

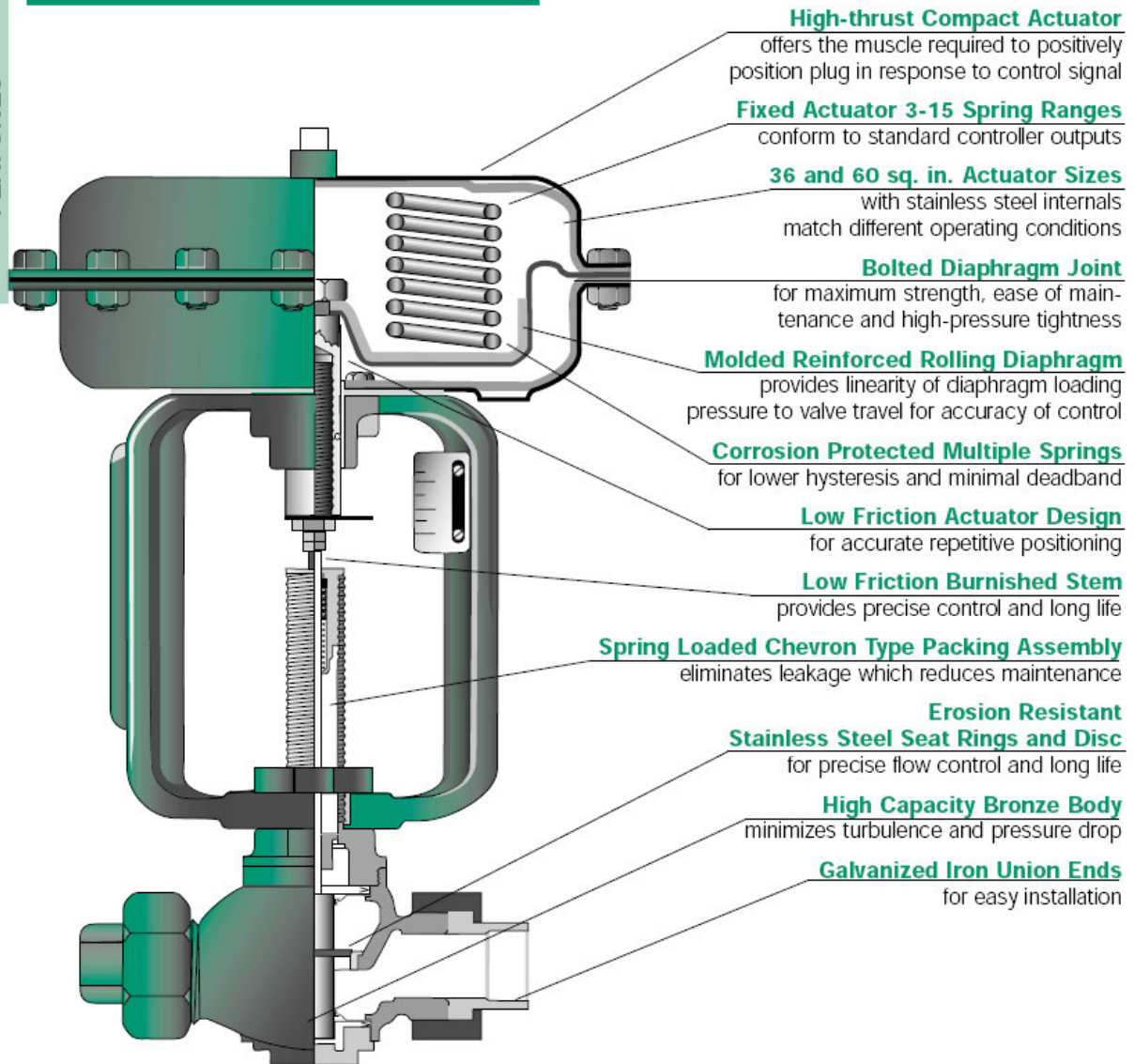
Applications

- Bottle Washing Machinery
- Steam Tables
- Plating Tanks
- Heating Ducts
- Fuel Oil Heaters
- Cooking Vats
- Heat Exchangers
- Induction Furnaces
- Industrial Compressors
- Cold Storage Boxes
- Cooling Ducts
- Engine Jacket Cooling
- Liquid Chillers
- Water Heaters
- Parts Washers

KOMBAT K1 Pneumatic Control Valve

*Pressures To 400 PSIG
Temperatures to 400°F*

KOMBAT K1
FEATURES



High-thrust Compact Actuator

offers the muscle required to positively position plug in response to control signal

Fixed Actuator 3-15 Spring Ranges

conform to standard controller outputs

36 and 60 sq. in. Actuator Sizes

with stainless steel internals match different operating conditions

Bolted Diaphragm Joint

for maximum strength, ease of maintenance and high-pressure tightness

Molded Reinforced Rolling Diaphragm

provides linearity of diaphragm loading pressure to valve travel for accuracy of control

Corrosion Protected Multiple Springs

for lower hysteresis and minimal deadband

Low Friction Actuator Design

for accurate repetitive positioning

Low Friction Burnished Stem

provides precise control and long life

Spring Loaded Chevron Type Packing Assembly

eliminates leakage which reduces maintenance

Erosion Resistant

Stainless Steel Seat Rings and Disc

for precise flow control and long life

High Capacity Bronze Body

minimizes turbulence and pressure drop

Galvanized Iron Union Ends

for easy installation

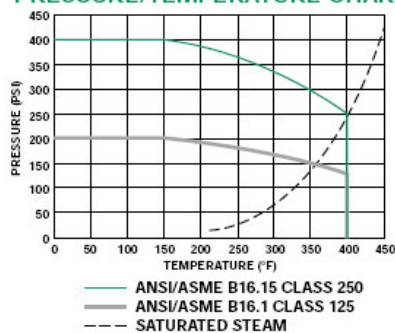


KOMBAT K1 CONTROL VALVE

APPLICATION DATA

- Process control systems for food, pulp and paper, chemical, petrochemical & other industries
- HVAC systems
- Feed water and fuel system controls in boiler rooms
- Packaged systems (OEM) such as heat exchangers, water purification systems & vaporizer, metal cleaning and plating
- Mixing or diverting applications

PRESSURE/TEMPERATURE CHART



KOMBAT SERIES K CONTROL VALVE

SIZES 1/2" – 4"
ANSI Class 125/250

- **Shutoff to 400 PSI without Positioner** for broad range of applications.
- **Ultra Compact Multi-spring Pneumatic Actuator** installs in tight spaces.
- **3–15 lb. Spring Ranges** in durable epoxy coated pneumatic actuators accommodate most standard input devices.
- **Powerful Electric Actuator** accepts a wide variety of signals while providing highest shutoff in it's class.
- **Live Loaded V ring Packing Assembly** is self adjusting.
- **Stainless Steel Valve Plugs & Seat Rings** resist wear and corrosion
- **Optional 3-Way Body** for mixing or diverting

MODELS

- Type K1 — Single Seat Bronze w/union ends & Pneumatic Actuator
- Type K3 — 3-Way Bronze w/union ends & Pneumatic Actuator
- Type K4 — Single Seat Flanged Cast Iron w/Pneumatic Actuator
- Type K5 — Same as K1 w/Electric Actuator, fail closed
- Type K6 — Same as K1 w/Electric Actuator, fail open
- Type K7 — Same as K3 w/Electric Actuator

OPTIONS

- 36 or 60 sq. in. Pneumatic Actuator
- Electric Actuator

APPLICABLE CODES

- Meets or exceeds ANSI B16.15 Class 250 or ANSI B16.1 Class 125
- ANSI/FCI 70-2 Class IV Seat Leakage

PLUG CHARACTERISTICS

Modified Equal Percent, 30:1 flow rangeability

KOMBAT SERIES K VALVE ORDERING CODE

Model	Orifice Size	Valve Size	Connections	Trim Material	Packing	Actuator	Spring	Positioner	Posit. Set	Accessories						
K	1	T	E	8	1	- 3	6	R	B	M - P	0	2	0	1		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Model - Position 1 & 2 K1 = Bronze, Pneumatic K3 = Bronze, 3 Way, Pneumatic K4 = Cast Iron, Pneumatic K5 = Bronze, Electric, FC K6 = Bronze, Electric, FO K7 = Bronze, 3 Way, Electric
Orifice Size - Position 3 A B C E T

Valve Size - Position 4 C = 1/2 D = 3/4 E = 1 F = 1 1/4 G = 1 1/2 H = 2 J = 2 1/2 K = 3 M = 4
Connections - Position 5 2 = 125 Flg 8 = Unions
Trim Material - Position 6 1 = Metal

Packing - Position 7 1 = V-ring
Actuator - Position 8 & 9 K1, K3, K4 only 01 = None 36 = 36 sq. in. 60 = 60 sq. in. K5, K6, K7 only 90 = 0-10vDC 91 = 4-20mA 92 = 0-135ohm

Spring - Position 10 & 11 All except K4 DA = Dir 36 DC = Dir 36 DD = Dir 36 DG = Dir 60 FM = Dir 36 RA = Rev 36 RB = Rev 36 RC = Rev 36 RD = Rev 36 RE = Rev 36 DF = Dir 60 DG = Dir 60 RG = Rev 60 K4 only DH = Dir 60 RH = Rev 60 RQ = Rev 60 RT = Rev 60
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Positioner - Position 12 & 13 A = None MI = Moore I/P MP = Moore P 4P = PMV P4 P 5I = PMV P5 I/P 5P = PMV P5 P
Positioner Set Position 14 & 15 01 = None 02 = 8-15/4-20 mA 03 = 3-9/4-12 mA 04 = 9-15/12-20 mA
Accessories - Position 16 & 17 01 = None 02 = Limit Switch, Mechanical 03 = Limit Switch, Proximity Sw. 04 = Feedback Potentiometer 1K 05 = Feedback 4-20mA Posit. Tra



KOMBAT SERIES K CONTROL VALVE

SPECIFICATION

Valve shall be pneumatically or electrically actuated, have a bronze or cast iron body and meet ANSI B16.15 Class 250 or ANSI B16.1 Class 125 accommodating pressures to 400 PSIG. Guiding shall be low friction utilizing spring loaded self adjusting chevron type teflon packing, burnished stem and double guided stainless steel monolithic disc assembly. Valve trim shall be erosion resistant stainless steel with a modified equal percent flow characteristic capable of exceeding ANSI/FCI 70-2 Class IV shut off. Valve connections shall be female NPT with integral galvanized cast iron unions or flanged.

Pneumatic actuator shall be 36 sq. in. or 60 sq. in. and have a high thrust multi spring diaphragm. Actuator components shall be stainless steel and epoxy coated. Fixed 3-15 pound springs shall be utilized to accommodate standard controller outputs without a positioner.

The electric actuator shall accept 0-10 VDC, 4-20 mA or 0-135 ohm input signal. Spring shall return to initial position on loss of signal. Actuator shall have manual override. It shall close to 400 psi. Enclosure shall meet NEMA 1.

MATERIALS OF CONSTRUCTION

Body K1, K3, K5, K6, K7 Bronze ASTM B62
K4 Cast Iron ASTM A126 CL B
Bonnet K4 DI ASTM A536 65-45-12
Seat K1, K3, K5, K6, K7 303 SS ASTM A276
K4 420 SS ASTM A743
Plug/Stem Assy K1, K3, K5, K6, K7 303 SS ASTM A276
Plug K4 420 SS ASTM A743
Stem 303SS ASTM A582
Stem Guide - Body K1, K3, K5, K6, K7 ... 301 SS/Monel/Brass
Live Loaded Packing PTFE/302 SS Spring/Viton O-Ring
Actuator Casing K1, K3, K4 ... Steel SAE 1006 - 1008/Epoxy
K5, K6, K7 Powder Coated Aluminum
Actuator Spring K1, K3, K4 Music Wire ASTM A228
Diaphragm K1, K3, K4 Nitrile/Polyester
Yoke K1, K3, K4 D Iron ASTM A536/Epoxy
K5, K6, K7 Powder Coated Aluminum

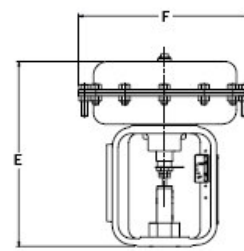
MAXIMUM RATED FLOW COEFFICIENTS* (Cv)

VALVE	VALVE SIZE								
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
2-WAY	5.2	7	11	20	25	30	71	94	146
3-WAY	5.4	6.4	8.7	19.5	24	34	—	—	—

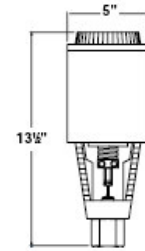
*See Flow Characteristic Chart on following pages.

K1, K4, K5 & K6 DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

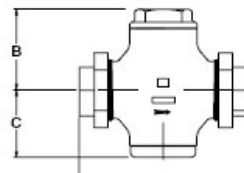
Size	A	B	C	Weight		
				K1, K4	K1, K4	K5, K6
				36 in ²	60 in ²	
1/2-3/4 (15)-(20)	5 1/2 (140)	11 1/8 (43)	1 3/8 (30)	21 (9.5)	—	13 (6)
1 (25)	7 3/8 (183)	2 1/8 (74)	2 5/8 (58)	25 1/2 (11.6)	39 (17)	17 1/2 (8)
1 1/4-1 1/2 (32)-(40)	8 7/8 (226)	3 3/8 (79)	2 3/4 (74)	31 1/2 (14.3)	45 (20)	23 3/8 (11)
2 (50)	8 7/8 (226)	3 3/8 (79)	2 3/4 (74)	33 1/2 (15.2)	47 (21)	25 1/2 (12)
2 1/2 (65)	9 (238)	5 1/4 (133)	4 (118)	—	72 (33)	—
3 (80)	10 (254)	6 1/8 (155)	5 3/8 (136)	—	84 (39)	—
4 (100)	11 1/8 (302)	7 1/8 (181)	7 3/8 (187)	—	145 (66)	—



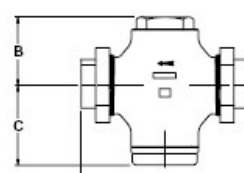
K1, K3, K4 ACTUATOR



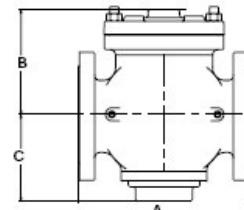
K5, K6, K7 ACTUATOR



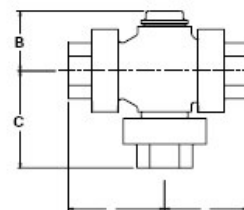
K1, K5 1/2" - 2"



K6 1/2" - 2"



K4 2 1/2" - 4"



K3, K7 1/2" - 2"

PNEUMATIC ACTUATOR DIMENSIONS inches (mm)

Size	E		F	
	36 in ²	60 in ²	36 in ²	60 in ²
1/2-3/4 (15)-(20)	9 3/8 (251)	—	9 3/4 (235)	—
1 (25)	9 3/8 (251)	11 1/4 (298)	9 3/4 (235)	11 1/4 (286)
1 1/4-1 1/2 (32)-(40)	9 3/8 (251)	11 1/4 (298)	9 3/4 (235)	11 1/4 (286)
2 (50)	9 3/8 (251)	11 1/4 (298)	9 3/4 (235)	11 1/4 (286)
2 1/2 (65)	—	11 1/4 (302)	—	11 1/4 (286)
3 (80)	—	11 1/4 (302)	—	11 1/4 (286)
4 (100)	—	11 1/4 (302)	—	11 1/4 (286)

K3, K7 DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

Size	A	B	C	D	Weight	
					36 in ²	60 in ²
1/2-3/4 (15)-(20)	3 3/8 (92)	3 3/8 (84)	4 1/8 (105)	2 1/8 (73)	28 (13)	—
1 (25)	3 3/8 (92)	3 3/8 (84)	4 1/8 (105)	2 1/8 (73)	28 (13)	—
1 1/4 (32)	4 1/8 (119)	4 1/8 (105)	4 1/8 (119)	3 1/8 (79)	35 (16)	48 (22)
1 1/2 (40)	4 1/8 (119)	4 1/8 (105)	4 1/8 (119)	3 1/8 (79)	37 (17)	50 (23)
2 (50)	4 3/8 (124)	4 3/8 (106)	4 3/8 (125)	3 3/8 (79)	42 (19)	55 (25)

Control Tip: Pair with Airmaster Pneumatic Temperature Controller for local temperature control. SEE PAGE 83.

Control Tip: Install with Model 65A Air Filter Regulator to convert plant air to instrument quality air. SEE PAGE 187.

KOMBAT SERIES K
CONTROL VALVES

K1, K4, K5, K6 SATURATED STEAM CAPACITY TABLE

(Modified Equal Percent Contour Plug) (Lb/Hr)

KOMBAT STEAM
CAPACITY TABLE

Pressure (PSI)		Valve Size and Port												
P1	P2	1/2" C	1/2" E	1/2" A	1/2" B	1/2" T	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
10	5	22	65	102	133	161	217	341	620	775	930	2237	2962	4601
	0	27	81	128	166	201	270	425	773	966	1159	2846	3768	5853
15	10	24	72	114	148	179	241	379	689	861	1033	2477	3280	5094
	5	31	92	145	189	229	308	484	880	1099	1319	3216	4257	6613
20	0	34	101	159	207	250	337	529	962	1202	1443	3586	4748	7374
	15	26	79	124	161	195	262	412	750	937	1125	2692	3565	5537
30	10	34	102	161	209	253	341	536	974	1217	1461	3543	4691	7286
	0	40	119	187	243	294	396	623	1132	1416	1699	4262	5643	8765
40	25	30	90	142	184	223	300	472	858	1072	1287	3072	4067	6316
	15	46	137	215	280	338	455	715	1301	1626	1951	4755	6295	9778
50	0	51	152	239	312	377	507	797	1450	1812	2174	5525	7315	11362
	25	52	156	245	319	385	519	815	1482	1852	2223	5384	7128	11071
60	15	59	178	280	365	442	595	935	1699	2124	2549	6297	8337	12948
	0	62	185	290	378	457	615	967	1758	2198	2637	6724	8903	13827
75	35	57	172	271	353	427	575	903	1643	2053	2464	5943	7869	12222
	30	63	190	299	389	470	633	995	1809	2262	2714	6596	8732	13563
80	25	67	202	318	414	501	674	1059	1925	2406	2888	7076	9368	14550
	2-0	72	217	341	444	537	723	1136	2066	2582	3099	7905	10466	16256
90	45	63	188	295	384	464	625	982	1786	2232	2679	6444	8531	13250
	40	69	208	327	426	515	693	1090	1981	2477	2972	7194	9524	14792
100	35	74	223	351	457	552	744	1169	2125	2656	3187	7767	10282	15971
	4-0	83	249	391	509	616	829	1303	2370	2962	3555	9067	12005	18645
110	55	77	232	365	476	575	774	1216	2212	2765	3318	7996	10587	16443
	50	84	251	395	514	622	837	1315	2391	2989	3587	8690	11505	17870
120	45	89	266	417	544	658	885	1391	2530	3162	3795	9246	12241	19013
	8-0	99	296	466	607	734	988	1552	2822	3527	4233	10797	14294	22202
130	75	97	291	457	596	721	970	1525	2773	3466	4159	10020	13266	20604
	60	113	340	534	696	841	1133	1780	3236	4045	4854	11845	15683	24358
140	15-0	125	375	589	767	927	1249	1962	3567	4459	5351	13649	18071	28068
	100	109	326	512	667	806	1086	1706	3102	3877	4652	11169	14787	22968
150	75	138	413	649	845	1022	1376	2163	3933	4916	5899	14409	19077	29630
	21-0	151	452	710	925	1119	1507	2367	4304	5381	6457	16470	21806	33869
160	125	119	356	560	730	882	1188	1866	3394	4242	5090	12192	16142	25071
	100	153	460	723	943	1140	1535	2412	4385	5481	6577	15975	21150	32850
170	28-0	176	529	831	1082	1309	1762	2769	5035	6293	7552	19264	25505	39614
	150	128	384	604	787	951	1281	2013	3659	4574	5489	13124	17376	26988
180	125	168	503	791	1030	1246	1677	2635	4791	5989	7187	17388	23021	35755
	100	189	567	891	1161	1403	1889	2969	5398	6747	8097	19859	26293	40838
190	35-0	202	605	951	1239	1498	2016	3168	5761	7201	8641	22031	29168	45304
	150	181	542	852	1110	1342	1806	2839	5161	6452	7742	18677	24728	38407
200	125	206	618	971	1265	1529	2059	3235	5882	7353	8823	21533	28509	44279
	41-0	227	681	1069	1393	1685	2268	3565	6481	8101	9722	24799	32833	50996
210	175	193	578	908	1183	1430	1925	3025	5500	6875	8250	-	-	-
	150	221	664	1043	1359	1644	2213	3478	6323	7904	9485	-	-	-
220	48-0	252	755	1187	1547	1870	2518	3956	7194	8992	10790	-	-	-
	200	204	611	960	1251	1512	2036	3199	5817	7271	8725	-	-	-
230	150	256	769	1208	1574	1904	2563	4027	7322	9153	10984	-	-	-
	100	275	825	1297	1690	2044	2752	4324	7862	9827	11792	-	-	-
240	54-0	277	830	1304	1699	2055	2766	4346	7902	9878	11854	-	-	-

- It is recommended to keep valve outlet velocity below 30,000 ft./min.
- Capacities based on maximum Cv.



K1, K4, K5, K6 WATER CAPACITY TABLE

(Modified Equal Percent Contour Plug) (G.P.M.)

KOMBAT WATER CAPACITY TABLE

Pressure (PSI)		Valve Size and Port												
P1	P2	1/2" C	1/2" E	1/2" A	1/2" B	1/2" T	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
10	5	2	5	7	10	12	16	25	45	56	67	159	210	326
	3	2	6	9	11	14	19	29	53	66	79	188	249	386
15	10	2	5	7	10	12	16	25	45	56	67	159	210	326
	7	2	6	9	12	15	20	31	57	71	85	201	266	413
	4	2	7	11	14	17	23	36	66	83	99	235	312	484
20	15	2	5	7	10	12	16	25	45	56	67	159	210	326
	10	2	7	10	14	16	22	35	63	79	95	225	297	462
	5	3	8	13	17	20	27	43	77	97	116	275	364	565
30	22	2	6	9	12	15	20	31	57	71	85	201	266	413
	17	3	8	12	16	19	25	40	72	90	108	256	339	526
	6	3	10	16	21	25	34	54	98	122	147	348	461	715
40	25	3	8	13	17	20	27	43	77	97	116	275	364	565
	20	3	9	15	19	23	31	49	89	112	134	318	420	653
	8	4	12	19	24	29	40	62	113	141	170	402	532	826
50	35	3	8	13	17	20	27	43	77	97	116	275	364	565
	30	3	9	15	19	23	31	49	89	112	134	318	420	653
	25	4	11	17	22	26	35	55	100	125	150	355	470	730
	10	4	13	21	27	33	44	70	126	158	190	449	595	923
60	50	2	7	10	14	16	22	35	63	79	95	225	297	462
	40	3	9	15	19	23	31	49	89	112	134	318	420	653
	25	4	12	20	25	31	41	65	118	148	177	420	556	864
	12	5	15	23	30	36	48	76	139	173	208	492	651	1012
75	70	2	5	7	10	12	16	25	45	56	67	159	210	326
	50	4	11	17	22	26	35	55	100	125	150	355	470	730
	25	5	15	23	30	37	49	78	141	177	212	502	665	1032
	15	5	16	26	33	40	54	85	155	194	232	550	728	1131
100	75	4	11	17	22	26	35	55	100	125	150	355	470	730
	60	4	13	21	27	33	44	70	126	158	190	449	595	923
	20	6	19	30	38	47	63	98	179	224	268	635	841	1306
125	100	4	11	17	22	26	35	55	100	125	150	355	470	730
	75	5	15	23	30	37	49	78	141	177	212	502	665	1032
	24	7	21	33	43	52	70	111	201	251	301	714	945	1467
150	125	4	11	17	22	26	35	55	100	125	150	355	470	730
	100	5	15	23	30	37	49	78	141	177	212	502	665	1032
	29	8	23	36	47	57	77	121	220	275	330	781	1034	1606
175	150	4	11	17	22	26	35	55	100	125	150	355	470	730
	125	5	15	23	30	37	49	78	141	177	212	502	665	1032
	100	6	18	29	37	45	61	95	173	217	260	615	814	1264
	34	8	25	39	51	62	83	131	237	297	356	843	1116	1734
200	150	5	15	23	30	37	49	78	141	177	212	502	665	1032
	100	7	21	33	43	52	70	110	200	250	300	710	940	1460
	39	9	27	42	55	66	89	140	254	317	381	901	1193	1853
225	175	5	15	23	30	37	49	78	141	177	212	-	-	-
	100	8	23	37	48	58	78	123	224	280	335	-	-	-
	43	9	28	45	58	70	94	148	270	337	405	-	-	-
250	200	5	15	23	30	37	49	78	141	177	212	-	-	-
	150	7	21	33	43	52	70	110	200	250	300	-	-	-
	100	9	26	40	53	64	86	135	245	306	367	-	-	-
300	48	10	30	47	61	74	99	156	284	355	426	-	-	-
	250	5	15	23	30	37	49	78	141	177	212	-	-	-
	150	9	26	40	53	64	86	135	245	306	367	-	-	-
	58	11	33	51	67	81	109	171	311	389	467	-	-	-
400	350	5	15	23	30	37	49	78	141	177	212	-	-	-
	200	10	30	47	61	74	99	156	283	354	424	-	-	-
	77	13	38	59	77	93	126	198	359	449	539	-	-	-

- It is recommended to keep valve outlet velocity below 30,000 ft./min.
- Capacities based on maximum Cv.

