

History

1910	The Tobata Foundry Co., which later became the Tobata Works, established. This was the first modern malleables manufacturing facility in Japan.
1922	Kizugawa Manufacturing, which later became the Kuwana Works, established as a plant specializing in fittings. Purchased in 1926 by the Tobata Foundry Co.
1935	Name of the Tobata Foundry Co. changed to Kokusan Industries, Ltd.
1937	Kokusan Industries, Ltd. purchased by Hitachi, Ltd.
1956	Hitachi Metals Industries, Ltd. established (Capital: ¥1 billion provided by Hitachi, Ltd.). Hitachi, Ltd., transferred its metals business and five plants to Hitachi Metals Industries, Ltd. (Tobata, Fukagawa, Kuwana, Wakamatsu, and Yasugi), and business activities began.
1965	Hitachi Metals America, Ltd., established in the United States.
1967	Merged with Hitachi Metals, Ltd., to change par value of shares and company name.
1970	Hitachi Metals Europe GmbH established in Germany.
1979	Hitachi Metals Singapore Pte. Ltd. established in Singapore.
1991	Recognized as ISO9002 Quality Management System(Kuwana Works).
1999	Recognized as ISO14001 Environment Quality Management System(Kuwana Works).
2003	Revised as ISO9001 Quality Management System(Kuwana Works).
2015	Hitachi Metals Korea Co., Ltd. established.
2023	Company name changed from Hitachi Metals, Ltd. to Proterial, Ltd.
2024	Kuwana Metals, Ltd. established with the transfer of Proterial's piping components business unit to Okaya & Co., Ltd.

Product Warranty

Within eighteen months of completion inspection or within twelve months of the start of usage, whichever is shortest, Kuwana Metals, Ltd. will repair or replace products or the faulty components of products free of charge in the event of failure under normal usage attributable to inadequate design or manufacturing on the part of Kuwana Metals, Ltd.

However, repairs or replacements will be charged in any of the following cases. Also note that if a separate agreement is in effect, that agreement shall take precedence.

- (1)When the product has been used in an incorrect manner which deviates from the catalog or instruction manual;
- (2)When the product failure is due to careless handling such as jamming with foreign substances or the sticking of excessive water stains;
- (3)When the product has been disassembled, repaired or altered by a third party other than Kuwana Metals, Ltd.;
- (4)When the product has been subject to causes beyond the control of Kuwana Metals, Ltd. including natural disasters such as wind or flood damage, earthquakes and electrical storms, fire, pollution (special environments), salt damage, war or acts of terror;
- (5)When a failure is due to any other factor not deemed to be the responsibility of Kuwana Metals, Ltd.



- The product specifications, performance values and prices listed in this catalog are based on general conditions of use and are intended as guidelines for selecting models. Please confirm product specifications and conditions including fluids, temperatures and pressures before selecting a product.
- The products listed in this catalog are not designed or manufactured for applications that require a special quality level, such as medical equipment, nuclear generation facilities or airplanes.
- Please note that to improve this catalog, the contents may be changed or revised without prior notice. Please be aware that product catalogs published prior to such revisions are not valid.
- The contents of this catalog are copyright of Kuwana Metals, Ltd. Duplication without permission is strictly prohibited.
- When using a product listed in this catalog, please follow the precautions listed in its instruction manual and use it properly.
- The products listed in this catalog are designed to be used within Japan. When exporting the products, the exporter will need to obtain an export license from the Ministry of Economy, Trade and Industry based on the provisions of the Export Control Order under the Foreign Exchange and Foreign Trade Act.

Agent

Kuwana Metals, Ltd.

- **Headquarters**
2 Daifuku, Kuwana-shi, Mie 511-8511, Japan
- **Tokyo Office**
Hatchobori Okaya Building, 4-11-5 Hatchobori, Chuo-ku, Tokyo 104-0032, Japan
Tel. +81-3-6275-2502 Fax. +81-3-6275-2461
<https://www.kuwana-metals.com>

Catalog



GOURD BRAND

Bellows Seal Valves

Ductile Iron / Stainless Steel / Forged Steel / Cast Steel

Kuwana Metals, Ltd.

Reduces External Leakage and Contributes to Energy Savings!

- By covering the circumference of the valve stem with bellows, leakage from the gland components is reduced. •
*MSS SP-117 compliant. Bellows allowable leakage amount (He Leak Test): 10^{-3} mm³ / sec or less.
- Controls energy loss due to leakage and helps save energy •
- Maintenance is simple as there is no need to retorque the gland packing •
*Please conduct regular maintenance as bonnet bolts may loosen due to vibrations or heat stress.

Uses
for
Bellows Seal Valves

Petrochemical Industry

Applicable Plants	Applicable Liquids
Various fiber plants (terephthalic acid)	Steam Ammonia
Synthetic rubber plants, Petroleum refining plants	Chlorine gas Hydrogen Heat medium

Electronics Industry

Applicable Plants	Applicable Liquids
Semiconductor fabrication plants	Steam Carrier air Carrier nitrogen Waste gases
Silicon fabrication plants	Phosgene Hydrogen cyanide Argon

General Industry

Applicable Plants	Applicable Liquids
Steel plants Paper manufacturing plants Pharmaceutical plant utilities	Steam Heat medium
Waste incineration plants District heating and cooling plants Hospital utilities	

Vacuum Industry

Applicable Plants	Applicable Liquids
Various vacuum equipment	Inert gases

Bellows Seal Valves

Ductile Iron Valves

Pages 9 - 12



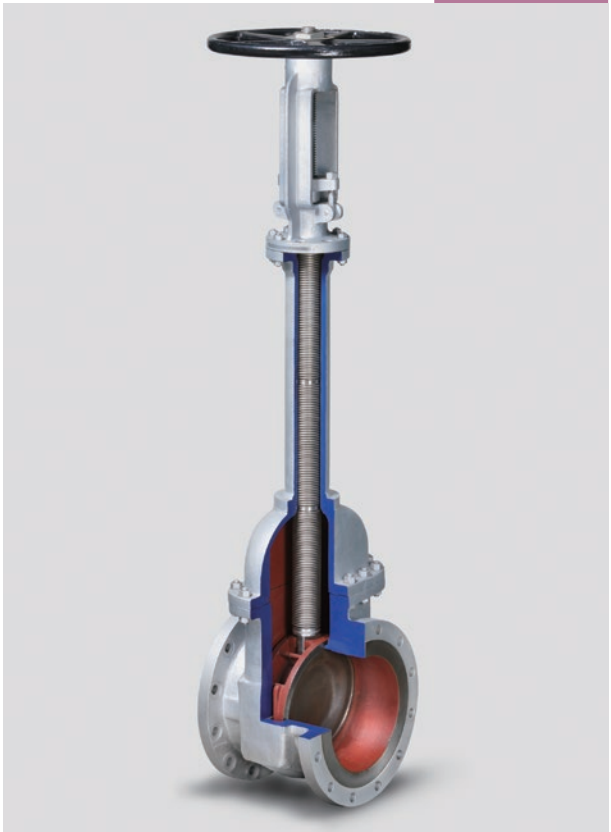
Stainless Steel Valves

Pages 13 - 17



Cast Steel Valves

Pages 19 - 24



Forged Steel Valves

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Bellows Seal Valve Features

General Features

● Reduced gland leakage

The use of bellows reduces leakage from the gland components.

● Effective for energy savings

Energy loss due to leakage is controlled, helping to prevent global warming and protecting the environment.

● Effective for preventing minor leakage

Based on He leak tests, the bellows guarantee leakage of no more than $6.5 \times 10^{-6} \text{ mm}^3 / \text{sec}$, making them effective in preventing minor leakage from gland components.

*MSS SP-117 compliant. Bellows allowable leakage amount (He Leak Test): $10^{-3} \text{ mm}^3 / \text{sec}$ or less.

● Additional odor and safety measures

The valves are suited to safety measures for flammable liquids, toxic liquids and liquids with odors.

● Easy maintenance

The valves are effective for reducing maintenance costs as the gland packing does not need to be regularly retorqued.

● Maintains liquid quality

The valve stem and gland components are sealed with bellows to prevent contact with liquids in pipes.

Kuwana Metals' Bellows Seal Valve Features

● Use of Kuwana Metals' own bellows

All Kuwana Metals' bellows valves use hydroformed multi-layered bellows designed and fabricated in-house. Our bellows meet the bellows lifespan requirements of MSS SP-117.

● Precision finished seat and surface

We provide both HF (hard facing) seats with excellent abrasion resistance and jamming decrease as standard specifications (optional for SUS valves).
Seat surface roughness is finished to 0.5S or less to prevent internal leakage.

● Suitable for vacuum usage

Compared with conventional gland packing methods, our offering can easily achieve a vacuum of 10^{-2} Pa (10^{-4} Torr).

● Easy replacement

Valve face-to-face dimensions are JIS B2002 or ASME B16.10-compliant and can be easily replaced with regular valves.
(Malleable valve 300lb1/2"-2" is compliant with JV4-4.)

● Extensive range of products

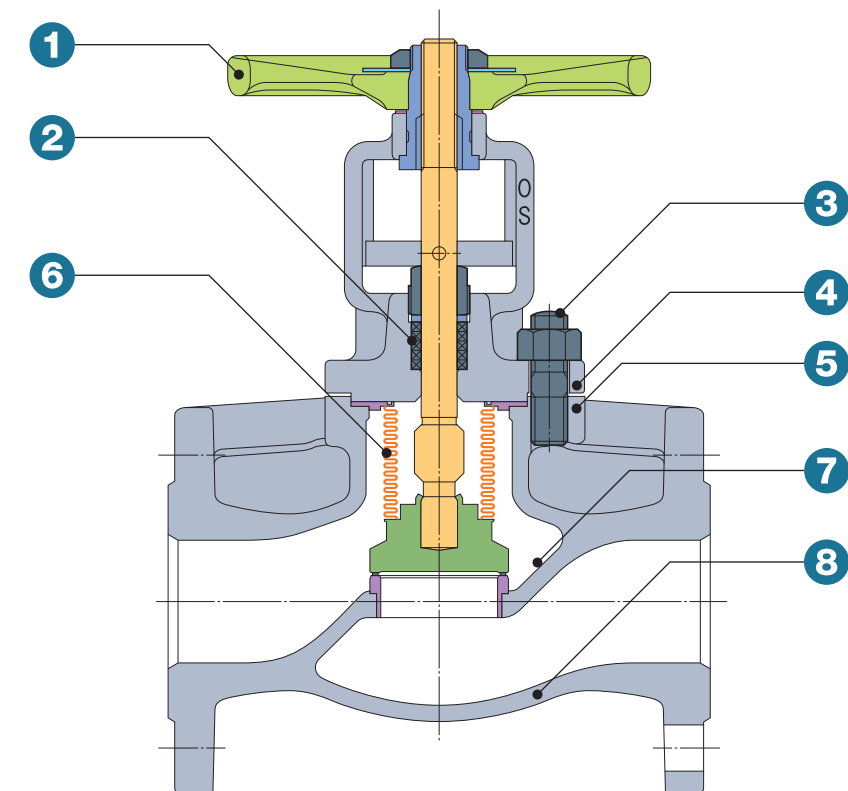
Based on a track record with Malleable bellows valves that spans decades, we have commercialized forged steel, cast steel and stainless steel bellows seal valves.

● Economy

Considering the significant energy loss due to leakage and factors such as maintenance costs, bellows valves offer excellent economy compared with regular valves.

Basic Structure

Globe Valve



1 OS&Y Structure (excluding SUS 50A and lower)

The structure features with a non-rotational stem and non-lifting handle so that the bellows are not twisted.

2 Gland Packing

This blocks external leakage in the event of bellows breakage.

MV, forged steel, cast steel, SUS 20K: Expanded graphite packing
SUS 10K, 150lb: Reinforced PTFE + PTFE packing

3 Bolted Bonnet Structure

The bolted bonnet structure provides simple maintenance and management.

The bolt tightened structure ensures reliable fastening.

4 Upper gasket

An expanded graphite seat is used for the upper gasket.

This blocks external leakage in the event of bellows breakage.

5 Lower gasket

External leakage is blocked with the use of a high-quality gasket.

MV, forged steel, cast steel, SUS 20K: Expanded graphic gasket
SUS 10K, 150lb: Reinforced PTFE gasket

6 Bellows

Hydraulic multi-layer bellows. SUS316L, which features excellent pressure and corrosion resistance, is used.

7 Seat surfaces

Both seat surfaces with excellent jamming and abrasion resistance. (Optional for SUS valves)

8 Valve body

Supports ductile cast iron (FCD-S), stainless steel (SCS13A), (SCS14A), cast steel (ASTM A216-WCB) and forged steel (ASTM A105).

Quality

Testing and inspection items for bellows seal valves differ depending on the model and conditions of use.
The following general inspection is performed on all items on a voluntary basis.
Special inspections and other inspections are performed based on discussions and instruction at the time of order placement.

Bellows Valve Shipping Inspection Items

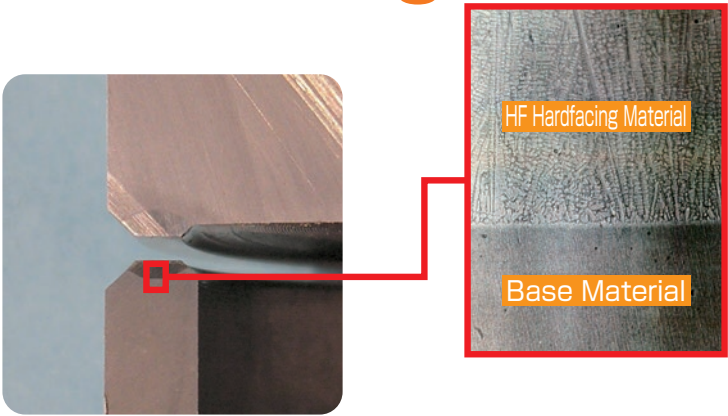
●General Inspection

Testing and Inspection Items	Applications	Applicable Codes and Standards
Materials Inspection	- Checking quality of materials - Mill sheet verification and submission	Material standards such as JIS and ASTM
Visual Inspection	- Checking internal and external surfaces, indication, etc.	JIS B2003
Dimensional Inspection	- Checking of surface interval, joints, fits	
Pressure-resistance Inspection	- Checking with pressure 1.0 times maximum working pressure	Internal standards
Air-tightness Inspection	- Checking with pressure 1.0 times maximum working pressure	
Valve Seat Leakage Inspection	- Checking with pressure 1.0 times maximum working pressure	Internal standards
Functional Inspection	- Checking state of assembly, operating performance, etc.	
Bellows Stand-alone Leakage Inspection	- He leak test	Internal standards

●Special Inspections

Testing and Inspection Items	Applications	Applicable Codes and Standards
Radiation Transparency Test	- Cast steel body, weld spots, groove areas, etc.	JIS G0581, Z3104, 6, Ministry of International Trade and Industry ordinances, etc.
Liquid Penetrant Test	- Weld spots, groove areas, etc.	JIS G0581, Z2343, Ministry of International Trade and Industry ordinances, etc.
He Leak Test	- Performed for high vacuums	Internal Standards

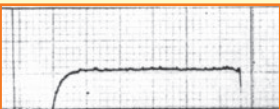
Seat Surface Processing



Mirror Finished Surface Seat Surface



100x magnification

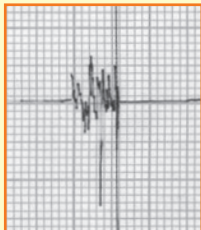


10,000x magnification
Surface roughness:
0.5S or less

Turning Finished Seat Surface



100x magnification



2000x magnification
Surface roughness: 2 - 5S

Production Process

The following shows the bellows seal valve production process used at Kuwana Metals, Ltd.

1 Bellows materials



5 Bellows heat-treating furnace



2 Bellows forming machine



3 End machining



4 Bellows welder



Testing and Inspection Equipment

Bellows Lifespan Testing Machine



Bellows Leakage Helium Inspection Machine



Bellows Seal Valves Product List

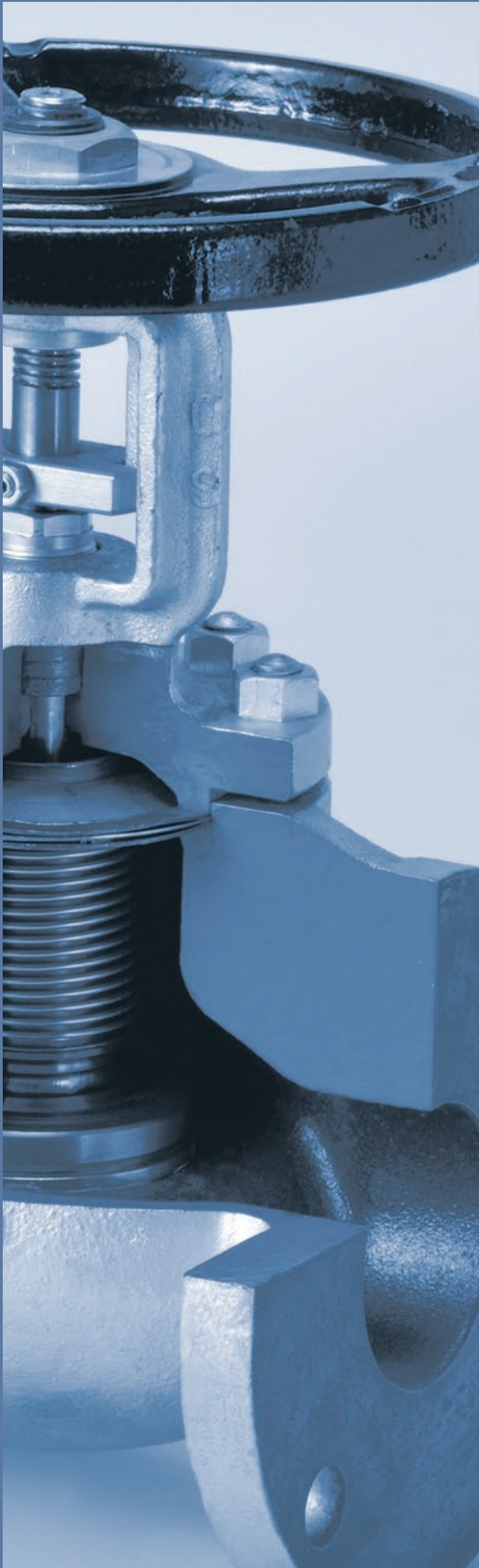
Valve Casing Material	Nominal Pressure	Connection	Valve Type	Seat Material	Product Code	10 ^A ¾ ^B	15 ^A ½ ^B	20 ^A ¾ ^B	25 ^A 1 ^B	32 ^A 1¼ ^B	40 ^A 1½ ^B	50 ^A 2 ^B	65 ^A 2½ ^B	80 ^A 3 ^B	100 ^A 4 ^B	125 ^A 5 ^B	150 ^A 6 ^B	200 ^A 8 ^B	250 ^A 10 ^B	300 ^A 12 ^B	Page
Ductile Iron (FCD-S)	10K	Flanged	Globe	HF	M10KFGB	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	11
	20K	Flanged	Globe	HF	M20KFGB	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	11
	150lb	Flanged	Globe	HF	M150FGB	-	○	○	○	○	○	○	○	○	○	○	○	○	○	-	11
	300lb	Flanged	Globe	HF	M300FGB	-	○	○	○	○	○	○	○	○	○	○	○	○	○	-	11
	10K	Flanged	Globe	PTFE	M10KFDB	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	12
	20K	Flanged	Globe	PTFE	M20KFDB	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	12
	150lb	Flanged	Globe	PTFE	M150FDB	-	○	○	○	○	○	○	○	○	○	○	○	○	○	-	12
Stainless Steel (SCS13A)	300lb	Flanged	Globe	PTFE	M300FDB	-	○	○	○	○	○	○	○	○	○	○	○	○	○	-	12
	10K	Flanged	Globe	18Cr-8Ni	U10FGB	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	15
	20K	Flanged	Globe	18Cr-8Ni	U20FGB	-	○	○	○	○	○	○	○	○	○	△	△	△	△	△	15
	150lb	Flanged	Globe	18Cr-8Ni	U150FGB	-	○	○	○	○	○	○	○	○	○	○	○	△	△	△	15
	10K	Flanged	Globe	PTFE	U10FDB	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	16
	150lb	Flanged	Globe	PTFE	U150FDB	-	○	○	○	○	○	○	○	○	○	○	○	○	-	-	16
	10K	Flanged	Gate	18Cr-8Ni	U10FSB	-	○	○	○	○	○	○	○	○	○	○	○	○	△	△	17
Stainless Steel (SCS14A)	150lb	Flanged	Gate	18Cr-8Ni	U150FSB	-	○	○	○	○	○	○	○	○	○	○	○	○	△	△	17
	10K	Flanged	Globe	16Cr-12Ni-2Mo	U10FGBM	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	15
	20K	Flanged	Globe	16Cr-12Ni-2Mo	U20FGBM	-	○	○	○	○	○	○	○	○	○	△	△	△	△	△	15
	150lb	Flanged	Globe	16Cr-12Ni-2Mo	U150FGBM	-	○	○	○	○	○	○	○	○	○	○	○	○	△	△	15
	10K	Flanged	Globe	PTFE	U10FDBM	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	16
	150lb	Flanged	Globe	PTFE	U150FDBM	-	○	○	○	○	○	○	○	○	○	○	○	○	-	-	16
	10K	Flanged	Gate	16Cr-12Ni-2Mo	U10FSBM	-	○	○	○	○	○	○	○	○	○	○	○	○	△	△	17
Cast Steel (WCB)	150lb	Flanged	Gate	16Cr-12Ni-2Mo	U150FSBM	-	○	○	○	○	○	○	○	○	○	○	○	○	△	△	17
	10K	Flanged	Globe	HF	S10KFGB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	21
	20K	Flanged	Globe	HF	S20KFGB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	21
	30K	Flanged	Globe	HF	S30KFGB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	21
	150lb	Flanged	Globe	HF	S150FGB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	22
	300lb	Flanged	Globe	HF	S300FGB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	22
	10K	Flanged	Gate	HF	S10KFSB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	23
Forged Steel (A105)	20K	Flanged	Gate	HF	S20KFSB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	23
	30K	Flanged	Gate	HF	S30KFSB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	23
	150lb	Flanged	Gate	HF	S150FSB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	24
	300lb	Flanged	Gate	HF	S300FSB	-	-	-	-	-	-	○	○	○	○	○	○	○	○	○	24
	10K	Flanged	Globe	HF	T10KFGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	27
	20K	Flanged	Globe	HF	T20KFGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	27
	30K	Flanged	Globe	HF	T30KFGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	27
Forged Steel (A105)	40K	Flanged	Globe	HF	T40KFGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	27
	150lb	Flanged	Globe	HF	T150FGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	28
	300lb	Flanged	Globe	HF	T300FGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	28
	600lb	Flanged	Globe	HF	T600FGB1	-	○	○	○	○	○	○	-	-	-	-	-	-	-	-	28
	800lb	Socket Welded	Globe	HF	T800WGB1	-	○	○	○	△	○	○	-	-	-	-	-	-	-	-	28

△ : Please contact us.

Short-neck Bellows Seal Valves

Valve Casing Material	Nominal Pressure	Connection	Valve Type	Seat Material	Product Code	15 ^A ½ ^B	20 ^A ¾ ^B	25 ^A 1 ^B	32 ^A 1¼ ^B	40 ^A 1½ ^B	50 ^A 2 ^B	Page
Forged Steel (A105)	10K	Flanged	Globe	HF	T10KFGB1-S	○	○	○	○	○	○	31
	20K	Flanged	Globe	HF	T20KFGB1-S	○	○	○	○	○	○	31
	30K	Flanged	Globe	HF	T30KFGB1-S	○	○	○	○	○	○	31
	40K	Flanged	Globe	HF	T40KFGB1-S	○	○	○	○	○	○	31
	150lb	Flanged	Globe	HF	T150FGB1-S	○	○	○	○	○	○	32
	300lb	Flanged	Globe	HF	T300FGB1-S	○	○	○	○	○	○	32
	600lb	Flanged	Globe	HF	T600FGB1-S	○	○	○	○	○	○	32
	800lb	Socket Welded	Globe	HF	T800WGB1-S	○	○	○	△	○	○	32

Ductile Iron Bellows Seal Valve Series



Metal Seat (HF Seat)

- 10K Ductile Iron Flanged Type Bellows Seal Globe Valves M10KFGB
- 20K Ductile Iron Flanged Type Bellows Seal Globe Valves M20KFGB
- 150lb Ductile Iron Flanged Type Bellows Seal Globe Valves M150FGB
- 300lb Ductile Iron Flanged Type Bellows Seal Globe Valves M300FGB

Soft Seat (PTFE Seat)

- 10K Ductile Iron Flanged Type Bellows Seal Globe Valves M10KFDB
- 20K Ductile Iron Flanged Type Bellows Seal Globe Valves M20KFDB
- 150lb Ductile Iron Flanged Type Bellows Seal Globe Valves M150FDB
- 300lb Ductile Iron Flanged Type Bellows Seal Globe Valves M300FDB

Temperature and Pressure Rating (JIS Flanged Valve)

	10K Type		20K Type	
	M10KFGB	M10KFDB	M20KFGB	M20KFDB
°C	MPa	MPa	MPa	MPa
-10~120	1.40	1.40	2.50	2.50
183		1.20		2.45
220	1.20	—	2.50	—
300	1.00	—	2.30	—
350	—	—	2.00	—

Temperature and Pressure Rating (ASME Flanged Valve)

		150lb Type		300lb Type	
		M150FGB	M150KDB	M300FGB	M300FDB
°F	°C	psi (MPa)	psi (MPa)	psi (MPa)	psi (MPa)
14~100	-10~38	198(1.37)	198(1.37)	363(2.50)	363(2.50)
361	183		198(1.37)		363(2.50)
400	204	198(1.37)	—		—
450	232		—	363(2.50)	—
500	260	170(1.18)	—		—
550	288		—	345(2.38)	—
650	343	125(0.86)	—	300(2.07)	—

Product Codes

Product Code - M: Ductile Iron Valve Series

Nominal Pressure - 10K: JIS 10K
20K: JIS 20K
150: ASME Class 150
300: ASME Class 300

Connection Type - F: Flanged

Valve Type - GB: Bellows Seal Globe Valve (HF seat)
DB: Bellows Seal Globe Valve (PTFE seat)

Nominal Size

M10KFGB-A15

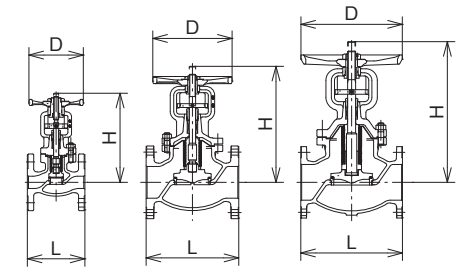
Ductile Iron Bellows Seal Globe Valves (HF Seat)

Product Code **M10KFGB**

10K Type

Ductile Iron Bellows Seal Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS304	HF (up to 50 ^A)
	ASTM A182-F304	HF (65~100 ^A)
	SUS410/SCS1	HF (125 ^A or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



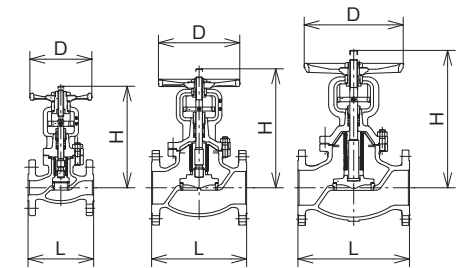
Nominal Diameter (A)	10	15	20	25	32	40	50	65	80	100	125	150	200	250
L	108	108	117	127	140	165	203	216	241	292	356	406	495	622
H	181	181	191	196	208	243	253	278	328	365	421	487	609	754
D	100	100	100	120	120	160	180	224	224	250	300	355	400	450

Product Code **M20KFGB**

20K Type

Ductile Iron Bellows Seal Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS304	HF (up to 50 ^A)
	ASTM A182-F304	HF (65~100 ^A)
	SUS410/SCS1	HF (125 ^A or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



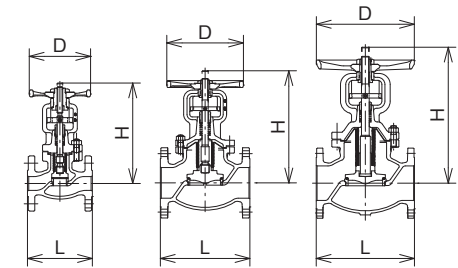
Nominal Diameter (A)	10	15	20	25	32	40	50	65	80	100	125	150	200	250
L	110	110	120	130	160	180	230	292	318	356	400	444	559	622
H	181	181	191	196	208	243	253	309	377	402	491	562	713	869
D	100	100	100	120	120	160	180	224	250	300	355	400	450	560

Product Code **M150FGB**

150lb Type

Ductile Iron Bellows Seal Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS304	HF (up to 2B)
	ASTM A182-F304	HF (2½~4B)
	SUS410/SCS1	HF (5B or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



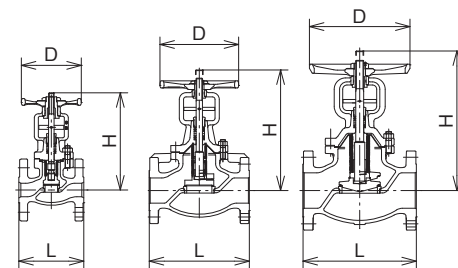
Nominal Diameter (B)	½	¾	1	1¼	1½	2	2½	3	4	5	6	8	10
L	108	117	127	140	165	203	216	241	292	356	406	495	622
H	181	191	196	208	243	253	278	328	365	421	487	609	754
D	100	100	120	120	160	180	224	224	250	300	355	400	450

Product Code **M300FGB**

300lb Type

Ductile Iron Bellows Seal Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS304	HF (up to 2B)
	ASTM A182-F304	HF (2½~4B)
	SUS410/SCS1	HF (5B or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	

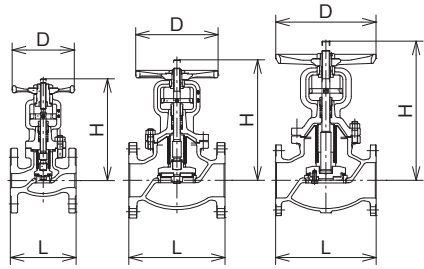


Nominal Diameter (B)	½	¾	1	1¼	1½	2	2½	3	4	5	6	8	10
L	110	120	130	160	180	230	292	318	356	400	444	559	622
H	181	191	196	208	243	253	309	377	402	491	562	713	869
D	100	100	120	120	160	180	224	250	300	355	400	450	560

Ductile Iron Bellows Seal Globe Valves (Soft Seat)

Product Code **M10KFDB** 10K Type Ductile Iron Bellows Seal Valves Flanged, PTFE Seat

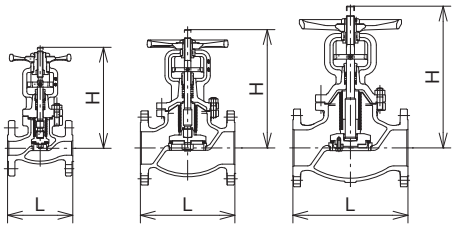
Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	
Disc seat	Reinforced PTFE	
Disc	ASTM A276-304	(65~100 ^A)
	SUS304	(up to 50 ^A) (125 ^A or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



Nominal Diameter (A)	10	15	20	25	32	40	50	65	80	100	125	150	200	250
L	108	108	117	127	140	165	203	216	241	292	356	406	495	622
H	181	181	191	196	208	243	253	278	328	365	421	487	609	754
D	100	100	100	120	120	160	180	224	224	250	300	355	400	450

Product Code **M20KFDB** 20K Type Ductile Iron Bellows Seal Valves Flanged, PTFE Seat

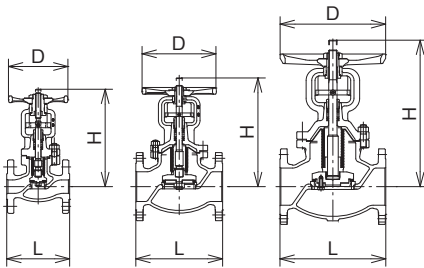
Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	
Disc seat	Reinforced PTFE	
Disc	ASTM A276-304	(65~100 ^A)
	SUS304	(up to 50 ^A) (125 ^A or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



Nominal Diameter (A)	10	15	20	25	32	40	50	65	80	100	125	150	200	250
L	110	110	120	130	160	180	230	292	318	356	400	444	559	622
H	181	181	191	196	208	243	253	309	377	402	491	562	713	869
D	100	100	100	120	120	160	180	224	250	300	355	400	450	560

Product Code **M150FDB** 150lb Type Ductile Iron Bellows Seal Valves Flanged, PTFE Seat

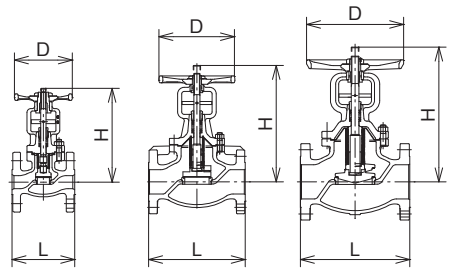
Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	
Disc seat	Reinforced PTFE	
Disc	ASTM A276-304	(2½~4B)
	SUS304	(up to 2B) (5B or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



Nominal Diameter (B)	½	¾	1	1¼	1½	2	2½	3	4	5	6	8	10
L	108	117	127	140	165	203	216	241	292	356	406	495	622
H	181	191	196	208	243	253	278	328	365	421	487	609	754
D	100	100	120	120	160	180	224	224	250	300	355	400	450

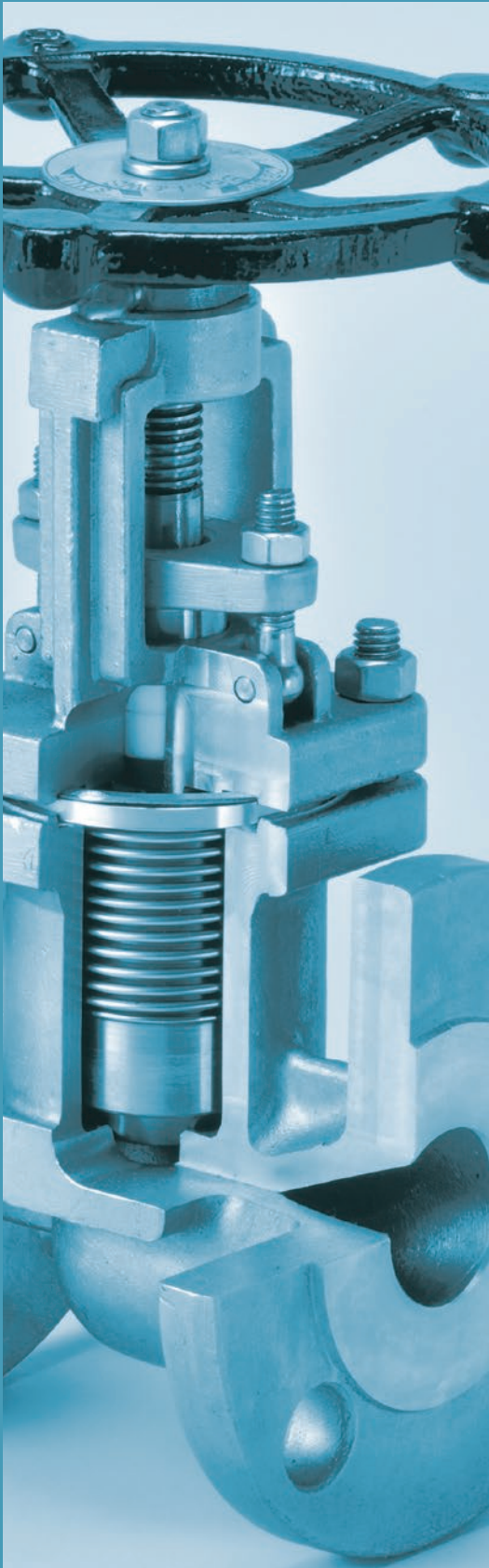
Product Code **M300FDB** 300lb Type Ductile Iron Bellows Seal Valves Flanged, PTFE Seat

Component Name	Material	Remarks
Body	FCD-S	
Cover	FCD-S	
Stem	SUS410	
Seat Ring	SUS410	
Disc seat	Reinforced PTFE	
Disc	ASTM A276-304	(2½~4B)
	SUS304	(up to 2B) (5B or larger)
Bellows	SUS316L	
Handwheel	FCMB340-10	Paint Color: Black
Gasket	Expanded Graphite	
Gland Packing	Expanded Graphite	



Nominal Diameter (B)	½	¾	1	1¼	1½	2	2½	3	4	5	6	8	10
L	110	120	130	160	180	230	292	318	356	400	444	559	622
H	181	191	196	208	243	253	309	377	402	491	562	713	869
D	100	100	120	120	160	180	224	250	300	355	400	450	560

Stainless Steel
Bellows Seal Valve Series



Metal Seat

- 10K Stainless Steel (13A) Flanged Type Bellows Globe Valves U10FGB
- 20K Stainless Steel (13A) Flanged Type Bellows Globe Valves U20FGB
- 150lb Stainless Steel (13A) Flanged Type Bellows Globe Valves U150FGB
- 10K Stainless Steel (13A) Flanged Type Bellows Gate Valves U10FSB
- 150lb Stainless Steel (13A) Flanged Type Bellows Gate Valves U150FSB
- 10K Stainless Steel (14A) Flanged Type Bellows Globe Valves U10FGBM
- 20K Stainless Steel (14A) Flanged Type Bellows Globe Valves U20FGBM
- 150lb Stainless Steel (14A) Flanged Type Bellows Globe Valves U150FGBM
- 10K Stainless Steel (14A) Flanged Type Bellows Gate Valves U10FSBM
- 150lb Stainless Steel (14A) Flanged Type Bellows Gate Valves U150FSBM

Soft Seat (PTFE Seat)

- 10K Stainless Steel (13A) Flanged Type Bellows Globe Valves U10FDB
- 150lb Stainless Steel (13A) Flanged Type Bellows Globe Valves U150FDB
- 10K Stainless Steel (14A) Flanged Type Bellows Globe Valves U10FDBM
- 150lb Stainless Steel (14A) Flanged Type Bellows Globe Valves U150FDBM

Temperature and Pressure Rating (JIS Flanged Valve)

Temperature °C	10K		20K
	Metal Seat MPa	PTFE Seat MPa	Metal Seat MPa
-29~120	1.4	1.4	3.4
180	1.28	1.28	
220	1.2	—	3.1
300	1.0	—	2.9
350	—	—	2.6
400	—	—	2.3
425	—	—	2.0

Temperature and Pressure Rating (ASME Flanged Valve)

Temperature °F °C		150lb							
		SCS13A(CF8)				SCS14A(CF8M)			
		Metal Seat		PTFE Seat		Metal Seat		PTFE Seat	
		psi	MPa	psi	MPa	psi	MPa	psi	MPa
-20~100	-29~38	275	1.90	275	1.90	275	1.90	275	1.90
200	93	230	1.59	230	1.59	235	1.62	235	1.62
300	149	205	1.41	205	1.41	215	1.48	215	1.48
356	180			195	1.35			203	1.40
400	204	190	1.31	—	—	195	1.34	—	—
500	260	170	1.17	—	—	170	1.17	—	—
600	316	140	0.97	—	—	140	0.97	—	—
650	343	125	0.86	—	—	125	0.86	—	—
700	371	110	0.76	—	—	110	0.76	—	—
750	399	95	0.66	—	—	95	0.66	—	—
797	425	81	0.56	—	—	81	0.56	—	—

Product Codes

Product Code - U: Stainless Steel Valve S Series

Nominal Pressure - 10K: JIS 10K
20K: JIS 20K
150: ASME Class 150

Connection Type - F: Flanged

Valve Type - GB: Bellows Seal Globe Valve (metal seat)
DB: Bellows Seal Globe Valve (PTFE seat)
SB: Bellows Seal Gate Valve

Valve Casing Material - None: SCS13A
M : SCS14A

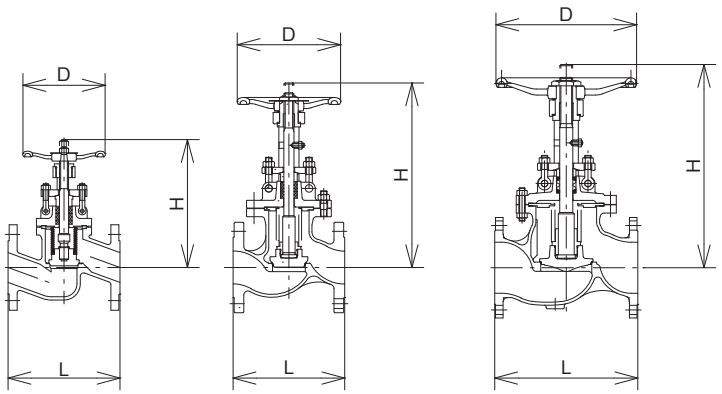
Nominal Size

U10FGBM-15

Stainless Steel Bellows Seal Globe Valves (Metal Seat)

Product Code **U10FGB(M)** 10K Type Stainless Steel Bellows Seal Globe Valves Flanged, Metal Seat

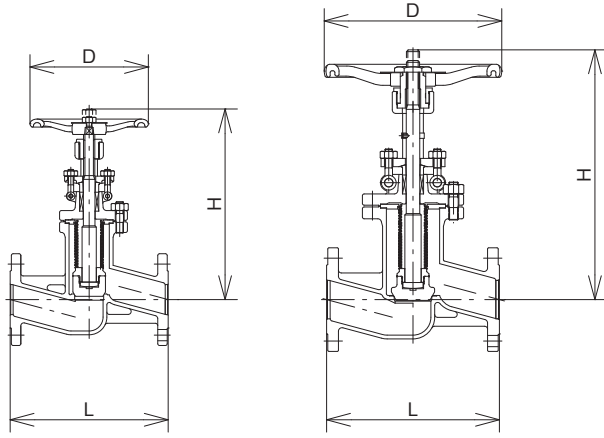
Component Name	Material		Remarks
	U10FGB	U10FGBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Disc	A276-304	A276-316	up to 80 ^A
	SCS13A	SCS14A	100 ^A or larger
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)
Gland Packing	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)



Nominal Diameter (A)	10	15	20	25	32	40	50	65	80	100	125	150	200
L	108	108	117	127	140	165	203	216	241	292	356	406	495
H	162	162	165	184	219	222	232	358	393	422	506	520	634
D	100	100	100	100	150	150	150	200	300	300	350	350	450

Product Code **U20FGB(M)** 20K Type Stainless Steel Bellows Seal Globe Valves Flanged, Metal Seat

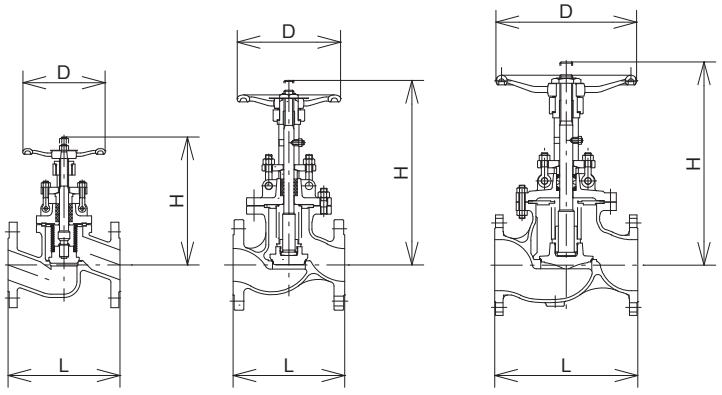
Component Name	Material		Remarks
	U20FGB	U20FGBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Disc	A276-304	A276-316	up to 100 ^A
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Expanded Graphite		
Gland Packing	Expanded Graphite		



Nominal Diameter (A)	15	20	25	32	40	50	65	80	100
L	152	178	203	216	229	267	292	318	356
H	188	191	229	235	276	322	422	464	545
D	100	100	150	150	200	200	300	300	350

Product Code **U150FGB(M)** 150lb Type Stainless Steel Bellows Seal Globe Valves Flanged, Metal Seat

Component Name	Material		Remarks
	U150FGB	U150FGBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Disc	A276-304	A276-316	up to 3B
	SCS13A	SCS14A	4B or larger
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)
Gland Packing	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)

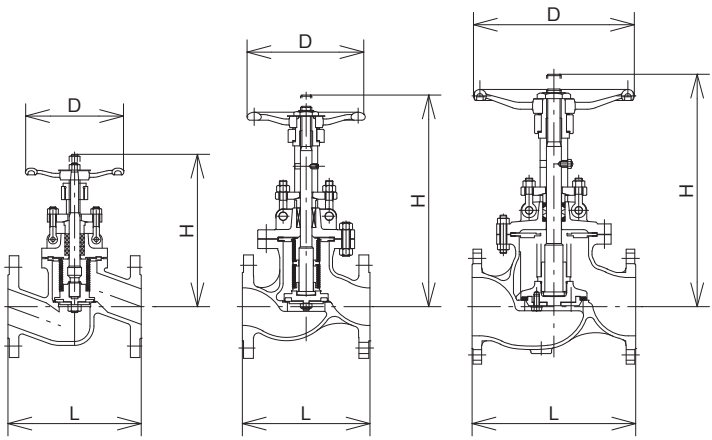


Nominal Diameter (B)	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8
L	108	117	127	165	203	216	241	292	356	406	495
H	162	165	184	222	232	358	393	422	506	520	634
D	100	100	100	150	150	200	300	300	350	350	450

Stainless Steel Bellows Seal Globe Valves (PTFE Seat)

Product Code **U10FDB(M)** 10K Type Stainless Steel Bellows Seal Globe Valves Flanged, PTFE Seat

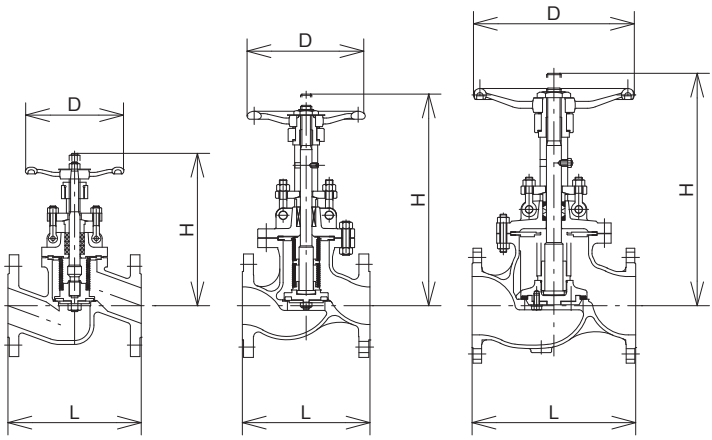
Component Name	Material		Remarks
	U10FDB	U10FDBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Disc seat	Reinforced PTFE		
Disc	A276-304	A276-316	up to 100 ^A
	A351-CF8	A351-CF8M	125 ^A or larger
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Reinforced PTFE		
Gland Packing	Reinforced PTFE		



Nominal Diameter (A)	10	15	20	25	32	40	50	65	80	100	125	150	200
L	108	108	117	127	140	165	203	216	241	292	356	406	495
H	162	162	165	184	219	222	232	358	393	422	506	520	634
D	100	100	100	100	150	150	150	200	300	300	350	350	450

Product Code **U150FDB(M)** 150lb Type Stainless Steel Bellows Seal Globe Valves Flanged, PTFE Seat

Component Name	Material		Remarks
	U150FDB	U150FDBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Disc seat	Reinforced PTFE		
Disc	A276-304	A276-316	up to 4B
	A351-CF8	A351-CF8M	5B or larger
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Reinforced PTFE		
Gland Packing	Reinforced PTFE		

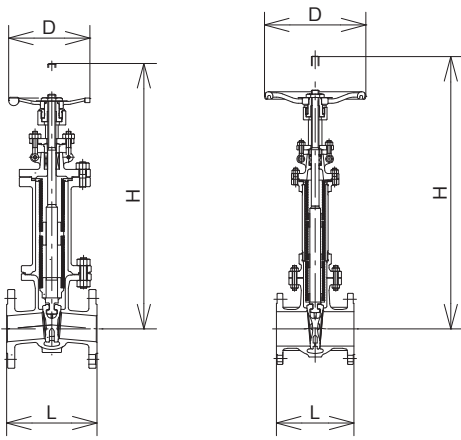


Nominal Diameter (B)	½	¾	1	1½	2	2½	3	4	5	6	8
L	108	117	127	165	203	216	241	292	356	406	495
H	162	165	184	219	232	358	393	422	506	520	634
D	100	100	100	150	150	200	300	300	350	350	450

Stainless Steel Bellows Seal Gate Valves

Product Code **U10FSB(M)** 10K Type Stainless Steel Bellows Seal Gate Valves Flanged, Metal Seat

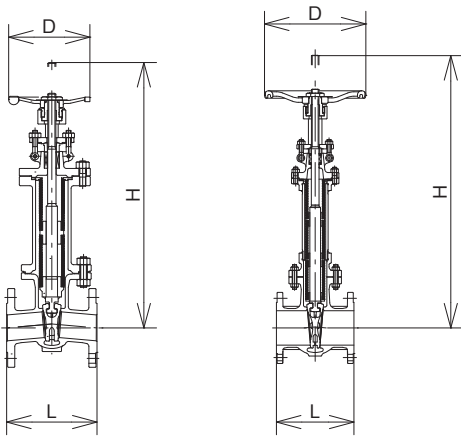
Component Name	Material		Remarks
	U10FSB	U10FSBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Wedge	A351-CF8	A351-CF8M	
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)
Gland Packing	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)



Nominal Diameter (A)	15	20	25	32	40	50	65	80	100	125	150	200
L	108	117	127	140	165	178	190	203	229	254	267	292
H	321	345	384	421	447	523	616	700	845	1000	1110	1418
D	100	100	150	150	150	150	200	200	300	300	300	350

Product Code **U150FSB(M)** 150lb Type Stainless Steel Bellows Seal Gate Valves Flanged, Metal Seat

Component Name	Material		Remarks
	U150FSB	U150FSBM	
Body	SCS13A	SCS14A	
Cover	SCS13A	SCS14A	
Stem	A276-304	A276-316	
Wedge	A351-CF8	A351-CF8M	
Bellows	SUS316L		
Handwheel	A536		Paint Color: Black
Upper Gasket	Expanded Graphite		
Lower Gasket	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)
Gland Packing	Reinforced PTFE		up to 180°C
	Expanded Graphite		Over 180°C (optional)



Nominal Diameter (B)	½	¾	1	1½	2	2½	3	4	5	6	8
L	108	117	127	165	178	190	203	229	254	267	292
H	321	345	384	447	523	616	700	845	1000	1110	1418
D	100	100	150	150	150	200	200	300	300	300	350

Stainless Steel

Cast Steel

Bellows Seal Valve Series

HF Seat

- 10K Cast Steel Flanged Type Bellows Seal Globe Valves S10KFGB
- 20K Cast Steel Flanged Type Bellows Seal Globe Valves S20KFGB
- 30K Cast Steel Flanged Type Bellows Seal Globe Valves S30KFGB
- 150lb Cast Steel Flanged Type Bellows Seal Globe Valves S150FGB
- 300lb Cast Steel Flanged Type Bellows Seal Globe Valves S300FGB

- 10K Cast Steel Flanged Type Bellows Seal Gate Valves S10KFGB
- 20K Cast Steel Flanged Type Bellows Seal Gate Valves S20KFGB
- 30K Cast Steel Flanged Type Bellows Seal Gate Valves S30KFGB
- 150lb Cast Steel Flanged Type Bellows Seal Gate Valves S150FGB
- 300lb Cast Steel Flanged Type Bellows Seal Gate Valves S300FGB



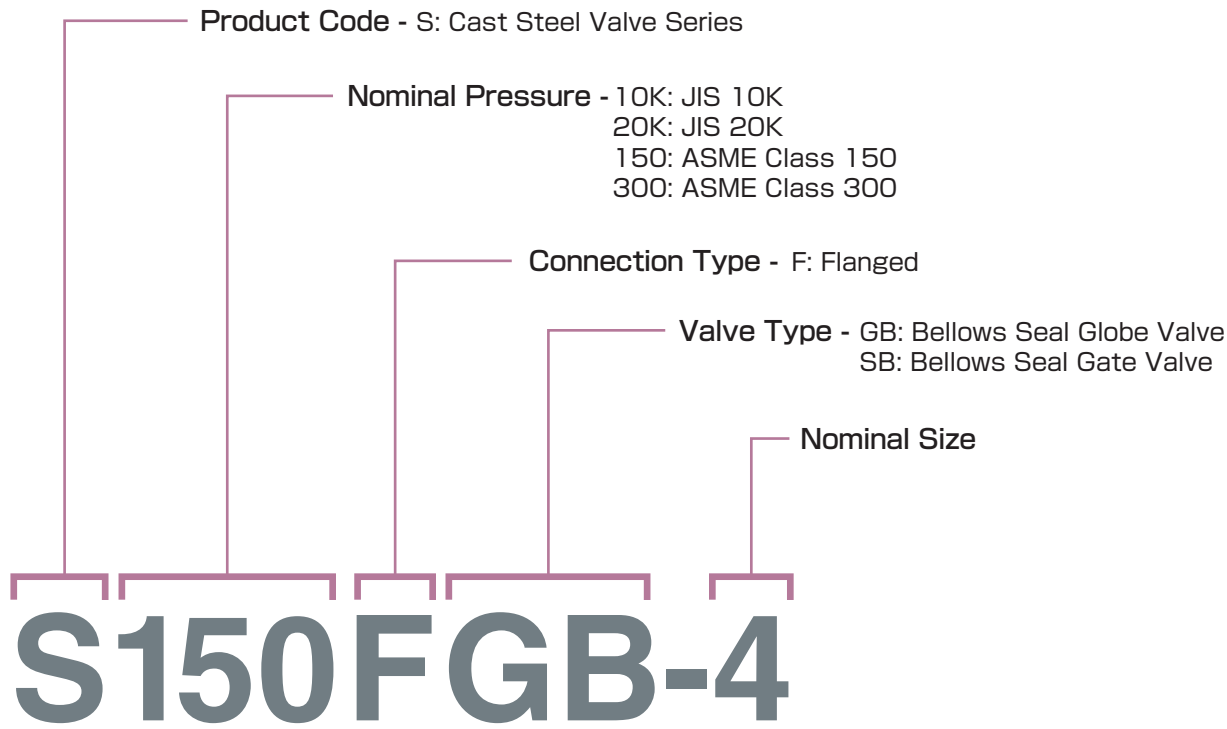
Temperature and Pressure Rating (JIS Flanged Valve)

Temperature	10K	20K	30K
°C	MPa	MPa	MPa
-29~120	1.4	3.4	5.1
220	1.2	3.1	4.6
300	1.0	2.9	4.3
350	—	2.6	3.9
400	—	2.3	3.4
425	—	2.0	3.0

Temperature and Pressure Rating (ASME Flanged Valve)

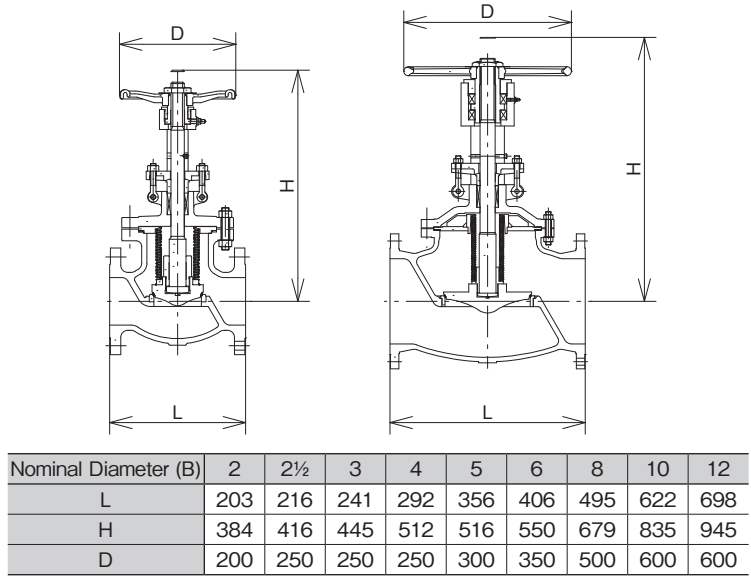
Temperature		150lb		300lb	
°F	°C	psi	MPa	psi	MPa
-20~100	-29~38	285	1.96	740	5.10
200	93	260	1.79	675	4.66
300	149	230	1.59	655	4.52
400	204	200	1.38	635	4.37
500	260	170	1.18	600	4.14
600	316	140	0.96	550	3.80
650	343	125	0.86	535	3.69
700	371	110	0.76	535	3.69
750	399	95	0.66	505	3.48
797	425	81	0.56	416	2.87

Product Codes



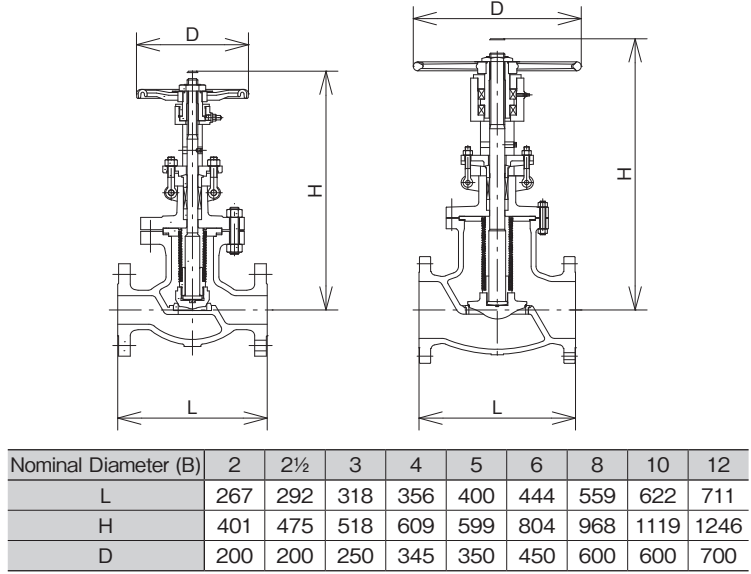
Product Code **S10KFGB** 10K Type Cast Steel Bellows Seal Globe Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Disc	A217-CA15	up to HF 4B
	A105	HF 5B or larger
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



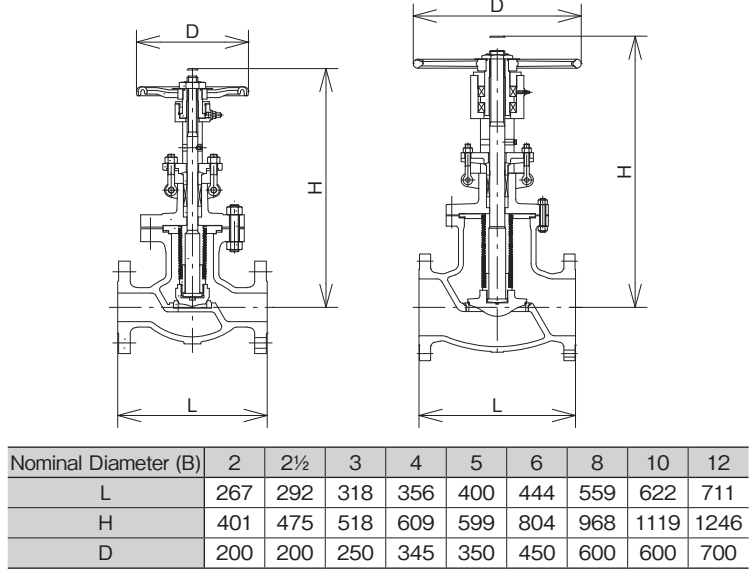
Product Code **S20KFGB** 20K Type Cast Steel Bellows Seal Globe Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Disc	A217-CA15	up to HF 4B
	A105	HF 5B or larger
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



Product Code **S30KFGB** 30K Type Cast Steel Bellows Seal Globe Valves Flanged, HF Seat

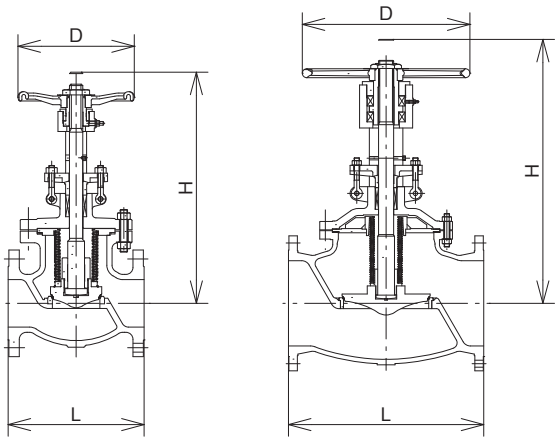
Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Disc	A217-CA15	up to HF 4B
	A105	HF 5B or larger
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



Cast Steel Bellows Seal Globe Valves

Product Code **S150FGB** 150lb Type Cast Steel Bellows Seal Globe Valves Flanged, HF Seat

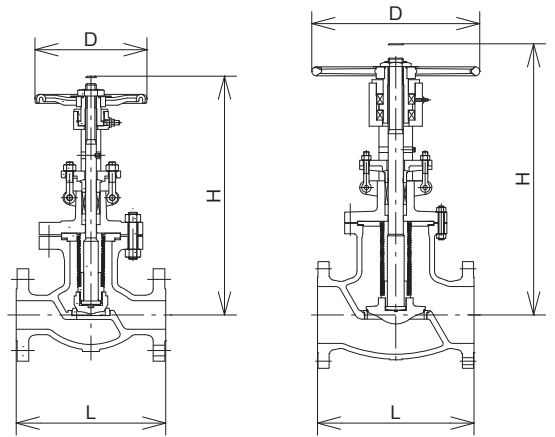
Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Disc	A217-CA15	up to HF 4B
	A105	HF 5B or larger
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	203	216	241	292	356	406	495	622	698
H	384	416	445	512	516	550	679	835	945
D	200	250	250	250	300	350	500	600	600

Product Code **S300FGB** 300lb Type Cast Steel Bellows Seal Globe Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Disc	A217-CA15	up to HF 4B
	A105	HF 5B or larger
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	

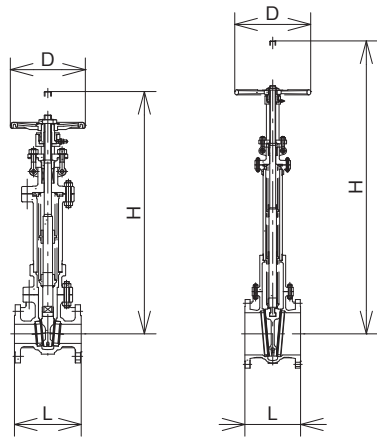


Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	267	292	318	356	400	444	559	622	711
H	401	475	518	609	599	804	968	1119	1246
D	200	200	250	345	350	450	600	600	700

Cast Steel Bellows Seal Gate Valves

Product Code **S10KFSB** 10K Type Cast Steel Bellows Seal Gate Valves Flanged, HF Seat

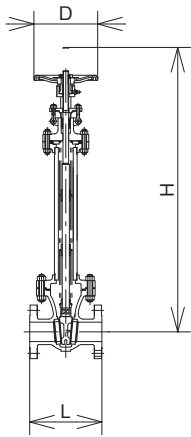
Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Wedge	A216-WCB	HF
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Bonnet Gasket	P/#6633	
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	178	190	203	229	254	268	292	330	356
H	600	697	795	866	998	1127	1420	1735	2041
D	200	200	250	250	300	300	350	450	500

Product Code **S20KFSB** 20K Type Cast Steel Bellows Seal Gate Valves Flanged, HF Seat

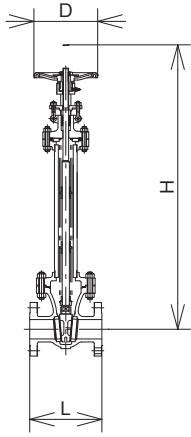
Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Wedge	A216-WCB	HF
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Bonnet Gasket	P/#6633	
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	216	241	283	305	381	403	419	457	502
H	748	865	964	1172	1345	1424	1816	2142	2808
D	200	200	250	300	300	350	400	500	600

Product Code **S30KFSB** 30K Type Cast Steel Bellows Seal Gate Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Wedge	A216-WCB	HF
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Bonnet Gasket	P/#6633	
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	

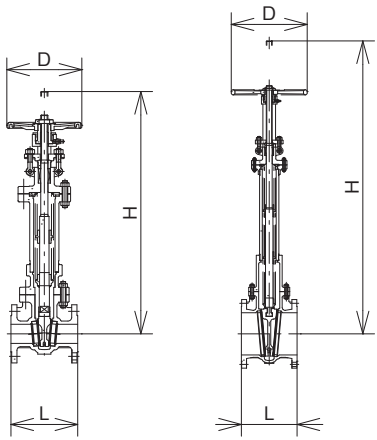


Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	216	241	283	305	381	403	419	457	502
H	748	865	964	1172	1345	1424	1816	2142	2808
D	200	200	250	300	300	350	400	500	600

Cast Steel Bellows Seal Gate Valves

Product Code **S150FSB** 150lb Type Cast Steel Bellows Seal Gate Valves Flanged, HF Seat

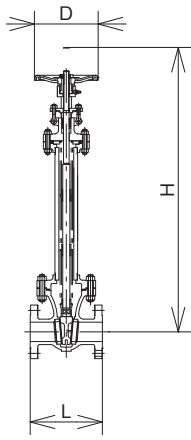
Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A276-410	
Seat Ring	A105	HF
Wedge	A216-WCB	HF
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Bonnet Gasket	P/#6633	
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	178	190	203	229	254	268	292	330	356
H	600	697	795	866	998	1127	1420	1735	2041
D	200	200	250	250	300	300	350	450	500

Product Code **S300FSB** 300lb Type Cast Steel Bellows Seal Gate Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A216-WCB	
Cover	A216-WCB	
Stem	A216-410	
Seat Ring	A105	HF
Wedge	A216-WCB	HF
Bellows	SUS316L	
Handwheel	STEEL	Paint Color: Black
Bonnet Gasket	P/#6633	
Upper Gasket	P/#6633	
Lower Gasket	P/#2601-GG0	
Gland Packing	P/#6710CH+P/#6610CH	



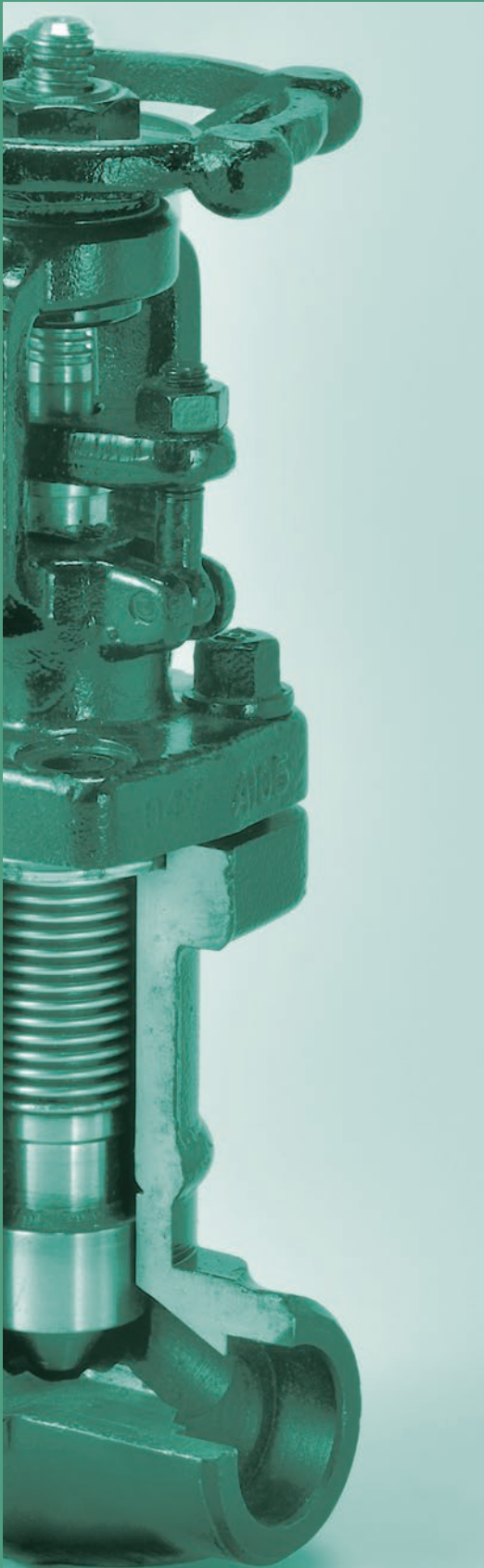
Nominal Diameter (B)	2	2½	3	4	5	6	8	10	12
L	216	241	283	305	381	403	419	457	502
H	748	865	964	1172	1345	1424	1816	2142	2808
D	200	200	250	300	300	350	400	500	600

Forged Steel
Bellows Seal Valve Series

HF Seat

- 10K Forged Steel Flanged Type Bellows Seal Globe Valves T10KFGB1
- 20K Forged Steel Flanged Type Bellows Seal Globe Valves T20KFGB1
- 30K Forged Steel Flanged Type Bellows Seal Globe Valves T30KFGB1
- 40K Forged Steel Flanged Type Bellows Seal Globe Valves T40KFGB1
- 150lb Forged Steel Flanged Type Bellows Seal Globe Valves T150FGB1
- 300lb Forged Steel Flanged Type Bellows Seal Globe Valves T300FGB1
- 600lb Forged Steel Flanged Type Bellows Seal Globe Valves T600FGB1
- 800lb Forged Steel Socket Welded Bellows Seal Globe Valves T800WGB1

- 10K Forged Steel Flanged Type Bellows Seal Gate Valves T10KFGB1
- 20K Forged Steel Flanged Type Bellows Seal Gate Valves T20KFGB1
- 30K Forged Steel Flanged Type Bellows Seal Gate Valves T30KFGB1
- 40K Forged Steel Flanged Type Bellows Seal Gate Valves T40KFGB1
- 150lb Forged Steel Flanged Type Bellows Seal Gate Valves T150FSB1
- 300lb Forged Steel Flanged Type Bellows Seal Gate Valves T300FSB1
- 600lb Forged Steel Flanged Type Bellows Seal Gate Valves T600FSB1
- 800lb Forged Steel Socket Welded Bellows Seal Gate Valves T800WSB1



Temperature and Pressure Rating (JIS Flanged Valve)

Temperature	10K	20K	30K	40K
°C	MPa	MPa	MPa	MPa
-29~120	1.4	3.4	5.1	6.8
220	1.2	3.1	4.6	6.2
300	1.0	2.9	4.3	5.7
350	—	2.6	3.9	5.2
400	—	2.3	3.4	4.6
425	—	2.0	3.0	4.0

Temperature and Pressure Rating (ASME Flanged Valve)

Temperature		150lb		300lb		600lb		800lb	
°F	°C	psi	MPa	psi	MPa	psi	MPa	psi	MPa
-20~100	-29~38	285	1.96	740	5.10	1098	7.57	1098	7.57
200	93	260	1.79	685	4.66	1098	7.57	1098	7.57
300	149	230	1.59	655	4.52	1098	7.57	1098	7.57
400	204	200	1.38	635	4.37	1098	7.57	1098	7.57
500	260	170	1.18	600	4.14	1098	7.57	1098	7.57
600	316	140	0.96	550	3.80	1098	7.57	1098	7.57
650	343	125	0.86	535	3.69	1075	7.41	1098	7.57
700	371	110	0.76	535	3.69	1065	7.35	1098	7.57
750	399	95	0.66	505	3.48	1010	6.96	1098	7.57
797	425	81	0.56	416	2.87	838	5.78	1098	7.57

Product Codes

Product Code - T: Forged Steel Valve Series

Nominal Pressure - 10K: JIS 10K
20K: JIS 20K
30K: JIS 30K
150: ASME Class 150
300: ASME Class 300
600: ASME Class 600
800: ASME Class 800

Connection Type - F: Flanged
W: Socket Welded

Valve Type - GB: Bellows Seal Globe Valve
SB: Bellows Seal Gate Valve

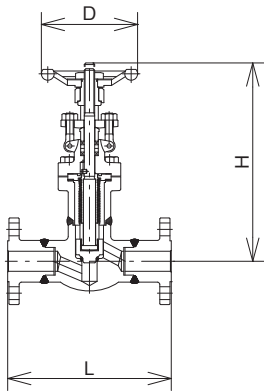
Nominal Size

T800WGB1-2

Forged Steel Bellows Seal Globe Valves

Product Code **T10KFGB1** 10K Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

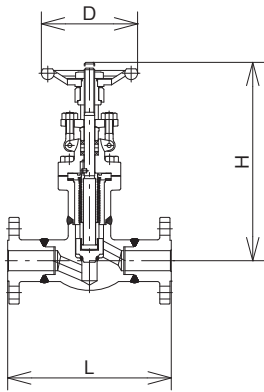
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	237	239	269	294	344
D	95	95	125	150	175

Product Code **T20KFGB1** 20K Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

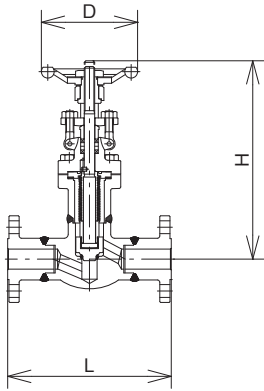
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	237	239	269	294	344
D	95	95	125	150	175

Product Code **T30KFGB1** 30K Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

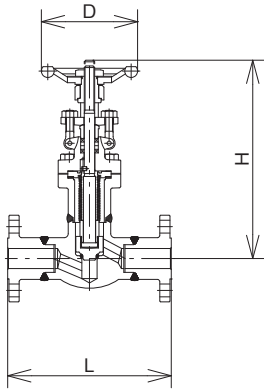
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	237	239	269	294	344
D	95	95	125	150	175

Product Code **T40KFGB1** 40K Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



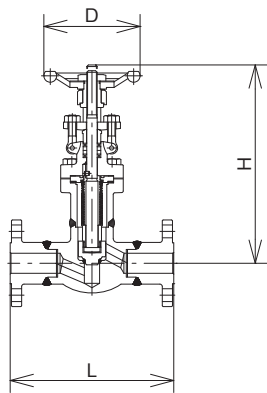
Nominal Diameter (B)	½	¾	1	1½	2
L	165	190	216	241	292
H	237	239	269	294	344
D	95	95	125	150	175

Forged Steel

Forged Steel Bellows Seal Globe Valves

Product Code **T150FGB1** 150lb Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

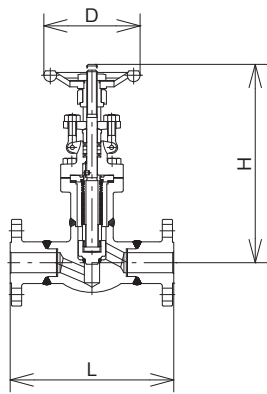
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	237	239	269	294	344
D	95	95	125	150	175

Product Code **T300FGB1** 300lb Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

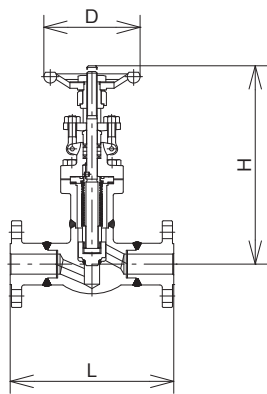
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	237	239	269	294	344
D	95	95	125	150	175

Product Code **T600FGB1** 600lb Type Forged Steel Bellows Seal Globe Valves Flanged, HF Seat

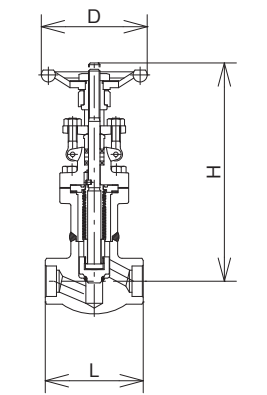
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	165	190	216	241	292
H	237	239	269	294	344
D	95	95	125	150	175

Product Code **T800WGB1** 800lb Type Forged Steel Bellows Seal Globe Valves Socket Welded, HF Seat

Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	

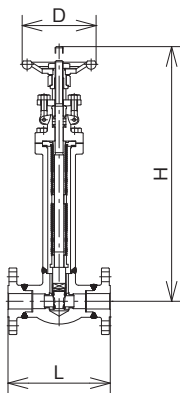


Nominal Diameter (B)	½	¾	1	1½	2
L	79	92	111	152	172
H	237	239	269	294	344
D	95	95	125	150	175

Forged Steel Bellows Seal Gate Valves

Product Code **T10KFSB1** 10K Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

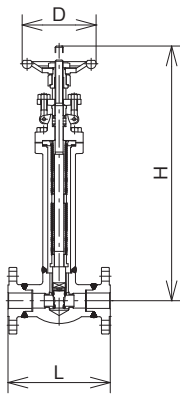
Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	140	152	165	190	216
H	345	372	438	530	618
D	100	100	120	160	180

Product Code **T20KFSB1** 20K Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

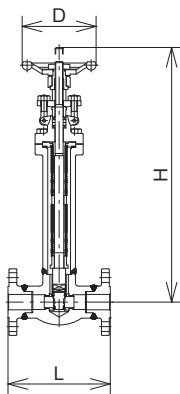
Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	140	152	165	190	216
H	345	372	438	530	618
D	100	100	120	160	180

Product Code **T30KFSB1** 30K Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

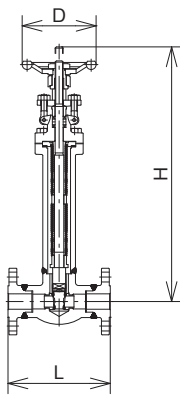
Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	140	152	165	190	216
H	345	372	438	530	618
D	100	100	120	160	180

Product Code **T40KFSB1** 40K Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	

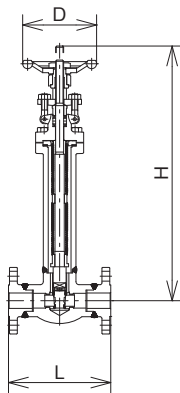


Nominal Diameter (B)	½	¾	1	1½	2
L	165	190	216	241	292
H	345	372	438	530	618
D	100	100	120	160	180

Forged Steel Bellows Seal Gate Valves

Product Code **T150FSB1** 150lb Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

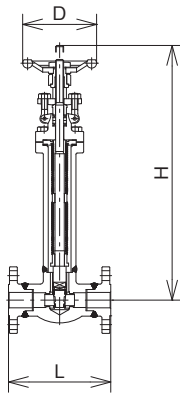
Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	140	152	165	190	216
H	345	372	438	530	618
D	100	100	120	160	180

Product Code **T300FSB1** 300lb Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

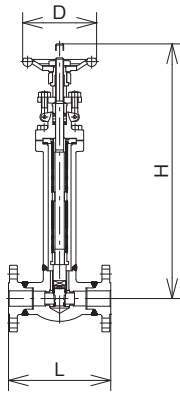
Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	140	152	165	190	216
H	345	372	438	530	618
D	100	100	120	160	180

Product Code **T600FSB1** 600lb Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

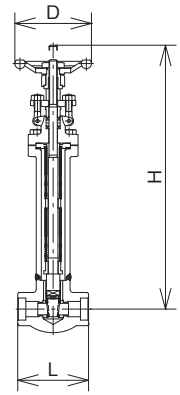
Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	165	190	216	241	292
H	345	372	438	530	618
D	100	100	120	160	180

Product Code **T800WSB1** 800lb Type Forged Steel Bellows Seal Gate Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A105	
Cover	A105	
Stem	SUS410	
Seat Ring	SUS410	HF
Disc	SUS410	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GOO equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	79	92	111	120	140
H	345	372	438	530	618
D	100	100	120	160	180

Forged Steel Short-neck Type Bellows Seal Valve Series

HF Seat

- 10K Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T10KFGB1-S
- 20K Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T20KFGB1-S
- 30K Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T30KFGB1-S
- 40K Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T40KFGB1-S
- 150lb Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T150FGB1-S
- 300lb Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T300FGB1-S
- 600lb Forged Steel Flanged Type Short-neck Type Bellows Seal Globe Valves T600FGB1-S
- 800lb Forged Steel Socket Welded Short-neck Type Bellows Seal Globe Valves T800WGB1-S

Temperature and Pressure Rating (JIS Flanged Valve)

Temperature	10K	20K	30K	40K
°C	MPa	MPa	MPa	MPa
-29~120	1.4	3.4	5.1	5.1
220	1.2	3.1	4.6	5.1
300	1.0	2.9	4.3	5.1
350	—	2.6	3.9	5.1
400	—	2.3	3.4	4.6
425	—	2.0	3.0	4.0

Temperature and Pressure Rating (ASME Flanged Valve)

Temperature		150lb		300lb		600lb		800lb	
°F	°C	psi	MPa	psi	MPa	psi	MPa	psi	MPa
-20~100	-29~38	285	1.96	740	5.10	740	5.10	740	5.10
200	93	260	1.79	675	4.66	740	5.10	740	5.10
300	149	230	1.59	655	4.52	740	5.10	740	5.10
400	204	200	1.38	635	4.37	740	5.10	740	5.10
500	260	170	1.18	600	4.14	740	5.10	740	5.10
600	316	140	0.96	550	3.80	740	5.10	740	5.10
650	343	125	0.86	535	3.69	740	5.10	740	5.10
700	371	110	0.76	535	3.69	740	5.10	740	5.10
750	399	95	0.66	505	3.48	740	5.10	740	5.10
797	425	81	0.56	416	2.87	740	5.10	740	5.10

Product Codes

Product Code - T: Forged Steel Valve Series

Nominal Pressure - 10K: JIS 10K
20K: JIS 20K
30K: JIS 30K
40K: JIS 40K
150: ASME Class 150
300: ASME Class 300
600: ASME Class 600
800: ASME Class 800

Connection Type - F: Flanged
W: Socket Welded

Valve Type - GB: Bellows Seal Globe Valve

Short-neck Type

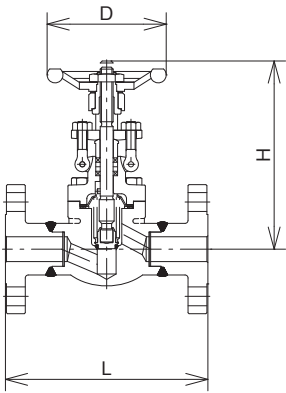
Nominal Size

T800WGB1-S2

Forged Steel Short-neck Type Bellows Seal Globe Valves

Product Code **T10KFGB1-S** 10K Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

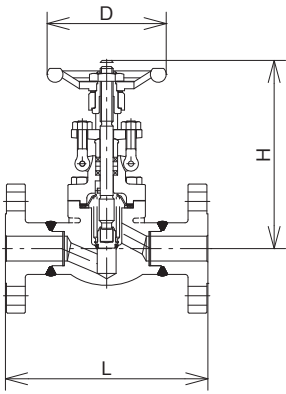
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	161	166	191	237	270
D	95	95	125	150	175

Product Code **T20KFGB1-S** 20K Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

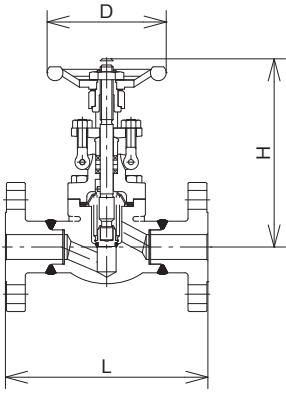
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	161	166	191	237	270
D	95	95	125	150	175

Product Code **T30KFGB1-S** 30K Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

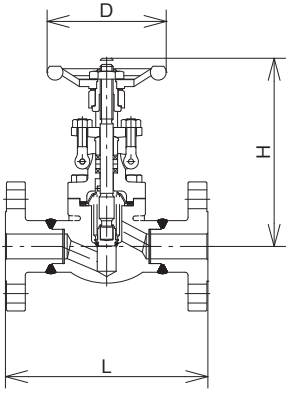
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	½	¾	1	1½	2
L	152	178	203	229	267
H	161	166	191	237	270
D	95	95	125	150	175

Product Code **T40KFGB1-S** 40K Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



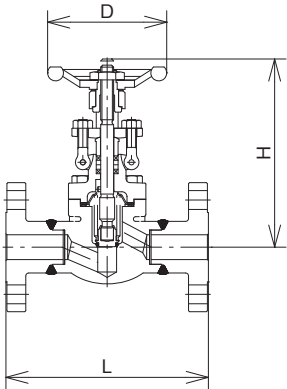
Nominal Diameter (B)	½	¾	1	1½	2
L	165	190	216	241	292
H	161	166	191	237	270
D	95	95	125	150	175

Forged Steel Short-neck Type

Forged Steel Short-neck Type Bellows Seal Globe Valves

Product Code **T150FGB1-S** 150lb Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

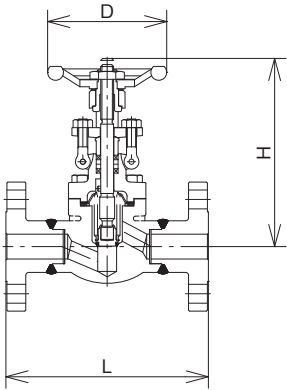
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	152	178	203	229	267
H	161	166	191	237	270
D	95	95	125	150	175

Product Code **T300FGB1-S** 300lb Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

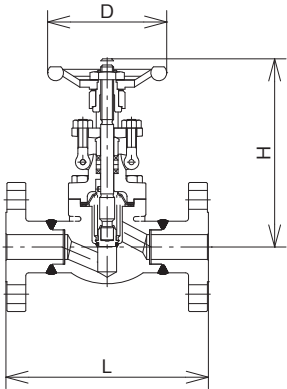
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	152	178	203	229	267
H	161	166	191	237	270
D	95	95	125	150	175

Product Code **T600FGB1-S** 600lb Type Forged Steel Short-neck Type Bellows Seal Globe Valves Flanged, HF Seat

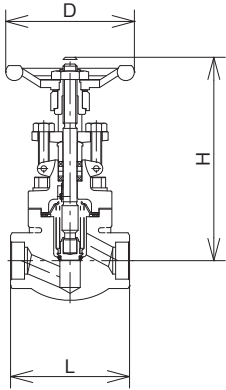
Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	165	190	216	241	292
H	161	166	191	237	270
D	95	95	125	150	175

Product Code **T800WGB1-S** 800lb Type Forged Steel Short-neck Type Bellows Seal Globe Valves Socket Welded, HF Seat

Component Name	Material	Remarks
Body	A105	HF
Cover	A105	
Stem	SUS410	
Disc	SUS304	HF
Bellows	SUS316L	
Handwheel	FCMB275-5	
Upper Gasket	P/#6631 equivalent	
Lower Gasket	P/#2601-GG0 equivalent	
Gland Packing	P/#6710+P/#6610 equivalent	



Nominal Diameter (B)	1/2	3/4	1	1 1/2	2
L	79	92	111	152	172
H	161	166	191	237	270
D	95	95	125	150	175

Chemical Resistance of Bellows and Valve Materials

Name of Liquid	Body material					Bellows	Remarks
	FCD-S ^{*1}	SCS13A (CF8)	SCS14A (CF8M)	WCB (SCPH2)	A105 (SFVC2A)	SUS316L	
Hydrogen	○	○	○	○	○	○	Degreasing of valve interior
Argon	○	○	○	○	○	○	
Hydrogen cyanide	×	○	○	○	○	○	
Ethylene oxide	○	○	○	○	○	○	Some prohibited materials apply ^{*2}
Chlorine (dry gas)	○ (≤30℃)	○ (≤30℃)	○ (≤30℃)	○ (≤30℃)	○ (≤30℃)	○ (≤30℃)	
Ammonia	○	○	○	○	○	○	Some prohibited materials apply ^{*2}
Hydrogen sulfide (dry gas)	○	○	○	○	○	○	HF Seat
Hydrogen sulfide (wet gas)	×	○	○	○	○	○	HF Seat
Chloromethyl	○ (Room temperature, dry)	○ (Room temperature, dry)	○ (Room temperature, dry)	○ (Room temperature, dry)	○ (Room temperature, dry)	○ (Room temperature, dry)	
Trimethylamine	○	○	○	○	○	○	
Ethanol	○	○	○	○	○	○	
Amine	○	○	○	○	○	○	Some prohibited materials apply ^{*2}
Heat transfer oil	○	○	○	○	○	○	
Oxygen	○	○	○	○	○	○	Degreasing of valve interior P/G : PTFE
Liquefied petroleum gas	○	○	○	○	○	○	
Natural gas	○	○	○	○	○	○	
Citygas	○	○	○	○	○	○	
Nitric acid	×	○ (≤50%, ≤70℃)	○ (≤50%, ≤70℃)	○ (≤50%, ≤70℃)	○ (≤50%, ≤70℃)	○ (≤50%, ≤70℃)	P/G : PTFE
Sulfuric acid	○ (98%≤, ≥80℃)	○ (98%≤, ≥150℃)	○ (98%≤, ≥150℃)	○ (98%≤, ≥150℃)	○ (98%≤, ≥150℃)	○ (98%≤, ≥150℃)	P/G : PTFE
Carbon dioxide (dry gas)	○	○	○	○	○	○	
Sodium hydroxide	○ (≤50%, ≤80℃)	○ (≤70%, ≤250℃)	○ (≤70%, ≤250℃)	○ (≤70%, ≤80℃)	○ (≤70%, ≤80℃)	○ (≤70%, ≤250℃)	
Acetylene	○	○	○	○	○	○	Some prohibited materials apply ^{*2}
Phosgene	×	○	○	○	○	○	P/G : PTFE

* 1: For liquids applicable under the Security Regulation for General High-Pressure Gas, usage is restricted to 2.4MPa or less and -5℃~350℃
* 2: See materials whose use is prohibited depending on the type of gas based on the listed standards such as Security Regulation for General High-Pressure Gas.
P/G: Abbreviation of Packing / Gasket

Materials whose use is prohibited depending on the type of gas based on the listed standards such as Security Regulation for General High-Pressure Gas

Name of Gas	Banned materials
Acetylene	Copper, copper alloys with more than 62% copper content, mercury
Ammonia	Copper, copper alloys, zinc, mercury
Dimethylamine	Copper, copper alloys, zinc, mercury
Allylamine	Copper, copper alloys, zinc, mercury
Butadiene	Copper, silver, magnesium, mercury, metals that produce acetylide
Ethylene oxide	Copper, copper alloys, silver, silver alloys, magnesium, magnesium alloys, aluminum alloys, metals that produce acetylide, cast iron, Type 416 and 442 stainless steel, natural rubber, asbestos, mercury
Vinyl chloride	Copper, silver, mercury, magnesium, aluminum, aluminum alloys, metals that produce acetylide
Methyl bromide	Aluminum, aluminum alloys
Methyl chloride	Aluminum, aluminum alloys

Use of Bellows Seal Valve Vacuum Line

- Range of vacuum use for our valves
Table 1 indicates the range of use with vacuum devices for Kuwana Metals' regular valves and bellows seal valves.

Table 1: Range of Use for Kuwana Metals' Vacuum Valves

Valve Type	Range of Use	Allowable Leakage Amount	
		Body	Seat
Standard Regular Valve	~10 ² Pa(abs) (1 Torr)	10 ⁻² Pa m ³ /sec	Metal Seat : 10 ⁻¹ Pa m ³ /sec PTFE Seat : 10 ⁻² Pa m ³ /sec
Regular Valve with Vacuum Specifications	~10 ⁻¹ Pa(abs) (10 ⁻³ Torr)	10 ⁻⁴ Pa m ³ /sec	Metal Seat : 10 ⁻³ Pa m ³ /sec PTFE Seat : 10 ⁻⁴ Pa m ³ /sec
Bellows Seal Valve	~10 ⁻² Pa(abs) (10 ⁻⁴ Torr)	10 ⁻⁷ Pa m ³ /sec	Metal Seat : 10 ⁻⁶ Pa m ³ /sec PTFE Seat : 10 ⁻⁷ Pa m ³ /sec

A vacuum refers to pressure lower than normal atmospheric pressure (1.013 x 10⁵ Pa (abs)). In the vacuum industry, for the sake of convenience pressure levels are divided into the categories shown in Table 2. For your reference, allowable leakage amount for major main vacuum devices is shown in table 3.

Table 2: Vacuum Categories

Classification	Pressure
Low vacuum (Low vacuum)	Vacuum of 10 ² Pa (abs) or greater
Medium vacuum (Medium vacuum)	Vacuum of 10 ² - 10 ⁻¹ Pa (abs)
High vacuum (High vacuum) (HV)	Vacuum of 10 ⁻¹ - 10 ⁻⁵ Pa (abs)
Ultrahigh vacuum (Ultra-high vacuum) (UHV)	Vacuum of 10 ⁻⁵ Pa (abs) or less
Absolute vacuum (absolute vacuum, perfect vacuum)	Vacuum of 0 Pa (abs) (unfeasible)

Table 3: Allowable Leakage Amounts for Main Vacuum Devices

Vacuum Device	Allowable Leakage Amount
Reduced-pressure drying unit	~1 Pa m ³ /sec
Vacuum distillation unit	~10 ⁻² Pa m ³ /sec
Freeze dehydration unit	~10 ⁻³ Pa m ³ /sec
Medium vacuum-level deposition unit	~10 ⁻⁶ Pa m ³ /sec
High vacuum unit	~10 ⁻⁹ Pa m ³ /sec
Ultrahigh vacuum unit	~10 ⁻¹¹ Pa m ³ /sec
Braun tube / vacuum tube	~10 ⁻¹² Pa m ³ /sec

- Vacuum Valve Inspection Methods
There are two main methods to check for leakage in a vacuum valve, the pressurization method and vacuum method. Examples of each are given in Table 4.

Table 4: Inspection Methods and Detection Limits

Testing Method		Detection Limit Leakage Amount
Pressurization Method	Pressure Change Measurement Method	0.1~1 Pa m ³ /sec
	Underwater Foaming Method	10 ⁻⁵ Pa m ³ /sec
	Soap Water Foaming Method	5×10 ⁻⁶ Pa m ³ /sec
	Ammonia Gas Method	10 ⁻⁸ Pa m ³ /sec
	Helium Gas Method	10 ⁻⁸ Pa m ³ /sec
Vacuum Method	Pressure Change Measurement Method	10 ⁻² Pa m ³ /sec
	Geissler Method	10 ⁻⁴ Pa m ³ /sec
	Ionization Vacuum Gauge-based Method	10 ⁻⁸ Pa m ³ /sec
	Helium Method	10 ⁻¹⁰ Pa m ³ /sec

