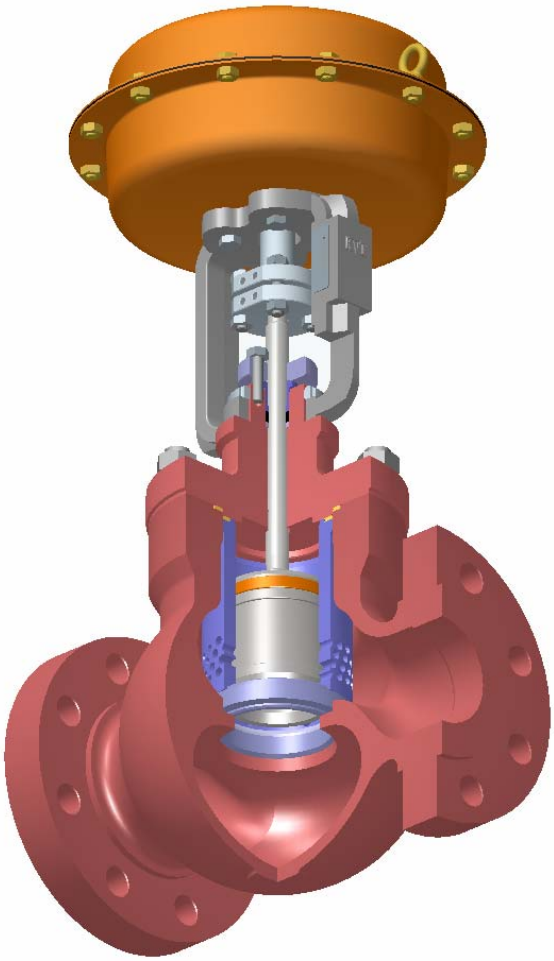
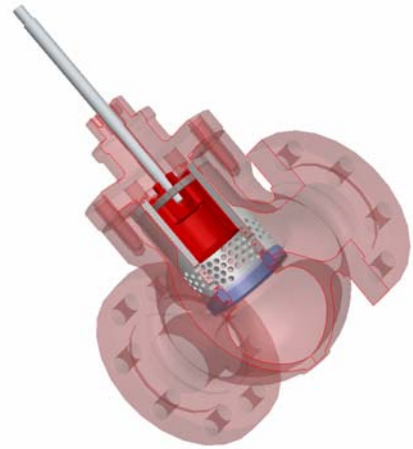
Huddersfield Valves Limited

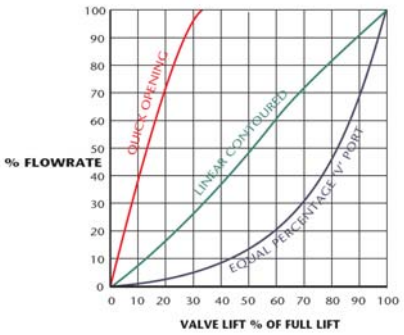
Control Valves



HV Cage Trim was developed not only to prevent cavitation but also to attenuate noise generated by high pressure drop gas and steam applications. Conventional valves usually have one vena-contracta and if critical pressure drop is required, sonic velocity is generated.
Turbulence and pressure changes in the downstream piping can become forcing functions and if the natural frequency of the system is close to the forcing function, resonance can occur. Not only will the system be noisy, but there is a risk that stresses produced by resonance could cause fatigue.

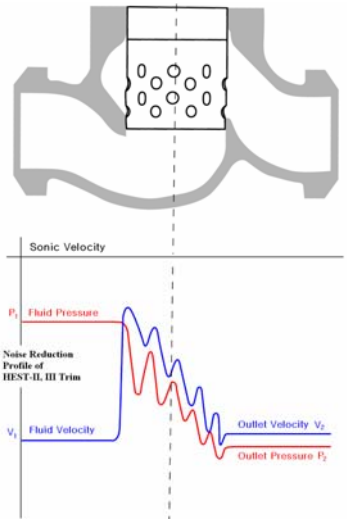


HV Cage Trim controls the gas/steam velocity to sub-sonic values through each stage of drop. As in liquid applications, flow enters the trim from under the seats and into the cylinder assembly. This unique trim is designed so that gas/steam will not reach sonic velocity at any stage. Expansion of the gas/ steam is allowed to occur immediately after the major restriction in each stage. Trim and valve size will depend on the number of stages of pressure drop and the size and number of holes required to pass the flow. In addition, by using a large number of small restrictions, the energy is broken, providing for a quiet valve.



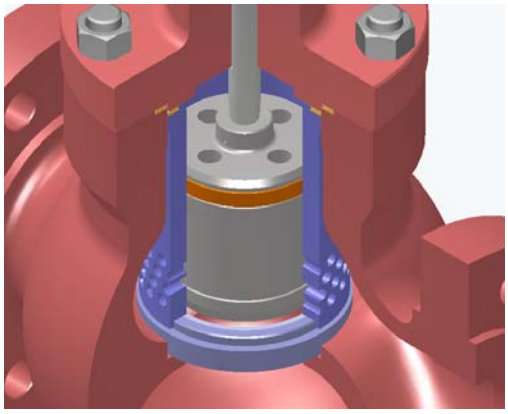
Advantages

- Prevents cavitation and flashing.
- Prevents aerated liquids from corroding/eroding trim and valve parts.
- Prevents mechanical vibration.
- Prevents sonic velocity from occurring within the valve.
- Provides high reliability and maintainability.



Recommended Applications

- Turbine Bypass
- Choke Valves
- Minimum Pump Flow Recirculation
- Anti Surge
- Boiler Feedwater
- Attemperator Spray Valve
- Overboard Dump



Contents

Control Globe Valves (Standard Globe Style)
GS ： General Service Control Valves
SD ： Severe Duty Control Valves
Angle Globe Style
3Way Globe Style
Forged Straight Through and Angle Globe

Actuators
Pneumatic
– Diaphragm Actuators
– Cylinder Actuators
Electric Actuators
Other Types

Products

Control Globe Valves (Standard Globe Style)

GS ： General Service Control Valves

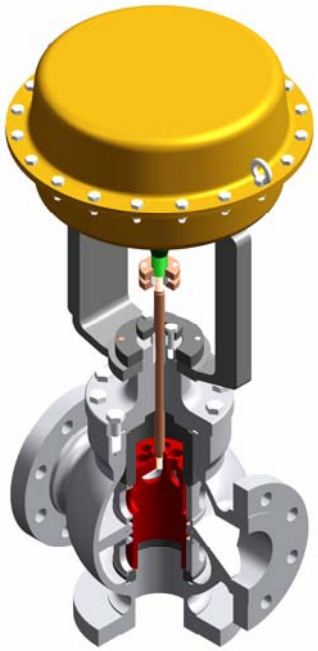
SD ： Severe Duty Control Valves

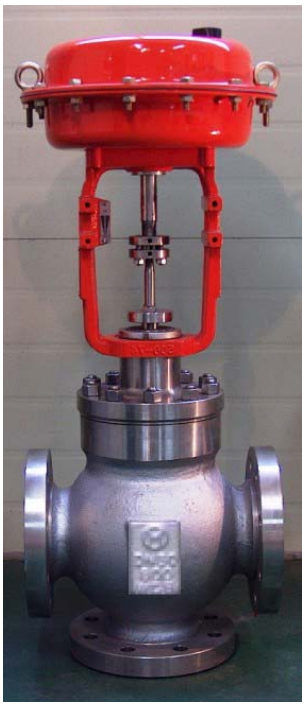
Angle Globe Style

Forged Straight Through and Angle Globe

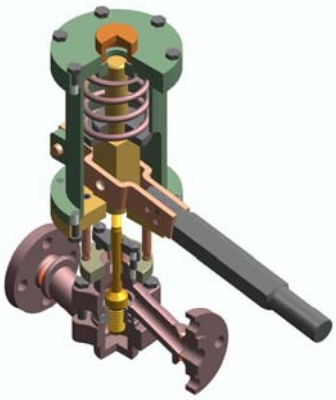
Angle Globe

3Way Globe Style





BlowDown Valves



Steam Conditioning Valves

Steam Pressure (Reducing) and Temperature (Desuperheating) Valves

- SAMO : Spring Assist Multiple Orifice Desuperheater
- MNSD : Multi Nozzle Spray Desuperheater– No need spray water control valve

Actuators

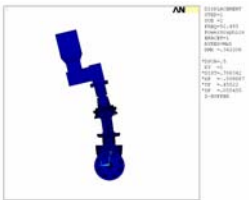
Pneumatic

- Diaphragm Actuators
- Cylinder Actuators

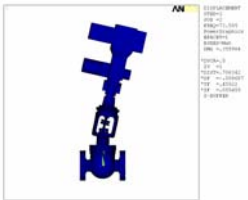
Electric Actuators

Seismic Simulation

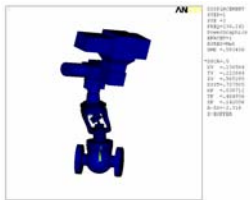
Seismic Model



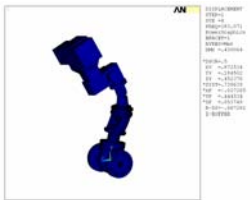
Seismic Mode-I



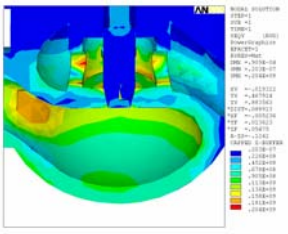
Seismic Mode-II



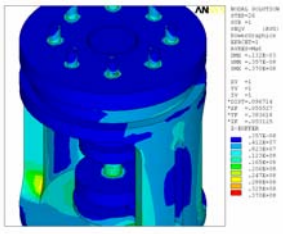
Seismic Mode-III



Seismic Mode-VI



Pressure Analysis



Stress Analysis (YOKE)

Valve on Seismic Simulator

Control Globe Valves
(Standard Globe Style)

Structure

Typical Valve Construction

Quick Change Trim Design

All HV Quick Change Trim proves the fastest possible means for inspection and replacement of valve trim. The body need not be removed from the line. No special tools are required. There is no crewed in or welded cage. It is held in place by the bonnet which is attached to the valve body by studs and nuts.

Vibration Forces Minimal

Close clearances are maintained between plug and cage and between cage and body web core. The plug is well supported in the cage, thus radial forces generated by, the fluid are controlled.

Cage Guiding

With few exceptions, HV trims are cage guided. Cage guiding, is a very durable design that provides exceptional wear life. It provides maximum support and guiding to the plug, thus minimizing trim wear in the most severe of services.

Valve Stem and Plug Connection

Valve stem is fastened to plug by a tapered connection. Threads do not absorb compressive load of fluid and operator. A precision taper on both stem and plug threads wedge them together when assembled.
Load is taken on the tapered surface. Protection against unscrewing is provided by pinning the plug an stem together.

Cage Outside Diameter Fixed

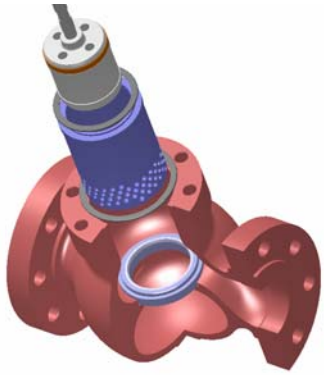
The inside diameter changes for reduced trim. Cage sealing gasket load is applied very close to the body to bonnet seal and nearly in line with the resisting gasket. The bonnet is extremely rigid and does not bend, providing an excellent seal between body and bonnet.

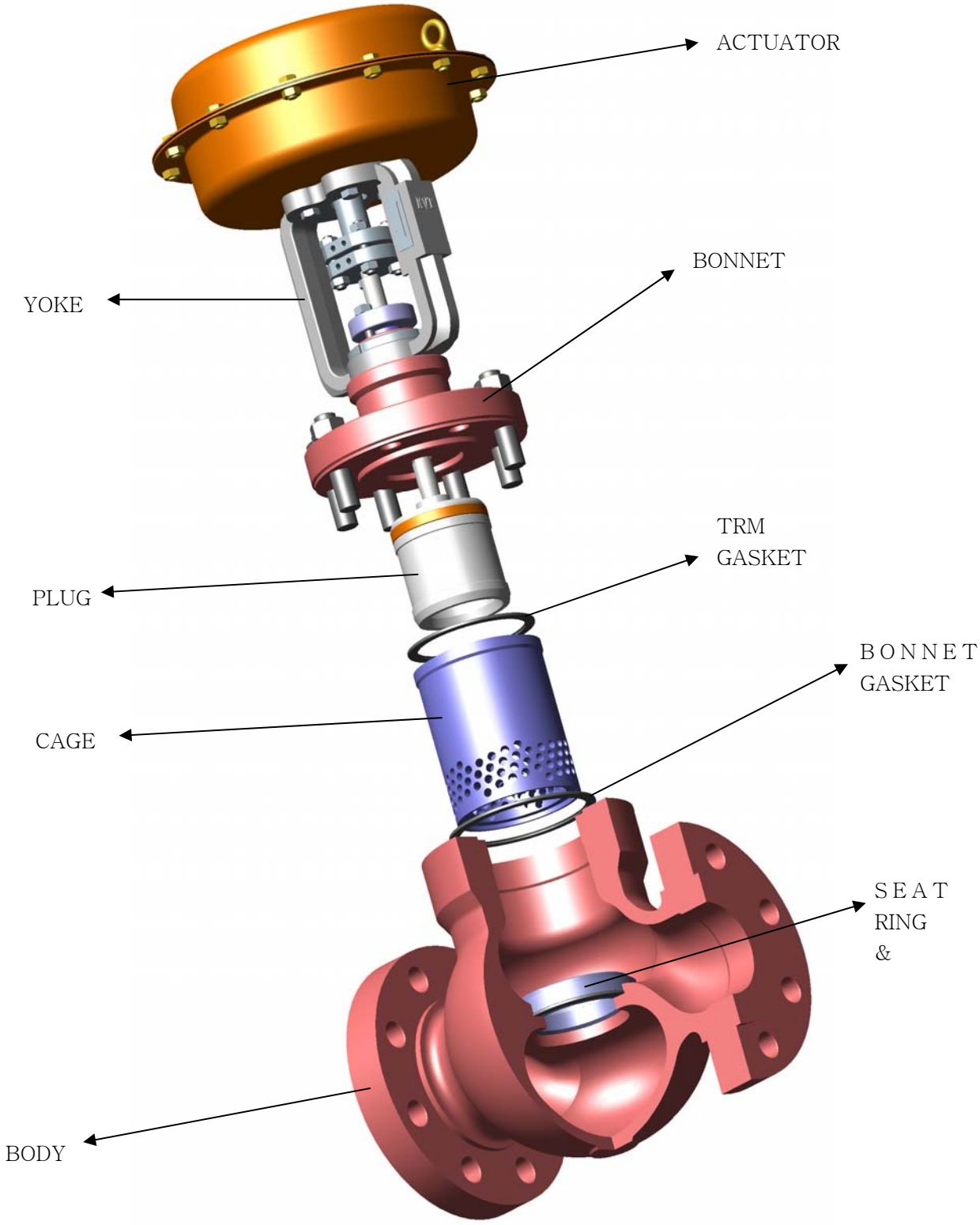
Trim Readily changed

The following easy steps are required:
. Disconnect stem from actuator junction
. Remove bonnet nuts
. Lift off actuator and bonnet
. Lift out stem and plug
. Remove bonnet gasket, cage and seat with trim gaskets
. Repair or replace trim items as required and reassemble

Gasket are Fully Trapped with Controlled Compression

Minimum deviation from optimum gasket loading is obtained. Bolted load provides necessary gasket stress to seal upstream fluid from downstream. Also, to seal down-stream fluid from atmosphere.
Unbalance or seating forces cannot over compress gaskets as all preload is absorbed by metal-to-metal contact between cage and body web and cage and bonnet.




ACTUATOR
BONNET
YOKE
TRM
GASKET
PLUG
BONNET
GASKET
CAGE
SEAT
RING
&
BODY

PRODUCT SPECIFICATION SHEET

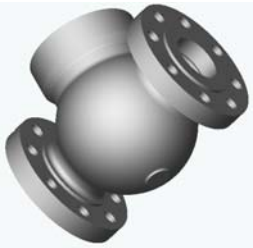
CAGE TRIM VALVES HV SERIES

Huddersfield Valves Ltd.,

Table 1 – Materials of construction

Cage	Plug	Plug Stem	Seat	Service
420 ST.ST. Hardened	17-4PH ST.ST. Hardened	316 ST.ST./	Integral with Cage/	-35°C to 399°C
		17.4 PH	316 ST.ST./	-30°F to 750°F
420 ST.ST. Hardened	316 ST.ST. with		316 + Stellite	400°C to 565°C
	Stellite face & Guide			750°F to 1050°F
316 ST.ST./	316 ST.ST. with Chrome Plated			NACE MR-01-75
17-4PH ST.ST.	Guide Diameter			-35°C to 232°C
				-30°F to 450°F
420 ST.ST. Hardened	17-4PH ST.ST.		316 ST.ST.	-35°C to 232°C
	Hardened with PTFE Face			-30°F to 450°F
Monel K500	Monel 400	Monel 400/	Integral with Cage/	-35°C to 500°C
		MonelK500	Monel K500	-30°F to 932°F
Hastelloy C	Hastelloy C	Hastelloy C	Integral with Cage/ Hastelloy C	
Duplex	Duplex	Duplex	Integral with cage/Duplex	
Ceramic/420 ST.ST.	316 ST.ST. + Ceramic	316 ST.ST.	316 ST.ST. + Ceramic	

** options for Stellite face or full Stellite available for most materials.*



Sealing material per leakage classification

CAGE TRIM VALVES HV SERIES

Huddersfield Valves Ltd.,

Table 2 – Sealing material per leakage classification

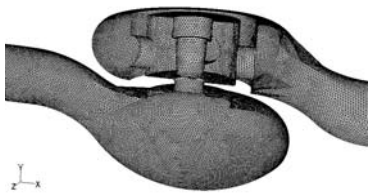
Leakage Class Designation	Maximum Leakage Allowable	Test Medium	Test Pressure
I	…	…	…
II	0.5% of rated capacity	Air or water at 50-125°F (10-52°C)	40-50 psig or max. operating differential, whichever is lower
III	0.1% of rated capacity	As above	As above
IV	0.01% of rated capacity	As above	As above
V	0.0005 ml per minute of water per inch of port diameter per psi differential	water at 50-125°F(10-52°C)	Max, service pressure drop across valve plug, not to exceed ANSI body rating. (100 psi pressure drop minimum)
VI	Not to exceed amounts shown in following table based on port diameter	Air or water at 50-125°F (10-52°C)	50 psig or max. rated differential pressure across valve plug, whichever is lower

Table 3 – Recommended limiting of medium flow velocities

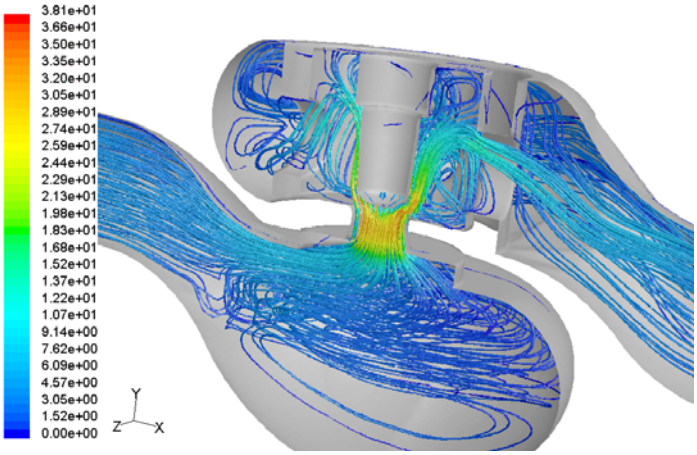
Metric Units			US Units		
Body Size (MM)	Liquid (M/S)	Steam or Gas (M/S)	Body Size (IN)	Liquid (FT/S)	Steam or Gas (Ft/S)
40, 50	13.5	150	1 1/2, 2	44	490
80, 100	13.5	150	3, 4	44	490
150, 200, 250, 300	13.5	150	6, 8, 10, 12	44	490
350, 400, 450, 500	12	130	14, 16, 18, 20	39	425
≥ 600	8.5	120	≥ 24	28	390

Note: Maximum outlet velocity (steam or gas) = 0.65 x sonic

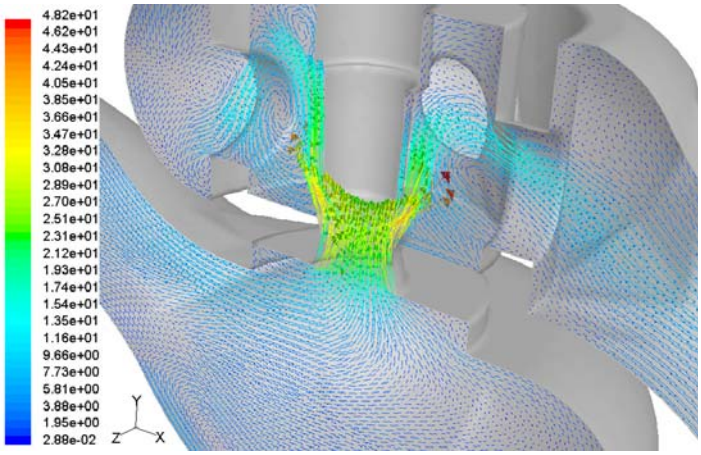
HV SIMULATION



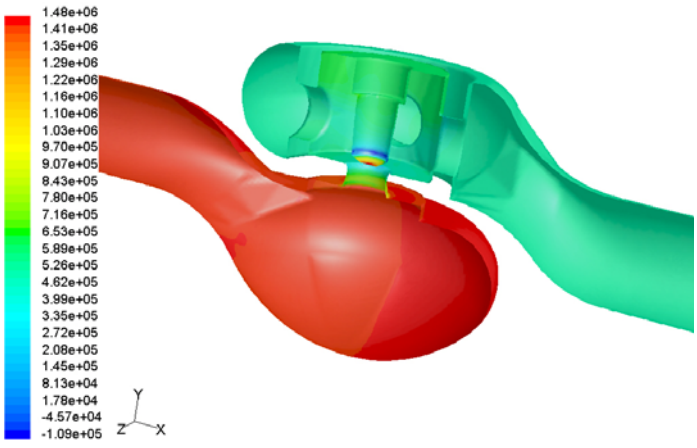
Segments



Fluid Flow Path



Velocity of the Flow

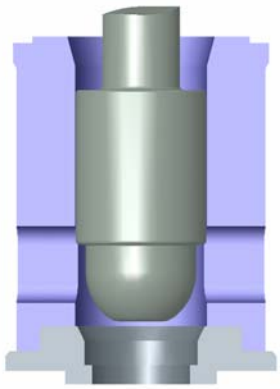


Pressure range of the Flow

TRIM STYLE COMPARISION

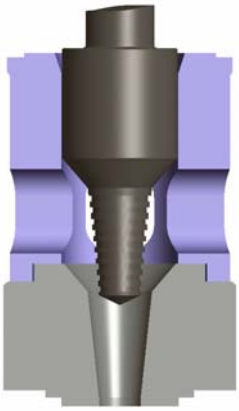
PLUG THROTTLING TRIMS

HV-PT
Single Seat Plug Throttling

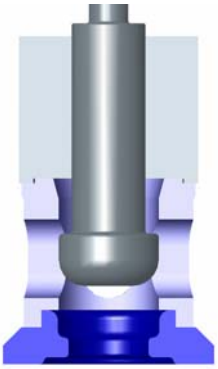


HV-Micro
High Step Cascade Numeric Sizes

HV-HSC
High Step Cascade Inch Sizes



HV-TG
Top-Guide

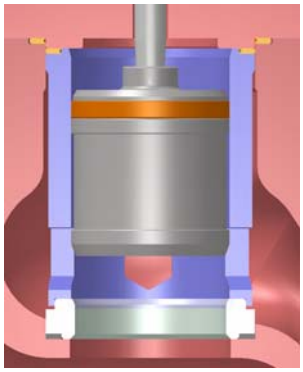


Angle Globe Valve with Cascade Trim

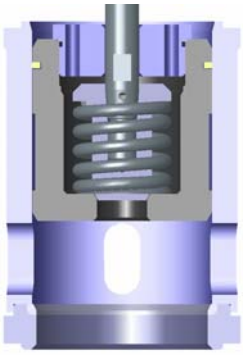
Special Plug & Cage for 3-way Valve

PORT THROTTLING TRIMS

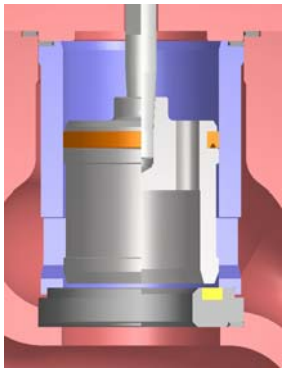
HV-PT-II
Single Seat Plug Throttling



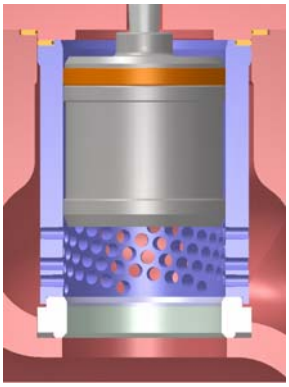
HV-PT-II (TANDEM)



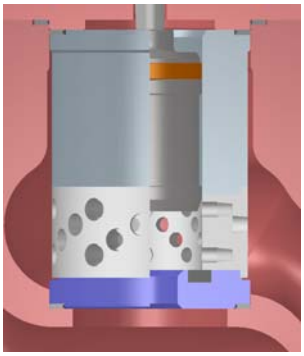
HV-PT-II (Soft Seat)



HV-SCI
Single Cage



HV-SCII



HV-SCIII

TRIM STYLE COMPARISON

Trim types per control rangeability

Table 4 – Trim types per control range ability

Table 4-1. : TRIM STYLE COMPARISON

PLUG THROTTLING TRIMS

STYLE / SPEC	TRIM SIZES	MAXIUM Cv RANGE	RANGE ABILITY	Flowing Form	WEB SEAL	LEAK CLASS	CHARAC-RERISTIC	BALANCE OF TRIM	REMARK	TYPICAL APPLY
HV-PT	1/4" through 12"	1.4 through 1460	Refer to HV	Under the Seat	Quick Change	IV or V	Linear 1/4"-3/4" Eq.% 1/4"-3/4" Mod.Para. 1"-12"	Unbalanced	General Service	Heater Drain. Con.OverFlow Steam PRV
HV-Micro	#000 through #11	0.4 through 9.9	200:1	Under the Seat	Quick Change	IV or V	Unique	Unbalanced	Low-Flow High ΔP Erosion N.S.	DesuperHeater Cooling Water Service Steam PRV Sootblower Thermal Drain Fuel Oil Control Reheat and Superheat Spray Fluid
HV-HSC	1" through 6"	16.2 through 406	200:1	Under the Seat	Quick Change	IV or V	Unique	Unb. 1"-3" Bal. 3"-6"	High Range. Erosion Pro. Near Seat	
HV-TG	1/8" through 4"	0.4 through 218	1/8"-1" 15:1 11/2"-12:1	Under the Seat	Quick Change	IV	Linear Equal Percent	Unbalanced	Low-Pressure Drop	Corrosion. Viscous, Slurries Fluid

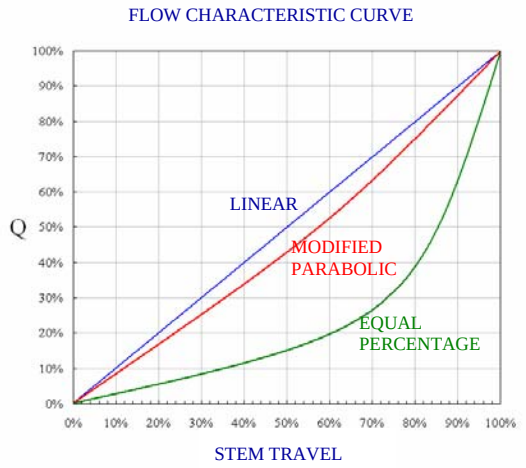
Table 4-2. : TRIM STYLE COMPARISON

PORT THROTTLING TRIMS

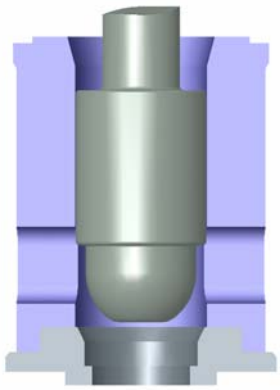
STYLE / SPEC	TRIM SIZES	MAXIUM Cv RANGE	RANGE ABILITY	Flowing Form	WEB SEAL	LEAK CLASS	CHARAC-RERISTIC	BALANCE OF TRIM	REMARK	TYPICAL APPLY
HV-PTII	2" through 12"	40 through 1620	Varies 25:1 Average	Over or Under per Applic.	Quick Change	IV	Linear Eq.% Mod.Parabolic	Unbalanced Balanced:H-T Balanced:L-T	General Service	Level, Feedwater Control
HV-PT-II (TANDEM)	4" through 16"	75 through 3178	Varies 25:1 Average	Over the Seat	Quick Change	V	Linear(SSH) Mod.Parabolic	Balanced	Tight Shut off and High Pressure	Isolation Valve Sream to Condenser
HV-PT-II (Soft Seat)	2" through 8"	38 through 577	Varies 25:1 Average	Under the Seat	Quick Change	VI	Linear Eq.% Mod.Parabolic	Balanced	Tight Shut off and High Pressure	Block Valve Gas Regulation
HV-SCI	2" through 12"	38 through 1608	Varies 12:1 Average	Over or Under per Applic.	Quick Change	IV	Linear	Unbalanced Balanced:H-T Balanced:L-T	Noise Light Cavit. Flashing	Staem PRV Steam Dump Cond. Recirc. Feedwater Reg.
HV-SCII	2" through 8"	5.4 through 216	Per Application	Under the Seat	Quick Change	Per Application	Linear(STD)	Unbalanced Balanced	Noise and Cavitating Condition	Feedpump Recirc. Feedwater Startup Bypass
HV-SCIII	2" through 12"	6 through 1154	Per Application	Over the Seat	Quick Change	V	Linear Eq.%	Unbalanced Balanced	Cavitating Condition	Feedwater Reg. Level Control Cond. Recirc.

HV-PT
Single Seat Plug Throttling

TRIM Characteristic



TRIM Construction



CONTOURED PLUG

MODIFIED PARABOLIC TRIMS

Valve Size	TRIM SIZE											
	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8'	10"	12"
3/4" & 1"	15											
1-1/2"	17.1	22	30									
2"	17.4	22.8	33	50								
2-1/2"	17.4	23.2	34	55	70							
3"	17.4	23.2	35	57	77	110		NOT AVSILABLE				
4"	17.4	23.2	35	58	80	121	190					
5"		23.2	35	58	81	125	209	290				
6"			35	58	81	128	217	318	380			
8"				58	81	128	220	330	418	740		
10"						128	220	336	433	814	1060	
12"	SPECIALS					128	220	336	440	843	1168	1460
14"							220	336	440	857	1208	1606
16"								336	440	857	1230	1665
Full Travel	1"	1"	1"	1"	1-1/4"	2"	2"	2"	2"	2-1/2"	3"	3"

TRIMS OUTSIDE DOUBLE LINES ARE CONSIDERED SPECIAL ONLY TRIMS UP 1-1/2" SIZE ARE CONSIDERED STOCK ITEMS. SUBTRACT 25% FROM ABOVE Cv. FOR CLASS 4500 VALES.

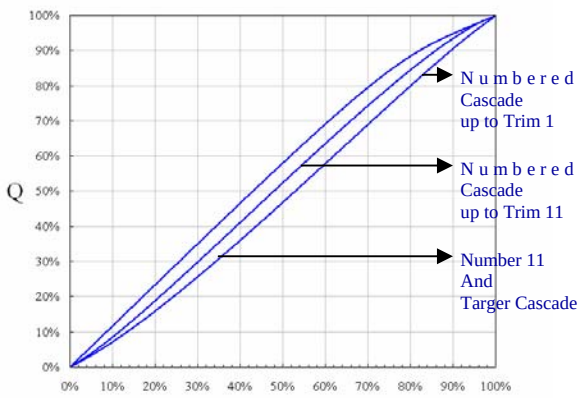
PLUG TYPES

CAGE TYPE example

HV-Micro
High Step Cascade Numeric Sizes & Inch Sizes

TRIM Characteristic

FLOW CHARACTERISTIC CURVE



TRIM Construction

Numbered Size Cascade

Trim C_v Value, Travel, Reducing

NUMBERED SIZES

SIZE	000	00	0	1	2	3	4
C_v	0.24	0.31	0.37	0.48	0.67	0.86	1.30
UNBALANCED AREA	0.054	0.056	0.058	0.062	0.067	0.057	0.087

SIZE	5	6	7	8	9	10	11
C_v	1.67	2.2	3.0	4.3	6.1	8.2	9.9
UNBALANCED AREA	0.98	0.175	0.205	0.326	0.390	0.549	0.643

INCH SIZES

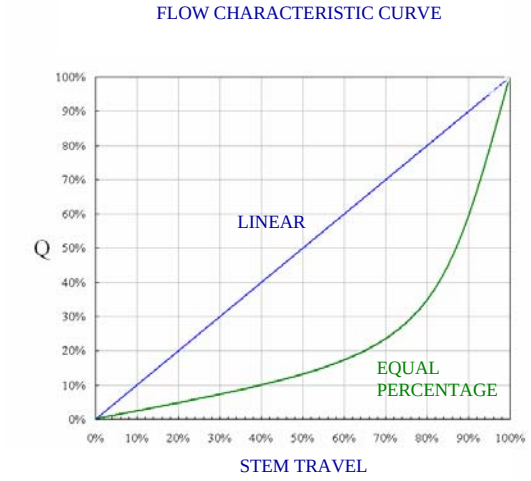
VALVE SIZE	TRIM SIZE						
	1"	1-1/2"	2"	2-1/2"	3"	4"	6"
1-1/2"	16.2	23.1					
2"	16.8	25.4	36.4				
2-1/2"		26.4	42.3	66.8			
3"			43.9	73.5	112		
4"				75.9	123	177	
6"					130	200	406
8"						204	446
10"							464
FULL TRAVEL	1-1/2"	1-1/2"	1-1/2"	2"	2"	2-1/2"	3"

CASCADE PLUG TYPES

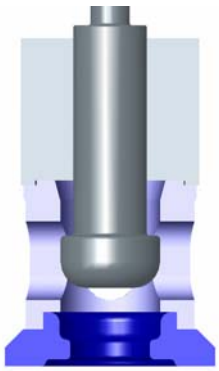


HV-TG
Top Guide Trim

TRIM Characteristic



TRIM Construction



TOP-GUIDE

Trim Cv Value, Travel, Reducing

Linear Flow Characteristics

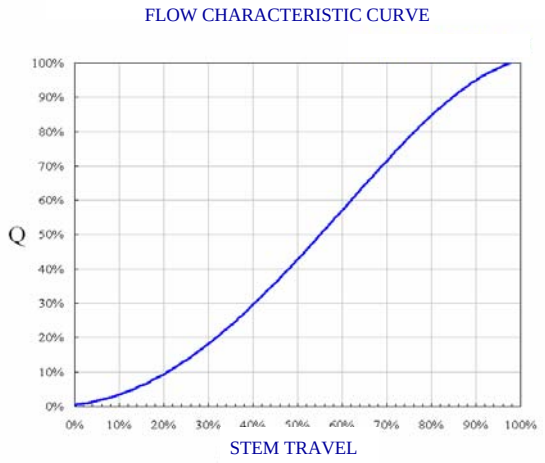
Valve Size		3/4"	1"	1-1/2"	2"	3"	4"
Trim Size (inches)	1/8"	0.57	0.59				
	1/4"	2.0	2.1				
	3/8"	3.7	4.3				
	1/2"	5.1	6.2	7.3			
	5/8"	6.8	9.0	10.8			
	3/4"	7.6	10.4	14.0	15.9		
	1"		13.7	20.5	24.9		
	1-1/2"			30.8	41.8		
	2"				54.7	82.1	
	2-1/2"					104	134
	3"					123	158
	4"						218

Equal Percent Flow Characteristics

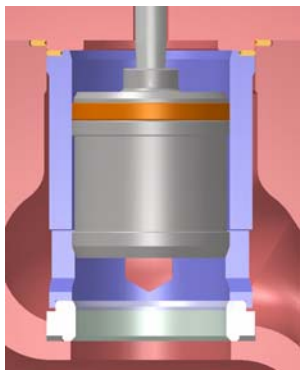
Valve Size		3/4"	1"	1-1/2"	2"	3"	4"
Trim Size (inches)	1/8"	0.40	0.41				
	1/4"	1.4	1.5				
	3/8"	2.6	3.0				
	1/2"	3.6	4.3	5.1			
	5/8"	4.8	6.3	7.7			
	3/4"	5.3	7.2	9.8	11.1		
	1"		9.5	14.4	17.4		
	1-1/2"			21.6	29.3		
	2"				38.3	57.5	
	2-1/2"					73.4	134
	3"					86.2	158
	4"						218

HV-PTII
Single Seat Plug Throttling (Port Throttling Trim-Modify Parabolic)

TRIM Characteristic



TRIM Construction



STANDARD PORTS UNBALANCED

Trim C_v Value, Travel, Reducing

BALANCED AND UNBALANCED - MODIFIED PARABOLIC PORTS
FULL SIZE TRIM IN CLASS 150-600 GS STYLE VALVE BODIES

VALVE SIZE		2"	3"	4"	6"	8"
TRIM SIZE		2"	3"	4"	6"	8"
C_v	8 PORTS					689
	6 PORTS	56		176	398	606
	4 PORTS	47	102	145	329	473
	3 PORTS	40	90	121	274	380
	2 PORTS		71		200	
MIN. CONTR. C_v		1.1	1.5	2	4.2	6.4
STEM TRAVEL		1	2	2	2.5	3

BALANCED AND UNBALANCED - MODIFIED PARABOLIC PORTS
REDUCED SIZE TRIM IN CLASS 150-600 GS STYLE VAVLE BODIES

VALVE SIZE		3"		4"		6"		8"	
TRIM SIZE		2-1/2"	2"	3"	2-1/2"	4"	3"	6"	4"
C_v	6 PORTS		78			231		510	237
	4 PORTS	79	62	132	84	183	139	409	186
	3 PORTS	69	51	114	71	149	118	333	150
	2 PORTS	52		86	53		88	238	
STEM TRAVEL		1.5	1	2	1.5	2	2	2.5	2

HV-PTII
Single Seat Plug Throttling (Port Throttling Trim-Modify Parabolic)

BALANCED AND UNBANCED-MODIFIED PARABOLIC PORTS
FULL SIZE TRIM IN CLASS 900-2500 SD STYLE VALVE BODY SIZES T 8"
AND CALSS 150-2500 IN BODY SIZE 10" AND 12"

VALVE SIZE		2	2-1/2"	2-1/2"	3"	4"	6"	8"	10"	10"	12"	12"
TRIM SIZE		2	2-1/2"	2-1/2"	3"	4"	6"	8"	10"	10"	12"	12"
C_v	8 PORTS							651	1108	1198	1413	1620
								598	1030	1101	1325	1491
	6 PORTS	54	60			187	376	580	961	1070	1203	1446
		41	51			144	357	542	909	999	1147	1352
	4 PORTS	46	50	61	97	158	316	460	736	852	900	1150
		37	44	52	80	129	305	440	711	815	875	1101
	3 PORTS	39	41	54	86	133	266	373	585	693	707	935
		33	38	47	74	115	259	363	573	673	696	908
	2 PORTS			42	69		197					
				39	62		194					
MIN. CONTR.Cv		1.1	1.1	1.1	1.5	2	4.2	6.4	9.5	9.5	10.8	10.8
STEM TRAVEL		1	1	1.5	2	2	2.5	3	3	4	3	4

BALANCED AND UNBANCED-MODIFIED PARABOLIC PORTS
FULL SIZE TRIM IN CLASS 900-2500 SD STYLE VALVE BODY SIZES T 8"
AND CALSS 150-2500 IN BODY SIZE 10" AND 12"

VALVE SIZE		2-1/2"	3"		4"		6"		8"		10"		12"		
TRIM SIZE		2"	2-1/2"	2"	3"	2-1/2"	4"	3"	6"	4"	8"	6"	10"	10"	8"
C_v	8 PORTS										818		1368	1504	
											786		1288	1398	
	6 PORTS	70		74			217		481	222	712		1161	1314	730
		57		66			213		458	220	680		1110	1242	717
	4 PORTS	57	75	60	120	76	174	130	389	177	548	397	864	1015	556
		50	67	55	106	72	172	129	377	176	538	393	843	980	550
	3 PORTS	47	65	49	105	66	142	112	3120	144	437	324	679	811	441
		43	59	46	95	63	141	111	313	143	432	322	668	783	438
	2 PORTS		50		81	50		84	230			232			
			47		76	49		84	228			231			
STEM TRAVEL		1	1.5	1	2	1.5	2	2	2.5	2	3	2.5	3	4	3

NOTE: The only options available are those where a C_v value is indicated.

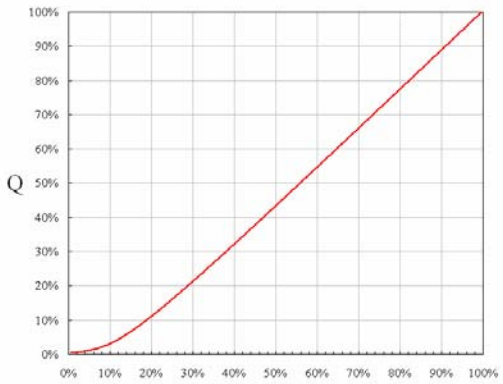
Un-shaded area is standard full capacity (Class 900-1500 sizes to 8" and Class 150-1500 in 10" and 12")

Shaded area is trim capacity in Class 2500 valve

HV-PTII
Single Seat Plug Throttling (Port Throttling Trim-Linearity)

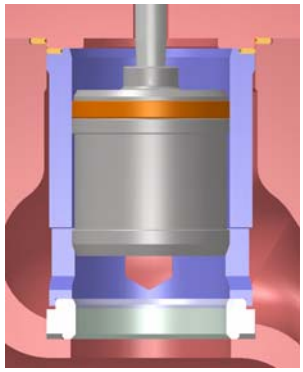
TRIM Characteristic

FLOW CHARACTERISTIC CURVE



STEM TRAVEL

TRIM Construction



STANDARD PORTS BALANCED

Trim C_v Value, Travel, Reducing

BALANCED AND UNBALLANCED – LINEAR CHARACTERISTIC PORTS
FULL SIZE TRIM IN CLASS 150 – 600 GS STYLE VALVE BODIES

VALVE SIZE		2"	3"	4"	6"	8"
TRIM SIZE		2"	3"	4"	6"	8"
Cv	9 PORTS					613
	6 PORTS	44	96	161	357	499
	4 PORTS	34	80	132	292	376
	3 PORTS	27	67	110	241	297
	2 PORTS				175	
MIN. CONTR. Cv		1.1	1.5	2	4.2	6.4
STEM TRAVEL		1	2	2	2.5	3

BALANCED AND UNBALLANCED – LINEAR CHARACTERISTIC PORTS
REDUCED SIZE TRIM IN CLASS 150 – 600 GS STYLE VALVE BODIES

VALVE SIZE		3"		4"		6"		8"	
TRIM SIZE		2-1/2"	2"	3"	2-1/2"	4"	3"	6"	4"
Cv	6 PORTS	65	52	110	68	185	114	405	188
	4 PORTS	54	39	91	55	150	93	328	152
	3 PORTS	44	31	75	45	123	76	269	124
	2 PORTS							193	
STEM TRAVEL		1.5	1	2	1.5	2	2	2.5	2

HV-PTII
Single Seat Plug Throttling (Port Throttling Trim-Linearity)

BALANCED AND UNBALANCED – LINEAR CHARACTERISTIC PORTS
FULL SIZE TRIM IN CLASS 900 – 2500 SD STYLE VALVE BODY SIZES TO 8"
AND CALSS 150 – 2500 IN BODY SIZES 10" AND 12"

VALVE SIZE		2"	2-1/2"	2-1/2"	3"	4"	6"	8"	10"	10"	12"	12"
TRIM SIZE		2"	2-1/2"	2-1/2"	3"	4"	6"	8"	10"	10"	12"	12"
C_v	9 PORTS							587	1084	1159	1386	1565
								548	1011	1071	1302	1447
	6 PORTS	43	46	56	92	166	342	485	895	995	1113	1343
		36	42	49	77	134	327	462	852	937	1068	1266
	4 PORTS	34	35	47	78	136	284	370	682	788	830	1064
		30	33	43	68	117	275	359	663	759	811	1025
	3 PORTS	27	28	39	66	113	237	294	542	639	652	863
		25	27	37	60	101	232	289	532	623	642	841
	2 PORTS						173					
							171					
MIN. CONTR. C_v		1.1	1.1	1.1	1.5	2.0	4.2	6.4	9.5	9.5	10.3	10.8
STEM TRAVEL		1	1	1.5	2	2	2.5	3	3	4	3	4

BALANCED AND UNBALANCED – LINEAR CHARACTERISTIC PORTS
REDUCED SIZE TRIM IN CLASS 900 – 2500 SD STYLE VALVE BODY SIZES TO 8"
AND CALSS 150 – 2500 IN BODY SIZES 10" AND 12"

VALVE SIZE		2-1/2"	3"		4"		6"		8"		10"		12"		
TRIM SIZE		2"	2-1/2"	2"	3"	2-1/2"	4"	3"	6"	4"	8"	6"	10"	10"	8"
C_v	9 PORTS										638		1193	1276	651
											622		1138	1210	642
	6 PORTS	48	61	50	107	66	171	104	376	174	528	383	983	1094	535
		43	58	47	97	63	169	104	365	172	519	380	962	1051	407
	4 PORTS	37	51	38	87	53	142	87	312	144	404	316	749	866	405
		35	48	30	72	43	119	73	260	120	400	314	736	844	323
	3 PORTS	30	43	30	72	43	119	73	260	120	322	262	595	702	322
		29	41	30	69	42	118	73	258	119	319	261	588	690	
	2 PORTS								190			191			
									188			190			
STEM TRAVEL		1	1.5	1	2	1.5	2	2	2.5	2	3	2.5	3	4	3

NOTE: The only options available are those whose where a C_v value is indicated.

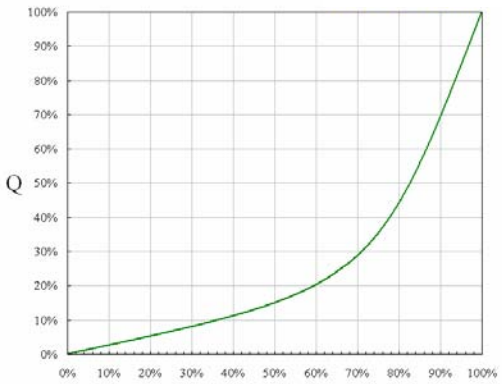
Unshaded are is standard full capacity (Class 900–1500 sizes to 8" and Class 1500 – 1500 in 10" and 12")

Shaded area is trim capacity in Class 2500 valve

HV-PTII
Single Seat Plug Throttling (Port Throttling Trim-Equal Percentage)

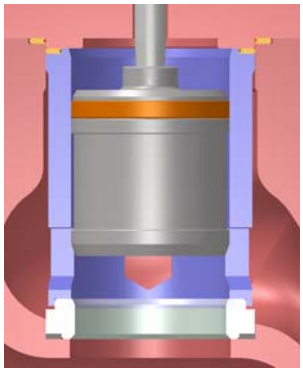
TRIM Characteristic

FLOW CHARACTERISTIC CURVE



STEM TRAVEL

TRIM Construction



STANDARD PORTS BALANCED

Trim Cv Value, Travel, Reducing

BALANCED AND UNBALLANCED - EQUAL PERCENT PORTS
FULL SIZE TRIM IN CLASS 150 - 600 GS STYLE VALVE BODIES

VALVE SIZE		2"	3"	4"	6"	8"
TRIM SIZE		2"	3"	4"	6"	8"
Cv	5 PORTS					477
	4 PORTS			137	295	414
	3 PORTS	35	88	116	249	334
	2 PORTS	26	73	87	184	
MIN. CONTR. Cv		1.1	1.5	2.0	4.2	6.4
STEM TRAVEL		1	2	2	2.5	3

HV-PTII

Single Seat Plug Throttling (Port Throttling Trim-Equal Percentage)

BALANCED AND UNBALANCED – EQUAL PERCENT PORTS
FULL SIZE TRIM IN CLASS 900 – 2500 SD STYLE VALVE BODY SIZES TO 8"
AND CALSS 150 – 2500 IN BODY SIZES 10" AND 12"

VALVE SIZE		2"	2-1/2"	2-1/2"	3"	4"	6"	8"	10"	10"	12"	12"
TRIM SIZE		2"	2-1/2"	2-1/2"	3"	4"	6"	8"	10"	10"	12"	12"
Cv	8 PORTS								722		812	
									699		794	
	6 PORTS								578	867	636	1049
									566	828	628	1011
	5 PORTS							422		772		920
								407		744		894
	4 PORTS					151	264	359	406	656	439	771
						126	257	350	402	638	436	756
	3 PORTS	31	32	46	82	126	217	284	310	518	333	602
		28	31	42	71	110	213	280	309	510	332	594
	2 PORTS	22	23	36	65	92	156					
		21	22	34	59	86	155					
MIN. CONTR. Cv		1.1	1.1	1.1	1.5	2.0	4.2	6.4	9.5	9.5	10.3	10.8
STEM TRAVEL		1	1	1.5	2	2	2.5	3	3	4	3	4

BALANCED AND UNBALANCED – EQUAL PERCENT PORTS
REDUCED SIZE TRIM IN CLASS 1500 – 2500 GS AND SD STYLE VALVE BODIES

VALVE SIZE		2-1/2" (SD)	3"		4"		6"		8"		10"(SD)		12"(SD)		
TRIM SIZE		2"	2-1/2"	2"	3"	2-1/2"	4"	3"	6"	4"	8"	6"	10"	10"	8"
Cv	8 PORTS												874		
													852		
	6 PORTS												693	1063	
													682	1023	
	5 PORTS													937	
														910	
	4 PORTS										433		482	790	437
											428		479	773	434
	3 PORTS	38	57	38			125		263	126	340		368	619	342
		35	53	37			125		258	126	337		366	611	340
	2 PORTS	27	43	27	82	44	90	82	187	90		188			
		26	41	27	79	45	88	82	185	90		187			
STEM TRAVEL		1	1.5	1	2	1.5	2	2	2.5	2	3	2.5	3	4	3

NOTE: The only options available are those whose where a Cv value is indicated.

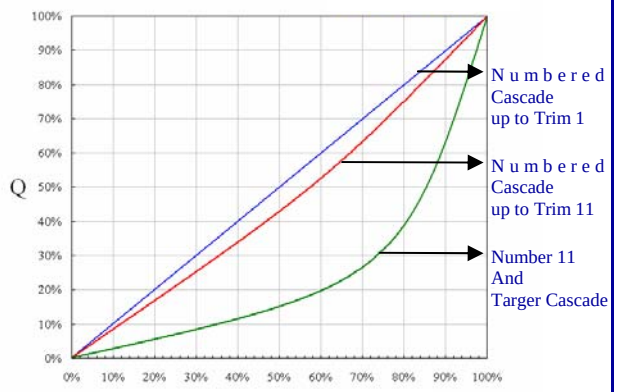
Unshaded are is standard full capacity (Class 900-1500 sizes to 8" and Class 1500 – 1500 in 10" and 12")

Shaded area is trim capacity in Class 2500 valve

HV-PTII(TANDEM)

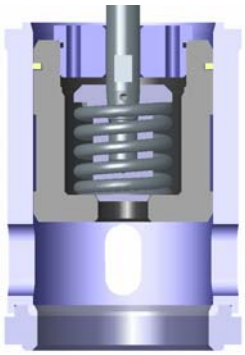
TRIM Characteristic

FLOW CHARACTERISTIC CURVE



STEM TRAVEL

TRIM Construction



TANDEM

Trim Cv Value, Travel, Reducing

TANDIM TRIM WITH MODIFIED PARABOLIC PORTS

VALVE SIZE	TRIM SIZE	MINIMUM STEM DIAMETER	NUMBER OF PORTS				
			8	6	4	3	2
4"	2"	1	190	170	130	105	75
6"	2-1/2"	1	371	320	241	191	135
8"	3"	1-1/4	660	570	430	340	240
10"	3"	1-1/4	1127	916	657	510	352
10"	4"	1-1/4	1388	1186	888	702	492
12"	3"	1-1/4	1242	997	708	547	376
12"	4"	1-1/4	1581	1325	976	767	535
12"	5"	1-1/4	1776	1577	1215	972	689
14"	3"	1-1/4	1367	1077	753	578	394
14"	4"	1-1/4	1821	1480	1062	825	569
14"	5"	1-1/4	2161	1825	1352	1065	744
16"	3"	1-1/4	1680	1312	909	695	472
16"	4'	1-1/4	2300	1841	1304	1007	691
16"	6'	1-1/4	3178	2717	2034	1609	1129

HV-PTII(TANDEM)

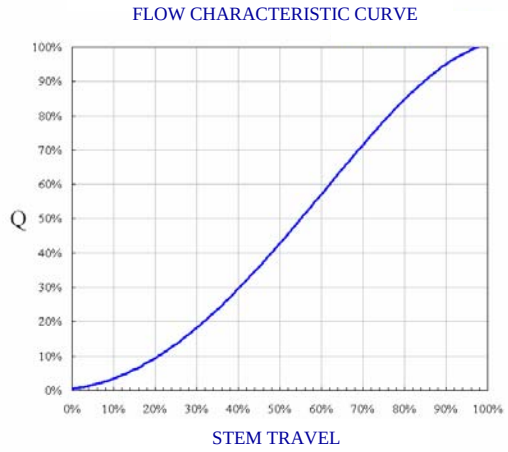
TANDEM TRIM WITH SINGLE STAGE HUSH

TRIM SIZE		4	6	8	10	12	14	16	10
C_v	6 START	186	343	550	760	794	868	979	1119
	5 START	169	3089	486	652	677	737	827	983
	4 START	147	264	411	536	555	600	671	827
	3 START	119	211	325	413	425	458	510	650
MINIMUM CONTROLLABLE C_v		9.4	14.7	21	32.7	35.8	41.3	50.5	32.7
STEM TRAVEL		2	1 1/2	3	3	3	3	3	4

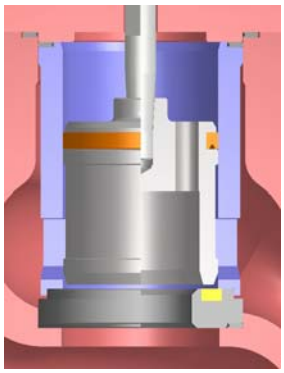
TRIM SIZE		12	14	16	12	14	15	16
C_v	6 START	1221	1397	1520	1534	1834	2216	2695
	5 START	1064	1205	1385	1371	1615	1924	2382
	4 START	888	997	1136	1170	1361	1601	2014
	3 START	694	772	874	933	1072	1247	1592
MINIMUM CONTROLLABLE C_v		35.8	41.3	50.5	35.8	41.3	50.0	50.0
STEM TRAVEL		4	4	4	5	5	3	6

HV-PTII (Soft Seat)
Single Plug Soft Seat - Modify Parabolic

TRIM Characteristic



TRIM Construction



SOFT SEAT

Trim Cv Value, Travel, Reducing

FULL SIZE TRIM IN CLASS 150 - 300 GS STYLE VALVE BODIES

VALVE SIZE		2-1/2" (SD)	3"		4"		6"		8"	
TRIM SIZE		2"	2-1/2"	2"	3"	2-1/2"	4"	3"	6"	4"
Cv	4 PORTS	53		55			156		378	168
	3 PORTS	45	59	46	97	60	139	102	315	143
	2 PORTS		47		75	48		50	230	
STEM TRAVEL		1	1.5	1	2	1.5	2	2	2.5	2

FULL SIZE TRIM IN CLASS 900 - 1500 SD STYLE VALVE BODIES

VALVE SIZE		2"	2-1/2"	2-1/2"	3"	4"	6"	8"
TRIM SIZE		2"	2-1/2"	2-1/2"	3"	4"	6"	8"
Cv	6 PORTS							547
	4 PORTS	42	44			146	298	443
	3 PORTS	36	38	47	77	126	255	364
	2 PORTS				39	43	192	
STEM TRAVEL		1	1	1.5	2	2	2.5	3

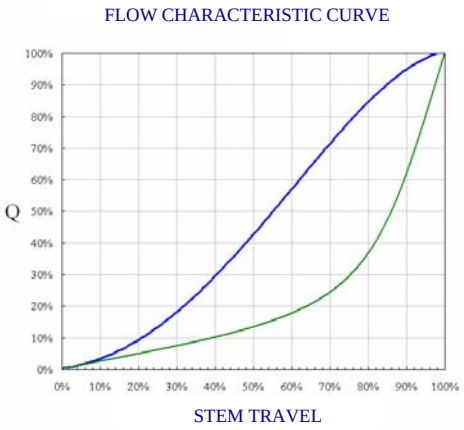
REDUCED SIZE TRIM IN CLASS 150 - 1500 GS AND SD STYLE VALVE BODIES

VALVE SIZE		2"	3"	4"	6"	8"
TRIM SIZE		2"	3"	4"	6"	8"
Cv	6 PORTS					577
	4 PORTS	44		136	312	459
	3 PORTS	38	81	115	264	373
	2 PORTS			66		196
STEM TRAVEL		1	2	2	2.5	3

HV-SCI

KCG series valves - HEST-I trim design CV

TRIM Characteristic



CAGE TRIM VALVES HV SERIES

Table 5 - HV series valves - SCI trim design CV

SIZE	TRAVEL	HEST-IA		HEST-IB		HEST-IC		HEST-ID		HEST-IE		HEST-IF		HEST-IG		HEST-IH	
	(mm)	=%	LIN	=%	LIN	=%	LIN	=%	LIN	=%	LIN	=%	LIN	=%	LIN	=%	LIN
1 1/2" 40mm	25mm					29	31	23	26	19	20	11	13	7	7		
2" 50mm	25mm					45	51	40	46	33	38						
3" 80mm	40mm								85		78		62				
3" 80mm	50mm								109		97		72				
4" 100mm	50mm				188		175		157		131		100		75		
6" 150mm	65mm				410		379		336		278		150		126		98
8" 200mm	80mm		630		584		520		433		330		213		186		152
10" 250mm	80mm		969		869		744		593		410						
10" 250mm	100mm		1144		1058		940		779		593		425				
12" 300mm	100mm		1431		1301		1133		918		833		651				
12" 300mm	125mm		1608		1501		1350		1145		915		786				
16" 400mm *1 *(TANDEM)*	100mm		1620		1385		1136		874								
16" 400mm *1 *(TANDEM)*	150mm		2695		2382		2014		1592								

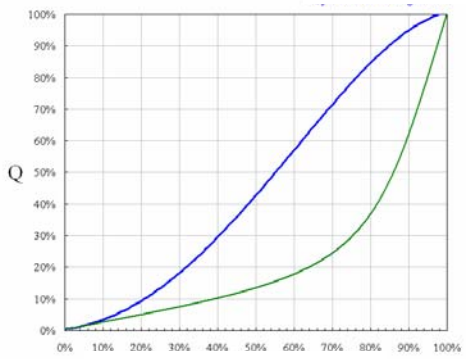
**1 TANSEM TRIM*

HV-SCII

HV series valve - HV-SCII trim design C_v

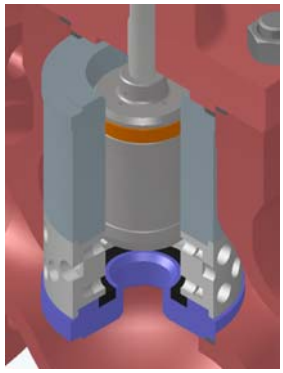
TRIM Characteristic

FLOW CHARACTERISTIC CURVE



STEM TRAVEL

HV-SCII TRIM VALVES



HV-SCII TRIM

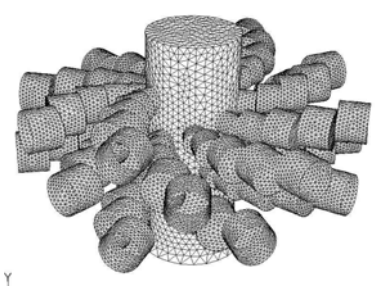
HV-SCII TRIM CAGE

HV CAGE TRIM VALVES

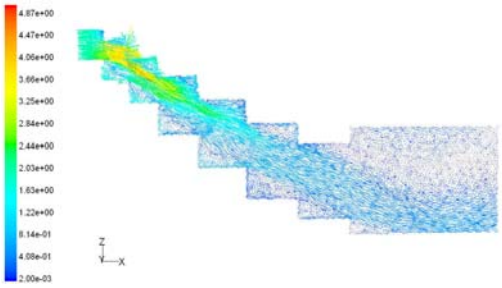
TABLE 6 – HV series valve - HV-SCII trim design C_v

VALVE SIZE	HEST-II/3		HEST-II/4		HEST-II/5		HEST-II/6		VALVE TRAVEL
	MOD =%	LINEAR	MOD =%	LINEAR	MOD =%	LINEAR	MOD =%	LINEAR	
2", 50mm		18		11		7		5	25mm
3", 80mm		52		31		21		13	50mm
4", 100mm		71		43		27		17	65mm
6", 150mm		140		91		37		37	80mm
8", 200mm		209		133		54		54	80mm
8", 200mm		175		171		68		68	100mm
10", 250mm		380		260		112		112	100mm

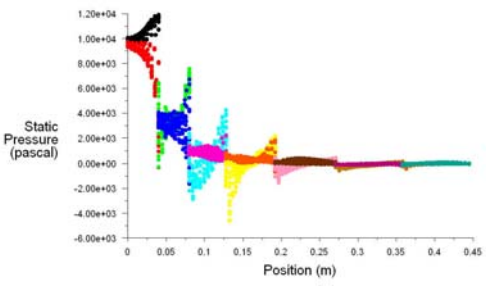
HV-SCII TRIM VALVES



HV-SCII TRIM CFD MODEL



Flow Velocity Field at 2m/sec

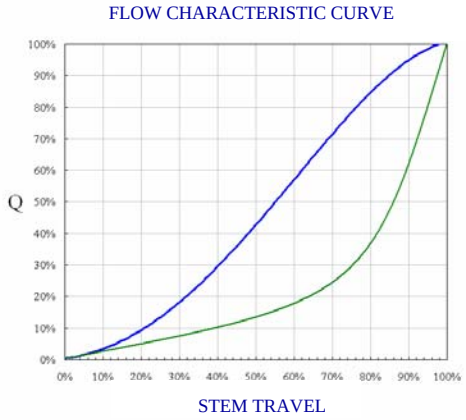


Pressure Field at 2m/sec

HV-SCIII

HV series valve - HV-SCIII trim design C_v

TRIM Characteristic

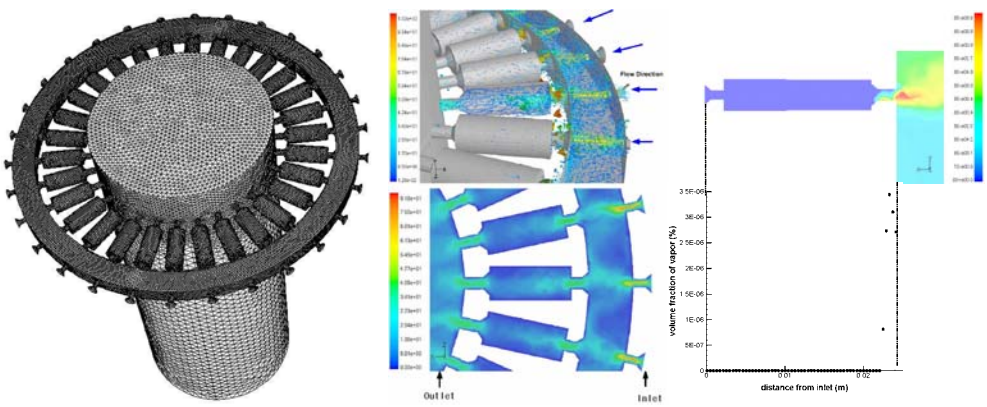


HV-SCIII TRIM

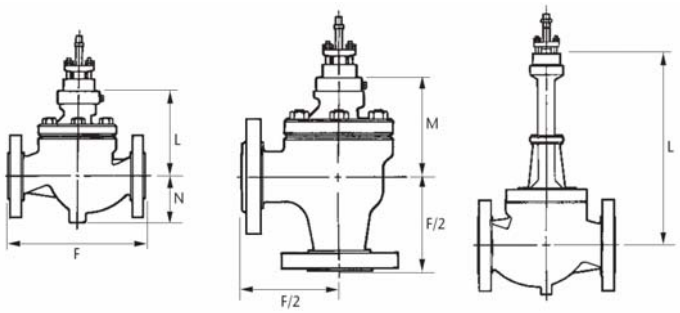
TABLE 7 – HV series valve – HV-SCIII trim design C_v

VALVE SIZE	VALVE SIZE	SC-III/2		SC-III/3		SC-III/4		SC-III/5		VALVE
		MOD =%	LINEAR	MOD =%	LINEAR	MOD =%	LINEAR	MOD =%	LINEAR	TRAVEL
1 1/2", 40mm	All	20	30	8	10					25
2", 50mm	~2500	20	30	8	10					40
3", 80mm	~1500	38	42	16	20	6	8			40
4", 100mm	~2500	73	95	40	44	18	20	10	12	50
6", 150mm	~1500	110	140	60	80	32	41	15	21	65

HV-SCIII TRIM VALVES



HV low pressure class valves dimensions



CAGE TRIM VALVES HV SERIES

Table 8 – HV low pressure class valves dimensions

VALVE SIZE	1 1/2" 40mm	2" 50mm	3" 80mm	4" 100mm	5" 150mm	6" 200mm	7" 250mm	8" 300mm	10" 350mm	12" 400mm	30" 750mm
Up to 300# RF	235	267	317	368	473	568	718	775	1057	1057	1676
Up to 300# RT	248	283	333	384	489	584	733	791	1073	1073	1692
Class 300 Butt Weld	251	286	337	394	508	610	762	775	1057	1057	1676
BS, PN64, PN100, ANSI 600	251	286	337	394	508	610	762	820	1108	1108	1778
Class RF Flanged & Butt Weld											
ANSI 600 Class RTJ	251	289	340	397	511	613	765	823	1111	1111	1781
Plain Bonnet (L)	148	148	185	193	252	335	475	513	721	721	AF
Plain Bonnet (M)	124	124	140	160	189	237	AF	AF	AF	AF	AF
Norm Bonnet (L)	344	344	430	430	572	763	815	853	AF	AF	AF
Norm Bonnet (M)	320	320	397	397	509	665	AF	AF	AF	AF	AF
Extension Bonnet (L)	438	438	455	455	550	645	910	AF	AF	AF	AF
Extension Bonnet (M)	414	414	421	421	511	546	AF	AF	AF	AF	AF
Standard Travel	28.5	28.5	38	38	57	89	89	89	178	178	AF

RF = Raised Face. RTJ = Ring Type Joint. Face-to-Face and Face to Centre Line Dimensions are generally in accordance with ISA 5.75.03. AF = Ask Factory.

HV high pressure class valves dimensions

CAGE TRIM VALVES HV SERIES

Table9 – KCG high pressure class valves dimensions

VALVE SIZE	1 1/2" 40mm	2" 50mm	3" 80mm	4" 100mm	5" 150mm	6" 200mm	7" 250mm	8" 300mm	10" 350mm	12" 400mm	18" 450mm	20" 500mm	24" *600mm*	30" 750mm
RATINGS UP TO AND INCLUDING ANSI CLASS 1500lb														
900# RF & PN160	305	337	394	470	556	934	914	1130	1422	1422	1727	1740	AF	AF
900# RTJ	305	340	397	473	559	937	918	1130	1422	1422	1727	1740	AF	AF
1500# RF & PN250	305	337	413	489	610	990	1142	1146	1422	1422	1727	1740	AF	AF
1500# RTJ	305	340	416	492	616	1001	1153	1146	1422	1422	1727	1740	AF	AF
900# & 1500# PN160 & PN250 Butt Weld	305	337	413	489	610	1001	1142	1146	1422	1422	1727	1740	AF	AF
Plain Bonnet	200	215	238	298	302	498	602	680	730	730	940	1054	AF	AF
Norm Bonnet 313	327	355	406	415	695	750	800	902	902	1105	1250	1178	AF	AF
Standard Travels	28.6	28.6	38	57	57	89	89	REFER TO TRIM SELECTION						
ANSI CLASS 2500lb														
2500# Butt Weld	359	413	546	650	900	1150	1400	1600	1803	AF	AF	AF	AF	AF
Plain Bonnet	225	260	296	381	514	649	AF	AF	AF	AF	AF	AF	AF	AF
Norm Bonnet	355	377	422	504	669	846	AF	AF	AF	AF	AF	AF	AF	AF
Travel	28.6	28.6	38	57	57	89	89	REFER TO TRIM SELECTION						

AF = Ask Factory Consult factory for ANSI Class 4500lb Rated Valves

End connection details for butt weld end valves

CAGE TRIM VALVES HV SERIES

TABLE 10 – End connection details for butt weld end valves (mm)

VALVE SIZE	ALL RATINGS		UP TO & INCLUDING 1500LB (PN 250)		2500LB RATING (PN 420)	
	ID	OD	ID	OD	ID	OD
40mm (1 1/2")	20	70	38	89	38	89
50mm (2")	38	80	38	85	38	95
80mm (3")	65	105	65	115	75	145
100mm (4")	90	145	85	155	90	185
150mm (6")	45	200	140	205	130	265
200mm (8")	185	255	190	310	195	350
250mm (10")	250	315	255	390		
300mm (12")	300	370	325	515		
400mm (16")	370	460				
500mm (20")						
600mm (24")						
750mm (30")						

AF = Consult factory.

Steam Conditioning Valves

Steam Pressure (Reducing) and Temperature (Desuperheating) Valves

A steam conditioning valve converts steam from an incoming state (pressure and temperature) to predetermined required outlet state (pressure and temperature).

Many industries, such as power plants, pulp and paper, petro-chemical facilities, require steam at a temperature very close to saturation. If the steam is supplied at a temperature too high the product or equipment can be damaged. If the temperature is too low there will be excess water. If the required control is lost, severe damaged to piping and downstream equipment occur, resulting in expensive maintenance cycles and loss of production.

DesuperHeater Valve

- COMBINED PRESSURE REDUCING AND DESUPERHEATING ENSURE MAXIMUM PERFORMANCE AND RELIABILITY
- TURBINE BYPASS VALVES RESIST THERMAL SHOCK AND FATIGUE
- HIGH RANGEABILITY DESIGNS MAXIMIZE OUTPUT IN STEAM CONDITIONING APPLICATIONS

Main applications – high pressure system

- Pressure control/turbine bypass.
- Controlled pressure build-up in the boiler.

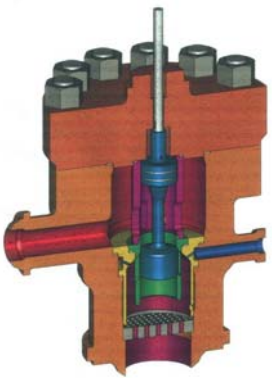
Main applications – low pressure system

- Controlled pressure build-up in the reheater.
- Pressure control/bypass of the intermediate and low pressure section of the turbine. This will assist in avoiding release of the safety valves, and consequently helps to prevent large condensate losses.
- Protection of the condenser in case of disturbances.

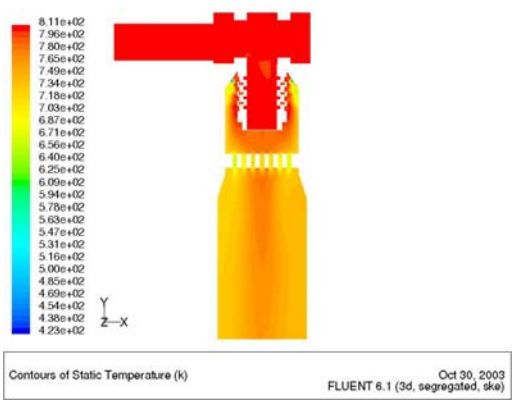
Pressure and Temperature Conditioning Valve (Qualification by Analysis)

Turbine Bypass Valve, HV Model

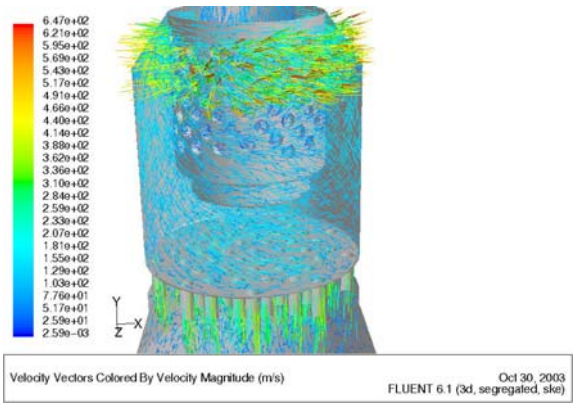
DN150 x DN350(6"×14"), ANSI 2500#
Pressure Letdown 140barg → 26barg
Temp. Desuperheating 540℃ → 210 ℃



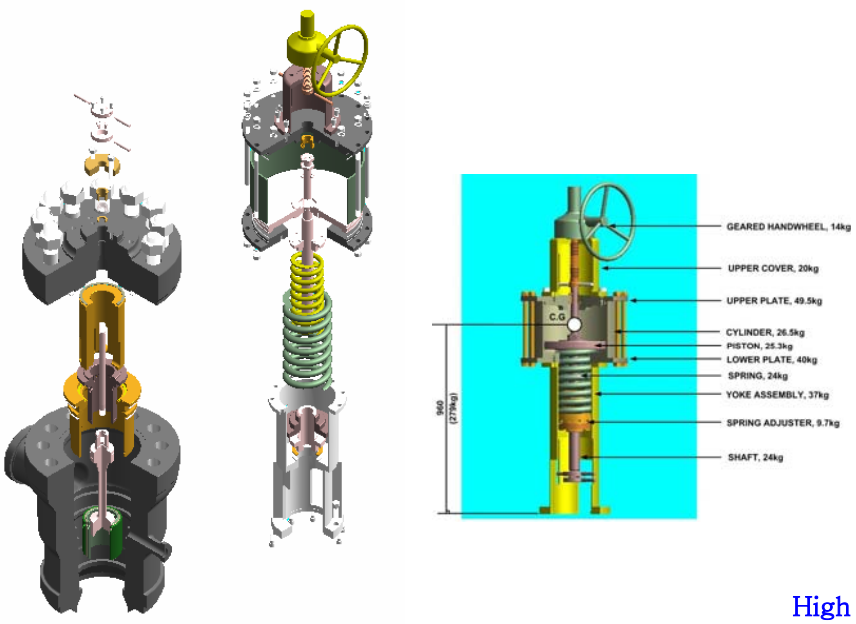
Temperature Field



Velocity Vector & Path



STRUCTURE



High Pressure Turbine Bypass Valve,

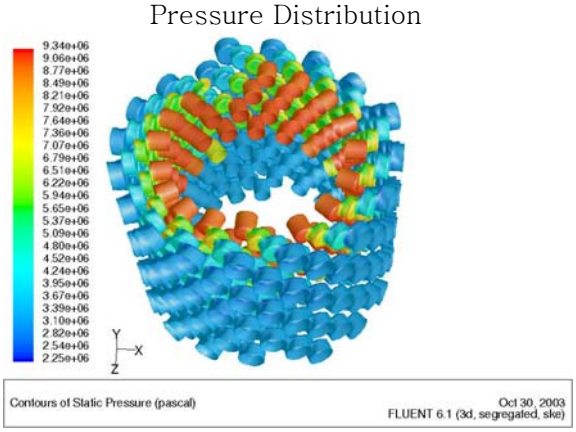
- **SAMO : Spring Assist Multiple Orifice Desuperheater**
  Supplied to POSCO Thermal Power Plant, DN100/ANSI 2500#, 6 Nozzles Orifice
- **MNSD : Multi Nozzle Spray Desuperheater– No need spray water control valve**
  Supplied to POSCO Thermal Power Plant, DN80/ANSI 900#, 6 Nozzles
- **PTCV – Turbine Bypass Valves, under construction**
  Supplied to POSCO in April 20, 6”(DN150) x 14”(DN350), WC9, 2500#, Angle Type, Piston Actuator (RA), 2250kgf

Design Parameters of PTCV

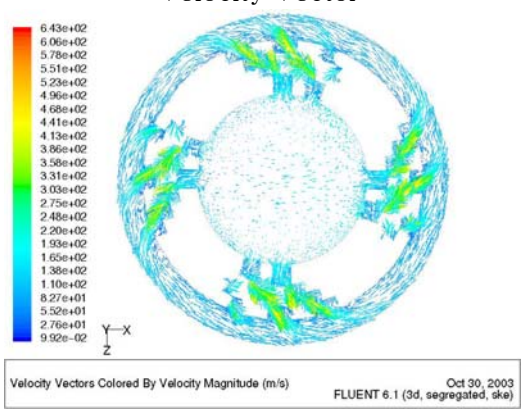
Steam Inlet	Steam Outlet	Cooling Water	Parameter	Unit
127	28.3	155	Pressure	barg
538	330	158.2	Temp.	(℃)
132,000	152,363	20,363	Flow rate	Kgf/hr

Analytical tools such as computational fluid dynamics (CFD) verify the superior spray pattern given by the Turbine Bypass Valve’s injection devices.

Pressure Distribution



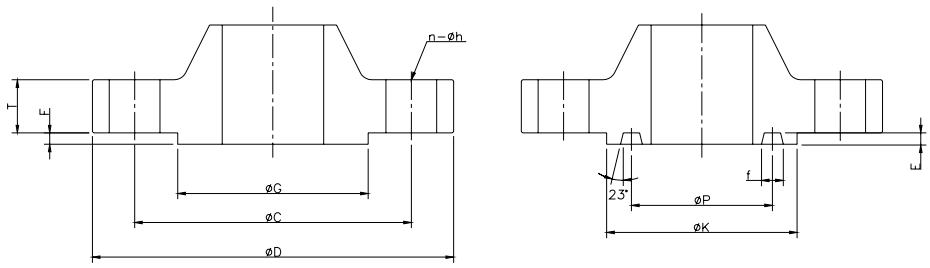
Velocity Vector



Various Connection available

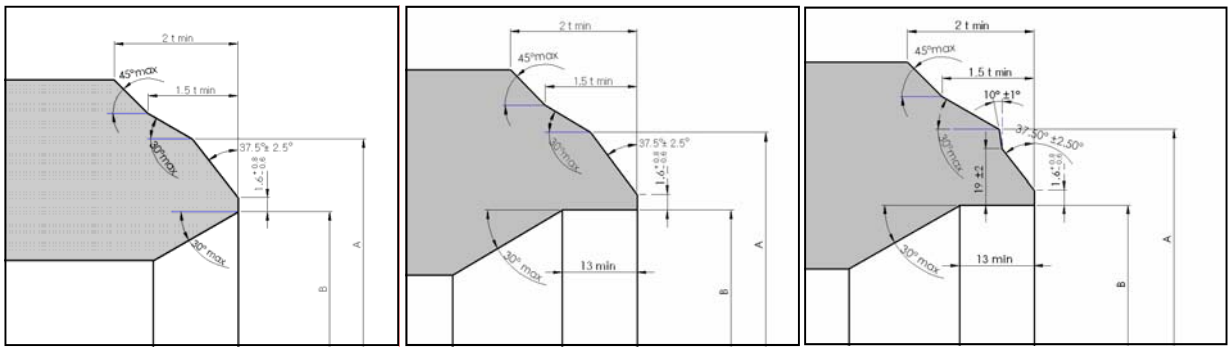
FLANGE DIMENSIONS;

Ref., ASME B16.5-2003



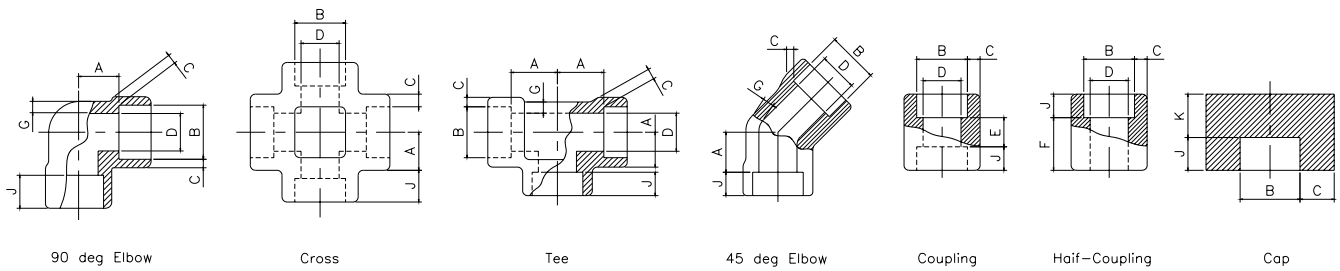
BUTT WELD DIMENSIONS;

Ref., ASME B16.25-2003



SOCKET WELD DIMENSIONS;

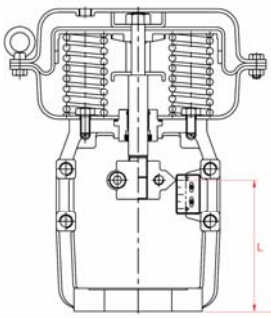
Ref., ASME B16.25-2003



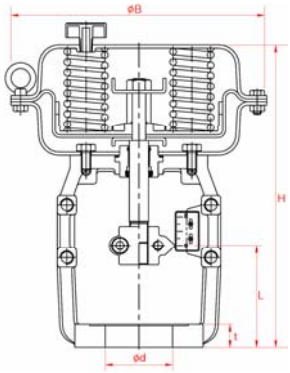
Actuators

Diaphragm Actuators

Multi-Spring Type Diaphragm Actuators M-Series



DA Type

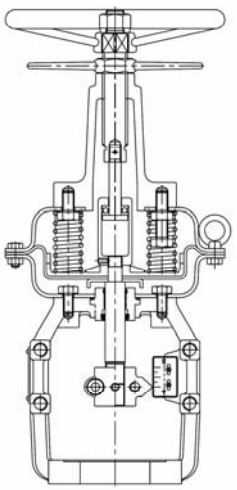


RA Type
(Reverse Action Type)

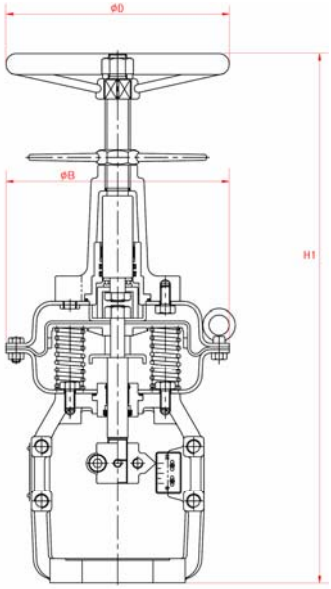
Application of Control Valves
Multi-Spring Type Diaphragm Actuator
– Top Mounted Handwheel

Model No.		V-220	V-270	V-350	V-450	V-620
Maximum Stroke (mm)		25	38	50	75	100
Diaphragm Area (Cm^2)		150	267	480	950	1300
L		105^{+15}_{0}	95^{+25}_{0}	102^{+38}_{0}	172^{+75}_{0}	100^{+100}_{0}
H		260	334	407	612	712
ϕd		56	56	70	90	120
t		22	22	26	35	40
ϕB		218	267	350	450	620
Top Mounted Handwheel	H1 MAX.	507	580	722	998	1148
	ϕD	150	200	250	400	500

 # Ask Factory Consult factory for Side Mounted Hanswheel and Top-Side Mounted Handwheel.



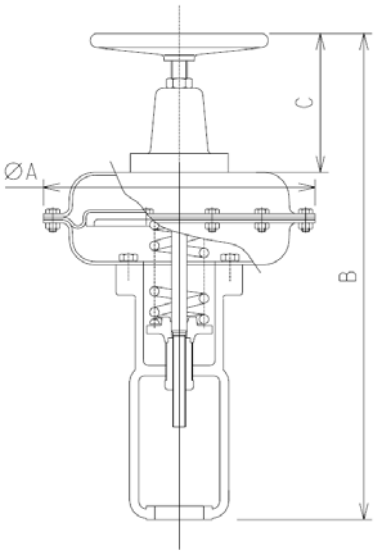
DA Type
(Direct Action Type)



RA Type
(Reverse Action Type)

Diaphragm Actuators

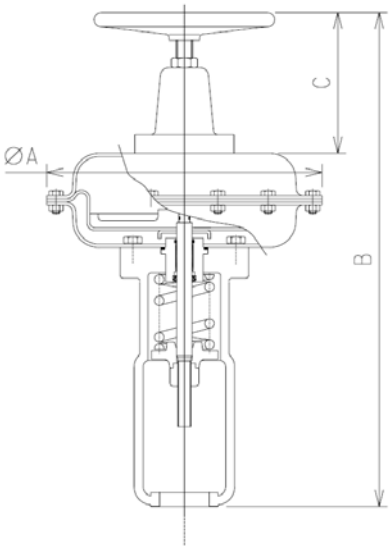
Single-Spring Type Diaphragm Actuators S-



DA Type (Direct Action Type)

DIAPHRAM ACTUATOR DA TYPE

STROKE	A	B	C
25	289	478	206
	333	576	229
40	289	478	206
	333	576	229
50	333	595	229
	406	769	300
80	406	769	300
100	406	769	300
150	406	784	300
	473	784	300
	536	933	388
200	536	933	388



RA Type (Reverse Action

DIAPHRAM ACTUATOR RA TYPE

STROKE	A	B	C
25	289	440	164
	333	498	204
40	289	440	164
	333	498	204
50	333	548	204
	406	658	260
80	406	658	260
100	406	658	260
150	406	721	260
	473	721	260
	536	840	313
200	536	840	313

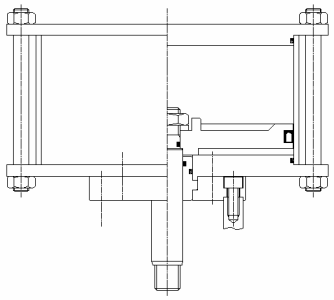
Cylinder Actuators

Cylinder Type Actuators - P200 Series

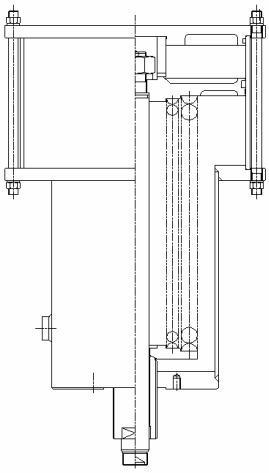
ACTUATOR SPECIFICATION

- **Air Supply : 4bar ~ 10bar**
- **Spring Range : available application**
- **Temperature : -20℃~120℃**
  - **Material : Cylinder - BLACK AMALGA**
    Cover - Carbon Steel
    Piston - Al. Alloy
    Stem- STS410(Ni-Plating)
- **Model : P200 Series**
- **Cylinder Diameter Range : *Φ*160 ~ *Φ*600**
- **PT : 1/4" ~ 1"**
- **TYPE : Reverse Acting with bevel Gear, Direct Acting, Direct Acting with Handwheel, Double Acting, Tandem Piston, Reverse Acting, Reverse Acting with Handwheel.**

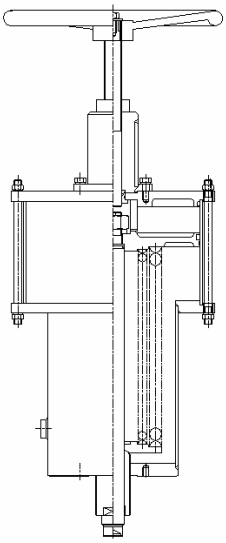
Double Acting



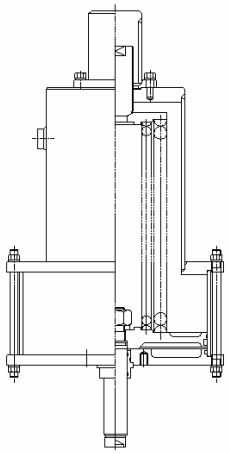
Direct Acting



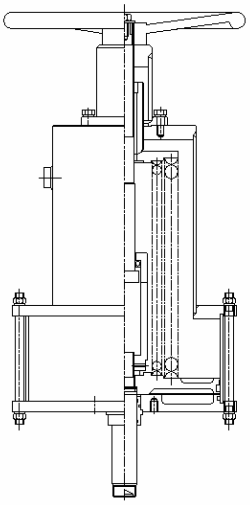
Direct Acting
with Top-mounted Handwheel



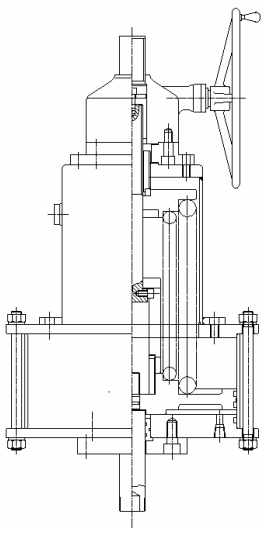
Reverse Acting



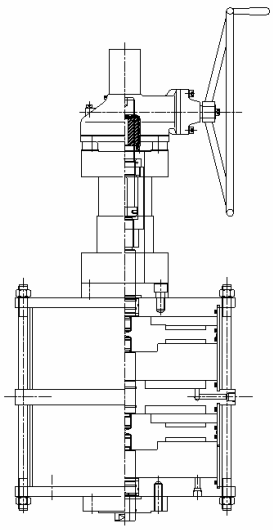
Reverse Acting
with Top-mounted Handwheel



Reverse Acting with Bevel Geared
Top-side mounted Handwheel

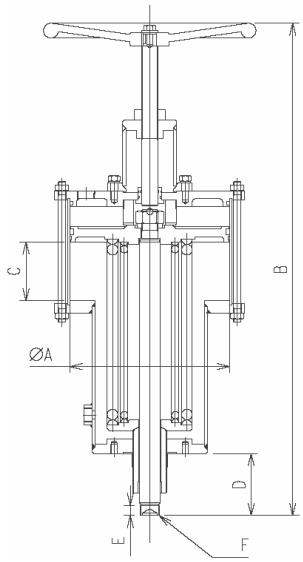


Tandem Piston with Bevel Geared
Top-side mounted Handwheel



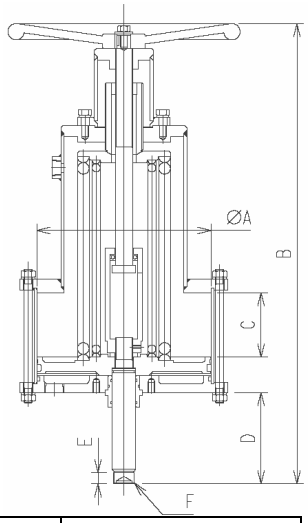
Cylinder Actuators

Cylinder Type Actuators – P200 Series



CYLINDER ACTUATOR DA TYPE

	A	B	C	D	E	F
P250	250	830	85	97	17	M28 X 2P
P300	300	926	111	117	19	M36 X 2P
P350	355.6	1,066	111	102	19	M40 X 2P
P400	406.4	1,149	116	144	26	M45 X 2P

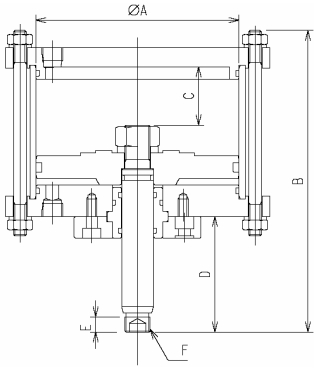


CYLINDER ACTUATOR RA TYPE

	A	B	C	D	E	F
P300	300	792	111	157	19	M36 X 2P
P350	355.6	912	111	167.5	19	M40 X 2P
P400	406.4	1,008	116	183	26	M45 X 2P

CYLINDER ACTUATOR DB TYPE

	A	B	C	D	E	F
P160	160	238	46.0	74.0	12	M20 X 2P
P200	200	243	53.0	85.0	15	M24 X 2P
P250	250	293	65.0	113.0	17	M28 X 2P
P300	300	308	65.0	115.0	19	M36 X 2P
P350	355.6	350	81.5	127.5	19	M36 X 2P
P400	406.4	453	106.0	173.0	26	M45 X 2P
P450	457.2	453	108.0	173.0	26	M45 X 2P



Electric Actuators

Electric Actuators

In many applications, operation of valves may require the use of electric, pneumatic or hydraulic actuators. Such applications include those where the valve (1) is too large or has too high a differential shut-off pressure for manual operation; (2) is not accessible for manual operation; (3) is part of a system requiring simultaneous opera-tion of many valves; (4) must be triggered from a remote location, as is often essential for emergency shut-off in hazardous areas.

We will gladly furnish any type or make of actuator you specify, or make recommen-dations for your particular service condi-tions. All Pacific gate, globe and non-return valves can be supplied with electric, air, gas or hydraulic driven motor actuators or cylinder actuators.

Motor Actuators

Motor actuators for rising stem valves can be powered by air, gas, hydraulic or electric power. The most common method of actuation is the electric motor actuator, as it is generally the most cost effective.

Electric motor actuated valves can be provided to meet the broadest range of requirements including operating cycle time, use of integral or remote controls, starters and indicators, and a wide range of power sources. They are less readily adaptable to fail-safe operation than cylinder actuators because they generally require more stored energy.

Air motor actuators are often specified in very hazardous locations where electric power is not available or permitted. The major disadvantage of this type of actuator is air consumption, particularly when applied to large valves. The combination of high gear ratio and long stroke can drain an entire air system unless the air supply system is specially designed to accommodate this type of actuator. Like electric motor actuators, these are not readily

Information Required to Quote Motor Actuators

1. Valve size, figure number or description.

2. Valve operating conditions (pressure, temperature, flow rate and fluid).

3. Maximum differential (shut-off) pressure.

4. Primary power supply:
a) electric-voltage, phase cycles,
b) gas or hydraulic-fluid, available flow rate, maximum and minimum pressure.

5. Control voltage.

6. Valve stem position.

7. Closing time and frequency.

8. Required construction (NEMA, etc.) or local environment.

9. Auxiliary equipment:
a) push-button stations,
b) reversing controllers,
c) position indicators,
d) other (i.e., stem covers, etc.)

10. Special requirements (i.e., radiation, seismic, etc.)

11. Preference for specific manufacturer, if any.

PRODUCT CODING SYSTEM

Code	1	2	3	4	5	6	7	8	9		
	H	G	B	P	2	B	A	B	B	A	C	N	W

1 Code 1

Products
- H : HV PRODUCTS
- M : MAINTENANCE SERVICE
- O : OTHER & OEM PRODUCTS

2 Code 2

Valve Body Types
- A : ANGLE GLOBE VALVES
- B : BALL VALVES
- C : CHECK VALVES
- D : DIAPHRAGM VALVES
- E : INSTRUMENT NEEDLE(BAR STOCK TYPE) GLOBE OR MANIFOLD VALVES
- F : FORGED GLOBE VALVES
- G : CAST GLOBE VALVES
- H : BELLOWS SEALED GLOBE VALVES
- J : FORGED PARALLEL SLIDE GATE VALVES
- K : CAST PARALLEL SLIDE GATE VALVES
- L : BELLOWS SEALED GATE VALVES
- M : AUTOMATIC RECIRCULATION VALVE(ARV)
- P : NOZZLE PLUG CHECK VALVES
- R : 3-WAY(CAST-GLOBE STYLE) VALVES
- T : OTHER TYPES OF GATE VALVES
- U : BUTTERFLY VALVES
- X : SPECIAL TYPES
- Y : Y-GLOBE/STOP CHECK VALVES

3 Code 3

Valve Bonnet Types
- B : BOLTED BONNET
- C : EXTENDED FINNED TYPE BONNET(CRYOGENIC)
- S : SCREWED-IN SEAL WELD BONNET
- P : PRESSURE SEALED BONNET
- W : WELDED BONNET
- E : EXTENDED FOR HOT TEMPERATURE SERVICE
- F : FLANGED JOINT FOR NOZZLE CHECK VALVES
- N : NON-SPECIFIED BONNET SUCH AS BUTTERFLY/BALL VALVES

4 Code 4

Operating Power Types
- D : DIAPHRAGM-PNEUMATIC POWER OPERATED
- E : MOTOR(ELECTRIC) OPERATED
- G : MANUAL - GEARED OPERATED
- H : HYDRAULIC-ELECTRIC OPERATED
- M : MANUAL OPERATED
- P : PISTON - PNEUMATIC POWER OPERATED
- R : REGULATING - NO POWER REQUIRED
- X : BARE STEM DESIGN

K G B P 2B AB B A CNW

1. **HV PRODUCTS**
2. Valve Body Type ; **CAST GLOBE VALVES**
3. Bonnet Type ; **BOLTED BONNET**
4. Operating Power Types ; **PISTON - PNEUMATIC POWER OPERATED**
5. Valve Body Size ; **250mm(10")**
6. Pressure Rating ; **ANSI-250/300**
7. Connection Type ; **BUTT WELDED**
8. Body Construction Materials ; **A105N/A216-WCB**

9-1. Function ; **Flow Modulating or E/P Control**
9-2. Function - By-pass & Equalizing ; **No Options**
9-3. Application; **WATER SERVICE**

Application Code 9.1
In case Code 2-J, K

Application Code 9.2
Otherwise Code 2-J, K

5 Code 5

Valve Body Sizes

00 : ALL SIZES COVER
08 : 8mm (1/4")
10 : 10mm (3/8")
15 : 15mm (1/2")
20 : 20mm (3/4")
25 : 25mm (1")
32 : 32mm (1-1/4")
40 : 40mm (1-1/2")
50 : 50mm (2")
65 : 65mm (2-1/2")
80 : 80mm (3")
1A : 100mm(4")
1B : 125mm(5")
1C : 150mm(6")
2A : 200mm(8")
2B : 250mm(10")
3A : 300mm(12")
3B : 350mm(14")
4A : 400mm(16")
4B : 450mm(18")
5A : 500mm(20")
5B : 550mm(22")
6A : 600mm(24")
6B : 650mm(26")
7A : 700mm(28")
7B : 750mm(30")
8A : 800mm(32")
8B : 850mm(34")

6 Code 6

Pressure Rating

KA : KS/JIS-10K
KB : KS/JIS-20K
KC : KS/JIS-30K
KD : KS/JIS-43K

AA : ANSI-125/150
AB : ANSI-250/300
AC : ANSI-400
AD : ANSI-600
AE : ANSI-800
AF : ANSI-900 (PN150)
AG : ANSI-1500(PN250)
AH : ANSI-2500(PN420)
AI : ANSI-3500
AJ : ANSI-4500

* In case medium class, Select with low class. That is, in case 2250# Select with 1500#.

7 Code 7

End Connection

S : SOCKET WELDED
B : BUTT WELDED
R : RAISED FACED
T : RING/TONGUE JOINT
N : NOT SPECIFIED

8 Code 8

Body Construction Materials

A : A105N/A216-WCB
B : A182-F11,F12/A217-WC6
C : A182-F22/A217-WC9
D : A182-F51/DUPLEX, 6% Mo Steel
E : A182-F91/A217-C12A
F : A182-F304/A351-CF8
G : A182-F304L/A351-CF3
H : A182-F316/A351-CF8M
I : 182-F316L/A351-CF3M
J : A182-F317
K : A182-F321
L : A182-F347
M : MONEL
N : INCONEL 625

* In case 3-Ways Valve, Select Standards with Inlet

9 Code 9.1 Parallel Slide Gate Valves

Option Code per Valve Types

First digit - Function
N : General Purpose Operation
Q : Fast Acting
C : Throttling

Second digit - Function - By-pass & Equalizing
N : INTERNAL EQUALIZING (OR NO EQUALING HOLE) ON THE DISC & WITHOUT BY-PASS
1 : INTERNAL EQUALIZING & BY-PASS PIPING (ONE VALVE) - UNI DIRECTIONAL
2 : BY-PASS PIPING AND EXTERNAL EQUALIZING LINE(TWO VALVES) - UNI DIRECTIONAL
3 : BY-PASS PIPING AND EXTERNAL EQUALIZING LINE(THREE VALVES) - BI DIRECTIONAL
4 : OVER PRESSURE PROTECTION - RELIEF VALVE ONLY - BI DIRECTIONAL
5 : RELIEF VALVE & BY-PASS PIPING (3-WAY PSGV) - BI DIRECTIONAL
6 : BY-PASS PIPING & DRAIN VALVE
7 : EQUALIZING, BY-PASS PIPING & DRAIN VALVE

Third digit - Application
S : STEAM SERVICE
W : WATER SERVICE
L : LIQUID SERVICE EXCEPT WATER
G : GASEOUS SERVICE
N : NOT SPECIFIED
H : High Temperature
- Extension Bonnet Required (above 600℃)

9 Code 9.2 Globe Style Control Valves

Option Code per Valve Types

First digit - Function
N : On-Off Control
Q : Fast Acting or Emergency Shut-off Action
C : Flow Modulating or E/P Control
S : Stop Check or Check Valve - Non-return Check Function
B : Blowdown (Pressure Letdown) Control
E : Instrumentation Purpose
D : Desuperheating Control (PTCV)
T : Double Block & Bleed

Second digit - Function - By-pass & Equalizing
N : No Options
1 : Equalizing piping or Holes
2 : Drains
3 : Explosion Proof
4 : Special Options Required
5 : Orifice Attached in the Valve Outlet

Third digit - Application
S : STEAM SERVICE
W : WATER SERVICE
L : LIQUID SERVICE EXCEPT WATER
G : GASEOUS SERVICE
N : NOT SPECIFIED
H : High Temperature
- Extension Bonnet Required (above 600℃)

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