HB Series Control Valve with Pneumatic Actuator

Models	**HB Series**
Service	**Steam, Air, Water**
Sizes	**1/2", 3/4", 1", 1 1/2", 2"**
Connections	**NPT, 150# FLG, 300# FLG**
Body Material	**316 Stainless Steel**
Plug and Seat Material	**Stainless Steel**
PMA Max. Operating Pressure	**720 PSIG @ 100˚F**
TMA Max. Operating Temperature	**450˚F @ 497 PSIG**
Min Operating Temperature	**-20˚F**
Max Air Supply Pressure	**40 PSIG**
Max Ambient Temperature	**280˚F**
Min Ambient Temperature	**-20˚F**

DESIGN PRESSURE/TEMPERATURE RATING – PMA/TMA

NPT	**300 PSIG**	**@ 450˚F**
150# FLG	**150 PSIG**	**@ 450˚F**
300# FLG	**300 PSIG**	**@ 450˚F**

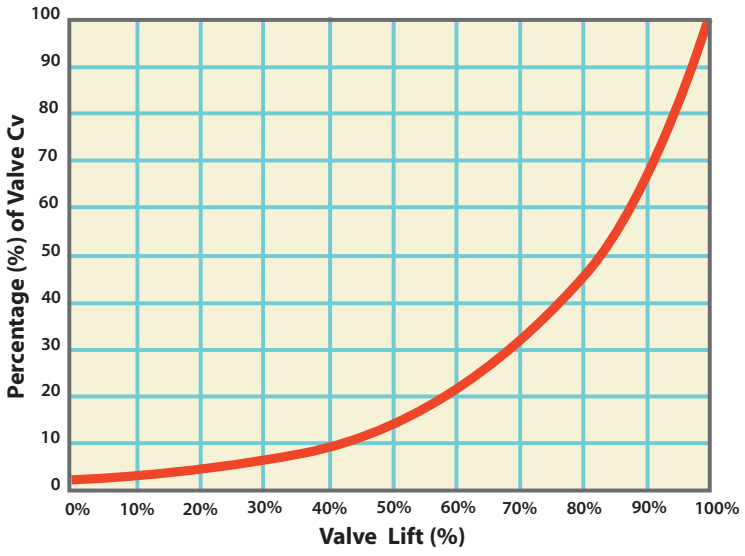
These Control Valve feature all 316 Stainless Steel bodies and trim for use with Steam, Water, Glycol and other chemically compatible fluids.

CONTROL VALVES

The **HB Series** is a high performance, general service control valve designed using Computational Fluid Dynamics (CFD) for high control accuracy, optimized flow characteristics and extended service life. These control valves, with stainless steel bodies, are equipped with a contoured plug design to withstand the rigorous nature of steam service and are compatible with many fluids and environments. Modern manufacturing techniques and modular construction allows these stainless steel valves to be extremely cost-effective in comparison to valves with bronze, cast iron or cast steel bodies. The standard configuration has an equal percentage flow characteristic with metal-to-metal seating, spring-loaded Teflon V-ring stem packing and pneumatic actuator. The HB Series is available with both pneumatic or electric actuation.

Description & Operation

A control valve is a device capable of modulating flow at varying degrees between minimal flow and full capacity in response to a signal from an external control device. The valve modulates flow through movement of a valve plug in relation to the port(s) located within the valve body. The valve plug is attached to a valve stem, which, in turn, is connected to the actuator. The actuator, which can be pneumatically or electrically operated, directs the movement of the stem as dictated by the external control device.



Options & Associated Control Loop Accessories

- Electric Actuators
- Positioner: Pneumatic, Electro-Pneumatic or Explosion-Proof
- PID Electronic Controllers (TR890 Series)
- I/P converters (Model TA901)
- Air Filter Regulators (Air Sets-Model TA987)
- Thermocouples
- RTD's
- Pressure Transmitters

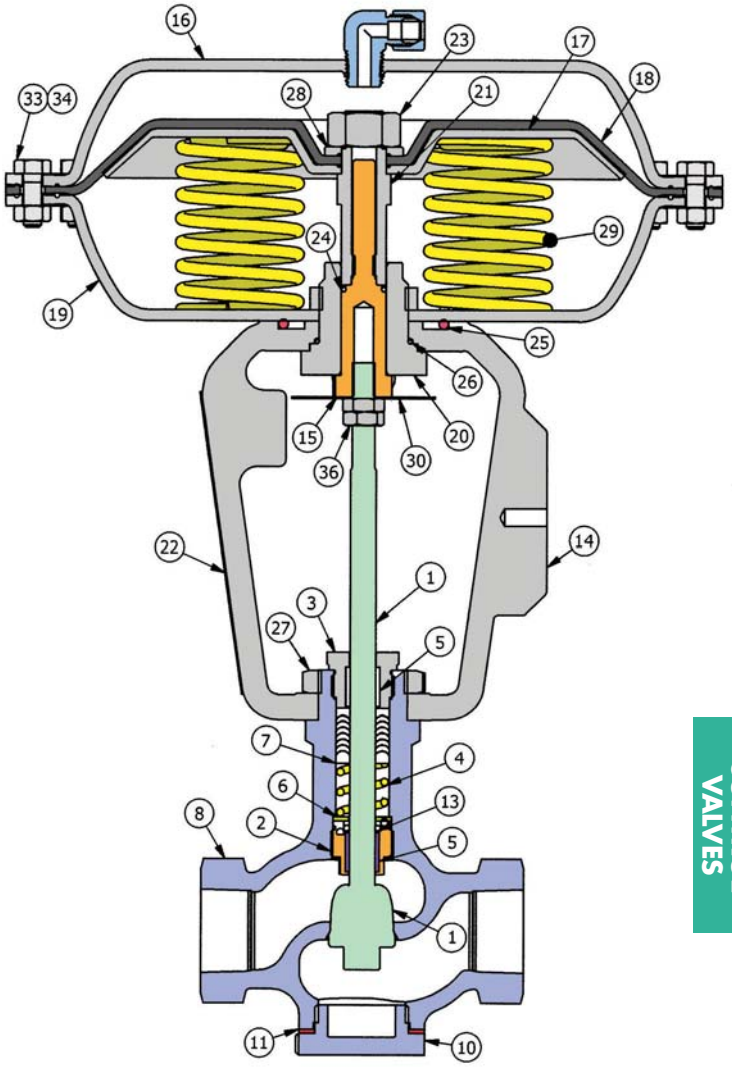
HB Series Control Valve with Pneumatic Actuator

MATERIALS • Pneumatic Actuator		
14	Yoke	Stainless steel
15	Lower actuator stem	Stainless steel
16	Upper diaphragm case	Epoxy painted steel
17	Diaphragm plate	Nickel plated steel
18	Diaphragm*	Nylon reinforced Neoprene
19	Lower diaphragm case	Epoxy painted steel
20	Upper guide bush	SS/Bronze Impregnated
21	Upper actuator stem	Stainless steel
22	Nameplate	Stainless steel
23	Hex nut	Stainless steel
24	Stem O-ring*	Viton
25	Yoke O-ring*	Viton
26	Upper guide O-ring*	Viton
27	Ring nut*	Stainless steel
28	Diaphragm washer	Stainless steel
29	Springs†	Stainless steel
30	Position indicator disc	Stainless steel
33/34	Hex bolt & nut	Grade 5 steel zinc plated

† **Air-To-Open Actuator**: 6 Actuator Springs
† **Air-To-Close Actuator**: 3 Actuator Springs
Diaphragm Area = 47 in²

MATERIALS • Valve Body		
1	Stem & Plug Assembly*	Stem: 316 SS, Plug: 303 SS
2	Lower Seal Bushing	303 Stainless Steel
3	Gland Nut	303 Stainless Steel
4	Stem Seal Spring*	302 Stainless Steel
5	Guide Bushing*	Rulon 641
6	Washer	303 Stainless Steel
7	V-ring Stem Seals*	PTFE
8	Body	316 Stainless Steel
10	Body Plug	316 Stainless Steel
11	Body Gasket*	303 Stainless Steel
13	Packing O-Ring	PTFE

* Available as part of a spares kit.



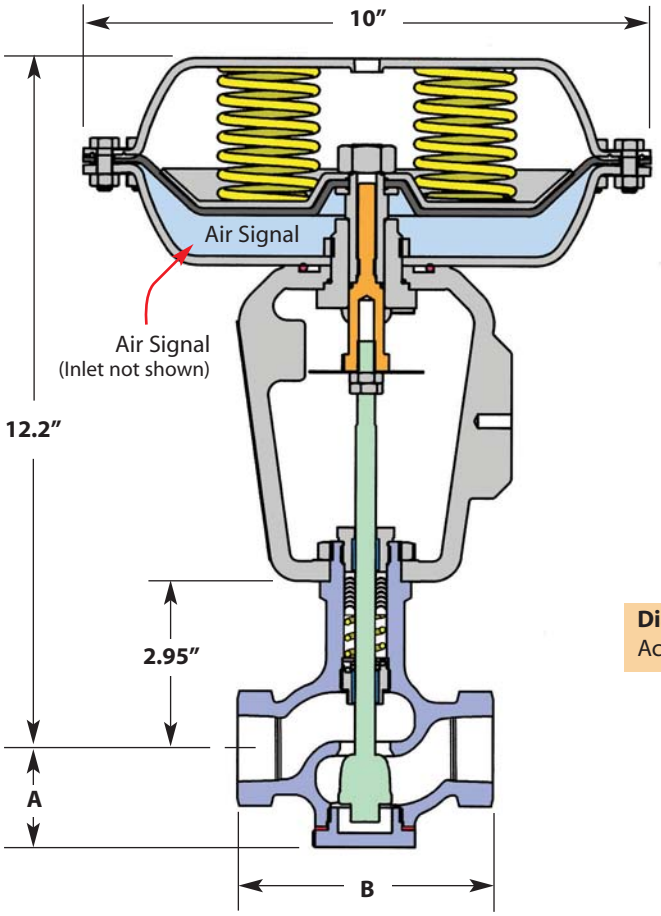
150# FLG or 300# FLG Available

Technical Information	
Plug Design	Contoured
Flow Characteristics	Equal Percentage
Leakage Rating	ANSI/FCI 70-2 Class IV
Rangeability	50:1
Travel	3/4"
Actuator Area	47 sq. in.
Body Design Rating	Class 300
Primary Stem Seals	PTFE Live-Loaded V-Ring
Diaphragm Design	Semi-Rolling
Design	Multi-Spring Diaphragm
Action (field-reversible)	Air-to-Open Air-to-Close
Positioner Mounting	IEC 60534-6-1 (NAMUR)
Stem Wiper	O-Ring

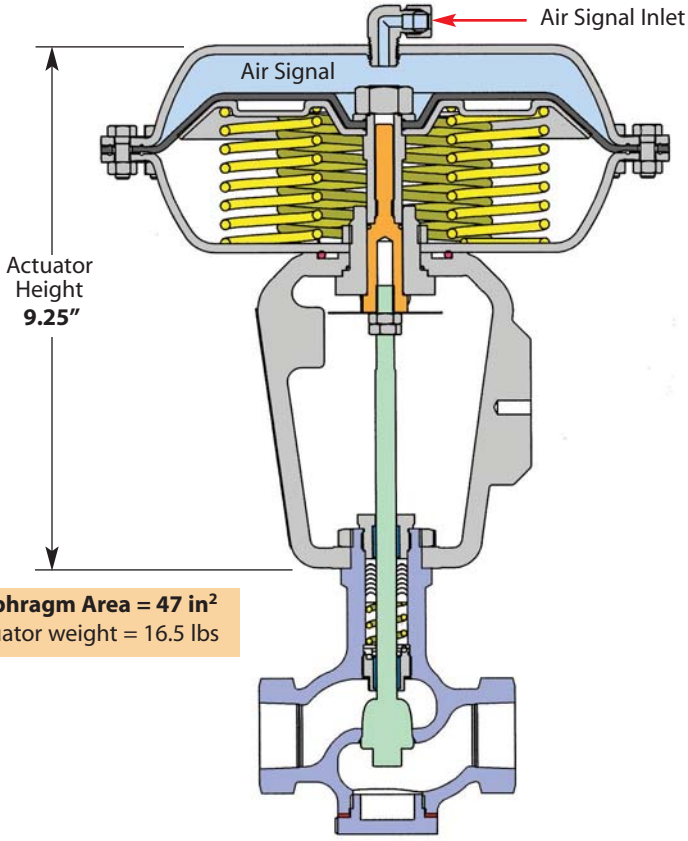
CONTROL VALVES

HB Series Control Valve with Pneumatic Actuator

Air-to-Close
(Normally Open)



Air-to-Open
(Normally Closed)



Diaphragm Area = 47 in²
Actuator weight = 16.5 lbs

HB Control Valve Selection

Model HB	Size Connection (NPT)	C_v Full Port	C_v Reduced Port	Close-Off Pressure (PSI△P) No Positioner	Close-Off Pressure (PSI△P) Positioner	A	NPT B	FLG #150 B	FLG #300 B	Approximate Weight
Air-To-CLOSE (Normally OPEN)										
HB-12-N-ATC	1/2"	5.0	3.5	300	300	1.76	4.5	7.25	7.75	22 lbs [10 kg]
HB-13-N-ATC	3/4"	6.5	3.5	300	300	1.76	4.5	7.25	7.75	22 lbs [10 kg]
HB-14-N-ATC	1"	10	7	300	300	1.74	4.5	7.25	7.75	24 lbs [11 kg]
HB-16-N-ATC	1 1/2"	22	17.5	230	300	2.15	5.0	8.75	9.25	26 lbs [12 kg]
HB-17-N-ATC	2"	42	32	120	300	2.31	6.0	10	10.5	29 lbs [13 kg]
Air-To-OPEN (Normally CLOSED)										
HB-12-N-ATO	1/2"	5.0	3.5	300	300	1.76	4.5	7.25	7.75	22 lbs [10 kg]
HB-13-N-ATO	3/4"	6.5	3.5	300	300	1.76	4.5	7.25	7.75	22 lbs [10 kg]
HB-14-N-ATO	1"	10	7	300	300	1.74	4.5	7.25	7.75	24 lbs [11 kg]
HB-16-N-ATO	1 1/2"	22	17.5	170	225	2.15	5.0	8.75	9.25	26 lbs [12 kg]
HB-17-N-ATO	2"	42	32	85	135	2.31	6.0	10	10.5	29 lbs [13 kg]

Model Code Configuration Chart

Models		Code	Size	Code	Connection Type	Actuator	
HB	Full Port	**12**	1/2”	**N**	NPT	**ATC**	Air-to-Close
HBR	Reduced Port	**13**	3/4”	**F150**	150# FLG	**ATO**	Air-to-Open
		14	1”	**F300**	300# FLG		
		16	1 1/2”				
		17	2”				

HB Series Control Valve with Pneumatic Actuator

Type 2000 Valve Positioner

(Pneumatic or **Electro-Pneumatic)**

Type 2000 Valve Positioners (Pneumatic and Electro-Pneumatic) are mechanical devices designed to provide enhanced control, stability, and shut-off capability in extreme flow applications. The positioner, which is mounted to the valve's yoke assembly and linked to the valve stem, receives a signal from an external control source, compares the control signal to the actual position of the valve plug, and then sends a corrected signal to the valve's actuator, thereby positioning the valve plug for optimum flow modulation.

Type-2000	Pneumatic	Electro-Pneumatic
Input Signal	3-15 PSI	4-20 mA
Supply Pressure	145 PSI maximum	21.8 - 145 PSI
Linearity Error	0.7 % full span	<1.0% of full span
Hysteresis	0.4 % full span	<0.6% of full span
Repeatability	0.3 % full span	<0.5% of full span
Pressure Gain	750 P-out/P-in	750 P-out/P-in
Flow Capacity	SCFM	SCFM
@20 PSI	9.5	9.5
@87 PSI	28.3	28.3
@145 PSI	47.1	47.1
Air Consumption	SCFM	SCFM
@20 PSI	0.18	0.2
@87 PSI	0.53	0.6
@145 PSI	0.88	1.0
Impedance		260 Ohms at 70° F
Loop Load		5.2 Volts at 70° F
Port Size	1/4" NPT; Gauge Ports 1/8" NPT	1/2" NPT
Temperature Range	-40° F – 185° F	
Media	Oil-free Instrument Air Filtered to 40 micron	
Enclosure	NEMA 4X	

Type 2000 Valve Positioner
(Pneumatic or **Electro-Pneumatic)**

Valve Positioner Model Code Configuration

Example Model : **CA2000L1C3N**

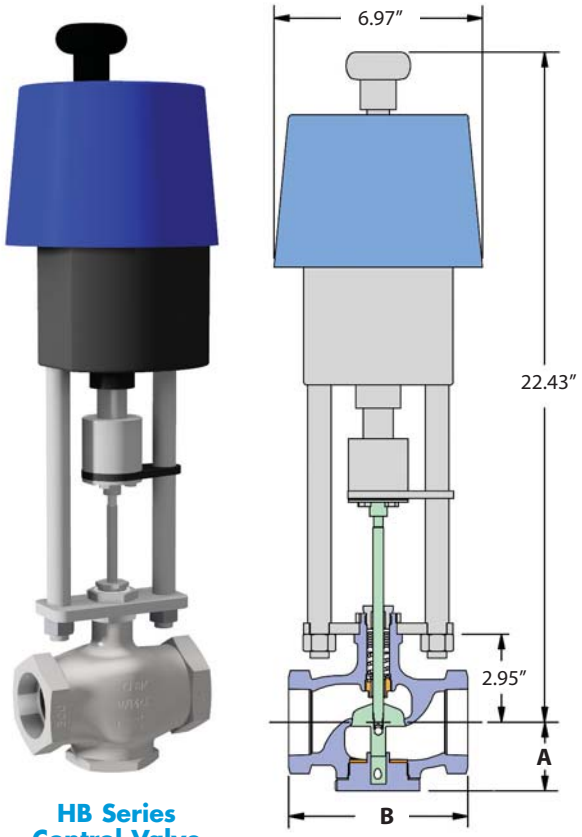
Model	Postioner Type	Indicator	Code
CA2000L1C3	Pneumatic	None (Standard Linear)	N
CA2010L1C3	Electro-Pneumatic	Dome (Option)	D
CA2020L1C3	Explosion-Proof		

CONTROL VALVES

HB Series Control Valve with Electric Actuator

The **HB Series Control Valve** with **Electric Actuator** is a robust, user-friendly alternative to the standard pneumatic actuator on the HB Series Control Valve. With fast and precise movement, this actuator is designed to handle a broad range of applications including instantaneous and semi-instantaneous water heaters. Ideal for installations where pneumatic lines are not present or are prohibitive.

WMEA Electric Actuator Specifications			
Power Supply	115VAC	24VAC	24VDC
Nominal Current (A)	0.66	3.15	2
Max Current (A)	0.86	4.1	2.6
Max Power Consumption (W)	57	53	48
Force	1,100 lbs		
Stem Velocity	0.088 - 0.177 in/sec		
Nominal 3/4" Travel Time	6 - 8 sec		
Duty Cycle, IEC 60034-1,8	S2 30min S4 50% ED @ 77°F		
Ambient Temperature	-4 to 140°F		
Shut-off Pressure (1/2" to 2" HB)	300 psig		
Actuator Weight	17.6 lbs		



HB Series Control Valve
(with Electric Actuator)

(For valve dimensions refer to HB Selection Chart)

CONTROL VALVES

Features and Benefits

- **Fast Response:** These actuators are respond extremely fast and will fully open or close the HB Control Valve in approximately 6 seconds making them ideal for instantaneous and semi-instantaneous water heaters. Typical signal response time is 2-3 seconds.
- **Fail-Safe Mode:** Super capacitors are used to drive the valve fully-closed or open in the event of power loss to the actuator. This replaces common back-ups such as springs with limited thrust or batteries with a limited life span.
- **High Stem Thrust:** Allows close-off of all HB valves sizes against the full rating of 300 psig.
- **Integral Positioner:** Accepts 4/0-20mA or 2/0-10 VDC control signals, eliminating the need for a separate I/P transducer.
- **Field-Configurable:** Using a PC, the actuator can be field-configured for minimum closing position, maximum opening position, fail-open, fail-close or stay-put failure mode in the event of power loss.

Options & Associated Control Loop Accessories

- USB Kit for parameter customization
- PID Electronic Controllers (TR890 Series)
- Thermocouples
- RTD's
- Pressure Transmitters

Additional Technical Information	
Motor Protection	Electric motor current monitoring with safety cut-off
Set Value Feedback	4/0-20mA or 2/0-10 VDC selectable, split range operation
Valve Positioner Function	Integrated positioner, deadband adjustable from 0.5 to 5%, shutoff min
Automatic Start-up	Recognizing the end position(s) and auto-scaling set and feedback values
Internal Fault Monitoring	Torque, set value, temperature, power supply, positioning deviation, etc
Diagnostic Function	Stores accumulated operation data (motor & total run time, number of starts) and data sets of current values (set value, feedback value, torque, temp, and error messages
Communication Interface	USB interface with Software - enables parameter adjustments
Cable Glands	2x M20x1.5 & 1x M16x1.5

Model Code Configuration Chart

Models		Code	Size	Code	Connection Type	Actuator		Power	
HB	Full Port	**12**	1/2″	**N**	NPT	**EFC**	Fail-Closed	**24V**	24VAC/DC
HBR	Reduced Port	**13**	3/4″	**F150**	150# FLG	**EFO**	Fail-Open	**115V**	115VAC
		14	1″	**F300**	300# FLG				
		16	1 1/2″						
		17	2″						

CAPACITIES – Steam (lbs/hr)

Inlet Pressure (PSIG)	Outlet Pressure (PSIG)	ΔP PSI	Reduced Port 1/2"	1/2"	3/4"	1"	1 1/2"	2"
	C_V Factors		3.5	5.0	6.5	10	22	42
	Orifice Size (in)		0.88	0.88	0.88	0.88	1.25	1.75
5	4	1	48	68	89	136	300	573
	0	5	96	137	178	274	602	1149
	-4	9	114	162	211	325	714	1363
	-8	**13**	**119**	**170**	**220**	**339**	**746**	**1424**
10	9	1	53	76	99	153	336	641
	5	5	110	156	203	313	689	1315
	0	10	138	197	255	393	865	1651
	-7	**17**	**148**	**211**	**274**	**422**	**929**	**1773**
15	10	5	122	174	226	348	765	1460
	5	10	156	223	290	447	983	1876
	0	15	172	246	320	492	1082	2066
	-5	**20**	**177**	**252**	**328**	**505**	**1110**	**2119**
20	15	5	133	189	246	379	833	1591
	10	10	173	247	321	494	1088	2076
	5	15	194	277	361	555	1221	2330
	-3	**23**	**205**	**293**	**381**	**587**	**1291**	**2464**
30	25	5	152	217	282	434	955	1822
	15	15	232	331	431	663	1459	2785
	5	25	260	371	482	742	1631	3115
	0	**30**	**262**	**375**	**487**	**750**	**1649**	**3149**
50	40	10	250	357	464	714	1570	2997
	30	20	324	463	601	925	2035	3886
	15	35	370	529	687	1057	2326	4440
	7	**43**	**376**	**537**	**697**	**1073**	**2361**	**4507**
80	70	10	307	438	570	877	1929	3682
	50	30	472	675	877	1350	2970	5670
	30	50	534	763	992	1525	3356	6407
	17	**63**	**544**	**777**	**1010**	**1554**	**3418**	**6526**
100	85	15	406	580	754	1160	2552	4872
	60	40	586	837	1089	1675	3684	7034
	40	60	643	918	1193	1836	4039	7710
	23	**77**	**655**	**936**	**1217**	**1872**	**4119**	**7864**
125	110	15	452	645	839	1290	2838	5418
	85	40	668	954	1240	1908	4199	8015
	50	75	782	1117	1452	2233	4913	9380
	31	**94**	**794**	**1135**	**1475**	**2270**	**4993**	**9532**
150	130	20	560	800	1040	1600	3519	6718
	100	50	800	1143	1485	2285	5027	9598
	70	80	904	1291	1678	2582	5680	10844
	40	**110**	**933**	**1333**	**1733**	**2666**	**5865**	**11196**
175	150	25	666	952	1237	1903	4187	7994
	115	60	931	1329	1728	2659	5850	11167
	75	100	1052	1503	1953	3005	6612	12622
	48	**127**	**1072**	**1531**	**1990**	**3062**	**6736**	**12859**
200	175	25	713	1018	1324	2037	4481	8554
	130	70	1061	1515	1970	3031	6668	12730
	90	110	1183	1690	2196	3379	7434	14192
	56	**144**	**1210**	**1729**	**2247**	**3457**	**7606**	**14521**
250	225	25	798	1140	1482	2281	5017	9578
	170	80	1273	1819	2364	3637	8002	15276
	120	130	1443	2062	2680	4124	9072	17319
	73	**177**	**1487**	**2125**	**2762**	**4249**	**9348**	**17846**
300	270	30	951	1359	1766	2718	5979	11414
	200	100	1535	2193	2850	4385	9648	18418
	140	160	1723	2461	3199	4922	10828	20672
	89	**211**	**1765**	**2521**	**3277**	**5042**	**11093**	**21177**

Note: The Steam Capacity Chart is based on ISA Standard 75.01.01-2007 (60534-2-1 Mod). It assumes pipe sizes equal to the size of the valve ports, with no attached fittings.

CAPACITIES – Water (GPM)

Inlet Pressure (PSIG)	Outlet Pressure (PSIG)	ΔP PSI	Reduced Port 1/2"	1/2"	3/4"	1"	1 1/2"	2"
	C_V Factors		3.5	5.0	6.5	10	22	42
	Orifice Size (in)		0.88	0.88	0.88	0.88	1.25	1.75
5	4	1	3.5	5.0	6.5	10	22	42
	0	5	7.8	11	15	22	49	94
10	7	3	6.1	8.7	11	17	38	73
	5	5	7.8	11	15	22	49	94
	0	10	11	16	21	32	70	133
15	10	5	7.8	11	15	22	49	94
	5	10	11	16	21	32	70	133
	0	15	14	20	26	39	86	165
30	25	5	7.8	11	15	22	49	94
	15	15	14	19	25	39	85	163
	7	23	17	24	31	48	106	203
50	40	10	11	16	21	32	70	133
	30	20	16	22	29	45	98	188
	16	34	20	29	38	58	128	244
80	70	10	11	16	21	32	70	133
	50	30	19	27	36	55	120	230
	30	50	25	35	46	70	155	296
100	85	15	14	19	25	39	85	163
	65	35	21	30	38	59	130	248
	40	60	27	39	50	78	171	326
125	110	15	14	19	25	39	85	163
	85	40	22	32	41	63	139	266
	52	73	30	43	56	86	188	360
150	130	20	16	22	29	45	98	188
	100	50	25	35	46	71	156	297
	63	87	33	47	60	93	205	391
200	175	25	18	25	33	50	110	210
	130	70	29	42	54	84	184	351
	87	113	37	53	69	106	234	446
250	225	25	18	25	33	50	110	210
	170	80	31	45	58	89	197	376
	111	139	41	59	77	118	260	495
300	270	30	19	27	36	55	120	230
	200	100	35	50	65	100	220	420
	134	166	45	64	84	129	283	540

Note: 1) Capacities based on 70°F water (SG = 1.00).
2) Capacities based on 100% of Cv.

CONTROL VALVES