

# Butterfly Valves



## Notes

- 1) Refer to the individual specification sheet or the drawing for details of a product.
- 2) Main units of this catalog are shown in SI (MPa, °C, millimeter).
- 3) Refer to the attached P-T ratings about applicable pressure and temperature.
- 4) Teflon is Du Pont's tradename.

## Products guarantee

**Term of a guarantee :** Within one year after the date of delivery from our factory to the original customer.

**Contents of a guarantee :** If the installations and the service conditions (such as pressure,temperature,fluid,etc.) are proper, necessary replacement and repair of our product will be carried out without charge.

**Guarantee exceptions :** Please keep in mind that the above articles of guarantee will not apply to the case owing to the following reasons:

- 1) Non-compliance of the customer with the technical instructions furnished by our catalog and specification sheet.
- 2) Natural disaster incidents, such as a fire, flood damage, an earthquake, and falling stone.
- 3) Reconstruction or repair by any third party other than us.
- 4) Deterioration. (such as shot rust,degradation,chemical changes, etc.)
- 5) Any other matter resulting from the damage not being regarded as manufacturer's responsibility.

In addition, you will be required necessary charge for repair or exchange of parts on failure or damage by the guarantee exceptions. Please contact our sales staff or agency for the details.

The specification and the performance term of our product indicated in this catalog are based on the internationally governed standards and specifications, our products experience or the design calculation and our in-house examination.

When using the product beyond the service conditions mentioned in this catalog, users are required to consult our sales staff or agency for further advice in advance, or to conduct the verification or evaluation for the performance under users' responsibility. We shall not be liable for any damages resulting from lack of aforementioned procedures by the customer.

\*Don't use our products in flammable or toxic gas service.

\*Items mentioned in this catalog are subject to change without prior notice to the customers.

Series	Class	Material	Rubber Seat	Fig.	Operated	Size range	Page		
Low Pressure Series	JIS 10K	Aluminum alloy	EPDM	550	Lever	40mm ~ 150mm	P2 ~ 3		
					Gear	40mm ~ 300mm			
	Class150	Ductile iron	NBR or EPDM	917	Lever	2" ~ 8"	P4 ~ 5		
					Gear	2" ~ 24"			
				918	Lever	2" ~ 8"			
					Gear	2" ~ 24"			
				PN16	Cast iron	957		Lever	50mm~200mm
								Gear	50mm~600mm
	Class150	Cast iron	907	Gear	2" ~ 24"				
				908		Gear			
JIS 10K	Ductile iron	NBR or EPDM	562	Lever	50mm ~ 150mm	P6 ~ 8			
				Gear	50mm ~ 600mm				
		NBR	565	Center Handle	50mm ~ 300mm				
				Gear	50mm ~ 300mm				
High Flow Series	JIS 10K	Stainless steel	HIGH FLOW-T (Teflon® Seat)	580	Gear	50mm ~ 300mm	P9 ~ 11		
	JIS 20K			581	Gear				

## Valve Figure Number Coding

**562-U N S L** (10K Ductile wafer butterfly valve, SUS304 disc, NBR seat, SUS403 stem, Lever operator)

①      ②   ③   ④   ⑤

① Basic Figure Number (Type of Butterfly Valves)

② Disc Material

B : Aluminum bronze

D : Ductile iron

U : 304 stainless steel

M: 316 stainless steel

N : Nylon lined ductile iron

③ Seat material

N : NBR (Buna-N)

E : EPDM

F : FKM

T : Teflon®

H : Metal (316L)

④ Stem material

S : 403/410/420 stainless steel

M: 316 stainless steel

⑤ Valve operation

L : Lever handle

G : Worm gear

C : Center handle

X : Bare stem

P : Pneumatic

E : Electric

## Standard Specification

Fig.	550	
Applicable standard	JIS B2032	
Body type	Wafer type	
Mating flange	JIS5K/10K, ASME 150, (PN16) *1	
End-to-end dimension	JIS B2002 series 46 (ISO 5752 Basic Series 20)	
Maximum service pressure	1.0 MPa	
Service temperature	EPDM seat : 0 *2 ~ 100°C	
Material	Body	ADC 12 *3
	Disc	SCS 13A (304SS)
	Rubber seat	EPDM *4
	Stem	SUS 410
	Yoke	SCS 13A (304SS)
	O-Ring	EPDM *4
Test pres.	Shell (Water)	1.5 MPa
	Seat (Water)	1.1 MPa

Remarks : \*1 Max. pressure is 10 Bar.

\*2 Please consult our sales staff or distributor for usage under 0°C.

\*3 Two component polyurethane resin painting.

\*4 NBR or FKM seat available upon request.

A FKM seat is recommended for hot wafer supply line.

- ⚠ Caution:**
1. A rubber seat (NBR/EPDM) may deteriorate at an early stage in service for hot water supply line.
  2. An EPDM seated butterfly valve shall not be used for all oil applications.



## ■ Features

### ● Conform to the specification of JIS and Japanese government offices

It conforms to the specification of JIS B2032 (wafer type rubber-seated butterfly valves) and Japanese government offices as a valve used for supply water services or air-conditioning facilities, etc. in buildings.

### ● Half of conventional type by weight! Super light-weight and slim body made of aluminum alloy

Since a body is made of aluminum alloy die casting (ADC12), which has light weight and excellent mechanical strength, it is a general-purpose butterfly valve that weight is as light as 1/2 of cast iron butterfly valve, and 1/10 of JIS cast iron gate valve, and dimension and height are as compact as 1/4 and 1/2 when compared with a gate valve.

### ● Excellent seat sealing capability and durability

By adopting spherical-surface disc and spherical-surface seat structure, high seat sealing capability and low torque performance are sufficiently improved as compared with former products, and the durability of rubber seat is improved immensely.

### ● Dew condensation-proof

The thermal insulation yoke made of austenitic stainless steel is provided between valve body and actuator, and it blocks transfer of the fluid temperature to a valve operating device and will minimize the dew condensation. Moreover, it is designed with the easy structure for disassembly and recycle of the material.

(Refer to the 13-page graph for dew condensation-proof capacity.)

### ● Suitable for rusty water prevention

By only disc and rubber seat contacting fluid, red water (rusty water) doesn't come out of valve body.

Disc: 18Cr (s) -8Ni steel (SCS13A-304SS)

Rubber seat : EPDM (NBR or FKM available upon request)

### ● Long neck structure in consideration of construction method and operability

For the minimum 62mm long neck structure under the actuator, the heat and cold thermal insulation is easily carried out, and it does not have trouble in valve operation.

(When thermal insulation is also carried out with gear actuator, the extended indicator kit is available upon request.

—Refer to 10-page)

### ● Wide range of selecting operators

Lever handle

Worm gear

Pneumatic actuator (double/action)

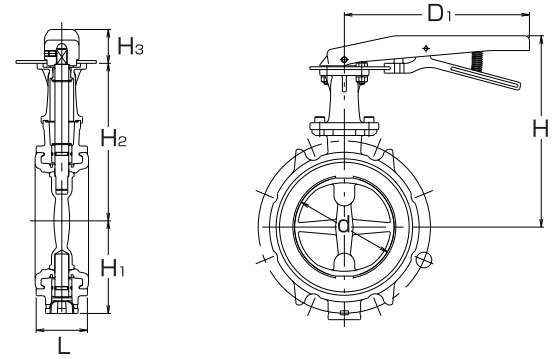
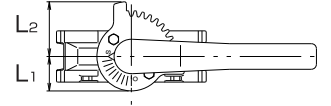
Electric actuator

—+Fig.550

— DEW CONDENSATION-PROOF —  
**JIS 10K Aluminum Butterfly Valves**

**10K/150 Lever Operated Aluminum Wafer Butterfly Valve**

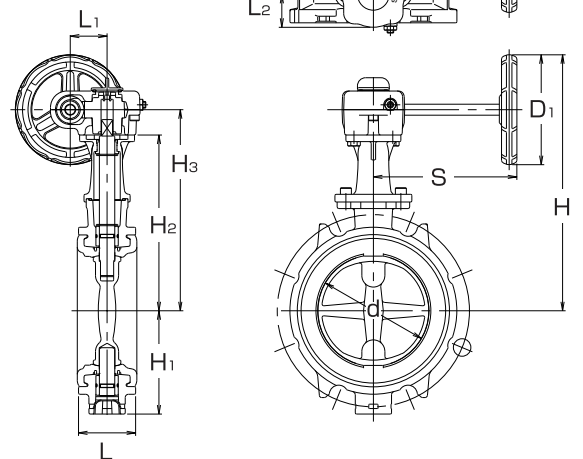
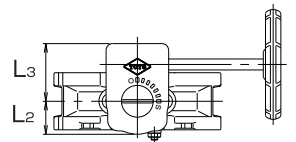
Fig. 550LA



(mm)										
size	d	L	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L <sub>1</sub>	L <sub>2</sub>	D <sub>1</sub>	Actuator No.
40	42	33	162	40.0	127.5					L-1A
50	50	43	166.5	64.5	132.0					
65	66	46	174.5	72.5	140.0	34.5	35	56	188	L-1B
80	79	46	184.5	84.0	150.0					
100	101	52	194.5	94.0	160.0					L-2A
125	125	56	239	124.5	195.0	44.0	48	58	260	
150	148	56	251	136.0	207.0					

**10K/150 Gear Operated Aluminum Wafer Butterfly Valve**

Fig. 550GA



(mm)												
size	d	L	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	S	D <sub>1</sub>	Actuator No.
40	42	33	200.5	40.0	127.5	150.5						G-00AN
50	50	43	205	64.5	132.0	155.0						
65	66	46	213	72.5	140.0	163.0	34	30	52	131	100	G-00BN
80	79	46	223	84.0	150.0	173.0						
100	101	52	233	94.0	160.0	183.0						
125	125	56	269	124.5	195.0	219.0	41	39	68	132	140	G-01AN
150	148	56	281	136.0	207.0	231.0	58	48	89	149		
200	198	60	335	165.0	234.0	265.0	58	48	89	149	140	G-02AN
250	245	68	445	238	328	360	63	51	91	180	170	No.2
300	295	78	470	263	353	385						

# Class 200/150/PN16 Ductile Iron Butterfly Valves

## Standard Specification

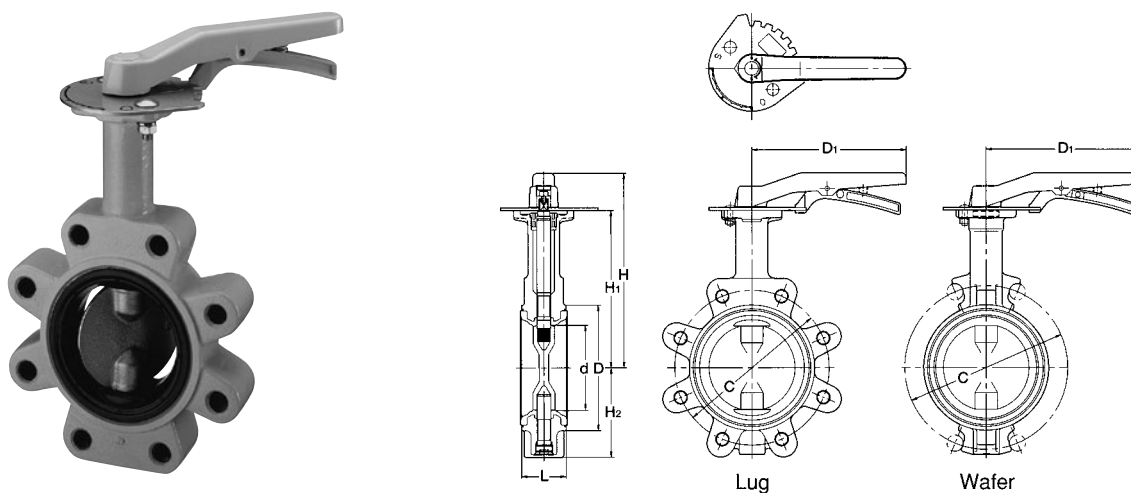
Fig.	917	907	957	918	908	
Applicable standards	MSS SP-67 and API609		EN 593	MSS SP-67 and API 609		
Body type	Wafer type			Lug type		
Mating flange	ASME Class 125 / 150		EN PN16	ASME Class 125 / 150		
End-to-end connection	MSS SP-67		BS5155 wafer short	MSS SP-67		
Maximum service pressure	200 psi	150 psi	16 bar	200 psi	150 psi	
Service temperature	NBR : 0 ~ 70°C、 EPDM : -20 ~ 130°C *1 (Continuous service : 0 ~ 100°C )					
Material	Body	Ductile iron	Cast iron	Ductile iron	Ductile iron	Cast iron
	Disc	Aluminum bronze, Ductile iron 316 Stainless steel		Ductile iron 316 Stainless steel	Aluminum bronze	
	Rubber seat	NBR or EPDM				
	Stem	410 or 420 Stainless steel				
Test pres.	Shell (Water)	300 psi	225 psi	24 bar	300 psi	225 psi
	Seat (Water)	220 psi	165 psi	17.6 bar	220 psi	165 psi
Size range	2" ~ 12"	14" ~ 24"	50mm ~ 600mm	2" ~ 12"	14" ~ 24"	

Remarks : \*1 There are some fluid type restrictions for the service at 130°C. Contact our sales staff or distributor for the details.

- ⚠ Caution:**
1. A rubber seat (NBR/EPDM) may deteriorate at an early stage in service for hot water supply line.
  2. An EPDM seated butterfly valve shall not be used for all oil applications.

## <Lever Operated>

Fig. 918-L Fig. 917-L  
Fig. 957-L



## ASME 200 psi • EN PN16 Design Dimensions

Nominal Size		d	H	H <sub>1</sub>	H <sub>2</sub>	L	D	C		D <sub>1</sub>
inch	mm							ASME 200	EN PN16	
2	50	50	191	147	67	43	90	120.5	125	180
2½	65	65	199	155	75	46	104	139.5	145	180
3	80	80	217	173	91	46	124	152.5	160	180
4	100	100	227	183	101	52	146	190.5	180	180
5	125	125	265	211	127	56	176	216	210	230
6	150	150	277	223	139	56	206	241.5	240	230
8	200	197	295	248	169	60	257	298.5	295	350

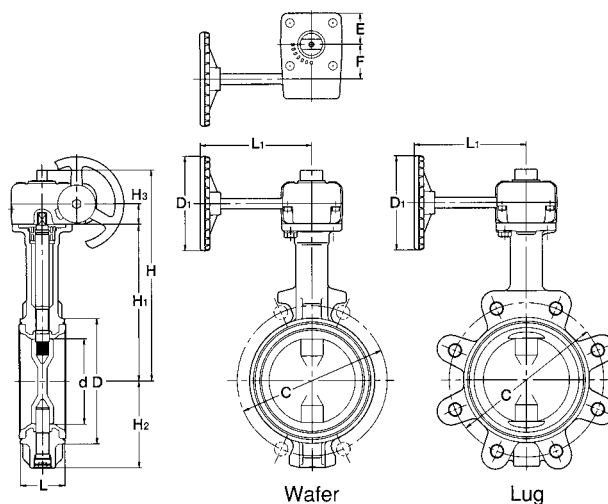
# Class 200/150/PN16 Ductile Iron Butterfly Valves

<Gear Operated>

Fig. 917-G Fig. 918-G

Fig. 907-G Fig. 908-G

Fig. 957-G



## ASME 150/200 psi Design Dimensions

Nominal Size		d	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L	D	C	D <sub>1</sub>	L <sub>1</sub>	E	F
inch	mm												
2	50	50	194	147	67	19	43	90	120.5	80	122	29	28
2½	65	65	202	155	75	19	46	104	139.5	80	122	29	28
3	80	80	236	173	91	24	46	124	152.5	110	135	36	40
4	100	100	246	183	101	24	52	146	190.5	110	135	36	40
5	125	125	274	211	127	24	56	176	216	110	150	36	40
6	150	150	286	223	139	24	56	206	241.5	110	150	36	40
8	200	197	325	248	169	32	60	257	298.5	170	180	51	63
10	250	246	381	304	219	32	68	312	362	170	180	51	63
12	300	295	406	329	244	32	78	364	432	170	180	51	63
14	350	333	447	360	309	47	78	407	476.5	310	220	54	66
16	400	385	502	415	348	47	102	466	539.5	310	220	54	66
18	450	434	526	439	372	47	114	522	578	310	220	54	66
20	500	482	587	488	423	60	127	575	635	500	360	68	89
24	600	579	635	536	472	60	154	680	749.5	500	360	68	89

\*: ASME 200 psi for size 2 to 12, 150 psi for size 14 to 24.

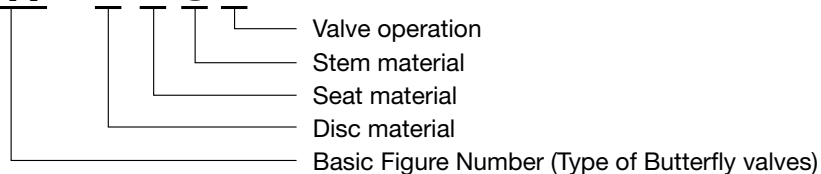
## EN PN16 Design Dimensions

Nominal Size		d	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L	D	C	D <sub>1</sub>	L <sub>1</sub>	E	F
inch	mm												
2	50	50	194	147	67	19	43	90	125	80	122	29	28
2½	65	65	202	155	75	19	46	104	145	80	122	29	28
3	80	80	236	173	91	24	46	124	160	110	135	36	40
4	100	100	246	183	101	24	52	146	180	110	135	36	40
5	125	125	274	211	127	24	56	176	210	110	150	36	40
6	150	150	286	223	139	24	56	206	240	110	150	36	40
8	200	197	325	248	169	32	60	257	295	170	180	51	63
10	250	246	381	304	219	32	68	312	355	170	180	51	63
12	300	295	406	329	244	32	78	364	410	170	180	51	63
14	350	333	461	360	309	60	78	407	470	500	360	68	89
16	400	385	516	415	348	60	102	466	525	500	360	68	89
18	450	434	540	439	372	60	114	522	585	500	360	68	89
20	500	482	623	488	423	65	127	575	650	500	410	90	134
24	600	579	671	536	472	65	154	680	770	500	410	90	134

## Valve Figure Number Coding

Fig.No.	Disc	Seat	Stem	Valve operation
917, 907, 957, 918, 908	B : Aluminum bronze	N : NBR	S : 410/420 stainless steel	L : Lock lever handle
	D : Ductile iron	E : EPDM	M : 316 stainless steel	G : Worm gear
	M : 316 stainless steel			

**917-BNSL** (Class 200 Cast iron butterfly valve, Al-bronze disc, NBR seat, SUS410 / 420 stem, Lever operator)





# JIS 10K Ductile Iron Butterfly Valves

## Standard Specification

Fig.	562	
Applicable standard	JIS B2032 10K	
Body type	Wafer type	
Mating flange	JIS5K, JIS10K	
End-to-end dimension	JIS B2002 series 46 (ISO 5752 Basic Series 20)	
Maximum service pressure	1.0 MPa	
Service temperature	NBR seat : 0 ~ 70°C *1 EPDM seat : 0 ~ 100°C *1	
Material	Body	FCD450 / FC250 *2
	Disc	SCS13A
	Rubber seat	NBR / EPDM
	Stem	SUS 403 or SUS 410
Test pres.	Shell (Water)	1.5 MPa
	Seat (Water)	1.1 MPa

Remarks : \*1 Please see Pressure-Temperature Rating on page 13.  
Please consult our sales staff or distributor for usage under 0°C.  
\*2 Sizes 350 to 600 : Body material : FC250.



- ⚠ Caution:**
1. A rubber seat (NBR/EPDM) may deteriorate at an early stage in service for hot water supply line.
  2. An EPDM seated butterfly valve shall not be used for all oil applications.

## ■ Features

### ● Upgrade the conventional cast iron butterfly valve

Upgrading the strength is accomplished with using spheroidal graphite cast iron (Ductile iron FCD 450) from conventional gray cast iron (FC 200). : sizes 50 to 300 mm.

### ● Excellent seat sealing capability and durability

By adopting spherical-surface disc and spherical-surface seat structure, high seat sealing capability and low torque performance are sufficiently improved when compared with former products, and the durability of rubber seat is improved immensely.

### ● Non-peeling Seat-to-body Construction

Molded-in (bonded) seat structure is employed (size 50 to 300mm). This non-peeling seat-to-body construction assures maintenance-free application for **high fluid velocity service**\*1, **vacuum service**\*2 and handling surging fluid velocity. It also guarantees peel-free valve mounting on pipelines.

\*1 **Maximum 4 meters / second for on-off service for valves up to size 300.**

\*2 **Up to 30 torr. Vacuum service is option for size 350 and larger.**

### ● ISO 5211 (Part-turm valve actuator attachment)

Top flange for actuator complies with ISO 5211.

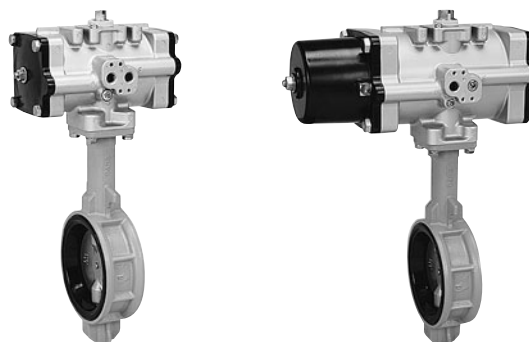
### ● Long neck structure

Providing minimum 50mm length under actuator, thermal insulation can be easily applied.

**\*JIS 10K / 16K ductile iron butterfly valves with double flanged are available upon request.**

## ● Easy automation is available upon request

### Pneumatic actuated



### Electric actuated



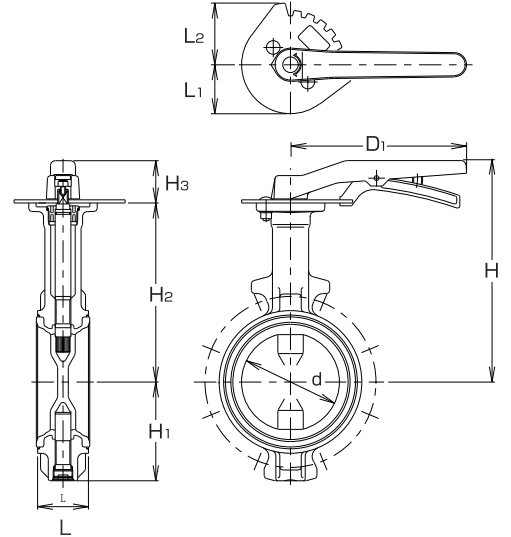


# JIS 10K Ductile Iron Butterfly Valves

## 10K Lever Operated Ductile Iron Wafer Butterfly Valve

Fig. 562-UNSL (SCS13A disc, NBR seat)

Fig. 562-UESL (SCS13A disc, EPDM seat)

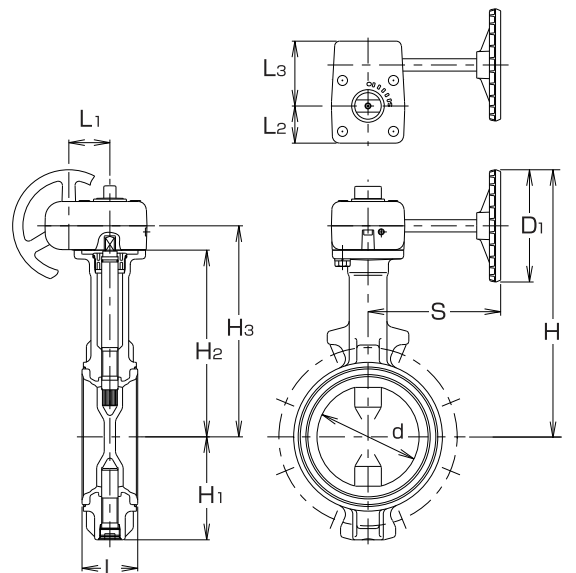


size	d	L	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L <sub>1</sub>	L <sub>2</sub>	D <sub>1</sub>	Actuator No.
50	50	43	191	67	147					
65	65	46	199	75	155	44			180	No.1
80	80	46	217	91	173		50	64		
100	100	52	227	101	183				230	No.2
125	125	56	265	127	211	54				
150	150	56	277	139	223					

## 10K Gear Operated Ductile Iron Wafer Butterfly Valve

Fig. 562-UNSG (SCS13A disc, NBR seat)

Fig. 562-UESG (SCS13A disc, EPDM seat)



size	d	L	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	S	D <sub>1</sub>	Actuator No.
50	50	43	206	67	147	166	28	29	49	122	80	No.0
65	65	46	214	75	155	174						
80	80	46	252	91	173	197				135		
100	100	52	262	101	183	207	40	36	64	150	110	No.1
125	125	56	290	127	211	235						
150	150	56	302	139	223	247						
200	197	60	365	169	248	280		51		180	170	No.2
250	247	68	461	219	304	336	63	60	91	250	250	
300	296	78	486	244	329	361						
350	333	78	562	309	360	407						No.3
400	385	102	617	341	415	462	66	54	95	220	310	
450	434	114	641	365	439	486						
500	482	127	728	414	488	548	89	68	122	350	360	No.4
600	579	154	776	463	536	596						

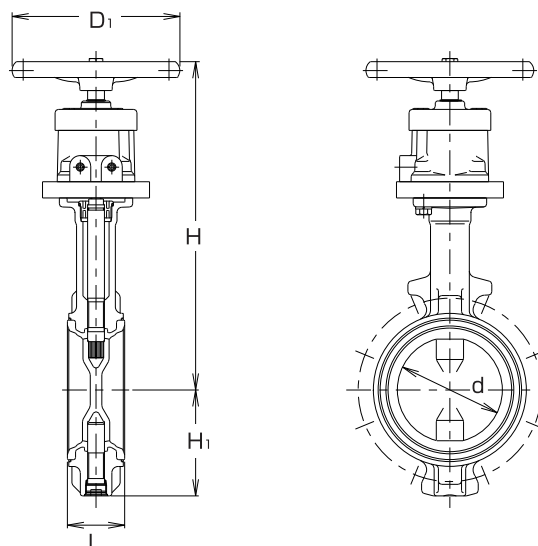
# JIS 10K Ductile Iron Butterfly Valves

## 10K Center Handle Operated Ductile Iron Wafer Butterfly Valve



Fig. 562-UNSC (SCS13A disc, NBR seat)  
Fig. 562-UESC (SCS13A disc, EPDM seat)

size	d	L	H	H <sub>1</sub>	D <sub>1</sub>	Actuator No.
50	50	43	271	67	110	VG1
65	65	46	279	75		
80	80	46	297	91		
100	100	52	307	101	170	
125	125	56	341	127		
150	150	56	353	139	200	
200	197	60	397	169		
250	247	68	453	219	310	VG2
300	296	78	497	244		



## 10K Gear Operated Ductile Iron Wafer Butterfly Valve (Nylon Lined)

### Standard Specification

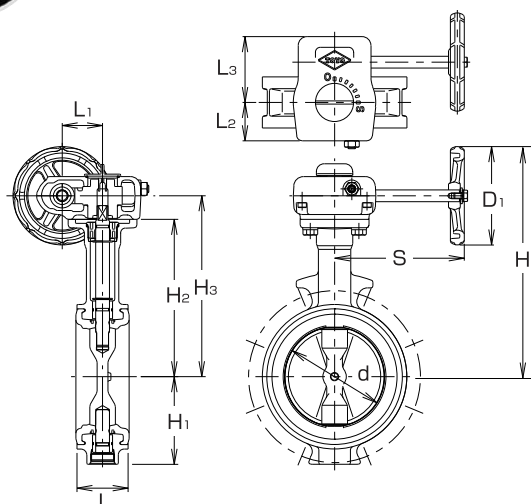
Fig.	565	
Applicable standard	JIS B2032	
Body type	Wafer type	
Mating flange	JIS 5K, JIS 10K	
End-to-end dimension	JIS B2002 series 46 (ISO 5752 Basic Series 20)	
Maximum service pressure	1.0 MPa	
Service temperature	0 ~ 60°C	
Material	Body	FCD 450 + Nylon 11
	Disc	FCD 450 (+ Nylon 11) or SCS 13A
	Rubber seat	NBR *1
	Stem	SUS 410 or SUS 403
Test pres.	Shell (Water)	1.5 MPa
	Seat (Water)	1.1 MPa

Remarks : \*1 Seat material for size 300 is EPDM.

Fig. 565-NNSG (Nylon lined disc, NBR seat)  
Fig. 565-UNSG (SCS13A disc, NBR seat)



size	d	L	H	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	S	D <sub>1</sub>	Actuator No.
50	49	43	205	60	132	155	34	30	52	131	100	G-00AN
65	65	46	213	68	140	163						
80	79	46	224	79	150	174						
100	100	52	234	89	160	184	41	39	67	132	100	G-01BN
125	125	56	269	110	195	219						
150	147	56	281	122	207	231	63	51	91	180	170	No.2
200	196	60	351	155	234	266						
250	245	68	461	229	304	336	63	60	91	250	250	No.3
300	295	78	486	254	329	361						



# High Performance Double Off-Set Butterfly Valve HIGH FLOW®-T Series(Stainless steel)

## Standard Specification

Type	HIGH FLOW®-T (Teflon® seat)	
Fig.	580 (10K) *1 / 581 (20K)	
Mating flange	JIS 10K / 16K / 20K, ASME 125 / 150 BS 4504 PN10 / 16, DIN PN10 / 16	
End-to-end dimension	JIS B2002 series 46 / ISO 5752 Basic Series 20	
Pressure-Temperature Rating	JPI-7S-83, API609, JV-9 Class 150	
Maximum service pressure	2.0MPa Reverse pressure (pressure from stem side) : 1.0MPa	
Flow direction	Disc side to Stem side *2	
Body type	Wafer type	
Service temperature	-29°C ~ 232°C	
Test pres.	Shell (Water)	Design pressure x1.5
	Seat	Air : 0.6MPa (Optional test : Design pressure x1.1 in water)
	Allowable leakage	Tight shutoff
Material	Body	SCS 13A
	Disc	SCS 13A
	Stem	SUS 304
	Seat ring	PTFE / R-PTFE
	Gland packing	Grafoil with Teflon®
Actuator type	Lever, worm gear, air cylinder, motor	
Applicable media	Steam, emissions gas, air, industrial water, food, oil, powder *3, grain *3	
Body paint	No paint	

Remarks : \*1 Size 250 and 300 are available in Fig.580.  
\*2 Regardless flow pressure, Disc side should be pressurized in the normal direction of the flow.  
\*3 For some media, this valve cannot be used depending on some operating condition.

## Features

### ●Improvement of the flow rate characteristics

To compare with, when Cv value of the conventional high performance butterfly valve is 100, the value of gate valve becomes 200 and more. It was difficult to achieve high flow with lower pressure loss. Then, HIGH FLOW® -T is developed for the purpose that pressure loss is lowered immensely with high flow. Thereby, Cv value which was below a half of a gate valve has been improved to about 70%, and the performance which customers demand has been realized sufficiently.

(Refer to Table 1 and sectional drawing)

### ●Lower torque

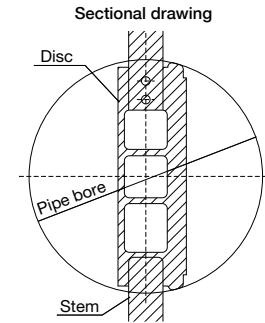
With setting up an optimum position for the sealing point of disc and seat ring, and an eccentricity of disc and seat ring in the valve, we developed new high performance butterfly valve, HIGH FLOW® -T, with lower and excellent operation torque.

### ●Upgrade the temperature characteristic

The volume of Teflon® seat has been lessened and the excellent seat sealing capability from low temperature to high temperature is realized by reducing the influence from thermal expansion.

Table 1 : Comparison table for Cv Value (Toyo 150mm)

	HIGH FLOW® -T	Conventional HP butterfly	Globe valve	Gate valve
Cv Value	1330	830	485	1920
Ratio	100	62	36	144



Fluid flows through the area except diagonal section in pipe bore.

## 10K/20K/ Gear Operated Teflon® Seated Wafer Butterfly Valves

size	d	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	L <sub>1</sub>	S	D <sub>1</sub>	Actuator No.
50	50	43	88	170	206	45	42	155	110	W11
65	65	46	101	188	224					
80	79	46	108	195	231					
100	99	52	120	207	243					
125	126	56	145	235	271	57	67	178	200	W2
150	148	56	167	252	298					
200	190	60	189	275	321					
250*	239	68	232	325	371	68	90	260	300	W3
300*	288	78	262	351	401					

Remarks : \*Sizes 250 and 300 are available in Fig.580

## Pressure-Temperature Rating for HIGH FLOW T

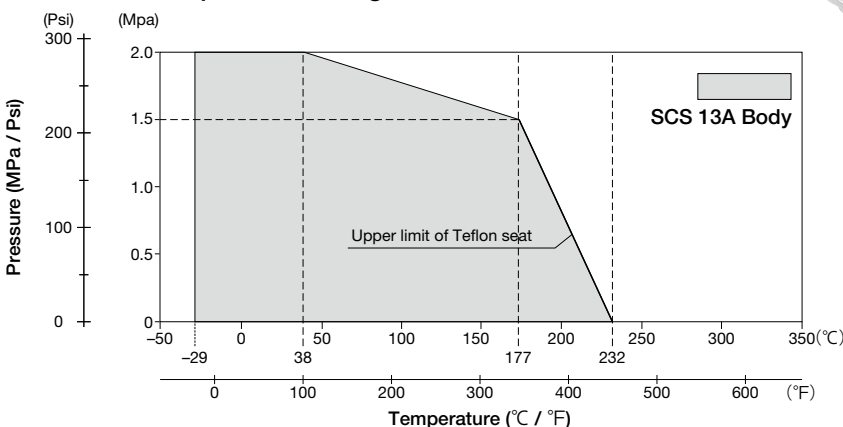
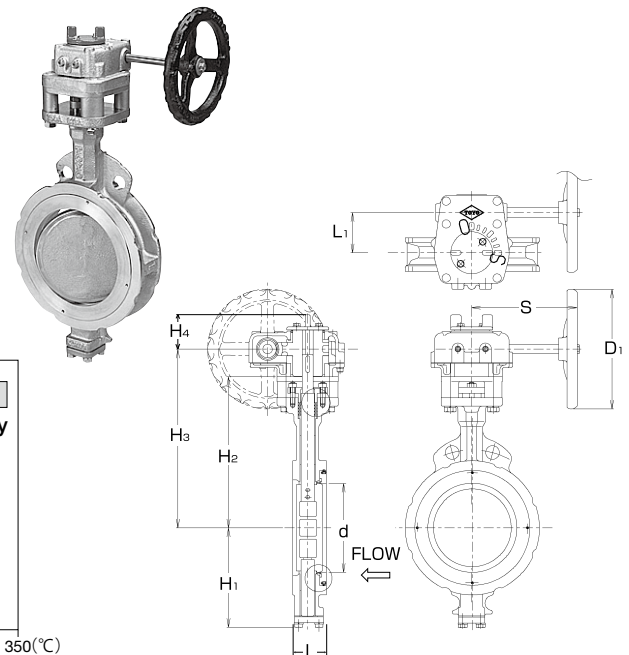


Fig. 580-G (10K, SCS13A body, Teflon® seat)  
Fig. 581-G (20K, SCS13A body, Teflon® seat)



# Special Specification

## Attachment position for actuator

Due to the operation or the piping space, the position of an actuator such as lever, worm gear, electric or pneumatic actuators can be changed as mentioned below.

### ● Position I / Position II (Standard position)

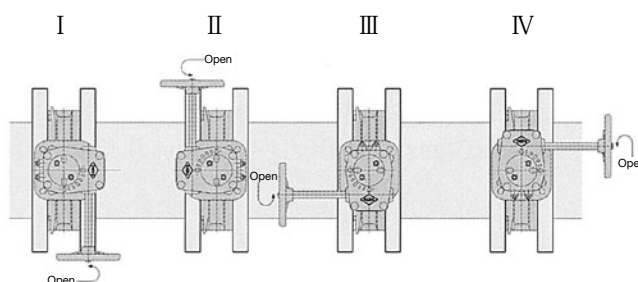
In case that the flow direction is restricted in High Performance Butterfly Valves, Position I becomes the standard position when the flow comes from the left in the figure shown, and Position II comes from the right.

When installing the valve, please check the flow direction is the same as the arrow on the valve body.

### ● Position III / Position IV (the quarter-turned position from the standard)

It is possible to adjust the actuator at the site. However, since the delicate adjustment for disc positioning is required, we recommend you to advise this request when ordering.

### Position



Although this example figure is for worm gear type, other actuators can also be changed as same. The arrow in the figure shows the turn direction of a handle.

## Indicator kit (extended indicator for thermal insulation)

This kit is for an indicator that can be installed in case of covering worm gear unit with thermal insulation material.

### ● For Fig. 550GA, 565

This indicator is for Fig. 550GA, 10K Aluminum alloy butterfly valves on page 3, and Fig 565 10K Gear operated Ductile Iron wafer Butterfly Valve (Nylon lined) on page 8. (size50 ~ 150)

- The indicator can be easily installed to mount on a worm gear unit.
- Only by inserting on the existing gear unit, it is simply attached.
- Because indicator is made with a plastic material, dew condensation is minimized in case of cold water service.
- It is possible to adjust length from 62mm to 75mm depending on thermal insulation thickness.
- Since the back of indicator plate is adhesive, they can attach on thermal insulation.
- Available in size 40 to 200.

### ● For ductile iron butterfly valves, High performance Double off-set Butterfly Valves

This indicator kit is used in the following models.

Fig. No.	Actuator	Valve Size	Page
562	Worm gear type	From 50 to 300	6-7
565		From 200 to 300	8
High Flow®-T		From 50 to 250	9

- Depending on thickness of thermal insulation material, it is possible to adjust within 35mm to 55mm.

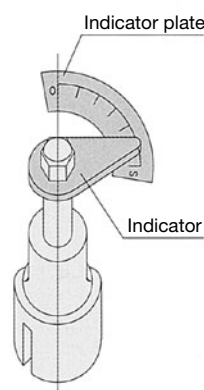


Fig. 550GA  
Fig. 565

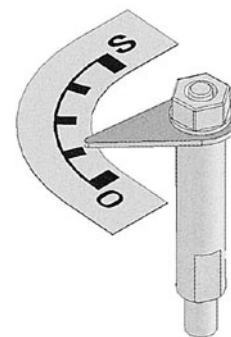


Fig. 562  
Fig. 568 (200 ~ 300)

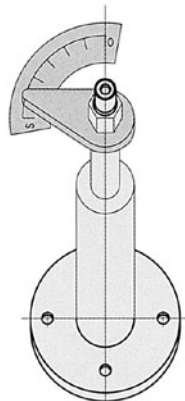
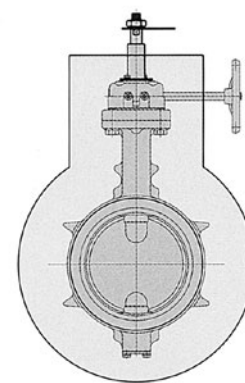


Fig. High Flow®-T

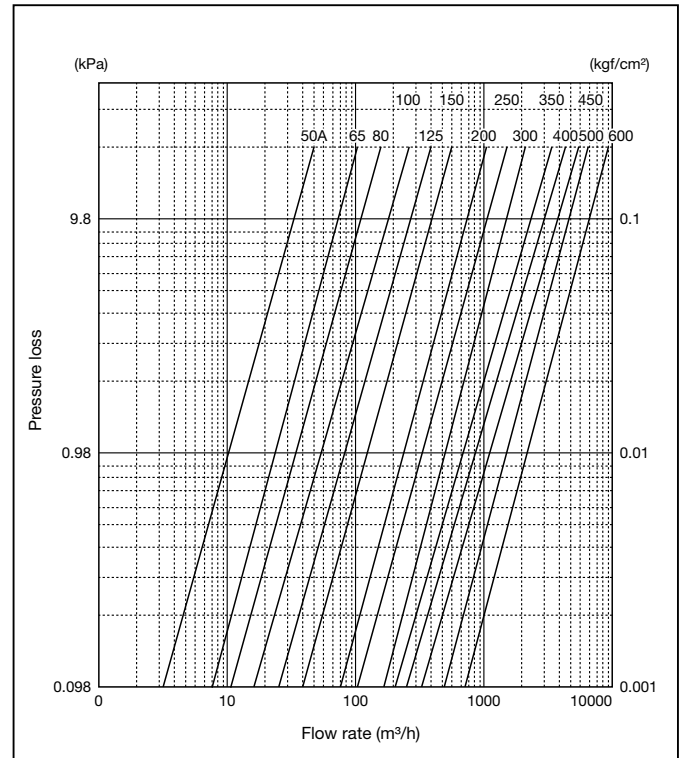
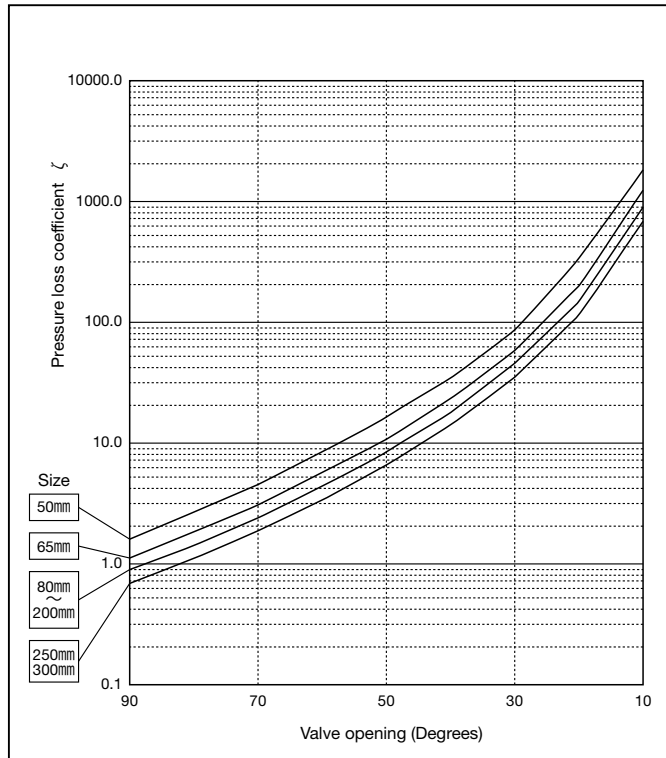


The status in thermal installation

## ■ Pressure Loss Coefficient / Equivalent Pipe Length

## ■ Pressure Loss (Fig.562 / 565 / 917 / 918 / 957) ~ Full open position with clear water (Non-Pulsate)

### ● High Flow®-T



### ● Equivalent pipe length for High Flow®-T (m)

Size	50	65	80	100	125	150	200	250	300
—	3.6	3.1	2.9	4.0	4.2	5.0	7.5	8.5	9.9

Pressure loss can be determined by the following formula using pressure loss coefficient.

$$\Delta P = \zeta \frac{v^2}{2g} \gamma \cdot 10^{-6} \quad \{\Delta P = \zeta \frac{v^2}{2g} \gamma \cdot 10^{-4}\}$$

$\Delta P$  : Pressure loss MPa {kgf/cm<sup>2</sup>}

$\zeta$  : Pressure loss coefficient

$v$  : Flow velocity of pipe m/s

$g$  : Acceleration of gravity m/s<sup>2</sup>  
(=9.8m/s<sup>2</sup>)

$\gamma$  : Specific gravity N/m<sup>3</sup> {kgf/m<sup>3</sup>}

In case of water, use 9800N/m<sup>3</sup> {1000kgf/m<sup>3</sup>}

The flow velocity ( $v$ ) can be obtained by the following formula.

$$v = \frac{Q}{A}$$

$Q$  : Flow rate m<sup>3</sup>/s

$A$  : Cross-sectional area of pipe m<sup>2</sup>

# Technical Data

## Flow Coefficient (Cv Value)

The Cv value - which is used by TOYO VALVE to indicate the capacity of a valve - is a flow rate represented in terms of U.S. gallons per minute when clear water at 60° F flows through a valve, in which the differential pressure between its outlet and inlet is kept at 1 psi - 6.89kPa.

The Cv value can be determined by experiment, and the relation between the Cv value and the flow rate or pressure drop, when the fluid is water.

In case of water, the pressure drop or the flow rate can be obtained by the following formulas.

$$\Delta P = 0.134 \frac{Q^2 G_L}{C_v^2}$$

$\Delta P$  = pressure drop (MPa)

Q = flow rate (m<sup>3</sup>/s)

$$Q = 2.735 C_v \sqrt{\frac{\Delta P}{G_L}}$$

$G_L$  = specific gravity of fluid when setting water to 1

$C_v$  = Cv value

● Fig. 550

Size	Valve opening (Degrees)								
	0	20	30	40	50	60	70	80	90
40mm	0	1	7	13	21	31	46	66	77
50	0	7	15	26	35	50	70	92	106
65	0	12	24	39	64	95	141	236	253
80	0	16	30	46	72	105	162	253	369
100	0	22	57	89	145	224	352	526	901
125	0	36	79	135	189	303	463	695	1022
150	0	55	115	196	283	426	671	948	1190
200	0	113	237	361	615	974	1410	2156	2746
250	0	261	326	805	1283	2170	3132	4067	4350
300	0	412	508	1269	2024	3360	4939	6414	6860

● Fig. 562 / 565

Size	Valve opening (Degrees)								
	0	20	30	40	50	60	70	80	90
50mm	0	5	10	18	29	47	75	107	124
65	0	12	22	39	64	102	163	232	270
80	0	17	33	57	94	149	240	341	397
100	0	29	55	96	158	252	404	577	671
125	0	44	83	145	239	381	610	871	1013
150	0	66	126	219	362	576	922	1318	1532
200	0	120	230	400	660	1050	1680	2400	2792
250	0	160	325	575	950	1514	2423	3462	4025
300	0	258	493	859	1418	2260	3618	5168	6010

● High Flow®-T

Size	Valve opening (Degrees)										
	0	5	10	20	30	40	50	60	70	80	90
50mm	0	1	3	7	14	22	32	45	61	80	102
65	0	2	6	15	28	44	65	90	122	159	202
80	0	4	10	25	46	72	106	148	199	260	330
100	0	7	17	42	76	121	177	247	332	433	550
125	0	13	29	73	131	207	303	423	568	741	940
150	0	18	42	104	188	297	436	607	816	1065	1350
200	0	31	71	174	314	496	727	1012	1360	1775	2250
250	0	51	117	287	516	816	1195	1665	2236	2919	3700
300	0	77	174	427	768	1213	1777	2476	3325	4339	5500

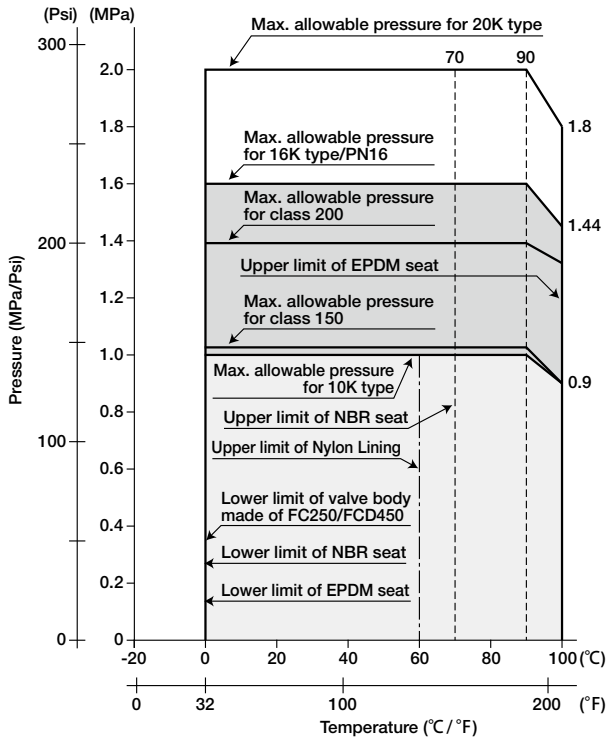
● Fig. 917 / 907 / 957 / 918 / 908

Size		Valve opening (Degrees)			
		30	45	60	90
50mm	2"	10	23	47	124
65	2½"	22	50	102	270
80	3	33	74	149	397
100	4	55	125	252	671
125	5	83	189	381	1013
150	6	126	286	576	1532
200	8	230	522	1050	2792
250	10	325	743	1514	4025
300	12	493	1123	2260	6010
350	14	617	1371	2829	7525
400	16	826	1787	3760	10080
450	18	1076	2441	4933	13120
500	20	1311	2969	6012	15990
600	24	1942	4449	8907	23690



# Pressure-Temperature Rating

## Rubber Seat



Note: 1. The maximum allowable working pressure is affected by the mating flange when installing the valve with JIS5K flanges.  
 Static water flow: 0.7MPa  
 Pulsated water flow: 0.6MPa

## Application of Pressure-Temperature Rating

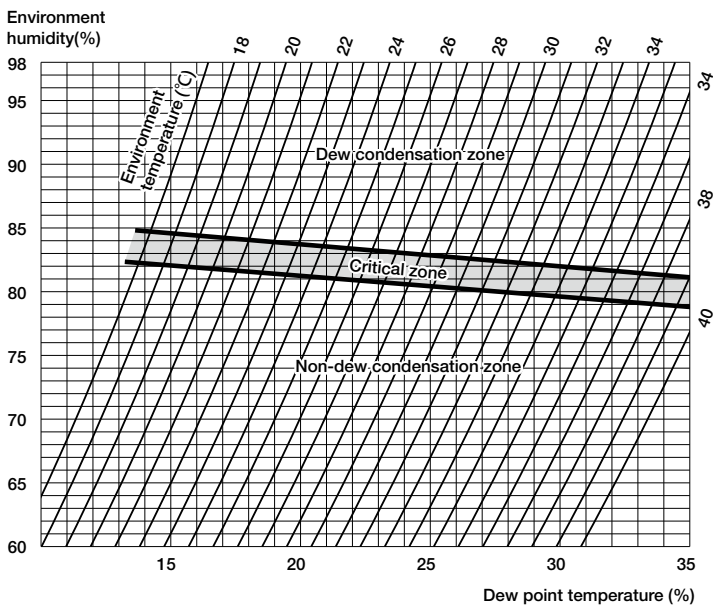
- This diagram is prepared with based on maximum allowable working pressure and temperature, pressure-temperature characteristics of EPDM in JIS B2032 (Wafer type rubber-seated butterfly valves).  
 In actual application, it is necessary to expect the safety allowance in consideration of piping design conditions, etc.  
 Generally, the following safety allowance is recommended.
  - For large size  
10 - 15%.
  - For pulsated flow or steam (Teflon® or metal seat)  
20 - 25%.
- In case of applying some regulations, such as Japanese government standards, etc., it may be restricted in material, temperature, design, strength, etc. Beforehand, please refer to related regulation or standard.
- In JIS B2032, the maximum allowable flow velocity of fluid when the valve is fully opened is specified as 3m/s at nominal pressure 10K and 4m/s at nominal pressure 16K, and 30m/s in case of gas. If the flow velocity exceeds these criteria, the pipe diameter should be revised.

### Caution:

- A rubber seat (NBR/EPDM) may deteriorate at an early stage in service for hot water supply line.
- An EPDM seated butterfly valve shall not be used for all oil applications.

## Dew condensation-proof capacity (Fig. 550)

— Relation between environment (temperature and humidity) and dew point temperature —



<Note> Critical zone... Boundary zone between dew condensation zone and non-dew condensation zone  
 The figure is given certain range in consideration of atmospheric pressure by the difference in height above sea level and climate, the circumstance around pipe, temperature change of the fluid in pipe (cold water), dispersion of data, etc.



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