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Saunders® Flow Coefficients 2-Way Forgings

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In order to provide a comparator of flow features for valves and associated equipment in a process system, they must be tested and measured under the same conditions. The resulting Cv or Kv value is used as a calculation basis for different working valve scenarios across applications.

Imperial Formula

$$Q = C_V \times K_1 \sqrt{\frac{P\ \Delta P}{ST}}$$

Where:

- Q = Quantity flowing in cubic feet per hour at NTP (SCFH)
- C_V = Valve coefficient
- K_1 = A constant = 1364
- P = Upstream pressure lbf/in^2 absolute
- ΔP = Pressure drop, lbf/in^2
- S = Specific gravity (air = 1)
- T = Temperature °R absolute (°F +460)

Note: NTP (Normal Temperature and Pressure) is 14.7 lbf/in^2 absolute and 60°F.
C_V values expressed in GPM per one psi pressure drop.

Metric Formula

$$Q = K_V \times K_2 \sqrt{\frac{P\ \Delta P}{ST}}$$

Where:

- Q = Quantity flowing in cubic meters per hour at NTP (Nm³/hr)
- K_V = Valve coefficient
- K_2 = A constant = 450
- P = Upstream pressure kg/cm^2 absolute
- ΔP = Pressure drop, kg/cm^2
- S = Specific gravity (air = 1)
- T = Temperature °K absolute (°C +273)

Note: NTP (Normal Temperature and Pressure) is 1 Kg/cm^2 absolute and 20°C.
K_V values expressed in m³/h per one bar pressure drop.

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2-Way Forged Bodies Tube OD ASME BPE

Saunders® - Standard Mark III 2-Way Forgings
Kv Values m³/h

Nominal Size (mm)	O/D (mm)	Wall (mm)	I/D (mm)	Kv (m³/h)		Specification
				10%	100%	
8 [1]	12.7	1.65	9.4	0.7	1.62	Tube OD ASME BPE
15	12.7	1.65	9.4	0.73	2.18	Tube OD ASME BPE
20	19.05	1.65	15.75	0.82	4.77	Tube OD ASME BPE
25	25.4	1.65	22.1	3.04	11.33	Tube OD ASME BPE
40	38.1	1.65	34.8	5.19	30.41	Tube OD ASME BPE
50	50.8	1.65	47.5	8.3	52.26	Tube OD ASME BPE
65	63.5	1.65	60.2	17.57	82.84	Tube OD ASME BPE
80	76.2	1.65	72.9	22.06	124.22	Tube OD ASME BPE
100 [2]	101.6	2.11	97.38	36.17	166.52	Tube OD ASME BPE
150 [2]	152.4	2.77	146.86	63.09	349.17	Tube OD ASME BPE

Cv Values (US gal/min)

Nominal Size (inch)	O/D (inch)	Wall (inch)	I/D (inch)	Cv (US gal/min)		Specification
				10%	100%	
0,25 [1]	0.5	0.065	0.37	0.8	1.87	Tube OD ASME BPE
0.5	0.5	0.065	0.37	0.84	2.52	Tube OD ASME BPE
0.75	0.75	0.065	0.62	0.95	5.51	Tube OD ASME BPE
1	1	0.065	0.87	3.51	13.1	Tube OD ASME BPE
1.5	1.5	0.065	1.37	6	35.15	Tube OD ASME BPE
2	2	0.065	1.87	9.6	60.41	Tube OD ASME BPE
2.5	2.5	0.065	2.37	20.31	95.76	Tube OD ASME BPE
3	3	0.065	2.87	25.5	143.6	Tube OD ASME BPE
4 [2]	4	0.083	3.83	41.82	192.5	Tube OD ASME BPE
6 [2]	6	0.109	5.78	72.94	403.65	Tube OD ASME BPE

1. DN8 (0.25") Body with DN15 (0.5") tube end.
2. DN100 (4") & DN150 (6") Sizes are machined from solid barstock (values based on CFD Analysis.)

2-Way Forged Bodies Tube OD ASME

Saunders® - Standard Mark IV 2-Way Forgings
Kv Values m³/h

Nominal Size (mm)	Code	O/D (mm)	Wall (mm)	I/D (mm)	Kv (m³/h)		Specification
					10%	100%	
8	3D	10	1	8	0.1	1.4	DIN11866 Series A / DIN11850 Series 2
10 [1]	73	13	1.5	10	0.2	2.3	DIN11866 Series A / DIN11850 Series 2
15	74	19	1.5	16	0.5	4.7	DIN11866 Series A / DIN11850 Series 2
20	75	23	1.5	20	0.5	5	DIN11866 Series A / DIN11850 Series 2
25	76	29	1.5	26	1.3	12	DIN11866 Series A / DIN11850 Series 2
32 [2]	77	35	1.5	32	6	25	DIN11866 Series A / DIN11850 Series 2
40	78	41	1.5	38	7.2	27.7	DIN11866 Series A / DIN11850 Series 2
50	79	53	1.5	50	12.8	53.5	DIN11866 Series A / DIN11850 Series 2
65	70	70	2	66	16.9	75.7	DIN11866 Series A / DIN11850 Series 1
80	71	85	2	81	21.5	128.7	DIN11866 Series A / DIN11850 Series 1
100 [3]	72	104	2	100	29.5	173.8	DIN11866 Series A / DIN11850 Series 1
150 [3]	C9	154	2	150	60.5	356	DIN11866 Series A / DIN11850 Series 1

Nominal Size (mm)	Code	O/D (mm)	Wall (mm)	I/D (mm)	Kv (m³/h)		Specification
					10%	100%	
8	93	13.5	1.6	10.3	0.1	2.39	DIN11866 Series B / ISO1127 Series 1
10 [1]	98	17.2	1.6	14	0.2	3.4	DIN11866 Series B / ISO1127 Series 1
15	0D	21.3	1.6	18.1	0.4	5	DIN11866 Series B / ISO1127 Series 1
20	0K	26.9	1.6	23.7	0.3	5.4	DIN11866 Series B / ISO1127 Series 1
25	0U	33.7	2	29.7	1	15.1	DIN11866 Series B / ISO1127 Series 1
32 [2]	1A	42.4	2	38.4	2.1	26.5	DIN11866 Series B / ISO1127 Series 1
40	1G	48.3	2	44.3	2.4	29.5	DIN11866 Series B / ISO1127 Series 1
50	1N	60.3	2	56.3	5	56.9	DIN11866 Series B / ISO1127 Series 1
65	1X	76.1	2	72.1	13.7	80.4	DIN11866 Series B / ISO1127 Series 1
80	2H	88.9	2.3	84.3	18.5	145.9	DIN11866 Series B / ISO1127 Series 1
100 [3]	9V	114.3	2.3	109.7	32.6	191.65	DIN11866 Series B / ISO1127 Series 1
150 [3]	8R	168.3	2.6	163.1	70	411.48	DIN11866 Series B / ISO1127 Series 1

1. DN10 tube specification is machined from a DN15 Body.
2. DN32 tube specification is machined from a DN40 Body.
3. DN100/150 Sizes are machined from solid barstock (values based on CFD Analysis.)

Estimated Flow for Standard Machined Bodies

Tee Valves Cv = 2-way Cv x 0.9
Tank Bottom Valves Cv= 2-way Cv x 0.85

Contact Saunders® for assistance with flow characteristics of non-standard block configurations

Please visit our Web-Based Drawing Library at: www.saundersdrawings.com for current database of drawings in PDF, 2D DWG, and 3D STP formats.

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