	.406	10.3	2.65	.75	3.37	85.6	1.63	41.4	1.25	31.8	.875	22.2
M12A-CO8L-***-SS	12mm A-LOK® Compression	12mm A-LOK® Compression	.375	9.5	2.55	.78	3.44	87.4	1.72	43.7	1.25	31.8	.866	22.0
M12Z-CO8L-***-SS	12mm CPI™ Compression	12mm CPI™ Compression	.375	9.5	2.55	.78	3.44	87.4	1.72	43.7	1.25	31.8	.866	22.0

\*Cracking Pressure \*\*Seal Designator

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

## Label Color Cross Reference

Label Color	Seal Material
Brown	Fluorocarbon Rubber
Black	Nitrile Rubber
Purple	Ethylene Propylene Rubber
Green	All others

**Testing:** All valves are 100% tested for crack, re-seal, and helium leakage.

## How to Order

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

The correct part number is easily derived from the following example and ordering chart. The six product characteristics required are coded as shown in the chart.

The example below describes a CO Series Check Valve with 1/4" male NPT inlet and a 1/4" female NPT outlet, 1 psig cracking pressure, fluorocarbon rubber seals, and stainless steel body construction.

**Example: 4M4F-CO4L-1-V-SS**

Inlet Port*				Outlet Port*				Body Size	Crack Pressure	Seat & Seal Material	Body Material		
4A	4Q	4V1	M6A	4A	4Q	4V1	M6A	CO4L	1/3 psi	V	Fluorocarbon Rubber	SS	316 Stainless Steel
4F	4TA	4Z	M6Z	4F	4TA	4Z	M6Z		1 psi				
4M	4V			4M	4V				5 psi	BN	Nitrile Rubber		
6A	6TA	8V	M8A	6A	6TA	8V	M8A	C06L	10 psi	EPR	Ethylene Propylene Rubber		
6F	6Z	8V1	M8Z	6F	6Z	8V1	M8Z		25 psi				
6M				6M					50 psi	KZ	Highly Fluorinated Fluorocarbon Rubber		
8A	8Q	8V1	M12A	8A	8Q	8V1	M12A	75 psi					
8F	8TA	8Z	M12Z	8F	8TA	8Z	M12Z	C08L	100 psi				
8M	8V			8M	8V								

\*If the inlet and outlet port s are the same, eliminate the outlet port designator.

## Options

**Oxygen Cleaning** – Add the suffix **-C3** to the end of the part number to receive filters cleaned and assembled for oxygen service in accordance with Parker specification ES8003. **Example:** 4A-CO4L-1-BN-SS-C3

**Special Cleaning** – All face seal ended valves are cleaned in accordance with Parker Specification ES8001. This is an option for all valves by adding the suffix **-C1** to the end of the part number. **Example:** M6A-CO4L-10-SS-C1

**Material** – Contact the factory for availability of AOD/VAR stainless steel and ID Electropolish.



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