

220C Concentric Type Segmental Ball Valves

GENERAL

This series is concentric segmental ball valve for modulating application. V-notch cut at disc makes reageability larger and creates shearing effect by disc and seal ring. Therefore, suitable to large rangeability service and/or control of fluids with fiber and/or slurry.

STANDARD SPECIFICATIONS

BODY

Series	220C
Body size	1"~12" (25A~300A)
Disc form	Segmental ball disc with V-notch cut.
Characteristics	Approximate EQ%
Trim materials Trim treatment	See Table 1 for hardening treatment and operating pressure-temperature.
Body ratings	Valve size ≤ 6 inch : JIS 10K, 20K, 30K, 40K / ANSI (JPI) Class 150, 300, 600 Valve size ≥ 8 inch : JIS 10K, 20K, 30K / ANSI (JPI) Class 150, 300
Body connections	Flanged type
Dimension	See pages 24~34.
Body & Bonnet Material	SCPH2/WCB, SCS13A/CF8, SCS14A/CF8M and other alloy steels. As to the operating pressure-temperature limitation for each material, see Tables 1 and 2.
Bonnet type	Standard type : -45~+450°C Note : The allowable operating pressure-temperature limitation for each material.
Packing	See Fig. 2 for selection.
Gasket	See Fig. 3 for selection.
Painting color	Munsell N-6 (Epoxy resin group) is standard. In the case of stainless steel body, no painting is standard.

ACTUATOR

Type	6300RB :		Pneumatic cylinder type
Specification	Spring return type		Double acting type
Purpose	Modulation		
Air supply	300, 400, 500 kPa[gauge]		300~500 kPa[gauge]
Connection	Air piping : See pages 24~31.		
Angle rotation	90 deg		
Direct action	Air to valve shut		Valve open or shut by air or electric signal.
Reverse action	Air to valve open		
Hysteresis	≤ 1.5%		≤ 1.5% of Full stroke with positioner
Linearity	≤ ± 2%		≤ ± 2% of Full stroke with positioner
Ambient Temp.	- 20 ~ + 60°C		
Painting	Cylinder..... Alodur (Special hard anodized) : Gray End cap..... Chromatized + Polyester cated : Gray		
Option	E/P, P/P Positioner, Air-set, Solenoid valve, Limit switch, Position transmitter, Lock valve, Speed controller, Rotation stopper, Manual handle, etc.		

Type Specification	Solid State Electric Type		Electric Motor Type
	3500RB	3600RA	3400RA
	DC Motor resolution : 0.3%	AC Motor resolution : 0.4%	AC Motor
Purpose	Modulation		On-off
Power supply	AC 100V 50/60 Hz		AC 100V 50/60 Hz
Input signal	4~20 mA DC		Change over contact
Wiring conduit	See pages 32~34.		See pages 32~34.
Angle rotation	90 deg		90 deg
Direct action	Signal increase to Valve shut		Manual selection Valve open, shut, stop
Reverse action	Signal increase to Valve open		
Hysteresis with positioner	≤0.5% of full stroke	≤0.8% of full stroke	—
Linearity with positioner	≤±1% of full stroke	≤±1% of full stroke	—
Ambient Temp.	- 10~ + 60℃		- 10~ + 60℃
Painting	Metallic blue		Metallic blue
Option	Resolution : 0.1% Split range Position transmitter	Overload protection Torque switch	Micro awitch Potentiometer
	Space heater, Manual handle, Junction box (Available except for Casing D1 & D2), Explosion proof (Available for Casing size B only)		

PERFORMANCE

Rated Cv	See Table 3.
Flow characteristics	See Fig. 5.
Rangeability	200 : 1~500 : 1
Seat leakage	See Fig. 1.
Allowable pressure drops	See Table 4.

OPTIONAL SPECIAL SPECIFICATIONS (Additional cost is required)

Special testing for body	Material certificate, Liquid penetment testing, Radiographic testing, Flow characteristic testing, Low temperature testing, Steam testing.
Special cleaning for body	Oxygen clean, Oil-free, Water-free.
Special specification for body and actuator	Sand and Dust proof, Salty environment proof, Cold area proof, Tropical area proof, Copper-free alloy, Vacuum service proof, Special piping and fitting, SUS bolt and nut for exposed parts, Non-standard painting.
Authorization	Japanese government authorization for High pressure gas.

Table 1 BODY/TRIM STANDARD MATERIAL COMBINATION AND OPERATING TEMPERATURE

- R. TFE (F) : MoS2 filled reinforced Teflon
- R. TFE (C) : Carbonfiber filled Reinforced Teflon
- Hcr : Hard chrome plated
- S.S : Stellite seat surface
- S.F : Stellite full surface
- PH : Precipitation hardening
- FMC : Flon metal coating

seal ring material/treatment vs operating temperature-pressure limitation : See Fig. 1.

Table 1-1 M CLASS BODY : JIS10K, 20K, 30K / ANSI (JPI) CLASS 150, 300

Body material		SCPH2/A216-WCB, SCS13A/A351-CF8, SCS14A/A351-CF8M					
Disc	Material	SCS14A					
	Treatment	Hcr					
Stem	Material	SUS316					
	Treatment	—					
Retainer	Material	SUS316					
	Treatment	—					
Bearing	Material	SUS316		SUS316	SUS316	SUS316	SUS316
	Treatment	FMC		Hcr	FMC	Hcr	Hcr
Seal ring	Type	FN	FV	CS	CS	L	L
	Material	R. TFE (F)	R. TFE (F)	R. TFE (C)	R. TFE (C)	SUS316	SUS316
	Treatment	—	—	—	—	—	—
Back ring	Material	NBR O ring	VITON O ring	SUS316	SUS316	—	—
Operating Temp. °C	SCPH2 /WCB Body	-5~+60	-5~+180	-5~+180	-5~+250	-5~+180	-5~+400
	SCS13A /CF8 Body	-45~+60	-10~+180	-45~+180	-45~+250	-45~+180	-45~+400
	SCS14A /CF8M Body	-45~+60	-10~+180	-45~+180	-45~+250	-45~+180	-45~+400
Seat leakage		See Fig. 1.					

Body material		SCPH2/A216-WCB, SCS13A/A351-CF8, SCS14A/A351-CF8M					
Disc	Material	SCS14A		SCS14A		SCS14A	
	Treatment	Hcr		S.S		S.F	
Stem	Material	SUS316		SUS316		SUS316	
	Treatment	—		—		—	
Retainer	Material	SUS316		SUS316		SUS316	
	Treatment	—		—		S.F	
Bearing	Material	SUS316	SUS316	SUS316	SUS316	SUS316	SUS316
	Treatment	FMC	Hcr	FMC	Hcr	FMC	Hcr
Seal ring	Type	H	H	HS	HS	HB	HB
	Material	SUS316	SUS316	SUS316	SUS316	SUS316	SUS316
	Treatment	—	—	S.S	S.S	S.F	S.F
Back ring	Material	—	—	—	—	—	—
Operating Temp. °C	SCPH2 /WCB Body	-5~+180	-5~+400	-5~+180	-5~+400	-5~+180	-5~+400
	SCS13A /CF8 Body	-45~+180	-45~+400	-45~+180	-45~+400	-45~+180	-45~+400
	SCS14A /CF8M Body	-45~+180	-45~+400	-45~+180	-45~+400	-45~+180	-45~+400
Seat leakage		See Fig. 1.					

Table 1-2 H CLASS BODY : JIS40K/ ANSI (JPI) CLASS 600

Body material		SCPH2/A216-WCB, SCS13A/A351-CF8					
Disc	Material	SCS14A				SCS14A	SCS14A
	Treatment	Hcr				S.S	S.F
Stem	Material	SUS630				SUS630	SUS630
	Treatment	PH				PH	PH
Retainer	Material	SUS316				SUS316	SUS316
	Treatment	—				—	S.F
Bearing	Material	SUS316				SUS316	SUS316
	Treatment	Hcr				Hcr	Hcr
Seal ring	Type	FN	FV	CS	H	HS	HB
	Material	R. TFE (F)	R. TFE (F)	R. TFE (C)	SUS316	SUS316	SUS316
	Treatment	—	—	—	—	S.S	S.F
Back ring	Material	NBR O ring	VITON O ring	SUS316	—	—	—
Operating Temp. °C	SCPH2 /WCB Body	-5~+60	-5~+180	-5~+250	-5~+400	-5~+400	-5~+400
	SCS13A /CF8 Body	-45~+60	-10~+180	-45~+250	-45~+400	-45~+400	-45~+400
Seat leakage		See Fig. 1.					

Table 2 BODY MATERIAL/OPERATING PRESSURE-TEMPERATURE RATING

Table 2-1 ANSI

UNIT : MPa

Temp. °C	Class 150			Class 300			Class 600	
	SCPH2 WCB	SCS13A CF8	SCS14A CF8M	SCPH2 WCB	SCS13A CF8	SCS14A CF8M	SCPH2 WCB	SCS13A CF8
-45~-5		1.90	1.90		4.95	4.95		9.91
-5~38	1.96	1.90	1.90	5.10	4.95	4.95	10.20	9.91
50	1.92	1.84	1.84	5.00	4.77	4.80	10.01	9.56
100	1.76	1.56	1.61	4.63	4.08	4.21	9.27	8.17
150	1.57	1.39	1.47	4.51	3.62	3.85	9.04	7.26
200	1.40	1.25	1.37	4.38	3.27	3.56	8.75	6.54
250	1.20	1.16	1.20	4.16	3.04	3.34	8.33	6.10
300	1.01	1.01	1.01	3.87	2.91	3.15	7.74	5.80
350	0.84	0.84	0.84	3.69	2.81	3.03	7.38	5.60
375	0.73	0.73	0.73	3.64	2.77	2.96	7.28	5.54
400	0.64	0.64	0.64	3.44	2.74	2.91	6.89	5.48
425	0.55	0.55	0.55	2.88	2.71	2.87	5.74	5.42
450	0.47	0.47	0.47	1.99	2.68	2.81	4.00	5.37

Table 2-2 JIS

UNIT : MPa

Temp. °C	JIS10K SCPH2	JIS20K SCPH2	JIS30K SCPH2	JIS40K SCPH2
-5~120	1.37	3.33	4.99	6.66
~220	1.17	3.03	4.50	6.07
~300	0.98	2.84	4.21	5.58
~350		2.54	3.82	5.09
~400		2.25	3.72	4.50

Fig. 1 SEAL RING OPERATING PRESSURE-TEMPERATURE RATINGS AND ALLOWABLE SEAT LEAKAGE

Fig.1-1 FV type • FN type

Seat leakage : ANSI Class VI

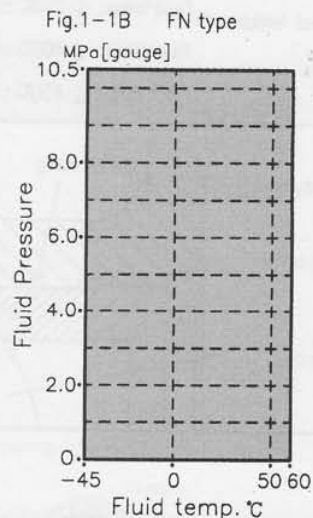
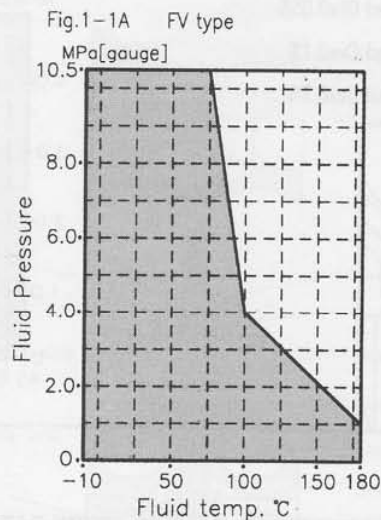
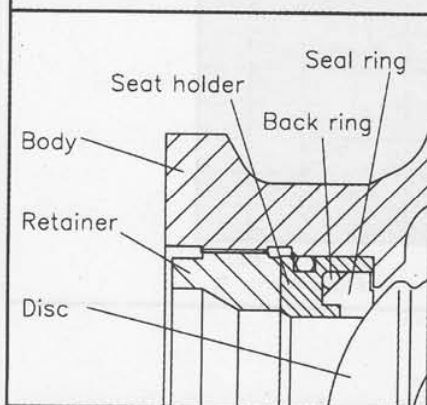


Fig.1-2 CS type

Seat leakage $\leq$ Rated Cv $\times$ 0.000001%

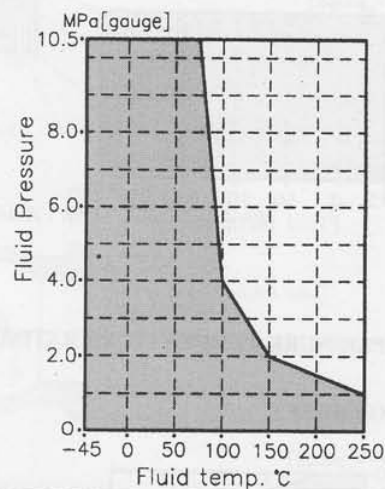
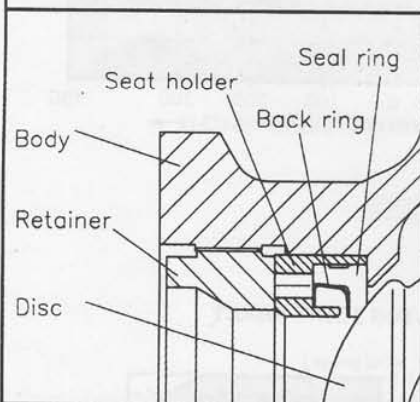
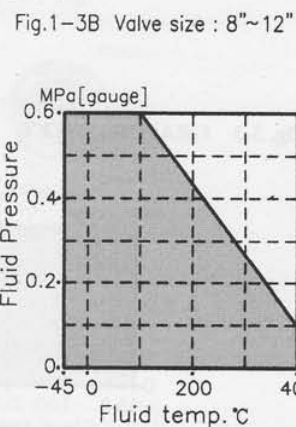
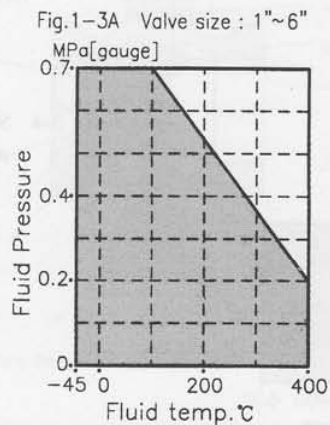
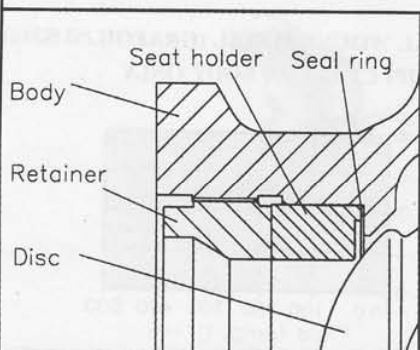


Fig.1-3 L type (SUS316 Thin seat)

Seat leakage

$\leq 250^{\circ}\text{C}$: Rated Cv $\times$ 0.001%

$\leq 400^{\circ}\text{C}$: Rated Cv $\times$ 0.005%



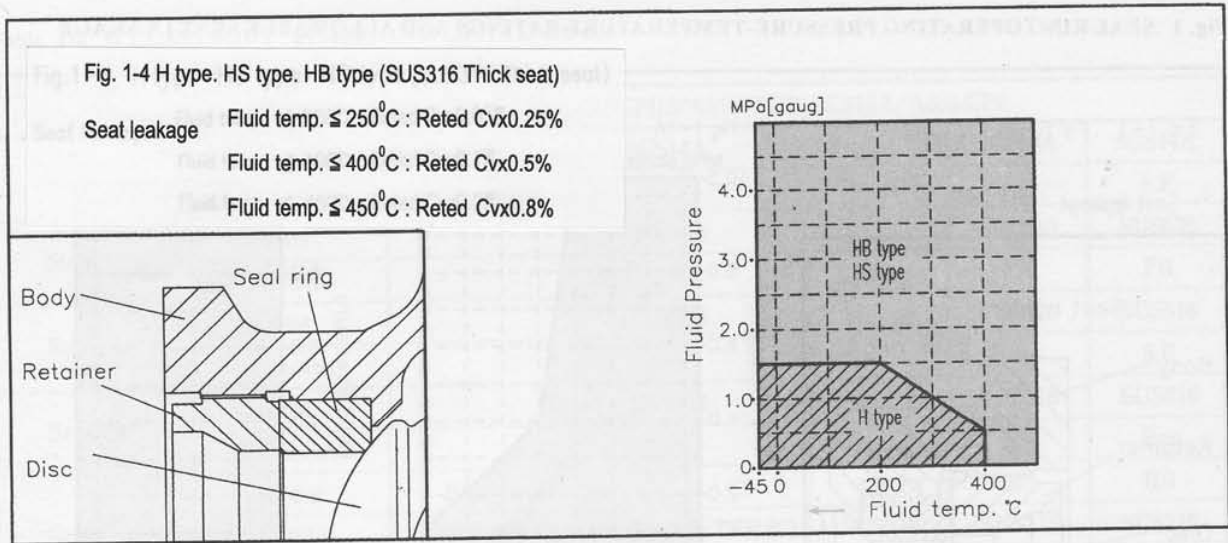


Fig. 2 GLAND PACKING OPERATING PRESSURE-TEMPERATURE RATINGS

Fig. 2-1 LOW TORQUE TYPE : TFE FIBER/TFE ASBEST

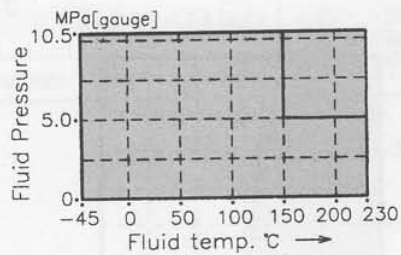


Fig. 2-2 GRAFOIL

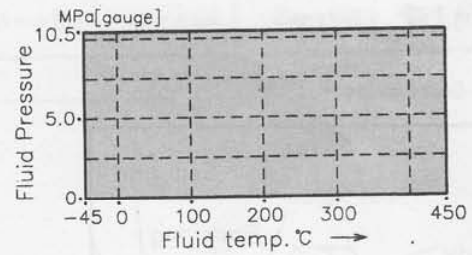


Fig. 3 GASKET PRESSURE-TEMPERATURE RATINGS

Fig. 3-1 TEFLON SHEET

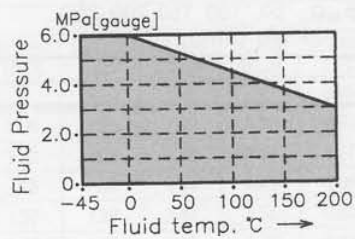


Fig. 3-2 ASBESTOS JOINT SHEET

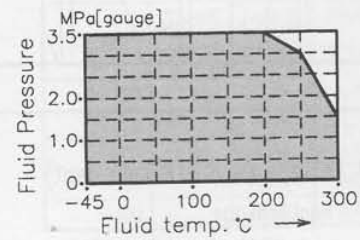
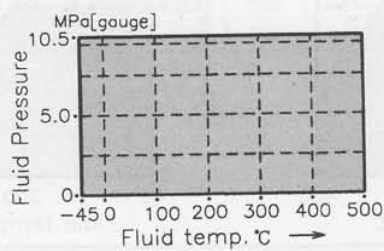


Fig. 3-3 GRAFOIL SHEET



**Fig. 3-4 SPIRAL WOUND METAL (GRAFOIL/SUS316)
ANSI/JPI CLASS 600 BODY ONLY**

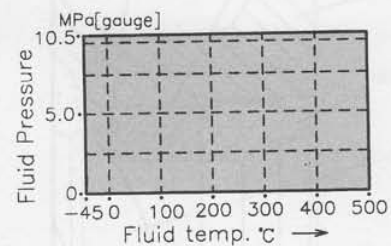


Fig. 4 BODY SECTION VIEW

Fig. 4-1 M CLASS BODY STANDARD BODY TYPE : JIS10K, 20K, 30K/ ANSI (JPI) CLASS 150, 300

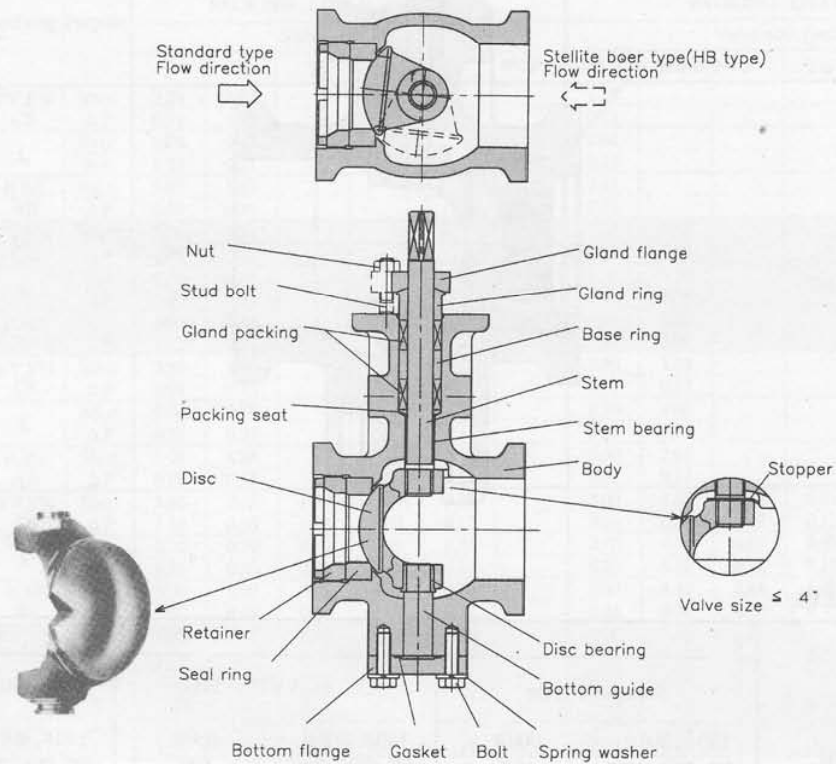


Fig. 4-2 H CLASS BODY STANDARD TYPE : JIS40K / ANSI (JPI) CLASS 600

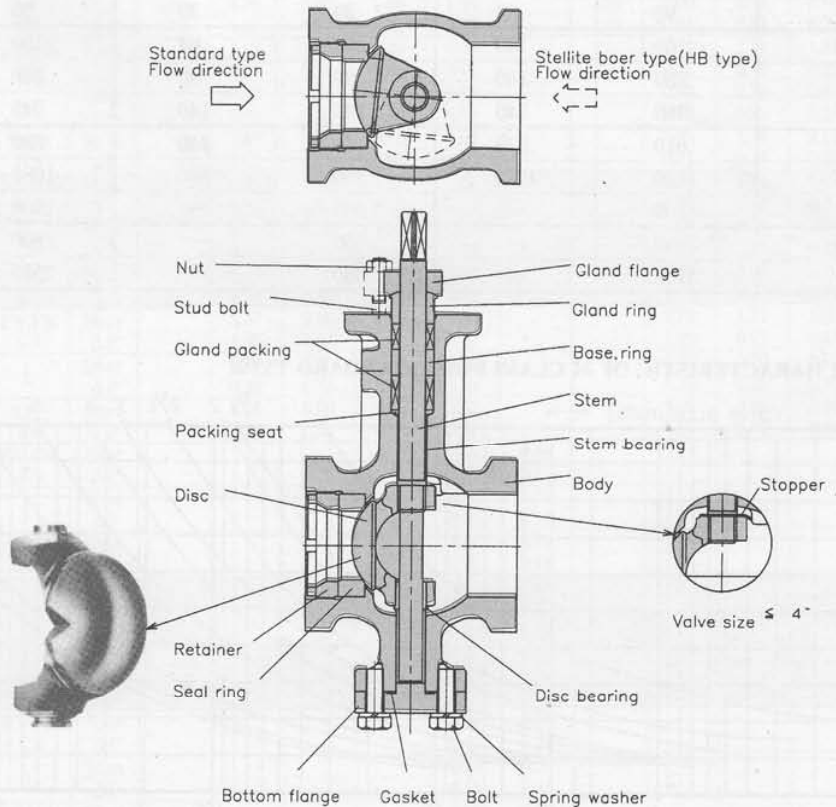


Fig. 4-3 ANTI CAVITATION TYPE

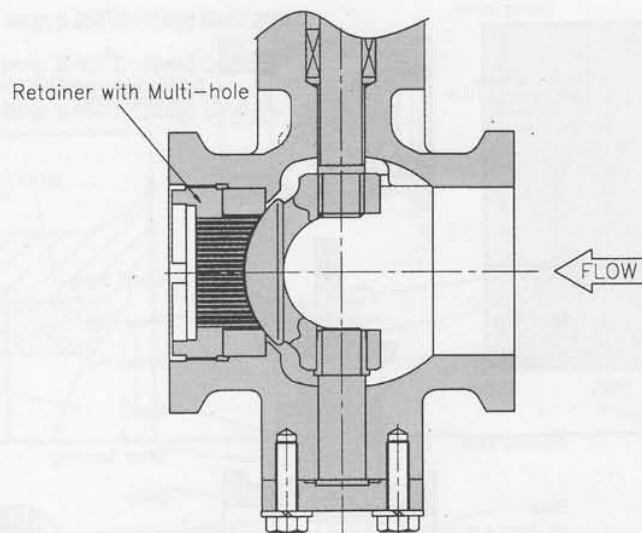


Table 3 Cv VALUE

Valve size inch (mm)	Metal seat				Soft seat	
	Standard type		ANTI-CAVITATION		Standard type	
	150#, 300# 10K, 20K, 30K	600# 40K	150#, 300# 10K, 20K, 30K	600# 40K	150#, 300# 10K, 20K, 30K	600# 40K
1 (25)	32	30	10	10	32	30
1½ (40)	78	74	24	24	78	74
2 (50)	90	85	39	39	90	85
2½ (65)	160	152	64	64	150	145
3 (80)	250	240	90	90	240	233
4 (100)	360	340	140	140	345	335
5 (125)	610	570	240	240	580	560
6 (150)	1120	1050	360	360	1080	1020
8 (200)	1850	—	660	—	1800	—
10 (250)	2950	—	1050	—	2800	—
12 (300)	3700	—	1350	—	3550	—

Fig. 5 FLOW CHARACTERISTIC OF M CLASS BODY STANDARD TYPE

