

# Metering Valves (N Series)

*Catalog 4170-N  
Revised, July 2002*



# NS Series Metering Valves

## Introduction

The Parker NS Series of metering valves are designed to provide accurate and stable control of flow rates in analytical, instrumentation, and research applications. A variety of connection sizes, body patterns and materials of construction provide considerable application versatility. For higher flow rates, refer to the NM and NL Series of metering valves.

## Features

- Precisely tapered valve stem accurately controls flow
- Brass or 316 SS forged body construction
- Panel or in-line mounting
- Positive handle stop prevents overtightening
- Angle or in-line patterns
- Valve stem threads not in contact with process fluid
- 100% function tested
- Optional stem seals and handles

## Specifications

- Pressure Rating at all temperatures:  
2000 psig (138 bar) CWP
- Flow Data:  
Orifice: 0.03" (0.76mm)  
In-line pattern:  $C_v = 0.039$ ;  $X_T = 0.64$   
Angle pattern:  $C_v = 0.042$ ;  $X_T = 0.53$
- Stem Taper:  $1^\circ$
- Turns to open: 13 +/- 1

## NS Materials of Construction

Item #	Description	Stainless Steel	Brass
1	Body	ASTM A 182 Type F316	ASTM B 283 Alloy C37700 (Nickel Plated)
2	Bonnet	ASTM A 479 Type 316	ASTM B 16 Alloy C36000 (Nickel Plated)
3	Stem	ASTM A 276 Type 316	ASTM A 276 Type 316
4	Handle*	ASTM A 582 Type 303	ASTM A 582 Type 303
5	Panel Nut	ASTM B 16 (Nickel Plated)	ASTM B 16 (Nickel Plated)
6	Sealing Ring*	Fluorocarbon Rubber	Fluorocarbon Rubber
7	Stem Seals*	Fluorocarbon Rubber	Fluorocarbon Rubber
8	Handle Set Screw**	Stainless Steel	Stainless Steel
9	Handle Lock Screw**	Stainless Steel	Stainless Steel

\* Optional Handles, Sealing Ring and Stem Seal materials are available - See How to Order

\*\* K, KS, and F Handles use 18-8 stainless steel screws; V Handles use alloy steel screws; Lock Screws are not used on F and V Handles  
Lubrication: Perfluorinated polyether

## Valve / Seal Temperature Ratings

Buna-N Rubber:

-50 °F to 300 °F (-46 °C to 149 °C)

Ethylene Propylene Rubber:

-50 °F to 300 °F (-46 °C to 149 °C)

Neoprene Rubber:

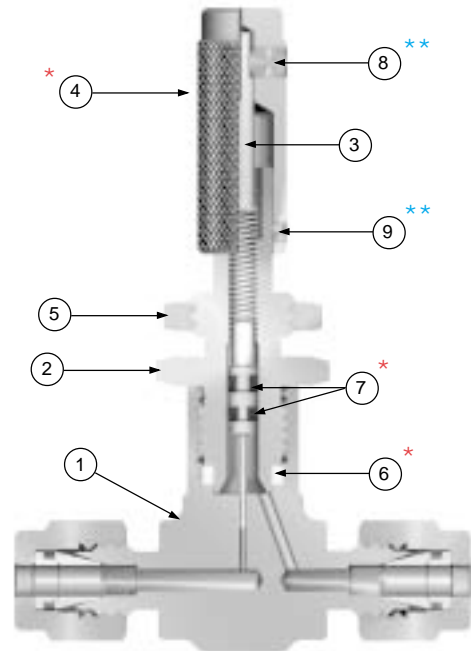
-50 °F to 300 °F (-46 °C to 149 °C)

Fluorocarbon Rubber:

-25 °F to 400 °F (-32 °C to 204 °C)

Highly Fluorinated Fluorocarbon Rubber:

-25 °F to 200 °F (-32 °C to 93 °C)



Model Shown: 2A-NSL-NE-SS-K

**Note:** These products are not intended for use as shut-off valves. For metering valves with shut-off capabilities, please refer to Catalog 4170-HR.

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

## NS Dimensions

Basic Part Number	End Connections		Dimensions							
	(Inlet Port 1)	(Outlet Port 2)	A†		B†		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
1A-NSL 1A-NSA	1/16" Compression A-LOK®		0.78	19.8	0.78	19.8	0.31	7.9	0.94	23.9
0.82			20.8	0.82	20.8	0.31	7.9	0.94	23.9	
1Z-NSL 1Z-NSA	1/16" Compression CPI™		0.78	19.8	0.78	19.8	0.31	7.9	0.94	23.9
0.82			20.8	0.82	20.8	0.31	7.9	0.94	23.9	
2A-NSL 2A-NSA	1/8" Compression A-LOK®		0.95	24.1	0.95	24.1	0.31	7.9	0.94	23.9
1.01			25.7	1.01	25.7	0.31	7.9	0.94	23.9	
2M-NSL 2M-NSA	1/8" Male NPT		0.88	22.4	0.88	22.4	0.31	7.9	0.94	23.9
0.88			22.4	0.88	22.4	0.31	7.9	0.94	23.9	
2Z-NSL 2Z-NSA	1/8" Compression CPI™		0.95	24.1	0.95	24.1	0.31	7.9	0.94	23.9
1.01			25.7	1.01	25.7	0.31	7.9	0.94	23.9	
4A-NSL 4A-NSA	1/4" Compression A-LOK®		1.02	25.9	1.02	25.9	0.31	7.9	0.94	23.9
1.02			25.9	1.02	25.9	0.31	7.9	0.94	23.9	
4V-NSL	1/4" VacuSeal		1.03	26.2	1.03	26.2	0.53	13.5	0.94	23.9
4Z-NSL 4Z-NSA	1/4" Compression CPI™		1.02	25.9	1.02	25.9	0.31	7.9	0.94	23.9
1.02			25.9	1.02	25.9	0.31	7.9	0.94	23.9	
M3A-NSL M3A-NSA	3mm Compression A-LOK®		0.94	23.9	0.94	23.9	0.31	7.9	0.94	23.9
1.00			25.4	1.00	25.4	0.31	7.9	0.94	23.9	
M3Z-NSL M3Z-NSA	3mm Compression CPI™		0.94	23.9	0.94	23.9	0.31	7.9	0.94	23.9
1.00			25.4	1.00	25.4	0.31	7.9	0.94	23.9	
M6A-NSL M6A-NSA	6mm Compression A-LOK®		1.02	25.9	1.02	25.9	0.31	7.9	0.94	23.9
1.02			25.9	1.02	25.9	0.31	7.9	0.94	23.9	
M6Z-NSL M6Z-NSA	6mm Compression CPI™		1.02	25.9	1.02	25.9	0.31	7.9	0.94	23.9
1.02			25.9	1.02	25.9	0.31	7.9	0.94	23.9	

### Note:

#### For K & KS Handles:

E = 2.50 (63.5mm), F = 2.27 (57.7mm),  
G = 0.37 (9.4mm), H = 0.46 (11.7mm),  
I = 0.16 (4.1mm)

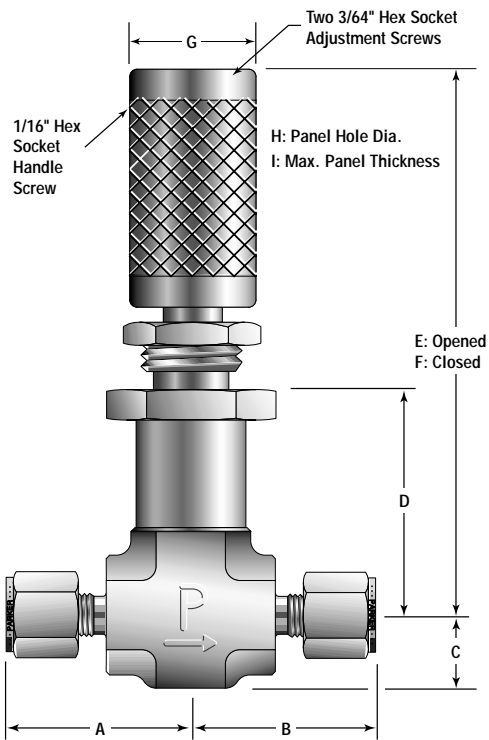
#### For V Handles:

E = 2.97 (75.4mm), F = 2.74 (69.6mm),  
G = 0.84 (21.3mm), H = 0.46 (11.7mm),  
I = 0.16 (4.1mm)

#### For F Handles:

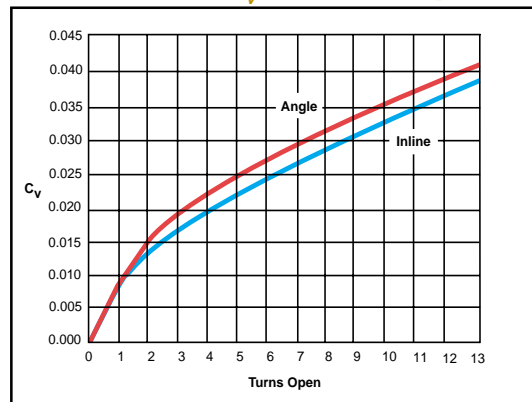
E = 2.97 (75.4mm), F = 2.74 (69.6mm),  
G = 0.84 (21.3mm), H = 0.46 (11.7mm),  
I = 0.16 (4.1mm)

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

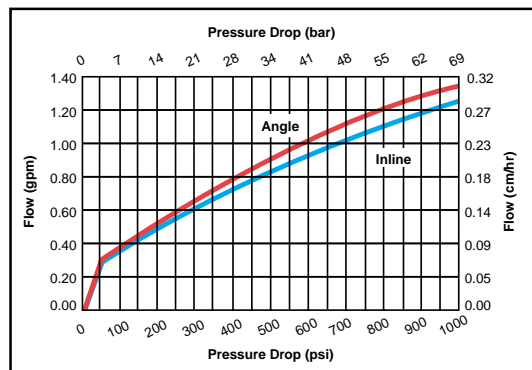


Model Shown: 2A-NSL-BN-SS-F

## NS Series - $C_v$ vs. Turns Open



## NS Series - Water Flow Data



# NM & NL Series Metering Valves

## Introduction

The Parker NM and NL Series of metering valves provide higher flow rates than the NS Series of metering valves and retain most of the features found in the NS Series.

## Features

- Precisely tapered valve stem accurately controls flow
- Brass or 316 SS forged body construction
- Panel or in-line mounting
- Angle or in-line patterns
- Valve stem threads not in contact with process fluid
- 100% function tested
- Optional stem seals and handles

## Specifications

- Pressure Rating at all temperatures:  
1000 psig (69 bar) CWP

## NM Specifications

- Flow Data:  
Orifice: 0.06" (1.5mm)  
In-line pattern:  $C_v = 0.055$ ;  $X_T = 0.41$   
Angle pattern:  $C_v = 0.057$ ;  $X_T = 0.38$
- Stem Taper: 3°
- Turns to open: 9 +/- 1

## NL Specifications

- Flow Data:  
Orifice: 0.13" (3.3mm)  
In-line pattern:  $C_v = 0.207$ ;  $X_T = 0.71$   
Angle pattern:  $C_v = 0.299$ ;  $X_T = 0.60$
- Stem Taper: 5°
- Turns to open: 10 +/- 1

## NM & NL Materials of Construction

Item #	Description	Stainless Steel	Brass
1	Body	ASTM A 182 Type F316	ASTM B 283 Alloy C37700 (Nickel Plated)
2	Bonnet	ASTM A 479 Type 316	ASTM B 16 Alloy C36000 (Nickel Plated)
3	Stem	ASTM A 276 Type 316	ASTM A 276 Type 316
4	Handle*	Stainless Steel	Stainless Steel
5	Panel Nut	ASTM B 16 (Nickel Plated)	ASTM B 16 (Nickel Plated)
6	Sealing Ring	PTFE	PTFE
7	Stem Seal*	Fluorocarbon Rubber	Fluorocarbon Rubber
8	Handle Set Screw**	Stainless Steel	Stainless Steel
9	Handle Lock Screw**	Stainless Steel	Stainless Steel

\* Optional Handles and Stem Seal materials are available - See How to Order

\*\* K, and KS Handles use 18-8 stainless steel screws;

V Handles use alloy steel screws; Lock Screws are not used on V Handles

Lubrication: Perfluorinated polyether

## Valve / Seal Temperature Ratings

Buna-N Rubber:

-50 °F to 300 °F (-46 °C to 149 °C)

Ethylene Propylene Rubber:

-50 °F to 300 °F (-46 °C to 149 °C)

Neoprene Rubber:

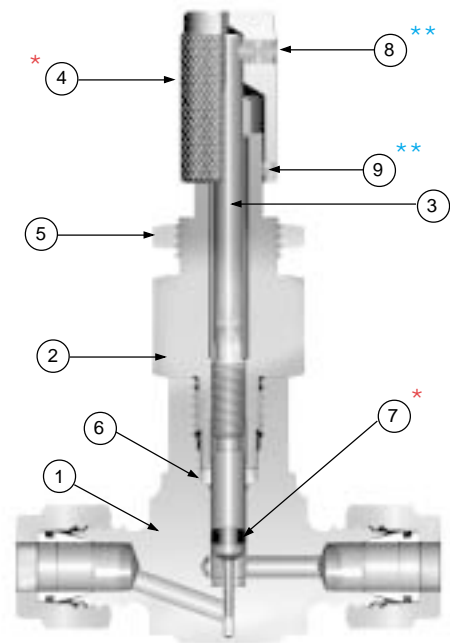
-50 °F to 300 °F (-46 °C to 149 °C)

Fluorocarbon Rubber:

-25 °F to 400 °F (-32 °C to 204 °C)

Highly Fluorinated Fluorocarbon Rubber:

-25 °F to 200 °F (-32 °C to 93 °C)



Model Shown: 4A-NML-KZ-SS-K

**Note:** These products are not intended for use as shut-off valves. For metering valves with shut-off capabilities, please refer to Catalog 4170-HR.

Flow tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = x_T$ .

## NM Dimensions

Basic Part Number	End Connections		Dimensions							
	(Inlet Port 1)	(Outlet Port 2)	A†		B†		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
2A-NML 2A-NMA	1/8" Compression A-LOK®		1.03	26.2	1.03	26.2	0.41	10.4	1.56	39.6
1.03			26.2	1.03	26.2	0.41	10.4	1.07	27.2	
2F-NML 2F-NMA	1/8" Female NPT		0.93	23.6	0.93	23.6	0.41	10.4	1.56	39.6
0.93			23.6	0.93	23.6	0.41	10.4	1.07	27.2	
2Z-NML 2Z-NMA	1/8" Compression CPI™		1.03	26.2	1.03	26.2	0.41	10.4	1.56	39.6
1.03			26.2	1.03	26.2	0.41	10.4	1.07	27.2	
4A-NML 4A-NMA	1/4" Compression A-LOK®		1.11	28.2	1.11	28.2	0.41	10.4	1.56	39.6
1.11			28.2	1.11	28.2	0.41	10.4	1.07	27.2	
4M-NML 4M-NMA	1/4" Male NPT		0.93	23.6	0.93	23.6	0.41	10.4	1.56	39.6
0.93			23.6	0.93	23.6	0.41	10.4	1.07	27.2	
4V-NML	1/4" VacuSeal		1.03	26.2	1.03	26.2	0.53	13.5	1.56	39.6
4Z-NML 4Z-NMA	1/4" Compression CPI™		1.11	28.2	1.11	28.2	0.41	10.4	1.56	39.6
1.11			28.2	1.11	28.2	0.41	10.4	1.07	27.2	
M3A-NML M3A-NMA	3mm Compression A-LOK®		1.00	25.4	1.00	25.4	0.41	10.4	1.56	39.6
1.00			25.4	1.00	25.4	0.41	10.4	1.07	27.2	
M3Z-NML M3Z-NMA	3mm Compression CPI™		1.00	25.4	1.00	25.4	0.41	10.4	1.56	39.6
1.00			25.4	1.00	25.4	0.41	10.4	1.07	27.2	
M6A-NML M6A-NMA	6mm Compression A-LOK®		1.09	27.7	1.09	27.7	0.41	10.4	1.56	39.6
1.09			27.7	1.09	27.7	0.41	10.4	1.07	27.2	
M6Z-NML M6Z-NMA	6mm Compression CPI™		1.09	27.7	1.09	27.7	0.41	10.4	1.56	39.6
1.09			27.7	1.09	27.7	0.41	10.4	1.07	27.2	

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

### Note:

**For K & KS Handles on in-line pattern valves:**

E = 3.22 (81.8mm), F = 2.99 (75.9mm),  
G = 0.50 (12.7mm), H = 0.58 (14.7mm),  
I = 0.19 (4.8mm)

**For K & KS Handles on angle pattern valves:**

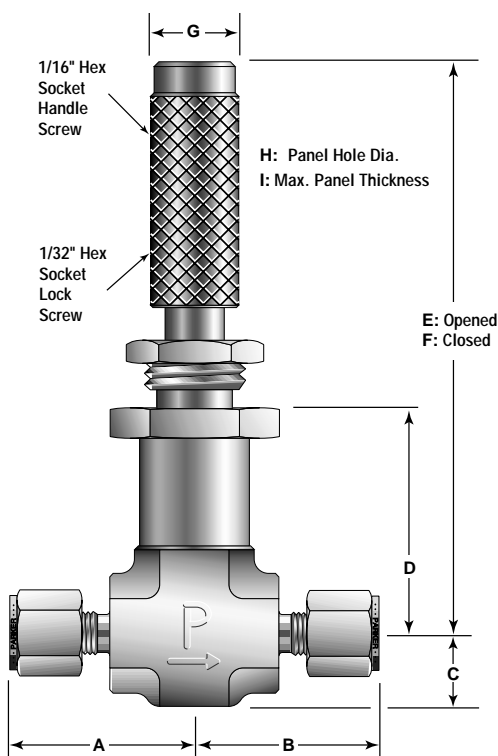
E = 2.82 (71.6mm), F = 2.59 (65.8mm),  
G = 0.50 (12.7mm), H = 0.58 (14.7mm),  
I = 0.27 (6.9mm)

**For V Handles on in-line pattern valves:**

E = 3.63 (92.2mm), F = 3.40 (86.4mm),  
G = 0.84 (21.3mm), H = 0.58 (14.7mm),  
I = 0.19 (4.8mm)

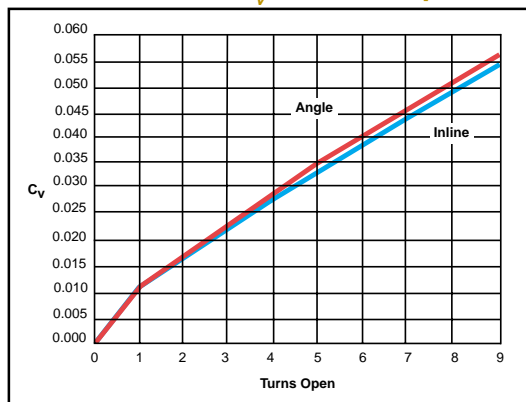
**For V Handles on angle pattern valves:**

E = 3.23 (82.0mm), F = 3.00 (76.2mm),  
G = 0.84 (21.3mm), H = 0.58 (14.7mm),  
I = 0.27 (6.9mm)

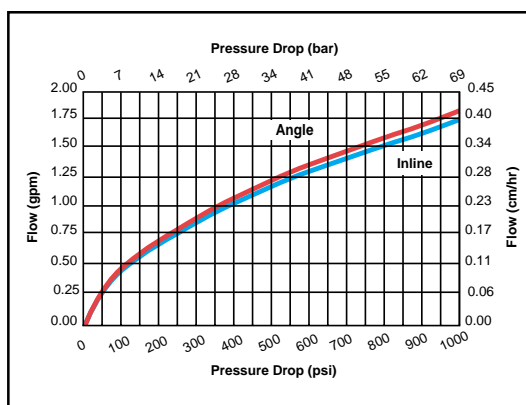


Model Shown: M3A-NML-V-SS-K

## NM Series - C<sub>v</sub> vs. Turns Open



## NM Series - Water Flow Data



# NL Series Metering Valves

## NL Dimensions

Basic Part Number	End Connections		Dimensions							
	(Inlet) Port 1	(Outlet) Port 2	A†		B†		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
2F-NLL 2F-NLA	1/8" Female NPT		0.93 0.93	23.6 23.6	0.93 0.93	23.6 23.6	0.41 0.41	10.4 10.4	1.56 1.07	39.6 27.2
4A-NLL 4A-NLA	1/4" Compression A-LOK®		1.16 1.16	29.5 29.5	1.16 1.16	29.5 29.5	0.41 0.41	10.4 10.4	1.56 1.07	39.6 27.2
4M-NLL 4M-NLA	1/4" Male NPT		0.93 0.93	23.6 23.6	0.93 0.93	23.6 23.6	0.41 0.41	10.4 10.4	1.56 1.07	39.6 27.2
4V-NLL	1/4" VacuSeal		1.03	26.2	1.03	26.2	0.53	13.5	1.56	39.6
4Z-NLL 4Z-NLA	1/4" Compression CPI™		1.16 1.16	29.5 29.5	1.16 1.16	29.5 29.5	0.41 0.41	10.4 10.4	1.56 1.07	39.6 27.2
6A-NLL	3/8" Compression A-LOK®		1.24	31.5	1.24	31.5	0.41	10.4	1.56	39.6
6Z-NLL	3/8" Compression CPI™		1.24	31.5	1.24	31.5	0.41	10.4	1.56	39.6
M6A-NLL M6A-NLA	6mm Compression A-LOK®		1.12 1.15	28.4 29.2	1.12 1.15	28.4 29.2	0.41 0.41	10.4 10.4	1.56 1.07	39.6 27.2
M6Z-NLL M6Z-NLA	6mm Compression CPI™		1.12 1.15	28.4 29.2	1.12 1.15	28.4 29.2	0.41 0.41	10.4 10.4	1.56 1.07	39.6 27.2

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

**Note:**

**For K & KS Handles on in-line pattern valves:**

E = 2.92 (74.2mm), F = 2.67 (67.8mm),  
G = 0.50 (12.7mm), H = 0.58 (14.7mm),  
I = 0.19 (4.8mm)

**For K & KS Handles on angle pattern valves:**

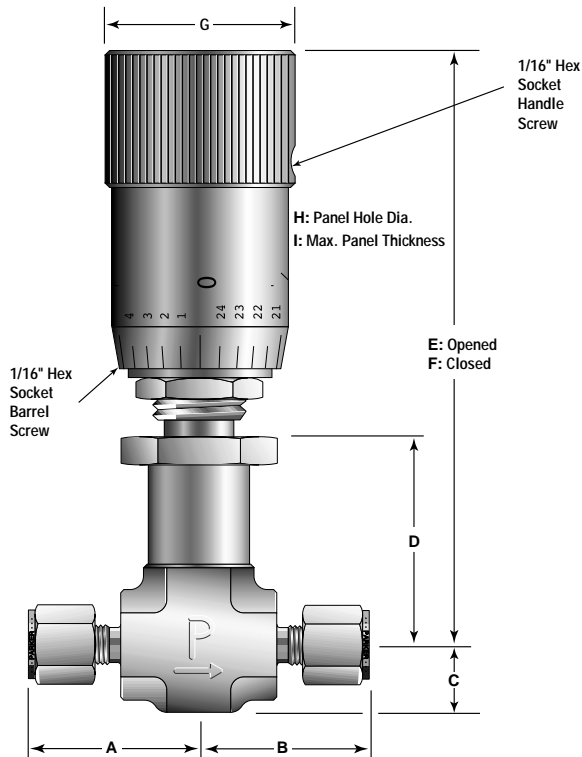
E = 2.83 (71.9mm), F = 2.58 (65.8mm),  
G = 0.50 (12.7mm), H = 0.58 (14.7mm),  
I = 0.27 (6.9mm)

**For V Handles on in-line pattern valves:**

E = 3.33 (84.6mm), F = 3.08 (78.2mm),  
G = 0.84 (21.3mm), H = 0.58 (14.7mm),  
I = 0.19 (4.8mm)

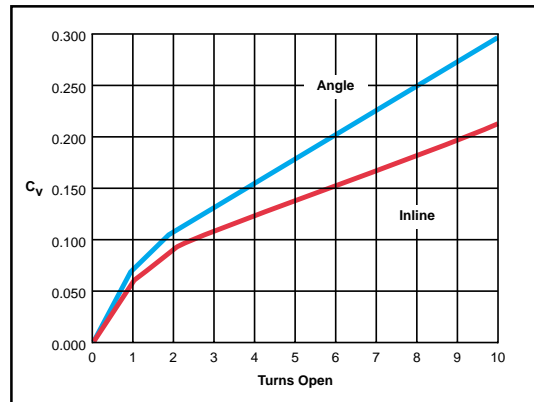
**For V Handles on angle pattern valves:**

E = 3.24 (82.3mm), F = 2.99 (75.9mm),  
G = 0.84 (21.3mm), H = 0.58 (14.7mm),  
I = 0.27 (6.9mm)

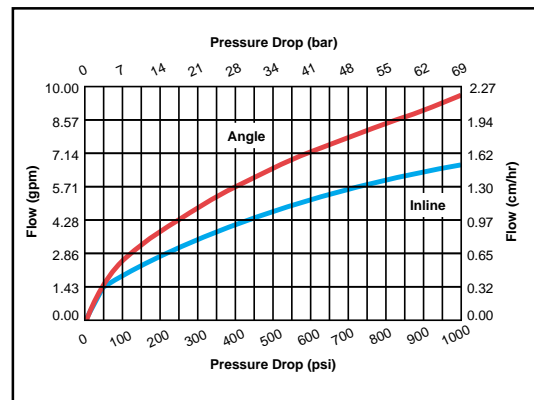


Model Shown: 6A-NLL-EPR-B-V

## NL Series - C<sub>v</sub> vs. Turns Open



## NL Series - Water Flow Data



## 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** - **\* -** **NLL** - **V** - **SS** - **V**

①            ②            ③            ④            ⑤            ⑥

Inlet        Outlet        Valve        Seal        Body        Handle  
Port        Port        Series        Material    Material    Type

① Inlet Port	② Outlet Port	③ Valve Series	④ Seal Material	⑤ Body Material	⑥ Handle Type
1A, 1Z, 2A, 2M, 2Z, 4A, 4V, 4Z, M3A, M3Z, M6A, M6Z		NSA NSL	BN - Buna-N Rubber EPR - Ethylene Propylene Rubber	SS- Stainless Steel	K - Knurled KS - Knurled with Slot
2A, 2F, 2Z, 4A, 4M, 4V, 4Z, M3A, M3Z, M6A, M6Z		NMA NML	NE - Neoprene Rubber V - Fluorocarbon Rubber	B - Brass	V - Vernier
2F, 4A, 4M, 4V, 4Z, 6A, 6Z, M6A, M6Z		NLA NLL	KZ - Highly Fluorinated Fluorocarbon Rubber		F - Precision Adjustment*

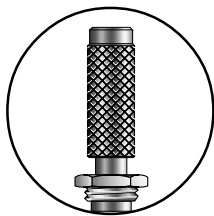
\* F Handle available only on NS Series.

## Optional Handles

Knurled (K) and  
Knurled with Slot (KS)

Vernier (V)

Precision Adjustment (F)



- Knurled K Handle for ease of actuation
- Knurled with Slot (KS) adds a screw-driver slot across the top for locations where handle access is difficult



- Precision graduated aluminum alloy permits repeatable flow settings
- Resolution to 1/25<sup>th</sup> turn



- Adjustable torque handle for precise positioning
- Knurled metal with two top mounted adjustment screws
- NS Series only

## How to Order Options

**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:** 4A-NMA-EPR-SS-V-C3

### WARNING

FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

### Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale" located in Catalog 4110-U Needle Valves (U Series).



Catalog 4170-N, 20M, 07/02

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