

Needle Valves (NP6 Series)

*Catalog 4110-NP
Revised, June 2001*



NP6 Series Needle Valves

Introduction

Parker NP6 Needle Valves are designed with packing below the stem threads and a two-piece stem. The packing below the threads protects the flow stream from thread lubricant contamination or washout and also protects the stem threads from potential damaging effects of the media. The two-piece stem produces a non-rotating lower stem for superior, repeatable sealing and reduced packing wear.

Features

- Packing below power threads protects thread lubricants from media and isolates the media from the lubricant for severe service applications
- O-ring dust seal in bonnet protects stem threads from external contamination
- Choice of two non-rotating stem types:
 - R-Stem – All metal, blunt stem tip
 - K-Stem – PCTFE stem tip
- Non rotating lower stem extends packing and valve life
- 316 stainless steel construction
- Inline and angle patterns
- Wide variety of US Customary and SI ports
- Panel mountable
- 100% factory tested
- Optional color coded handles

Specifications

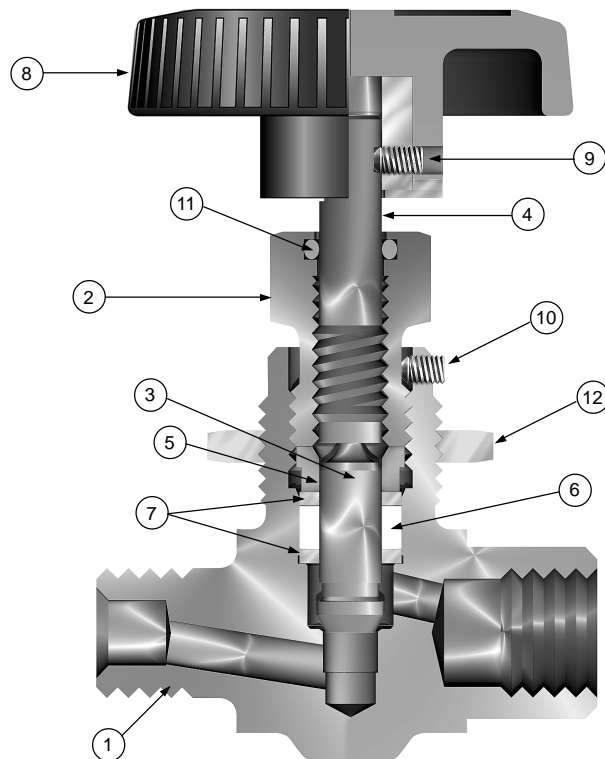
- **Pressure Rating:**
6000 psig (414 bar) CWP
- **Temperature Rating:**
 PTFE Packing:
-65 °F to 450 °F (-54 °C to 232 °C)
 PCTFE:
-65 °F to 350 °F (-54 °C to 177 °C)
 Buna-N Rubber:
-30 °F to 250 °F (-34 °C to 121 °C)
 Ethylene Propylene Rubber:
-70 °F to 275 °F (-57 °C to 135 °C)
 Fluorocarbon Rubber:
-15 °F to 400 °F (-26 °C to 204 °C)
 Grafoil®:
-70 °F to 700 °F (-57 °C to 371 °C)

Materials of Construction

Item #	Description	Material
1	Body	ASTM A 182 Type F316
2	Packing Nut	ASTM A 479 Type 316
3	Lower Stem (R-Stem)	ASTM A 276 Type 316
3	Lower Stem (K-Stem)	ASTM A 276 Type 316, with PCTFE
4	Upper Stem	ASTM A 276 Type 316
5	Packing Gland	ASTM A 479 Type 316
6	Packing*	PTFE
7	Packing Washer	Stainless Steel
8	Handle**	Nylon 6/6 with SS insert
9	Handle Screw	Stainless Steel
10	Packing Nut Screw	Stainless Steel
11	Dust Seal	Fluorocarbon Rubber
12	Panel Nut	316 Stainless Steel

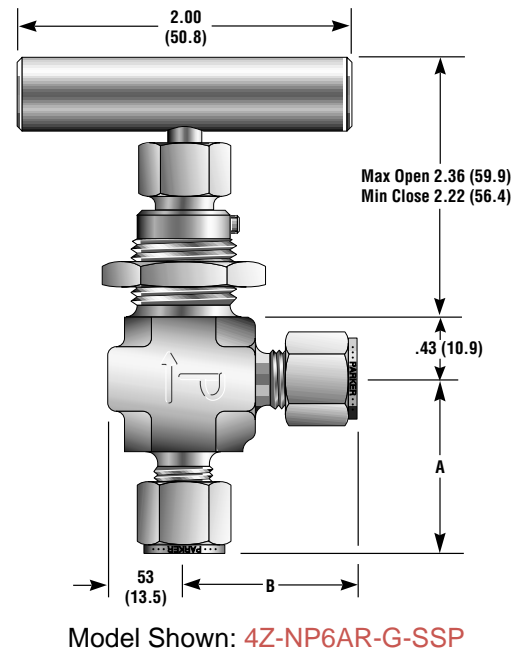
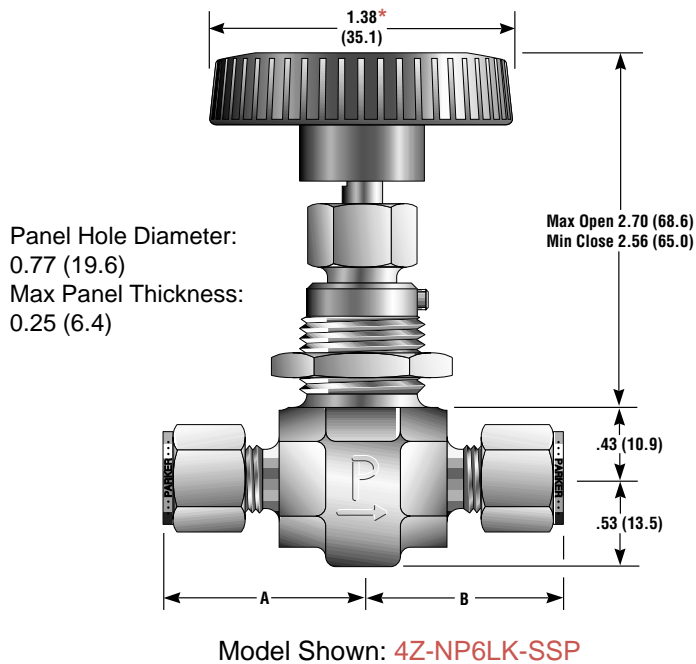
* Optional elastomeric stem seals and Grafoil® packing are available - See How to Order

** Handles for Grafoil® packed valves are aluminum T-bars.
Lubrication: Perfluorinated polyether



Model Shown: 4M4F-NP6LR-SSP

NP6 Series Needle Valves



* **Note:** Handle diameter for R Stem NP6 Series Valves is 1.81 (46.0)

Dimensions / Flow Data

() Denotes dimensions in millimeters

Basic		End Connections		Stem Type	Flow Data					Dimensions				
Part Number		Inlet (Port 1)	Outlet (Port 2)		Orifice	Inline		Angle		A†		B†		
Inline	Angle					Inch	mm	C_v	x_T^*	C_v	x_T^*	Inch	mm	Inch
4A-NP6LR 4A-NP6LK	4A-NP6AR 4A-NP6AK	1/4" Compression A-LOK®		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.20	30.5	1.20	30.5
4F-NP6LR 4F-NP6LK	4F-NP6AR 4F-NP6AK	1/4" Female NPT		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.00	25.4	1.00	25.4
4M-NP6LR 4M-NP6LK	4M-NP6AR 4M-NP6AK	1/4" Male NPT		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.03	26.2	1.03	26.2
4Z-NP6LR 4Z-NP6LK	4Z-NP6AR 4Z-NP6AK	1/4" Compression CPI™		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.20	30.5	1.20	30.5
6A-NP6LR 6A-NP6LK	6A-NP6AR 6A-NP6AK	3/8" Compression A-LOK®		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.23	31.2	1.23	31.2
6Z-NP6LR 6Z-NP6LK	6Z-NP6AR 6Z-NP6AK	3/8" Compression CPI™		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.23	31.2	1.23	31.2
M6A-NP6LR M6A-NP6LK	M6A-NP6AR M6A-NP6AK	6mm Compression A-LOK®		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.16	29.5	1.16	29.5
M6Z-NP6LR M6Z-NP6LK	M6Z-NP6AR M6Z-NP6AK	6mm Compression CPI™		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.16	29.5	1.16	29.5
M8A-NP6LR M8A-NP6LK	M8A-NP6AR M8A-NP6AK	8mm Compression A-LOK®		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.24	31.5	1.24	31.5
M8Z-NP6LR M8Z-NP6LK	M8Z-NP6AR M8Z-NP6AK	8mm Compression CPI™		Blunt PCTFE	0.177	4.5	0.60 0.51	0.50 0.55	0.67 0.65	0.39 0.52	1.24	31.5	1.24	31.5

* Tested in accordance with ISA S75.02. Gas flow will be choked when $P_2 - P_1 / P_1 = x_T$.
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

NP6 Series Needle Valves

How to Order

The correct part number is easily derived from the following number sequence. The six product characteristics required are coded as shown below. *Note: If the inlet and outlet ports are the same, eliminate the outlet port designator.

Example: 4Z * - NP6A K - BN - SSP
 ① ② ③ ④ ⑤ ⑥
 Inlet Outlet Valve Stem Stem Body
 Port Port Series Type Seal Material

Describes a angle pattern NP6 Series needle valve equipped with 1/4" CPI™ compression inlet and outlet ports, a PCTFE tipped stem, Buna-N seals, and stainless steel construction with panel mounting nut.

Example: 4M 4F - NP6L R - - SSP
 ① ② ③ ④ ⑤ ⑥
 Inlet Outlet Valve Stem Stem Body
 Port Port Series Type Seal Material

Describes a inline pattern NP6 Series needle valve equipped with 1/4" male NPT inlet port, 1/4" female NPT outlet port, a blunt stem type, PTFE stem seal, stainless steel construction with panel mounting nut.

① Inlet Port	② Outlet Port	③ Valve Series	④ Stem Type	⑤ Stem Seal	⑥ Body Material
4A, 4F, 4M, 4Z, 6A, 6Z, M6A, M6Z, M8A, M8Z		NP6L NP6A	R - Blunt K - PCTFE	Blank - PTFE BN- Buna-N Rubber EPR- Ethylene Propylene Rubber V- Fluorocarbon Rubber G - Grafoil®	SSP- Stainless Steel with Panel Nut

How to Order Options

Colored Round Handles – Add the designator corresponding to the correct handle color as a suffix to the part number. Black is standard, **W** - white, **B** - blue, **G** - green, **R** - red, **Y** - yellow. **Example:** 4A-NP6LK-SS-**G**

Oxygen Cleaning – Add the suffix **-C3** to the end of the part number to receive valves cleaned and assembled for oxygen service in accordance with Parker Specification ES8003. **Example:** M6A-NP6AK-EPR-SS-**C3**

Sour Gas –To obtain valves suitable for sour gas service in accordance with NACE Standard MR0175, add the suffix **NACE** to the end of the part number. **Example:** 4M4F-NP6LN-SS-**NACE**

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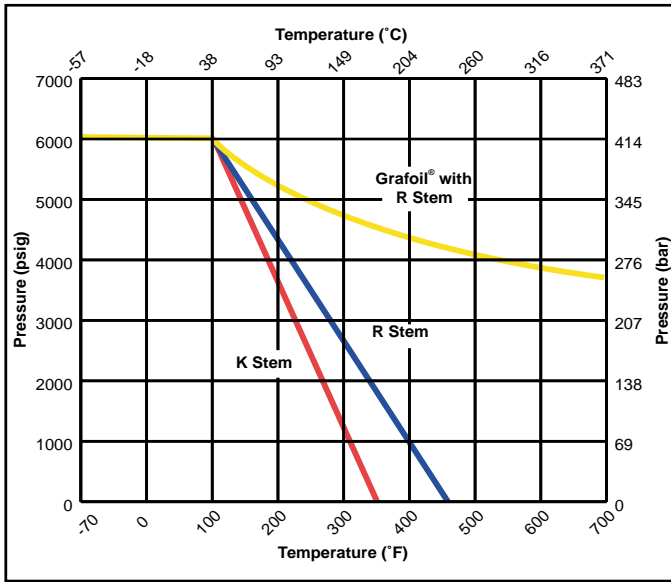
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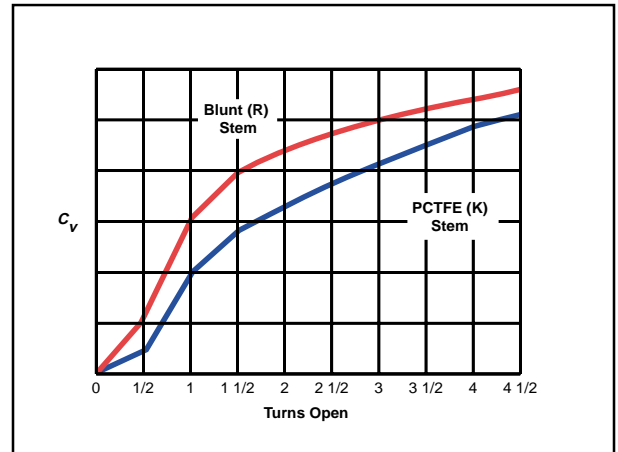
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Pressure vs. Temperature



Note: To determine MPa, multiply bar by 0.1

Flow Characteristics



Note: When combining seat and seal materials, the most restrictive temperature rating becomes the limiting factor on temperature range.

Inline Pattern Flow Calculations

$$C_v = .60 / X_T = .50$$

Inlet Pressure		Pressure Drop Δp		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
psig	bar	psig	bar	gpm	m ³ /hr	scfm	m ³ /hr
100	7	1	0.1	0.6	0.1	6.4	10.2
		10	0.7	1.9	0.4	19.0	30.0
		25	1.7	3.0	0.7	27.3	42.1
1000	69	10	0.7	1.9	0.4	59.7	100.9
		100	6.9	6.0	1.4	177.5	299.7
		250	17.2	9.5	2.2	251.1	422.8
3000	207	100	6.9	6.0	1.4	320.2	543.7
		500	34.5	13.4	3.0	651.3	1105.2
		1000	69.0	19.0	4.3	806.5	1367.5
6000	413	500	34.5	13.4	3.0	977.0	1660.8
		1000	69.0	19.0	4.3	1300.6	2210.4
		2000	137.9	26.8	6.1	1610.0	2734.6

$$C_v = .51 / X_T = .55$$

Inlet Pressure		Pressure Drop Δp		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
psig	bar	psig	bar	gpm	m ³ /hr	scfm	m ³ /hr
100	7	1	0.1	0.5	0.1	5.4	8.6
		10	0.7	1.6	0.4	16.3	25.6
		25	1.7	2.6	0.6	23.6	36.4
1000	69	10	0.7	1.6	0.4	50.8	85.8
		100	6.9	5.1	1.2	151.8	256.4
		250	17.2	8.1	1.8	217.2	365.9
3000	207	100	6.9	5.1	1.2	272.8	463.1
		500	34.5	11.4	2.6	559.8	950.1
		1000	69.0	16.1	3.7	703.3	1192.6
6000	413	500	34.5	11.4	2.6	834.8	1419.2
		1000	69.0	16.1	3.7	1118.0	1900.2
		2000	137.9	22.8	5.2	1403.9	2384.8

Angle Pattern Flow Calculations

$$C_v = .67 / X_T = .39$$

Inlet Pressure		Pressure Drop Δp		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
psig	bar	psig	bar	gpm	m ³ /hr	scfm	m ³ /hr
100	7	1	0.1	0.7	0.2	7.1	11.3
		10	0.7	2.1	0.5	20.9	32.8
		25	1.7	3.3	0.8	29.0	44.4
1000	69	10	0.7	2.1	0.5	66.5	112.4
		100	6.9	6.7	1.5	194.3	328.0
		250	17.2	10.6	2.4	264.8	445.5
3000	207	100	6.9	6.7	1.5	355.3	603.3
		500	34.5	15.0	3.4	701.8	1190.6
		1000	69.0	21.2	4.8	828.5	1403.9
6000	413	500	34.5	15.0	3.4	1072.9	1823.7
		1000	69.0	21.2	4.8	1401.2	2381.3
		2000	137.9	30.0	6.8	1653.4	2807.7

$$C_v = .65 / X_T = .52$$

Inlet Pressure		Pressure Drop Δp		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
psig	bar	psig	bar	gpm	m ³ /hr	scfm	m ³ /hr
100	7	1	0.1	0.7	0.1	6.9	11.0
		10	0.7	2.1	0.5	20.7	32.6
		25	1.7	3.3	0.7	29.8	46.0
1000	69	10	0.7	2.1	0.5	64.7	109.3
		100	6.9	6.5	1.5	192.8	325.6
		250	17.2	10.3	2.3	274.0	461.5
3000	207	100	6.9	6.5	1.5	347.2	589.5
		500	34.5	14.5	3.3	708.9	1203.1
		1000	69.0	20.6	4.7	883.3	1497.8
6000	413	500	34.5	14.5	3.3	1060.8	1803.2
		1000	69.0	20.6	4.7	1415.7	2406.2
		2000	137.9	29.1	6.6	1763.3	2995.1



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