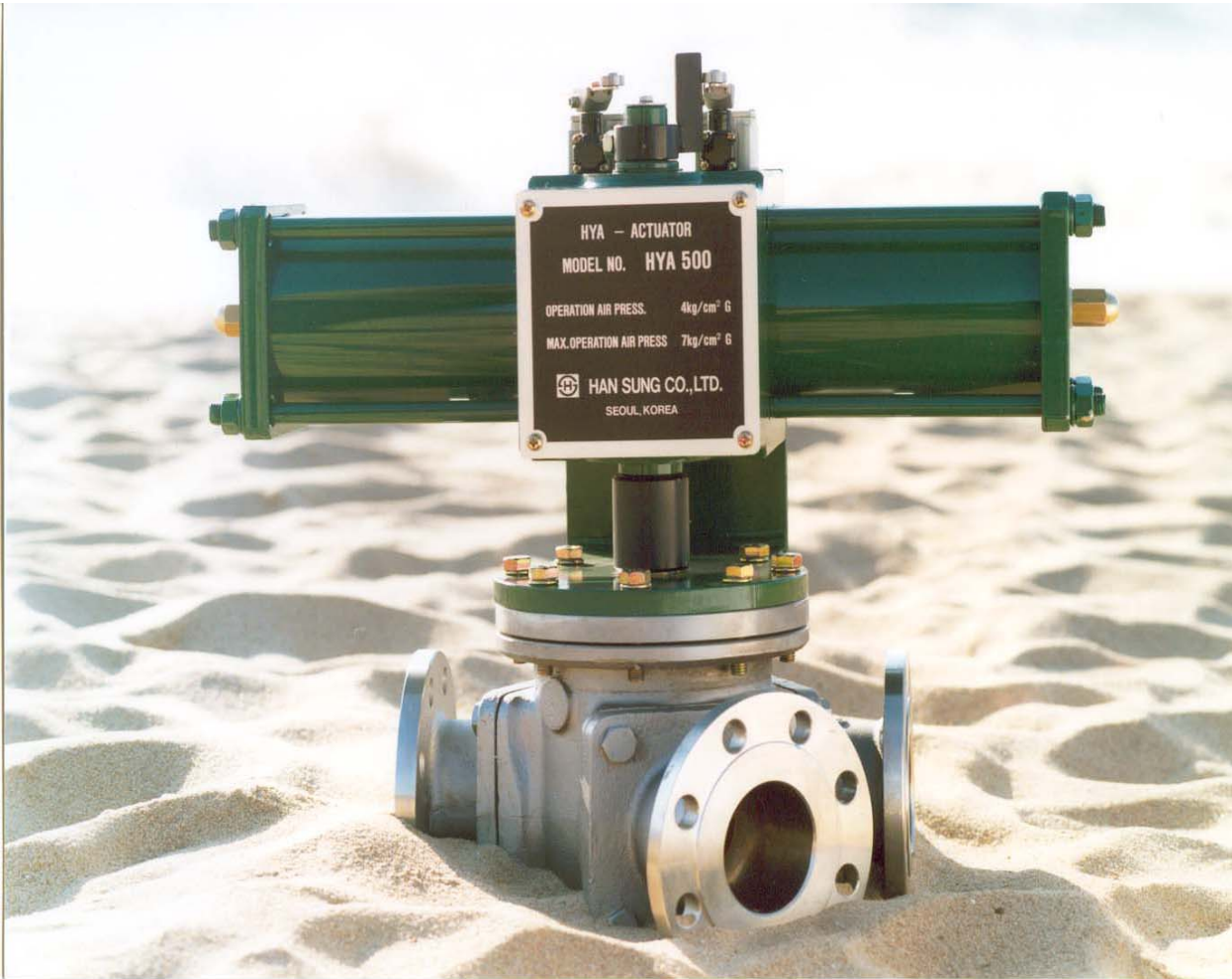


Y TYPE 3WAY BALL VALVES
FOR PNEUMATIC CONVEYING SYSTEM PIPELINE
MODEL HY1---MANUAL OPERATION / MODEL HY1-AR---ACTUATOR OPERATION



SAM SUNG BALL VALVES

FEATURES

TIGHT SEALING AND COMPLETE DIVERSION TYPE

HISKA HY1 ball valve is unique 3-way diverter valve designated to convey powder materials and featuring reduced pressure loss for full port and tight sealing by Teflon ball seat.

These valves can be easily automated by combining the newly developed AR-type actuator.

* As each body cap is fitted individually to the body, piping direction can be varied as necessary, which ensures rational arrangement of valve.

* Because fluid route curvature is larger (equal to or larger than long elbow curvature), pressure loss is reduced.

* An elastic (cushion rubber of 4B and smaller, spring or 5B and larger) is fitted to rear side of ball seat so as to prevent reduction of sealing effect due to seat wear by powder material and to prevent increase of rotating torque.

○ The spring section provided as rear side of seat is thoroughly protected by the O-ring, thereby preventing performance drop due to entry of powder material.

○ The bearing provided at the rotating shaft sliding part pre-vents scuffing.

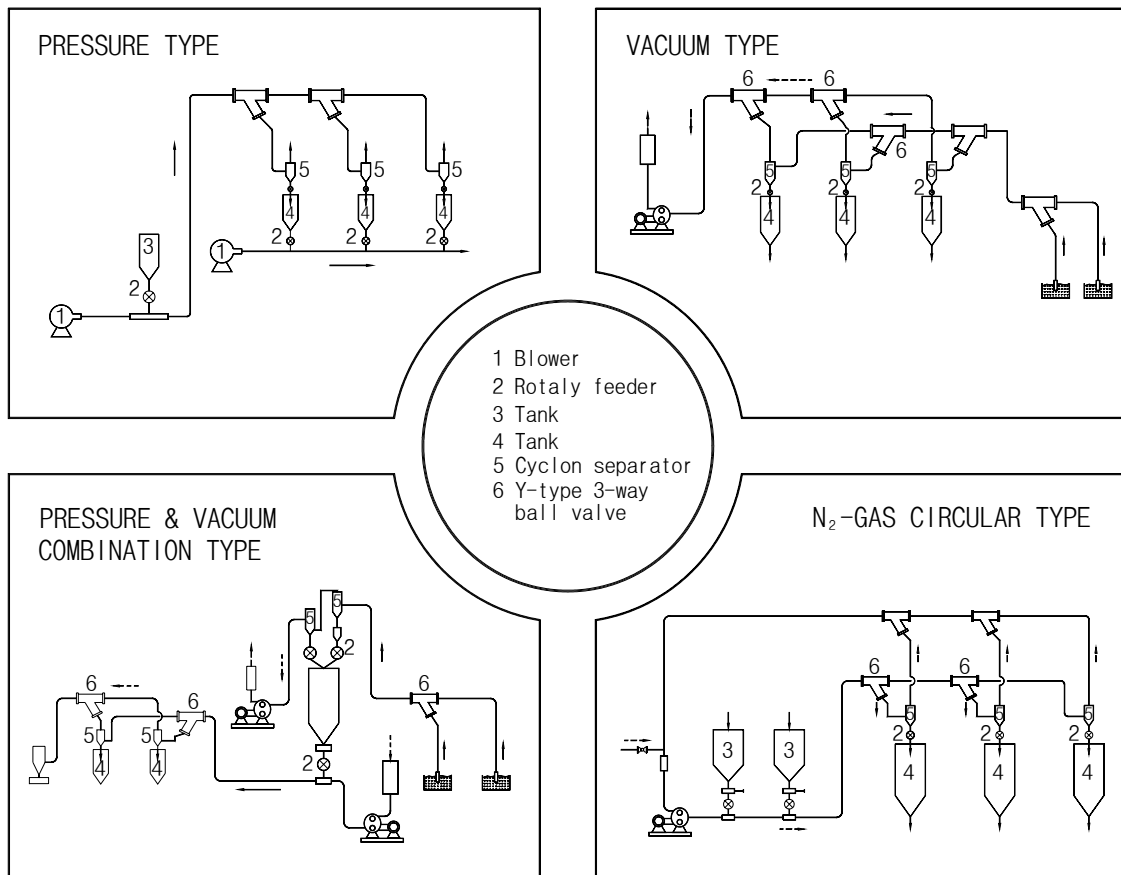
○ Each seal employs O-ring to ensure stable sealing. Especially, the dual O-rings on the shaft prevent troubles resulting from entry of powder material.

○ Since the body has two plugs, it is possible to prevent entry of powder material into the pocket by applying pressure higher than fluid pressure to the pocket to check leak caused by seat deterioration or to flush out powder material remaining in the pocket.

○ No-leakage through ball due to tight sealing by Teflon.

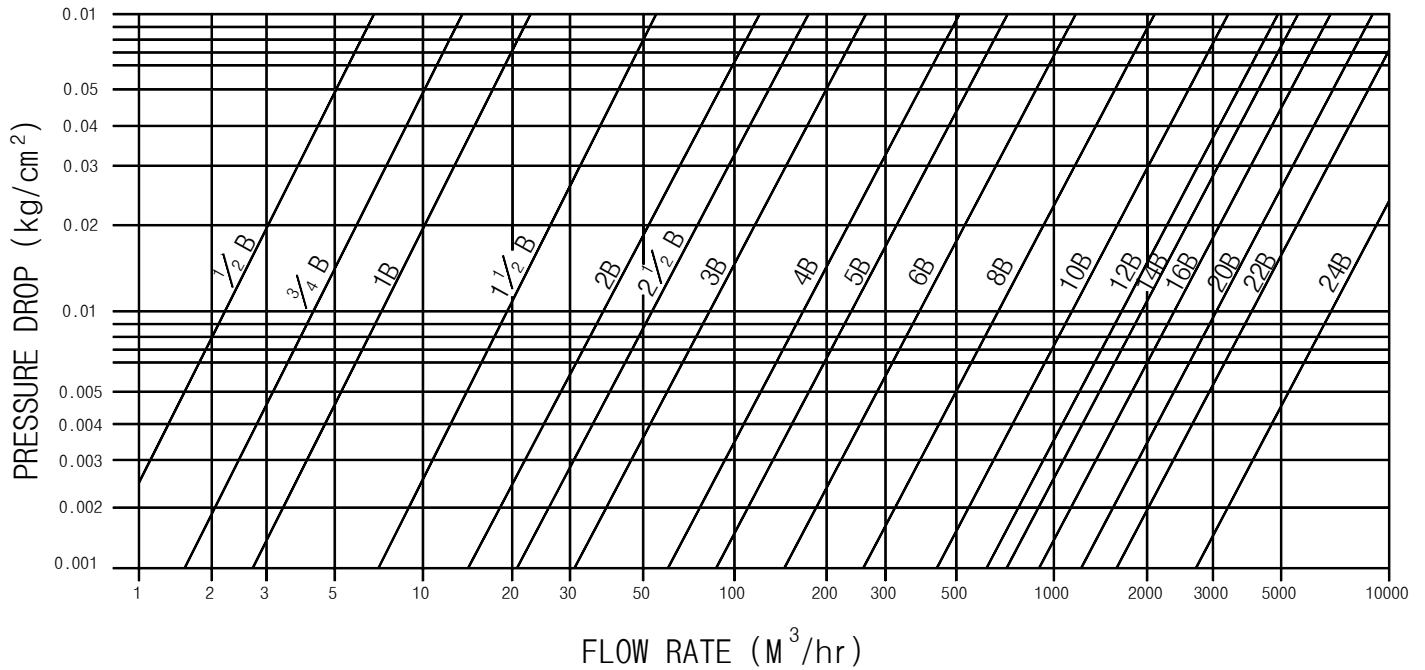
PNEUMATIC CONVEYING SYSTEM

WHERE TO USE Y-TYPE BALL VALVE

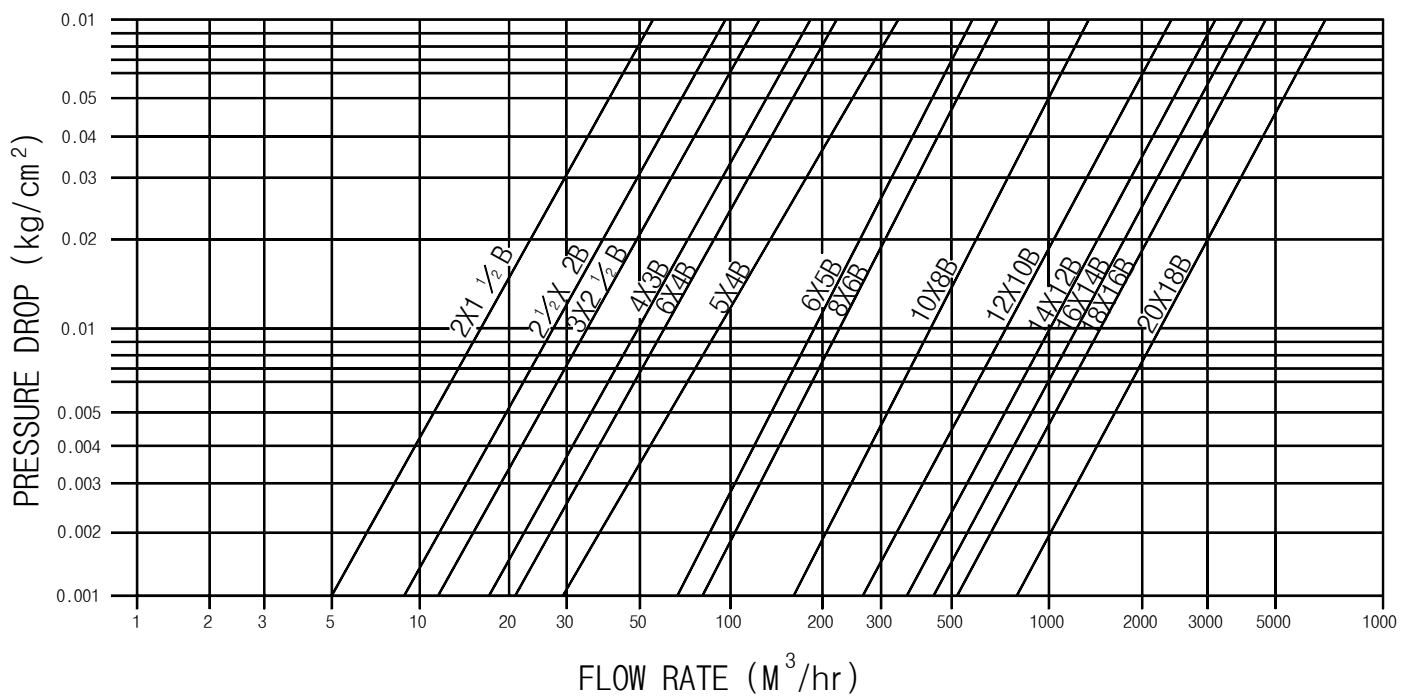


3 PRESSURE DROP VS FLOW RATE

FULL BORE BALL VALVE (CLASS: ANSI 150 Lbs)

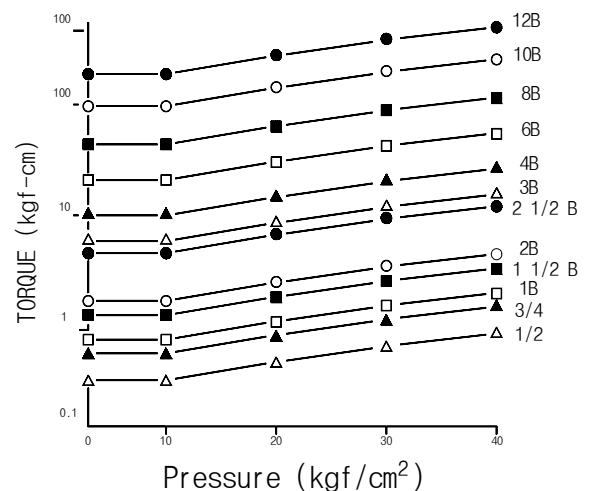


REDUCED BORE BALL VALVE (CLASS:ANSI 150 Lbs)



4 TORQUE DATA

The following torque data of ball valve is the average Torque of 50 ~ 100 pcs per each size and may have $\pm 20\%$ Tolerance Depending on actual service condition.
In case of the selection of actuator , safety factor 60% Should be added for smooth operation.



VALVE SIZING FORMULAS

Cv coefficient is the volume of water in gallons

Per minute at 60° F that will flow through a given

Opening with a pressure drop of one psi.

$$Q = C_v \sqrt{\frac{\Delta P}{G}}$$

Q = Flow rate (us Gallons/min)

ΔP = Pressure drop (Psi)

G = Specific gravity

Formulas shown below will assist in obtaining the

Correct Cv for liquid, gas and steam.

Qf (m³/h) : Liquid rate

Qg (m³/h) : Gas flow rate at 760mmHg
And temperature 15° C

Qs (kg/h) : Steam flow rate

P1 (kg/cm² ARS) : Upstream pressure

P2 (kg/cm² ARS) : Downstream pressure

PM (kg/cm² ARS) = (P1 + P2) / 2 : Pressure average

K : Revised factor of viscosity

h (kg/cm²) = (P1 + P2) / 2 : Pressure drop

t (°C) : flowing temperature

Gf : Liquid specific gravity (water=1)

Gg : Gas specific gravity (air=1)

S (°C) : Steam superheat

Gf : Liquid Specific Gravity		Gg : Gas Specific Gravity	
Name	Water = 1	Name	Water = 1
Alcohols	0.8	Acetylene	0.907
Ammonia	0.89	Ammonia	0.596
Benzene	0.70~0.76	Butane	2.009
Ether	0.73	Chlorine	2.486
Gasoline	0.80~0.83	Ethylene	0.974
Kerosene	0.76~0.80	Hydrogen	0.069
Lubricate oil	0.90~0.96	Methane	0.554
Sea water	1.01~1.05	Natural gas	0.570
Sulfuric acid	1.84	Nitrogen	0.967
		Oxygen	1.105
		Propane	1.562

FLOW CHARACTERISTIC

Flow characteristic of ball valve is shown by the

Percent of flow volume and the degree of ball

Opening after measuring the flow volume and

Pressure drop.

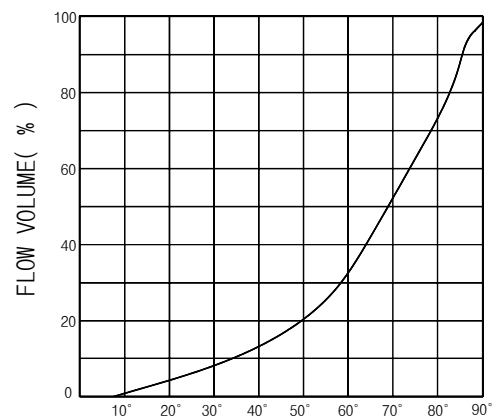
Condition		Fluid	
		$P_2 > P_{1/2}, h < P_{1/2}$	$P_2 > P_{1/2}, h < P_{1/2}$
Liquid	General	$C_v = 1.17 Q \sqrt{G/h}$	$C_v = 1.17 Q \sqrt{G/h}$
	High viscosity (over 20cs)	$C_v = 1.17 Q K \sqrt{G/h}$	$C_v = 1.17 Q K \sqrt{G/h}$
Gas	Nor, temp	$C_v = \frac{Q_g}{24} \sqrt{\frac{G_g}{h \cdot p_m}}$	$C_v = \frac{Q_g}{14.7 P_1} \sqrt{G_g}$
	High temp	$C_v = \frac{Q_g}{404} \sqrt{\frac{G_g(273+t)}{h \cdot p_m}}$	$C_v = \frac{Q_g}{248 P_1} \sqrt{G_g(273+t)}$
Steam	Saturated steam	$C_v = \frac{Q_s}{19.4 \sqrt{P_2 \cdot h}}$	$C_v = \frac{Q_s}{9.7 P_1}$
	Superheated vapor	$C_v = \frac{Q_s}{19.4 \sqrt{P_2}} (1+0.0013S)$	$C_v = \frac{Q_s}{9.7 P_1} (1+0.0013S)$

FULL BORE

Valve Size	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12
Cv	25	50	90	245	460	725	1250	2400	3600	5400	10500	17500	26000

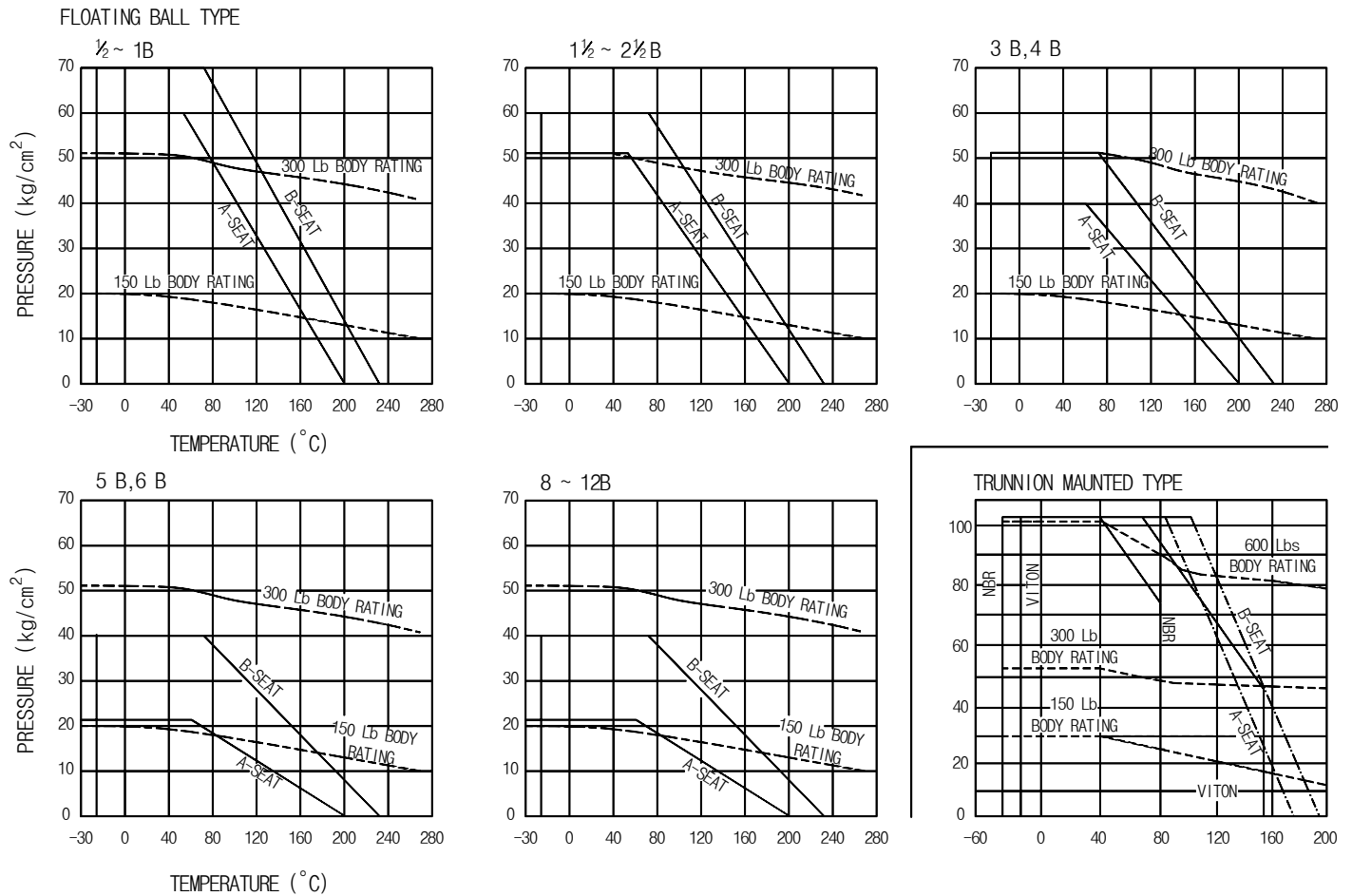
REDUCE BORE

Valve Size	2	2 1/2	3	4	5	6	8	10	12
Cv	190	340	410	620	920	1250	2900	5000	8700



MAXIMUM NON-SHOCK PRESSURE/TEMPERATURE RATING

The seat ratings are minimum requirement and based reasonable service conditions. They are not intended To be restrictive since further experience and material development may permit extensions to these ratings.



Body rating is in accordance with the latest edition of ANSI B16.34.

A-SEAT : Virgin PTFE

B-SEAT : Glassfiber filled PTFE

HISAKA'S BALL VALVES FOR VACUUM SERVICE

When HISAKA BALL valves are used for vacuum Service At around one (1) Torr , ambient temperature , the Following Average leakage is calculated after measuring Several valves per each size.

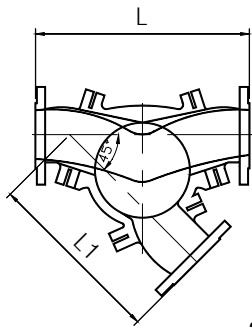
Valve Size	Leakage ($\int$. Torr / sec)	
	Body	Ball Seat
1/2" ~ 1"	1×10^{-3}	1×10^{-2}
1 1/2 ~ 2"	5×10^{-3}	5×10^{-2}
2 1/2 ~ 4"	1×10^{-2}	1×10^{-2}
5" ~ 6"	5×10^{-2}	1×10^{-1}
6" ~ 12"	1×10^{-1}	1

In case the various vacuum service , leakage be calculated by the following formula.

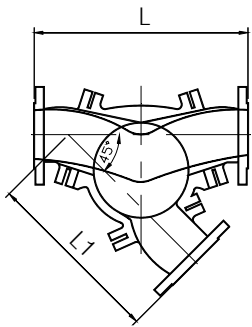
Leakage at 1 Torr (above)X factor(a)=requirement

Vacuum (Torr)	Factor (a)
100	0.70
200	0.60
300	0.50
400	0.40
500	0.30
600	0.20
700	0.10

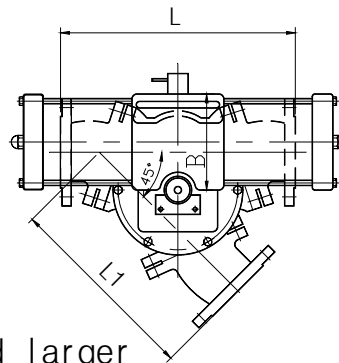
HY1



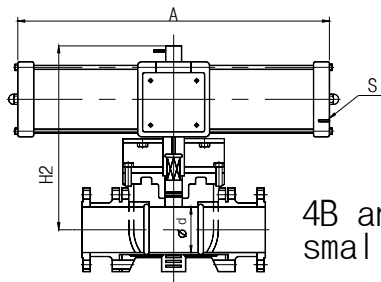
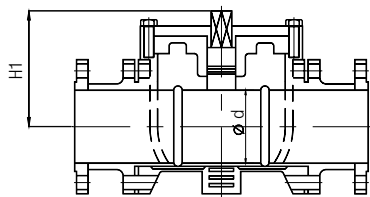
4B and smaller



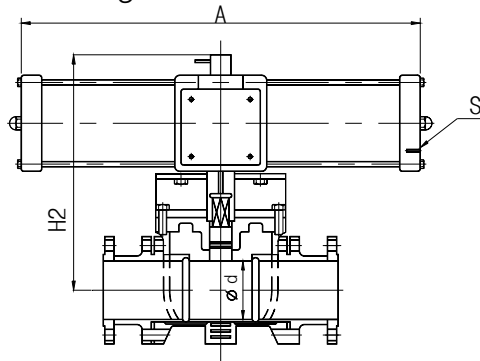
5B and larger



5B and larger



4B and smaller

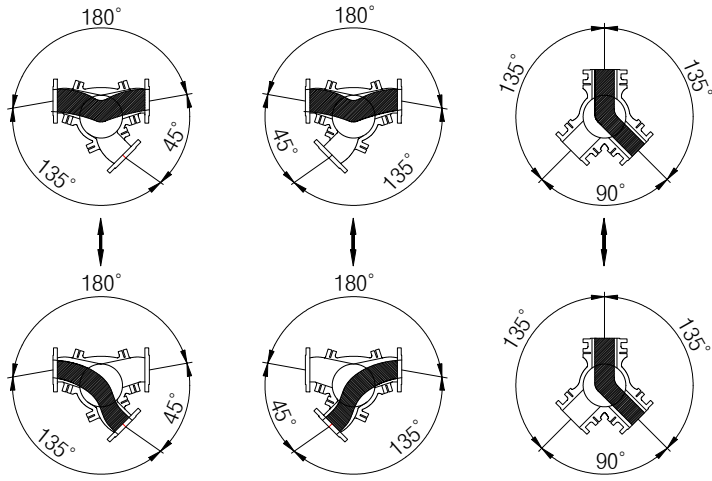


Unit : mm

BLUE FIGURES : JIS 10K CAST IRON FLAT FACE

Valve Size	d	L	L1	H1	Length Of Handle	H2	A	B	S	Cylinder Size	FLANGE
											Standard
1B 5A	25	230	180	115	220	266	432	95.5	PT¼	AR275	JIS 10 K
											ANSI 150 Lb
1 ½B 40A	38	250	199	125	220	276	432	95.5	PT¼	AR275	JIS 10 K
											ANSI 150 Lb
2B 50A	51	280	224	145	300	349	554	127.5	PT¼	AR400	JIS 10 K
											ANSI 150 Lb
2 ½B 65A	64	320	264	160	350	364	554	127.5	PT¼	AR400	JIS 10 K
											ANSI 150 Lb
3B 80A	76	360	291	175	550	405	652	149.5	PT¼	AR500	JIS 10 K
											ANSI 150 Lb
4B 100A	102	460	384	210	700	486	848	188.5	PT¼	AR600	JIS 10 K
											ANSI 150 Lb
5B 125A	127	560	483	245	1000	521	848	188.5	PT¼	AR600	JIS 10 K
											ANSI 150 Lb
6B 150A	152	660	547	275	1200	598	1036	228.5	PT⅜	AR700	JIS 10 K
											ANSI 150 Lb
8B , 200A	203	800	677	-	Worm Gear	684	1242	275	PT⅜	AR800	JIS 10 K
											ANSI 150 Lb
10B, 250A	254	950	805	-	Worm Gear	873	1520	630	PT½	SKRD 300	JIS 10 K
											ANSI 150 Lb
12B, 300A	305	1100	1024	-	Worm Gear	1070	1911	782	PT¾	SKRF 600	JIS 10 K
											ANSI 150 Lb

FLOW DIRECTION

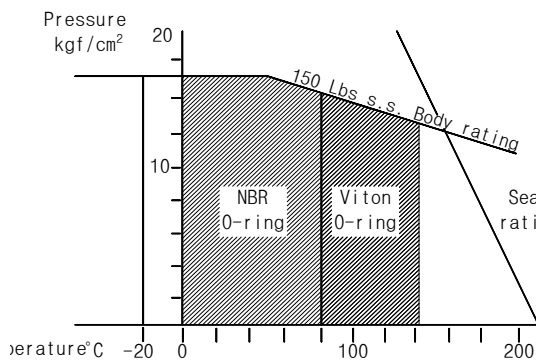


type 1R

type 1L

type 18

TEMPERATURE PRESSURE RATING



TEST PRESSURE

CLASS	BODY(A.T.P)	SEAT(A.T.P)
JIS 10K	15 kg/cm ² G	6 kg/cm ² G
ANSI 125	17.5 kg/cm ² G	
ANSI 150	21 kg/cm ² G	
NP 10	15 kg/cm ² G	

AIR CONSUMPTION

ITEM Model	A Cylinder Volume ℓ	V Air Consump- tion ℓ	Weight Kg
AR 275	0.37	1.85	7
AR 400	0.94	4.70	19
AR 500	1.63	8.15	29
AR 600	3.40	17.00	57
AR 700	6.10	30.50	95
AR 800	11.40	57.00	165
SKRD 300	78.00	390.00	240
SKRF 600	110.00	550.00	780

$$V = 2A (P+1 / 1) N$$

V : Air consumption (Nℓ)

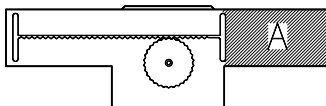
A : Actuator cylinder volume (ℓ)

P : Supply pressure (kg/cm²)

N : Frequency of operation

Per unit time

(one time = one cycle)



APPLICABLE PRODUCTS

Barley,	Nylon chips
Breeding materials	Polyester chips
Carbon	Polyethylene powder
Cement	Polypropylene powder
Coal dust	Polyvinyl chloride powder
Cream powder	Soda ash
Feed	Sugar
Fly ash	Terephtheric acid powder
Kaolin	Urea resin
Met acryl resin	and others

MANUFACTURING RANGE

JIS , ANSI , BS , DIN

STAINLESS STEEL (CF8/304,CF8M/316,CF3M/316L)

CAST IRON

MATERIALS

No.	PART NAME	MATERIALS
1	Body	Mentioned above
2	Body cap	
3	Top flange	
4	Ball	Stainless steel
5	Ball seat	Reinforced Teflon
6	Back seat	Silicone rubber
7	Seat box	Stainless steel
8	Spring	Stainless steel
9	Balance retainer	Stainless steel
10	Seal gasket	NBR or Viton (O-ring)
11	Stem packing	NBR or Viton (O-ring)
12	Gasket	NBR or Viton (O-ring)
13	Bearing	Stainless steel + Reinforced Teflon
14	Plug	Stainless steel or Carbon steel
15	Bolt	Stainless steel Cast iron
16	Stopper	Stainless steel or Carbon steel
17	Stopper pin	Stainless steel
18	Name plate	Aluminum
19	Frame	Carbon steel
20	Joint	Carbon steel
21	Actuator	AC2A-F,etc.

ACTUATOR SPECIFICATION

Max. operating pressure : 7 kg/cm²

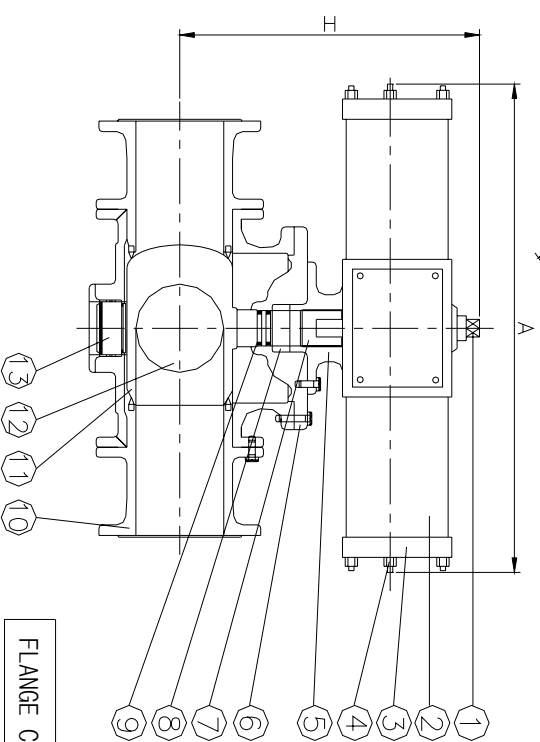
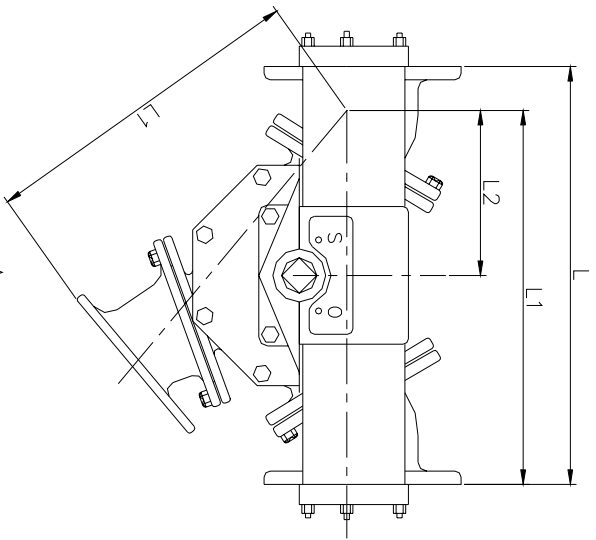
Nor. operating pressure : 4 kg/cm²

Allowable temperature : -15 °C to+80 °

Lubricant : Not required

Guarantee cycle : 100,000 cycle

Rotation angle : 135 degree



FLANGE CODE : JIS 10K RF

Horizontal				Vertical		
Left → Right		Left ← Right		Upper → Lower		
A	B	C	D	E	F	G

13	BALL GUIDE	STAINLESS STEEL	1
12	STEM	STAINLESS STEEL	1
11	BALL	STAINLESS STEEL	1
10	BODY	STAINLESS STEEL	1
9	SNAP RING	CARBON STEEL	1
8	PACKING	TEFLON	1
7	JOINT	STAINLESS STEEL	1
6	BONNET	STAINLESS STEEL	1
5	BRACKET	Al. Alloy	1
4	BOLT	STAINLESS STEEL	1
3	CYLINDER COVER	Al. Alloy	2
2	CYLINDER	Al. Alloy	1
1	ACTUATOR SHAFT	S45C	1
NO.	PART NAME	MATERIAL	Q'TY

VALVE DIMENSIONS UNIT : mm

SIZE	L	L1	L2	A	H	PT
40A	250	199	74	390	276	1/4"
50A	280	224	84	420	349	1/4"
65A	320	264	104	554	364	1/4"
80A	360	291	111	652	405	1/4"
100A	460	384	154	652	486	1/4"
125A	500	435	185	848	524	3/8"
150A	660	547	217	1275	570	3/8"
200A	800	667	277	1035	700	3/8"
250A	980	798	313	1525	965	3/8"

PNEUMATIC 3-WAY DIVERT BALL VALVE			MODEL NO.
HAN SUNG CONTROL VALVE			SB-3010
DATE 1999.09.06.	DRAWING NO.		
REF A	SAW-B3000-020		