INNOBIZ

ISO14001:2004 ISO9001:2000

GLOBE VALVE

Fundamental Of Engineering Data



Fundamental Of Engineering Data

GOLDEN RULES
Automatic Valve & Accessories

CAGE GUIDE SINGLE SEATED TYPE GLOBE VALVE

Product Features (Reliability)

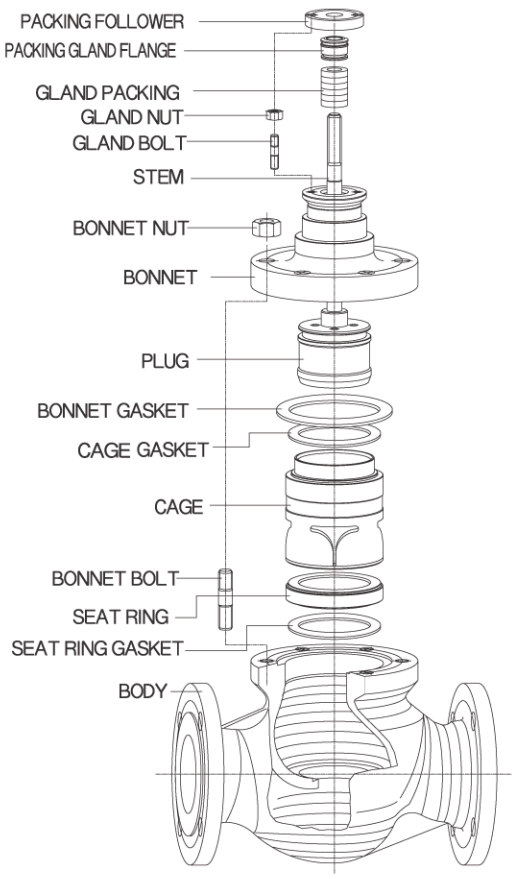
We do take into consideration all parts of the common use from product design.
And when the product is put into the field through complete inspection to produce rapid and complete mass product.
In particular, the seal line is total inspectin by optical equipment.

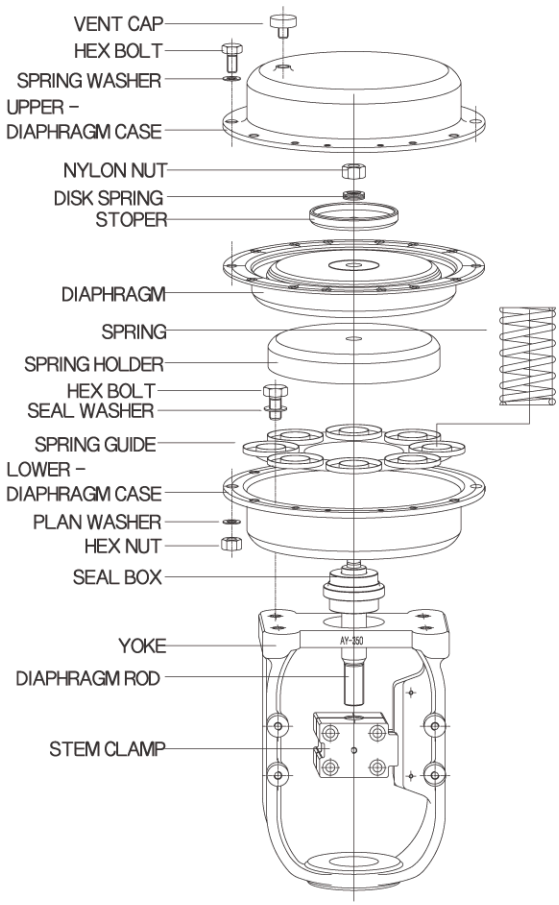
Body parts was designed to stremline for low pressure loss characteristics , and rangeability of 50: 1 was considerated to control the fluid flow as standard inside Trim part.

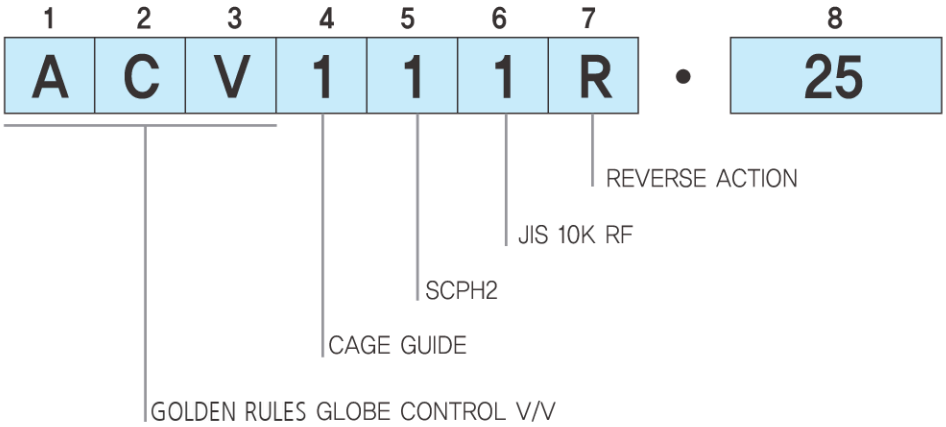
To able to assemble Extension bonnet, FIN bonnet, Bellowes bonnet, Jacket bonnet and etc is scalability of body part.
And end point of flange is JIS & ANSI standard.

The amount of fluid applies the standard type or ACV realizes accuracy required in the field by combination of body part, pneumatic daiphragm actuator, Positioner and Trim part ready-made to suit the needs of user specification.

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1 2 3

A C V

GOLDEN RULES GLOBE CONTROL VALVE MODEL

4

1

VALVE TYPE
1 : CAGE GUIDE
2 : TOP GUIDE

5

1

VALVE MAETERIAL
1 : SCPH2 (WCB)
2 : SCS13 (CF8)
3 : SCS14 (CF8M)
4 : SCS16 (CF3M)

6

1

VALVE END CONNECTION & RATING
1 : KS(JIS) 10K RF
2 : KS(JIS) 20K RF
3 : ANSI #150 RF
4 : ANSI #300 RF

7

R

ACTUATOR ACTION
R : REVERSE ACTION
D : DIRECT ACTION

8

25A

VALVE SIZE

Ex : 20A
40A
50A

STANDARD SPECIFICATION

Actuator Model No.			For See "Actuator (Pneumatic Daiphragm Linear) Dimention Chart"								
Valve Type			Diaphragm or Cylinder Actuator operated globe control valve. MODEL : ACV								
Body	Valve Size	(mm)	15	20	25	32	40	50	65	80	100
		(inch)	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
	Stroke	mm	20	20	20	25	25	25	30	40	40
	Cv		For see "Globe Valve Cv Chart"								
	Pressure Rating		KS 10K / JIS 10K / ANSI 150LB								
	End Connections		RF, FF								
	Body Materials		For see "Valve Body And Bonnet Parts, And The Combination Of Trin Malerials"								
	Operating Temperature		Standard Type: -20°C ~ 210°C "Body material & operating pressure-temperature rating."								
	Guide		Model : Cage Guide (Unbalance, Balance)								
	Gland Packing		V-PTFE, PTFE yarn, Graphite yarn								
	Gasket		SUS316 + Graphite spiral wound, Other alloy steels								
	Painting Color		Standard is silver. In the case of stainless steel, flange is not painted.								
	Plug Characteristics		Equal percentage, Linear								
	Trim Materials		SUS316, SUS316L+ (STL.), SUS410								
	Treatment of Trim		For see page "Valve body and bonnet parts, and the combination of trim materials Stem Motion & Trim treatment & material vs operating pressure-temperature ratings.								
Performance	Control Mode		For see page "Globe Valve Assembly dimensions"								
	Valve Action		Reverse action, Direct action								
	Rangeability		30:1, 50:1								
	Action Accuracy	Hysteresis	Without positioner max. 4% F.S., With positioner max. 1% F.S.								
		Linearity	Without positioner max. ±5% F.S., With positioner max. ±1% F.S.								

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GLOBE VALVE Cv CHART

1-1 Cage Guide Single Seat Unbalanced

[Unit : gal/min]

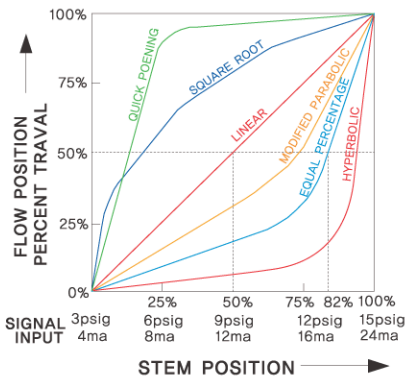
Port size / Trim type	15A (1/2″)	20A (3/4″)	25A (1″)	32A (1 1/4″)	40A (1 1/2″)	50A (2″)	65A (2 1/2″)	
Orifice DIA								
Equal percentage Cv	6	9	14	25	33	50	85	
Linear Cv	6	9	14	25	33	50	85	

1-2 Cage Guide Single Seat Balanced

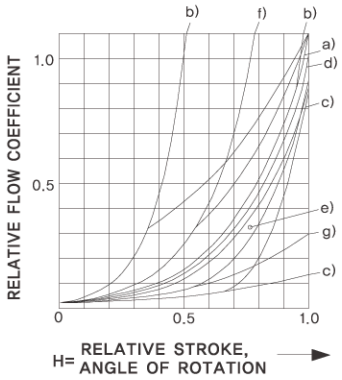
[Unit : gal/min]

Port size / Trim type	80A (3″)	100A (4″)	150A (6″)	200A (8″)
Orifice DIA				
Equal percentage Cv	100	170	420	750
Linear Cv	100	170	420	750

Inherrent Flow Characteristics For Common Valve Trim Designs



Cv Capacity Factor by IEC 534-24-4



DIN/IEC 534-2-4

a) Tolerance zone of flow coefficients $\pm 10(\frac{1}{\phi})^{0.2}$%

b) Max. slope tolerance 2b

c) Min. slope tolerance 0.5b

VDI/VDE 2173

e) Tolerance zone

f) Max. slope tolerance 1.3b

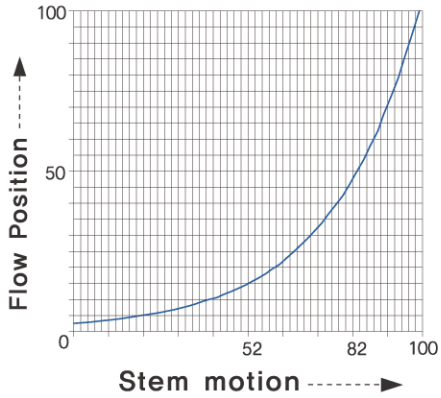
g) Min. slope tolerance 0.7b

$b=\tan \alpha = \frac{\triangle \phi}{\triangle h}$

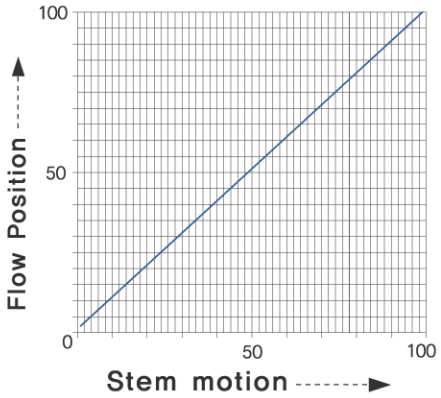
d) Ideal equal-percentage inherent flow characteristic

Flow Characteristics

Equal percentage



Linear



STEM MOTION

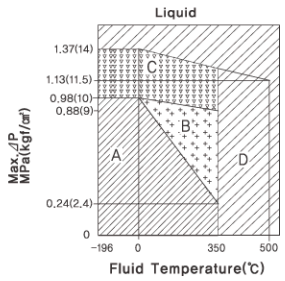
Stem Motion

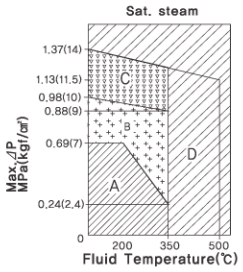
● : Must be Used ○ : Available

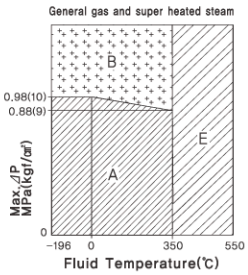
TRIM \ BODY		SCPH2		SCPH21	SCPL1	SCS13		SCS14
TRIM \ PLUG & SEAT		SUS304	SUS316	SUS304	SUS316	SUS304	SUS316	SUS316
PLUG & SEAT	NONE	●	●	●	●	●	●	●
	STELLITE	●	●	●	●	●	●	●
SOFT	PTFE	●	●	○	○	●	●	●
	CTFE	●	●	●	●	●	●	●
RETANER	NONE	○	○	○	○	●	●	●
	SCS14	●	●	●	●			
P/B SLEEVE	H-Cr	○	○	○	○	●	●	●
	SUS630	●	●	●	●			
GUIDE	NITRIBED	○	○	○	○	●	●	●
	SUS630	●	●	●	●			
	SUS420 J2							

Trim treatment & material vs operating pressure-temperature ratings.

A: Stellite standard (Plug & Seat), **B**: Stellite standard and ion treatment, **C**: Stellite face,
D: Stellite face + Stellite of guide bushing and guide post, **E**: Stellite seat + Stellite of guide bushing and guide post



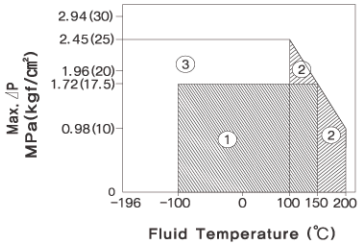




(1) Seat ring of on-off control valve and of throttling control valve for tight shut off is hard faced at the area of Stellite seat and over.
(2) In case of flushing fluid, seat ring is hard faces at the area of Stellite area.
(3) In spite of fluid sort, at 350°C and over, guide bushing and guide post is hard faced be Stellite treatment.
(4) In case of saturated steam, if inlet pressure is 0.69 MPa (7 kgf/cm²G) and over, seat ring is hard faced at area of Stellite seat and over.

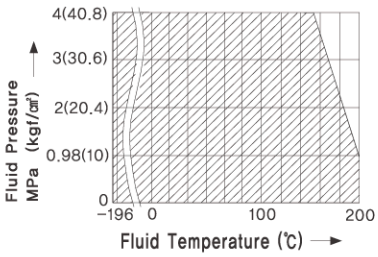
Soft seat operating pressure-temperature ratings.

Disc materials : ① PTFE,
② Glass reinforced PTFE,
③ PCTFE

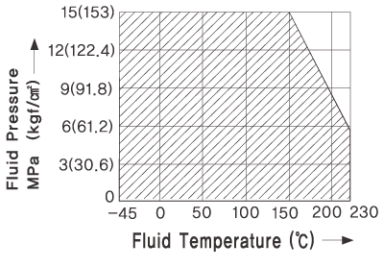


Packing operating pressure-temperature ratings.

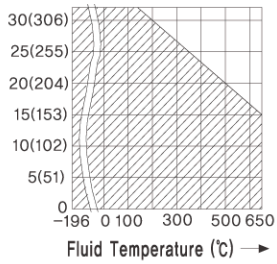
① V-PTFE



② PTFE yarn



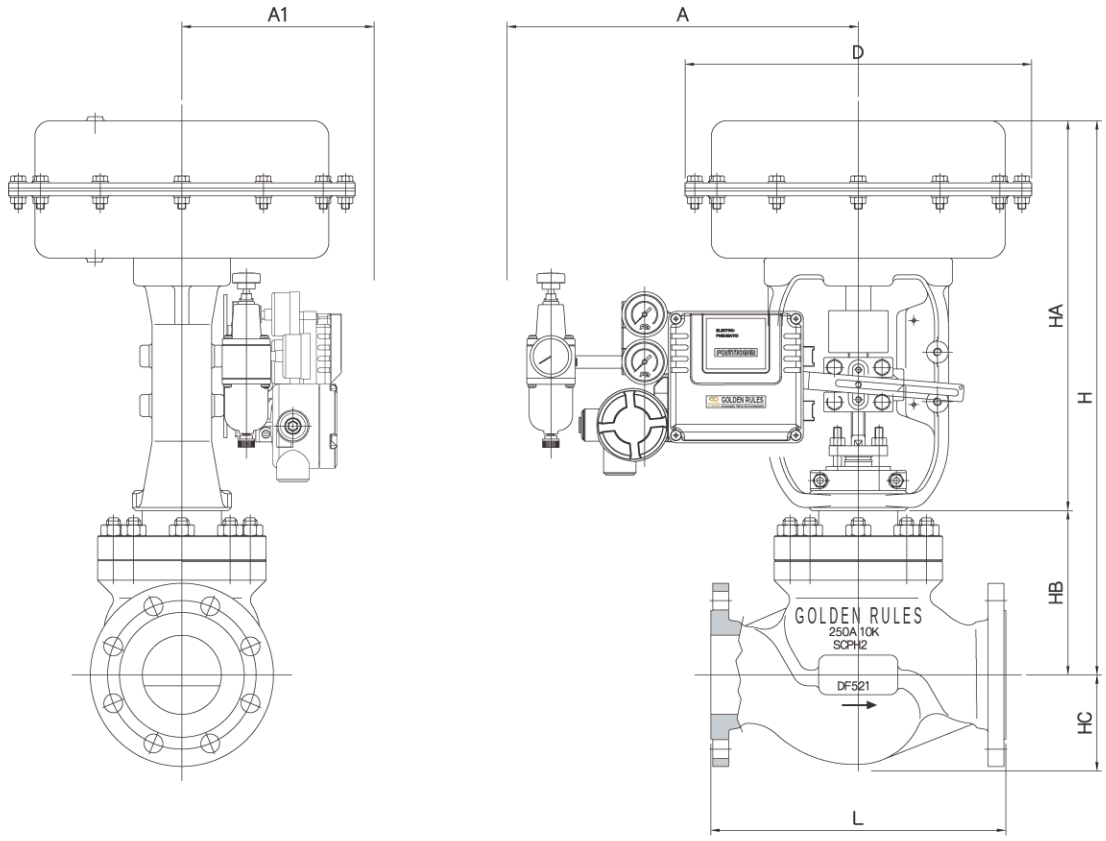
③ Graphite yarn



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CAGE GUIDE SINGLE SEATED TYPE
GLOBE VALVE ASSEMBLY DIMENSIONS

Model : ACV



Actuator Acting : Reverse, Direct
Operating Media : Compressed Dry Air
IN-PUT Signal : DC 4 ~ 20mA

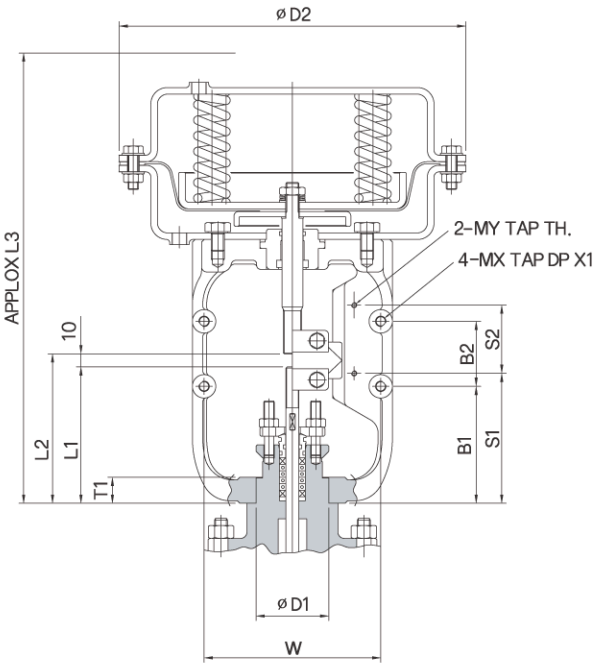
Fluid Temp : -20℃ ~ 210℃
End Coninection : KS 10K, JIS 10K, ANSI #150LB, DIN PN10
Accessories : E/P Positioner, Air Set

Globe Valve Assembly dimensions

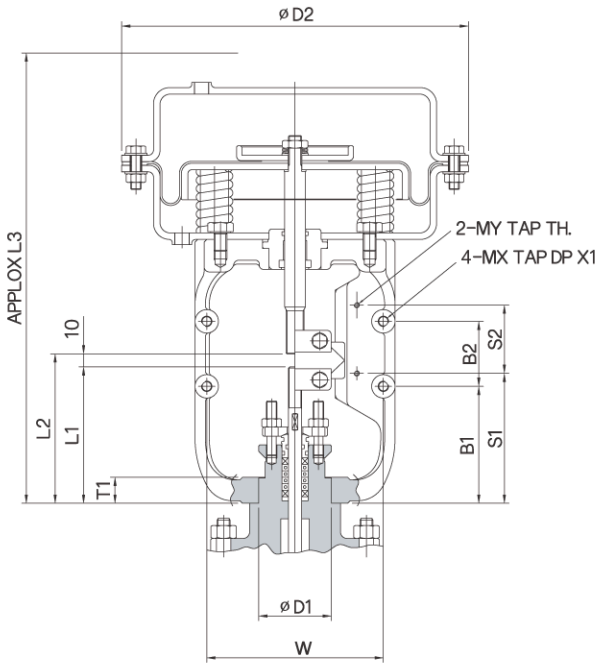
Size		Stroke	L	H	HA	HB	HC	D	A	A1	Weight
15A	1/2″	20	184	377	276	220	50	220	250	140	
20A	3/4″	20	184	377	276	220	50	220	250	140	
25A	1″	20	184	382	276	220	65	220	250	140	
32A	1-1/4″	25	222	431	320	270	70	270	260	140	
40A	1-1/2″	25	222	431	320	270	70	270	260	140	
50A	2″	25	254	444	320	270	80	270	260	140	
65A	2-1/2″	30	276	529	394	350	95	350	270	190	
80A	3″	40	298	561	394	350	100	350	270	190	
100A	4″	40	352	581	394	350	115	350	270	190	

ACTUATOR (PNEUMATIC DAIPHRAGM LINEAR) DIMENTIONS CHART

REVERSE ACTING



DIRECT ACTING



Fundamental of dimensions data (mm)

Model	øD1 +0.1~+0.3	øD2	T1	L1	L2	L3	W	B1	B2	S1	S2
220	56	220	20	105	115	290	120	85	50	100	36
270	56	270	20	105	115	345	136	90	50	90.5	62
350	65.5	350	20	125	135	420	160	110	50	107	85

Fundamental of engineering data

Model	Effective Diaphragm Area Cm2	Torque		Stroke mm	Actuators Rod diameter	MY×TH	MX×DPX1
		Direct kgf	Reverse kgf				
220	155	190	190	20	ø16×M14×1.5P	M4×0.7P	M8×DP20
270	198	320	320	25	ø16×M14×1.5P	M4×0.7P	M8×DP20
350	268	550(550)	550(550)	40(30)	ø25×M20×1.5P	M4×0.7P	M8×DP20

Spring Range : 1.0 bar ~ 2.4 bar / 0.8 bar ~ 2.4 bar
Supply Pressure : Reverse Act. 1.2 bar ~ 3.5 bar
Direct Act. 1.2 bar ~ 4 bar
Operating Speed : One Cycle(open to close) 3 to 15 sec
Signal Connection : PT 1/4
Ambient Temperature : -40℃ to +70℃

Main Part Material : Diaphragm / EPDM
Spring / SWOCS-V
Yoke / FCD45
Diaphragm Casing / C.Steel plate
Diaphragm Rod / 304SS
Color : HJ BULE

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VALVE BODY AND BONNET PARTS, AND THE COMBINATION OF TRIM MATERIALS

Prat No.	Part Name	Carbon Steel		Alloy Steel			Stainless Steel	
		WCB	LCB	WC6	WC9	C5	CF 8	CF 8M
101,111	Body, Bonnet	A216 Gr WCB	A352 Gr LCB	A217 Gr WC6	A217 Gr WC9	A217 Gr C5	A351 CF8	A351 CF8M
244 344 444	Plug	316SS/CF8M	316SS/CF8M	410SS/A217 CA15	410SS/A217 CA15	410SS/A217 CA15	316SS/CF8M	316SS/CF8M
		316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE
		316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6
221 321 421	Seat Ring	316SS/CF8M	316SS/CF8M	410SS /A217 CA15	410SS /A217 CA15	410SS /A217 CA15	316SS /CF8M	316SS /CF8M
		316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE	316SS+RTFE
		316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6	316SS+STL#6
231	Stem	A276 Gr 316	A276 Gr 316	A479 Gr 410	A479 Gr 410	A479 Gr 410	A276 Gr 316	A276 Gr 316
211	Cage	316SS/CF8M	316SS/CF8M	410SS/A217 CA15	410SS/A217 CA15	410SS/A217 CA15	316SS/CF8M	316SS/CF8M
131	Bonnet Bolt	A193 Gr B7	A193 Gr B7	A193 Gr B7	A193 Gr B7	A193 Gr B7	A320 Gr B8	A320 Gr B8M
132	Bonnet Nut	A194 Gr 2H	A194 Gr 2H	A194 Gr 2H	A194 Gr 2H	A194 Gr 2H	A194 Gr 8	A194 Gr B8
917	Packing Gland	304SS	304SS	304SS	304SS	304SS	304SS	304SS
910	Gland Flange	304SS	304SS	304SS	304SS	304SS	304SS	304SS
919	Gland Bolt	304SS	304SS	304SS	304SS	304SS	304SS	304SS
920	Gland Nut	304SS	304SS	304SS	304SS	304SS	304SS	304SS
30	Spring Pin	304SS	304SS	304SS	304SS	304SS	304SS	304SS
911	Packing	Graphite (Center Rings) + Carbon Fiber (Top & Bottom Rings), PTFE V-Ring						
32	Gasket	Grathite With S.S Spiral Wound or Metal Ring						
D93	Name Plate	Requirement						

TRIM PART materials can be changed by the combination.

CAVITATION, QUALITY AND DURABILITY OF METAL

Material	Deat Time	Index	Hardness
stellite #6(316Ss+#6)	120	20	HB 400
17-4PH HRC45	12	2	HB 375
316SS	6	1	HB 187
Chrome Moly Steel (astm c5)	4	0.67	HB 200
Carbon Steel (ASTM WCB)	2.25	0.38	HB 150
Brass (ASTM B16)	0.5	0.08	HB 90

BODY MATERIAL & OPERATING PRESSURE-TEMPERATURE RATING

Ansi [Unit : MPa]

Material / Temp. (℃)	150#			300#		
	A216-WCB	A351-CF8	A351-CF8M	A216-WCB	A351-CF8	A351-CF8M
-45~38		1.95	1.95		5.00	5.00
-5~38	2.01	1.95	1.95	5.15	5.00	5.00
50	1.97	1.85	1.89	5.15	5.00	5.00
100	1.81	1.61	1.66	4.68	4.13	4.26
150	1.62	1.44	1.52	4.56	3.67	3.90
200	1.45	1.30	1.42	4.43	3.32	3.61
250	1.25	1.21	1.25	4.21	3.09	3.39
300	1.06	1.06	1.06	3.92	2.96	3.20
350	0.89	0.89	0.89	3.74	2.86	3.08
375	0.78	0.78	0.78	3.69	2.82	3.01
400	0.69	0.69	0.69	3.49	2.79	2.96
425	0.60	0.60	0.60	2.93	2.76	2.92
450	0.52	0.52	0.52	2.04	2.73	2.86
475	0.42	0.42	0.42	1.40	2.70	2.78
500	0.33	0.33	0.33	0.93	2.65	2.72
525	0.23	0.23	0.23	0.56	2.24	2.62
538	0.18	0.29	0.20	0.36	2.23	2.58

Jis [Unit : MPa]

Material / Temp. (℃)	SCPH2		
	10K	20K	30K
-5~120	1.42	3.38	5.04
~220	1.32	3.08	4.55
~300	1.03	2.89	4.26
~350		2.59	3.87
~400		2.30	3.38
~425		2.01	2.99
~450			
~475			
~490			
~500			
~510			

Maximum Operating Temperature Accoring to Material

Material Group	Materials	Note
1.1	(a) (b) A105, A216-WCB (d) A350-LF2	(a) It is available up to 427℃ but not to used. (b) It is available up to 454℃ but not to used. (c) it is available up to 593℃ but not to used. (d) Max operating temperature 〈343℃ (f) Max operating temperature 〈425℃ (g) Max operating temperature 〈455℃ (h) Max operating temperature 〈540℃ (j) Max operating temperature 〈593℃
1.5	(b) (h) A182-F1, A271-WC1 (d) A352-LC1	
1.9	(c) A182-F11, A182-F12 (j) A217-WC6	
1.13	A182-F5a, A217-C5, A181-F5	
2.1	A182-F304, A182-F304H, A351-CF8 (f) A351-CF3	
2.2	A182-F316, A182-F316H, A351-CF8M (g) A351-CF3M	

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ALLOWABLE SEAT LEAKAGE

Series Number : ACV
Series Name : Cage Guide Single Seated Type Globe Valve Pneumatic Daiphrage Actuator
Allow.Leakage : Ansi B 16.104 - 1976
Test Fluid : Air (Test Pressure : 4 Kg/㎠ G)
Air Test : Bubble Titing Table

Port Size		Cv	Stroke	allowance leakage(Air-liter/min)				allowance leakage(Water-liter/min)			
Inch	mm			Ⅱ	Ⅲ	Ⅳ	Ⅴ	Ⅱ	Ⅲ	Ⅳ	Ⅴ
1/2	12.7	6	20	36.500	7.300	0.730	0.073	0.855	0.171	0.017	0.002
3/4	19.1	9	20	54.750	10.950	1.095	0.110	1.282	0.256	0.026	0.003
1	25	14	20	85.167	17.033	1.703	0.170	1.994	0.399	0.040	0.004
1 1/4	32	25	25	152.083	30.417	3.042	0.304	3.561	0.712	0.071	0.007
1 1/2	40	33	25	200.750	40.150	4.015	0.402	4.701	0.940	0.094	0.009
2	50	50	25	304.167	60.833	6.083	0.608	7.123	1.425	0.142	0.014
2 1/2	65	85	30	517.083	103.417	10.342	1.034	12.108	2.422	0.242	0.024
3	80	100	40	669.167	133.833	13.383	1.338	15.670	3.134	0.313	0.031
4	100	170	40	1034.167	206.833	20.683	2.068	24.217	4.843	0.484	0.048
6	150	420		2555.000	511.000	51.100	5.110	59.829	11.966	1.197	0.120
8	200	750		4988.333	997.667	99.767	9.977	116.809	23.362	2.336	0.234

1. Table items when calcualte the Ansi Clase Ⅱ, Ⅲ, Ⅳ, Ⅴ
   1.1. If the port doesn't provide a nominal outer diameter, operating test is poeformed by determining valve stroke based on valve size. Leakage is calculated using the formula allows.
   1.2. When testing the gauge pressure (G) must be used.
   1.3. When the amount of leakage is calculated by formula, it must be calculated by absolute pressure (abs.).
   1.4. Marking ④ is ANSI Class Ⅴ provisions. Only for our product, standard of Maximum Seat Leakage is conducted by us.
2. Allowed leakage calculation Ansi Calse Ⅴ

$Q2 = 14.6 \times P1 \times \sqrt{Cv} \times G2 \times 1000/60 \times 0.0001$	Q2 = Volumetric Flow (litter/min) G2 = Gas Weight (Air 1) P1 = Valve Inlet Pressure (Absolute Pressure : abs.)

Class Ⅵ Maximum Seat leakage Allowable (In accordance with ANSI/FCI 70-2)

Nominal Port Diameter		Bubbles Per Minute	
in	mm	ml per minute	Bubbles per minute
1	25	0.15	1
1-1/2	38	0.3	2
2	51	0.45	3
2-1/2	64	0.6	4
3	76	0.9	6
4	102	1.7	11

Water Test Pressure Table — Kgf/㎠ (PSIG)

Body Materiala	150LB		300LB		Material
	SHELL	SEAT/B.SEAT	SHELL	SEAT/B.SEAT	
A216-WCB	32 (450)	22 (315)	79 (1125)	57 (815)	C-Steel Casting
A352-LCB	28 (400)	21 (295)	74 (1050)	54 (765)	Ferritic Steel Casting
A352-LCC	32 (450)	22 (320)	79 (1125)	58 (825)	
A217-WC1	28 (400)	21 (295)	74 (1050)	54 (765)	Alloy Steel Casting
A217-WC6	32 (450)	22 (320)	79 (1125)	58 (825)	
A217-WC9					
A217-C5					
A217 C12					
A351 CF8	30 (425)	21 (305)	77 (1100)	56 (795)	Austenitic Steel Casting
A351 CF8M					
A351 CF3					
A351 CF3M					
A351 CN7M	25 (350)	18 (255)	63 (900)	46 (660)	
A351 CK20	28 (400)	20 (295)	72 (1025)	52 (740)	

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※ The product is subject to change for technical development and quality improvement without prior notice.

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