

## Before use

Please make sure to check the following prohibited items and items to note before use. Using the Bellows Valves under the specification/condition other than below may result in damage of the bellows or serious failure of the valve. If you have any questions, please contact us.



- Do not use the valve in conditions other than those that are within the operating range.
- Do not apply impact pressure of water hammer, etc.
- Be sure to take appropriate measures to ensure that the fluid inside the piping does not freeze.
- Do not use the valve with piping that is subject to significant vibration.
- Do not sharply open and close the valve using a cylinder or other such equipment.
- Do not use the valve in conditions in which it will be subject to excessively frequent open/close operations, such as those produced by electromotive or cylinder means, etc.
- Only attempt to use the valve within the following open/close range: (Globe valves 15-100A: 5,000 times, 125-250A: 3,000 times, Gate valves 15-100A: 3,000 times, 100A-: 1,500 time)
- For transportation of large-diameter valves, lift them with a rope tied to the valve casing or yoke. Never put the rope to the handle. Also, be sure not to let the valve fall over the handle and hit it hard. Otherwise, the valve shaft may be bent and open/close operations may be disabled.
- Use a supplementary handle etc. to avoid applying excessive torque. Otherwise, it may result in valve damages such as valve shaft being bent.
- Do not use the valve for corrosive fluid. The following are typical corrosive fluids that are unusable. (hydrochloric acid, nitric acid, dilute sulfuric acid, acetic acid, formic acid, ammonium persulfate, aluminum chloride, etc.)



- When using with high viscosity fluids or fluids that harden at low temperatures, take appropriate measures such as warming the bellows so that the fluid does not adhere to it.
- To keep foreign objects from entering the valve, do not remove the seal on the flange face until the valve is piped.
- Store the valve indoors with little moisture and dust. Do not store it in open air.
- Do not disassemble or replace parts.
- Conform the flow direction to the arrow on the valve casing.
- Tightening the valve suddenly hard in closing the valve fully may catch foreign objects on the seat face and result in leakage from the seat.
- When closing the handle, tighten the valve lightly and then open it slightly to let the foreign objects blown off.
- If the valve is used with extremely small opening, the high-speed fluid may crash the seat part or the valve casing and an erosion (mechanical corrosion) may occur.
- Frequent use of the valve requires periodic greasing to avoid slip of trapezoidal thread of the valve shaft.



The specifications and performance values of the product described in this catalog are for general operating conditions and are to be used for reference purposes when selecting the appropriate model. Hitachi Valve assures no responsibility for any property damage or injuries caused by use of the products outside the described specifications. The content of this catalog is subject to change or revision without notice. Note that this material supersedes any information contained in previous catalog.

Agent

**Hitachi Valve, Ltd.**

<http://www.hitachi-valve.co.jp/>

[Obtained ISO9001 & ISO 14001 certifications]

|                       |                                      |                  |
|-----------------------|--------------------------------------|------------------|
| <b>Tokyo branch</b>   | TEL 03-5524-3661~3                   | FAX 03-5524-3665 |
| Niigata sales branch  | TEL 025-241-5421 (in Hitachi Metals) | FAX 025-243-2558 |
| Hokkaido sales branch | TEL 011-221-1786 (in Hitachi Metals) | FAX 011-222-4273 |
| <b>Chubu branch</b>   | TEL 052-220-7478 (in Hitachi Metals) | FAX 052-220-7488 |
| Tokai sales branch    | TEL 054-202-1585 (in Hitachi Metals) | FAX 054-202-1588 |
| Hokuriku sales branch | TEL 076-420-2881 (in Hitachi Metals) | FAX 076-491-5201 |
| <b>Kansai branch</b>  | TEL 06-6203-9707 (in Hitachi Metals) | FAX 06-6203-2209 |
| Chugoku sales branch  | TEL 082-221-4486 (in Hitachi Metals) | FAX 082-221-4499 |
| Kyushu sales branch   | TEL 092-432-8608 (in Hitachi Metals) | FAX 092-451-2495 |

EBLV1①3



**Environmentally-friendly**  
Contribute to energy saving & cost reduction

Gourd Brand

# Bellows Seal Valves

**MALL® Bellows Seal Valves**

**Stainless Steel Bellows Seal Valves**

**Forged Steel Bellows Seal Valves**

**Cast Steel Bellows Seal Valves**



**Hitachi Valve, Ltd.**

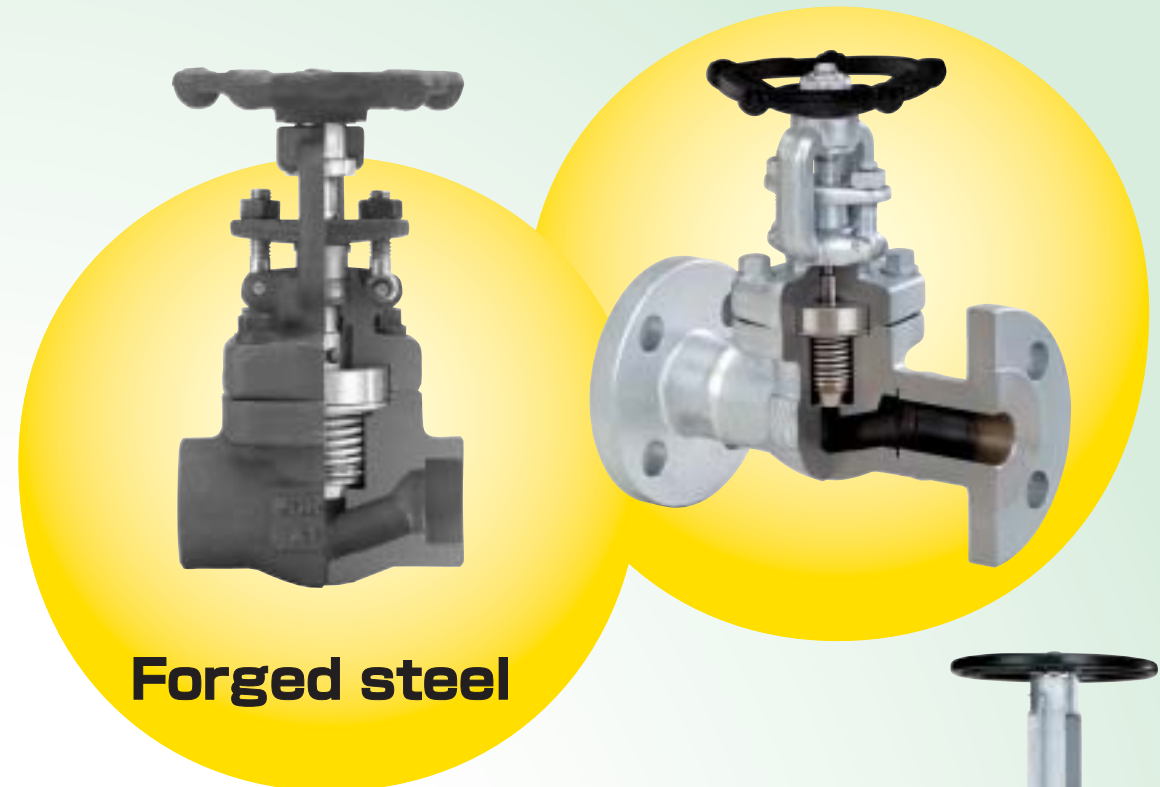
◆ **Zero emission:** Environmentally-friendly

- Contribute to energy conservation by no leakage of vapor or heat medium.
- Block out leakage of general gas, bad-smelling gas, erosion gas, etc.

◆ **Non-asbestos** valve clears up environmental issues

◆ **No maintenance:** No need to replace gland packing

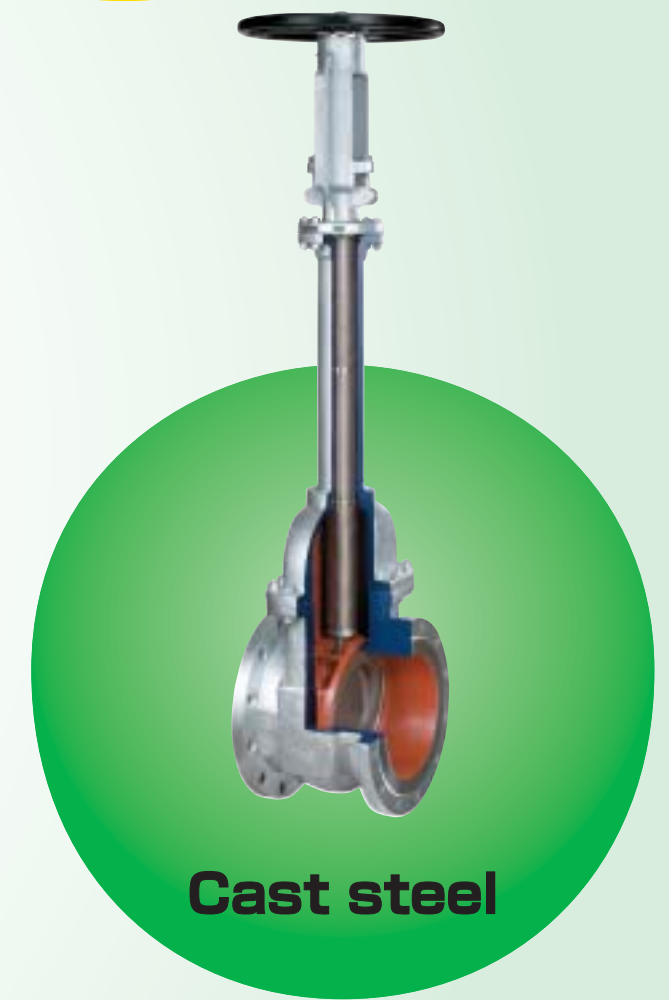
◆ **Economical:** Our Bellows Seal Valves are economical in total



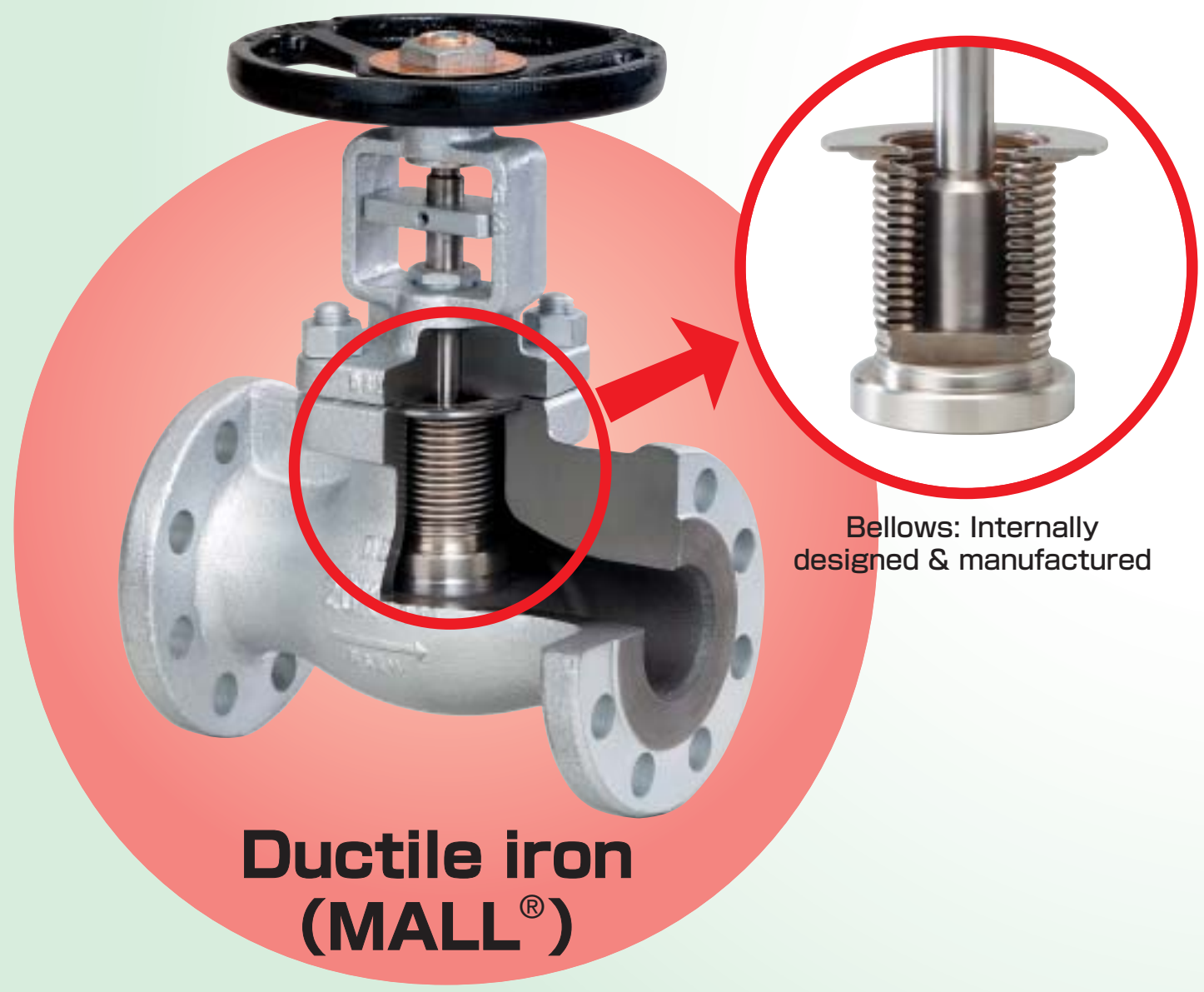
**Forged steel**



**Stainless steel**



**Cast steel**



Bellows: Internally designed & manufactured

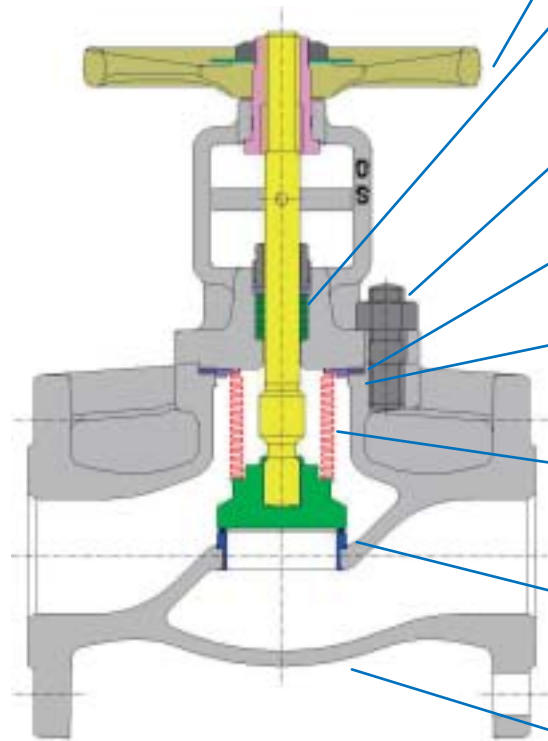
**Ductile iron (MALL®)**

**Use of Bellows Valves**

| Field                  | Applicable plant  | Applicable fluid  |
|------------------------|---|---|
| Petrochemical industry | Various textile plants (terephthalic acid), synthetic rubber plant, petroleum refinery  | Vapor, ammonia, chlorine gas, hydrogen, Dowtherm                              |
| Electronics industry   | Semiconductor manufacturing plant, silicon manufacturing plant  | Vapor, carrier air, carrier gas, waste gas, phosgene, hydrogen cyanide, argon |
| General industry       | Utilities for steelmaking plant, papermaking plant and pharmaceutical plant<br>Utilities for waste incineration plant, district cooling and heating plant and hospitals | Vapor, heat medium  |
| Vacuum industry        | Various vacuum systems  | Inert gas   |

## Basic structure

Globe valve



### OS&Y structure (excludes SUS 50A and smaller)

Prevents bellows from twisting by nonrotational valve shaft and lifting handle method.

### Gland packing

Prevents external leakage when bellows are damaged  
MV, cast/forged steel: Expanded graphite packing  
SUS: Reinforced PTFE+PTFE packing

### Bolted bonnet type

Easy maintenance and control  
Bolt fastening structure ensures sufficient fastening power

### Cover gasket

Expanded graphite sheet  
Prevents external leakage when bellows are damaged

### Joint part gasket

High quality gasket seal material prevents external leakage  
MV, cast/forged steel: Expanded graphite gasket  
SUS: Reinforced PTFE gasket

### Bellows

Hydroformed multilayer bellows  
Uses SUS316L, which has excellent pressure- and corrosion-resistant characteristics

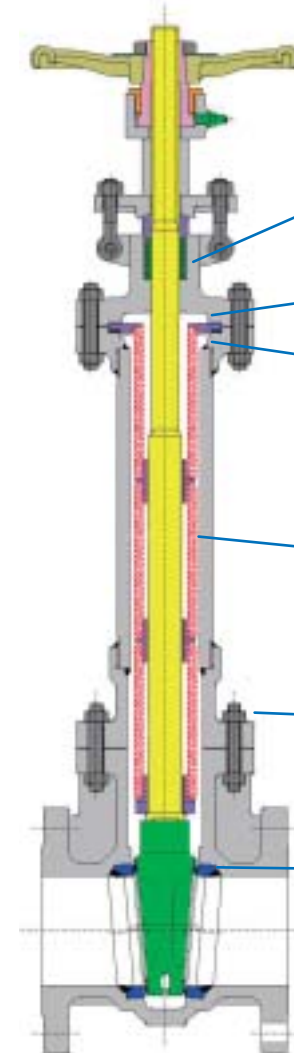
### Seat

Intrusion- and wear-resistant HF mirror finish for both sides  
(SUS valve optional)

### Valve casing

Corresponds to ductile (FCD-S), Stainless steel (SCS13A, SCS14A), cast steel (ASTM A216-WCB) and forged steel (ASTM A105)

Gate valve



### OS&Y structure (excludes SUS 50A and smaller)

Prevents bellows from twisting by nonrotational valve shaft and lifting handle method.

### Gland packing

Prevents external leakage when bellows are damaged  
Cast/forged steel: Expanded graphite packing  
SUS: Reinforced PTFE+PTFE packing

### Cover gasket

Expanded graphite sheet  
Prevents external leakage when bellows are damaged

### Joint part gasket

High quality gasket seal material prevents external leakage  
Cast/forged steel: Expanded graphite gasket  
SUS: Reinforced PTFE gasket

### Bellows

Hydroformed multilayer bellows  
Uses SUS316L, which has excellent pressure- and corrosion-resistant characteristics

### Bolted bonnet type

Easy maintenance and control  
Bolt fastening structure ensures sufficient fastening power

### Seat

Intrusion- and wear-resistant HF mirror finish for both sides  
(SUS valve optional)

### Valve casing

Corresponds to Stainless steel (SCS13A, SCS14A), cast steel (ASTM A216-WCB) and forged steel (ASTM A105)

## Features of Bellows Valves

### General features of Bellows Valves

#### 1. No leakage from gland

The bellows blocks out leakage from the gland.

#### 2. Effective for energy-saving effect

No energy loss due to leakage contributes to prevention of global warming and protection of environment.

#### 3. Effective for subtle leakage prevention

The bellows ensure  $6.5 \times 10^{-6} \text{mm}^3/\text{sec}$  or less leakage based on the He Leak test, which is effective for subtle leakage from the gland.  
(MSS SP-117:  $10^{-3} \text{mm}^3/\text{sec}$  or less)

#### 4. Positive effects in bad-smelling/safety measures

Perfect for safety measures against inflammable fluid, toxic fluid, and bad-smelling fluid

#### 5. Easy maintenance

No need to fully tighten the gland packing periodically, which reduces maintenance cost

#### 6. Continuous fluid quality

Complete sealing of valve shaft and gland part with the bellows allows no contact with the fluid inside the tube and no contamination of fluid by grease etc.

### Features of our Bellows Valves

#### 1. Adoption of self-manufactured bellows

All our bellows valves have adopted hydroformed multilayer bellows designed and manufactured in-house, and have cleared the bellows life required by MSS SP-117.

#### 2. Fine finish seat

Two-sided stellite-welded seat which is excellent in wear- and intrusion-resistance is provided as standard specification. (SUS valve optional)  
Surface roughness of the seat is fine-finished to 0.5S or lower for prevention of internal leakage.

#### 3. Best for vacuum application

Vacuum of  $10^{-2} \text{Pa}$  ( $10^{-4} \text{Torr}$ ) is easily attained compared to the conventional gland packing method.

#### 4. Non-asbestos

Graphoil packing and gasket which contain non-asbestos and are excellent in sealing characteristics, high-temperature characteristics and corrosion resistance were adopted.

#### 5. Easy replacement

Face-to-face and end-to-end dimensions of the valves conform to JIS B2002 and ANSI B16.10, allowing easy replacement of the valve with general valves.

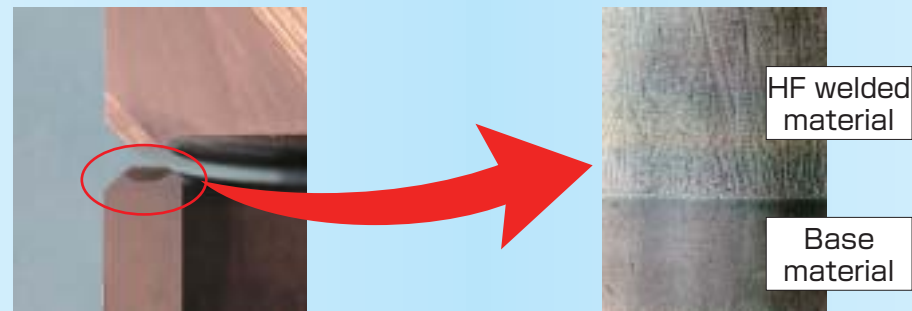
#### 6. Rich assortment

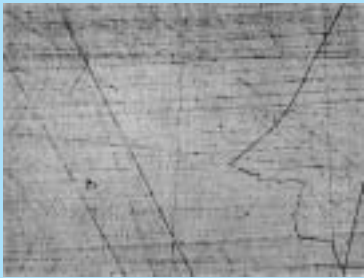
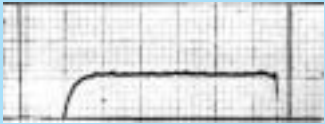
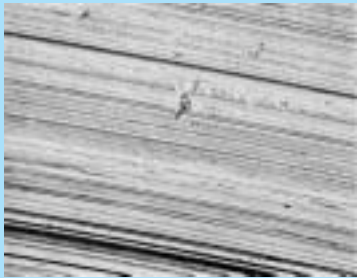
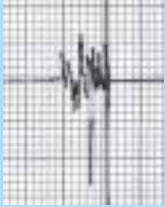
Our cast steel, forged steel and stainless steel valves are made based on the Malleable Bellows Valves having more than a dozen years of performance.

#### 7. Economic efficiency

The bellows valves are more economical than general valves in terms of energy loss due to leakage, which is fairly large, and the maintenance cost.

## Seat surface treatment



| Our mirror-finished seat surface  | Turning-finished seat surface  |
|---|--|
|  <p>(×100 times)</p>  <p>(×10,000)<br/>Surface roughness:<br/>0.5S or below</p> |  <p>(×100 times)</p>  <p>(×2,000)<br/>Surface roughness:<br/>2-5S</p> |

## Quality

The test and inspection items of bellows valves vary according to the models and the use conditions. The general inspections in Table 1 are performed voluntarily for all products. We also correspond to your request for special inspection and inspections not listed on Table 1 by consultation/instruction made at an order placement.

Table 1: Shipping inspection items of bellows valves

| Class                                  | Test/Inspection items  | Application   | Applied specification/standard   |
|--|------------------------|---|--|
| General inspection                     | Material inspection    | Check of material<br>Verification with and submission of Inspection Certificate | Material specifications such as JIS and ASTM   |
|  | Appearance inspection  | Check of inner & outer surface condition, indications, etc.                     | JIS B2003  |
|  | Dimensional inspection | Check of face-to-face, joint and mating parts, etc.                             |  |
|  | Pressure inspection    | Check with 1.5 times larger pressure than maximum allowable working pressure    | JIS 2003   |
|  | Air tightness test     | Check with 1.1 times larger pressure than maximum allowable working pressure    |  |
|  | Valve seat leak test   | Check with 1.1 times larger pressure than maximum allowable working pressure    |  |
|  | Functional inspection  | Check of assembly condition, operation performance, etc.                        | Internal standard  |
| Bellows stand-alone leakage inspection | He leak test           | Internal standard   |  |
| Special inspection                     | Radiograph examination | Cast body, welded part, groove part, etc.                                       | JIS G0581, Z3104, 6, Ordinance by Ministry of International Trade and Industry, etc. |
|  | Dye penetrant test     | Welded part, groove part, etc.  | JIS G0581, Z2343, Ordinance by Ministry of International Trade and Industry, etc.    |
|  | He leak test           | A test for high vacuum valves   | Internal standard  |

## Production facilities

The production process of our bellows valves is as follows.

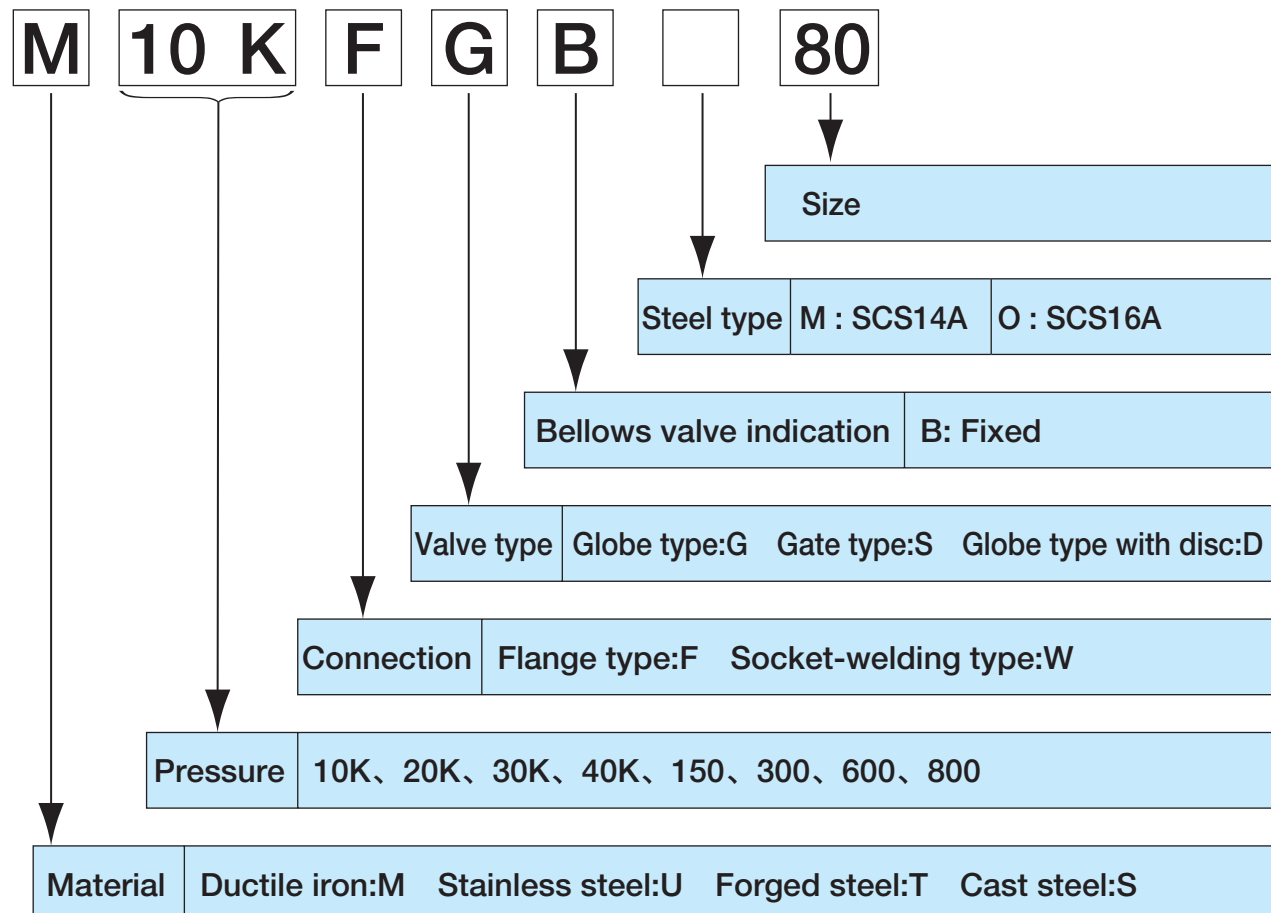


**Production items**

**MALL® Bellow Seal Valves**  
**Stainless Steel Bellow Seal Valves**  
**Forged Steel Bellow Seal Valves**  
**Cast Steel Bellow Seal Valves**

**Product code**

**Example**



**Product list of Bellows Seal Valves**

| Material  | Pressure    | Connection     | Valve type      | Valve seat structure | Product code | 10 <sup>A</sup>  | 15  | 20  | 25 | 32    | 40    | 50 | 65    | 80 | 100 | 125 | 150 | 200 | 250 | 300 | Pg. |    |    |    |
|---|-------------|----------------|-----------------|----------------------|--------------|------------------|-----|-----|----|-------|-------|----|-------|----|-----|-----|-----|-----|-----|-----|-----|----|----|----|
| Ductile iron (FCD-S)                              | 10K         | Flange type    | Globe           | Stellite             | M10KFGB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | 11  |    |    |    |
|   | 20K         | Flange type    | Globe           | Stellite             | M20KFGB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 13 |    |    |
|   | 150lb       | Flange type    | Globe           | Stellite             | M150FGB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 11 |    |    |
|   | 300lb       | Flange type    | Globe           | Stellite             | M300FGB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 13 |    |    |
|   | 10K         | Flange type    | Globe           | Soft                 | M10KFDB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 12 |    |    |
|   | 20K         | Flange type    | Globe           | Soft                 | M20KFDB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 14 |    |    |
|   | 150lb       | Flange type    | Globe           | Soft                 | M150FDB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 12 |    |    |
|   | 300lb       | Flange type    | Globe           | Soft                 | M300FDB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 14 |    |    |
| Stainless steel (13A)                             | 10K         | Flange type    | Globe           | Stainless steel      | U10FGB       | ○                | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 17 |    |    |
|   | 150lb       | Flange type    | Globe           | Stainless steel      | U150FGB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 17 |    |    |
|   | 10K         | Flange type    | Globe           | Soft                 | U10FDB       | ○                | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 19 |    |    |
|   | 150lb       | Flange type    | Globe           | Soft                 | U150FDB      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 19 |    |    |
|   | 10K         | Flange type    | Gate            | Stainless steel      | U10FSB       |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ●   | ●  | 18 |    |
| 150lb   | Flange type | Gate           | Stainless steel | U150FSB              |              | ○                | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ●   | ●  | 18 |    |
| Stainless steel (14A)                             | 10K         | Flange type    | Globe           | Stainless steel      | U10FGBM      | ○                | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 17 |    |
|   | 150lb       | Flange type    | Globe           | Stainless steel      | U150FGBM     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 17 |    |
|   | 10K         | Flange type    | Globe           | Soft                 | U10FDBM      | ○                | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 19 |    |
|   | 150lb       | Flange type    | Globe           | Soft                 | U150FDBM     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 19 |    |
|   | 10K         | Flange type    | Gate            | Stainless steel      | U10FSBM      |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ●  | ●  | 18 |
|   | 150lb       | Flange type    | Gate            | Stainless steel      | U150FSBM     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | ●  | ●  |
|   | Pressure    | Connection     | Valve type      | Valve seat structure | Product code | 3/8 <sup>B</sup> | 1/2 | 3/4 | 1  | 1 1/4 | 1 1/2 | 2  | 2 1/2 | 3  | 4   | 5   | 6   | 8   | 10  | 12  | Pg. |    |    |    |
| Forged steel (A105) (reduced port <sup>**</sup> ) | 800lb       | Socket welding | Globe           | Stellite             | T800WGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 21 |    |    |
|   | 10K         | Flange type    | Globe           | Stellite             | T10FGBL1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 22 |    |    |
|   | 20K         | Flange type    | Globe           | Stellite             | T20KFGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 22 |    |    |
|   | 30K         | Flange type    | Globe           | Stellite             | T30KFGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 22 |    |
|   | 40K         | Flange type    | Globe           | Stellite             | T40KFGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 22 |    |
|   | 150lb       | Flange type    | Globe           | Stellite             | T150FGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 22 |    |
|   | 300lb       | Flange type    | Globe           | Stellite             | T300FGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 22 |    |
|   | 600lb       | Flange type    | Globe           | Stellite             | T600FGB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 22 |    |
|   | 800lb       | Socket welding | Gate            | Stellite             | T800WSB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 23 |    |
|   | 10K         | Flange type    | Gate            | Stellite             | T10KFBS1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 24 |    |
|   | 20K         | Flange type    | Gate            | Stellite             | T20KFBS1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 24 |    |
|   | 30K         | Flange type    | Gate            | Stellite             | T30KFBS1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 24 |    |
|   | 40K         | Flange type    | Gate            | Stellite             | T40KFBS1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 24 |    |
|   | 150lb       | Flange type    | Gate            | Stellite             | T150FSB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 24 |    |
|   | 300lb       | Flange type    | Gate            | Stellite             | T300FSB1     |                  | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | ○  | 24 |    |
| 600lb   | Flange type | Gate           | Stellite        | T600FSB1             |              | ○                | ○   | ○   | ○  | ○     | ○     | ○  | ○     | ○  | ○   | ○   | ○   | ○   | ○   | ○   | ○   | 24 |    |    |

※Please contact us for manufacturing of full port.

| Material         | Pressure | Connection  | Valve type | Valve seat structure | Product code | 1 1/2 <sup>B</sup> | 2 | 2 1/2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | Pg. |    |    |
|------------------|----------|-------------|------------|----------------------|--------------|--------------------|---|-------|---|---|---|---|---|----|----|----|----|----|----|----|-----|----|----|
| Cast steel (WCB) | 10K      | Flange type | Globe      | Stellite             | S10KFGB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | 27 |    |
|                  | 20K      | Flange type | Globe      | Stellite             | S20KFGB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 28 |
|                  | 30K      | Flange type | Globe      | Stellite             | S30KFGB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 28 |
|                  | 150lb    | Flange type | Globe      | Stellite             | S150FGB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 27 |
|                  | 300lb    | Flange type | Globe      | Stellite             | S300FGB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 28 |
|                  | 10K      | Flange type | Gate       | Stellite             | S10KFBS      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 29 |
|                  | 20K      | Flange type | Gate       | Stellite             | S20KFBS      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 30 |
|                  | 30K      | Flange type | Gate       | Stellite             | S30KFBS      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 30 |
|                  | 150lb    | Flange type | Gate       | Stellite             | S150FSB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 29 |
|                  | 300lb    | Flange type | Gate       | Stellite             | S300FSB      |                    | ○ | ○     | ○ | ○ | ○ | ○ | ○ | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○   | ○  | 30 |

Please contact us for products with ●

# MALL<sup>®</sup> Bellows Valve

## Metal seat (Stellite seat)

- 10K MALL<sup>®</sup> flange-type bellows seal globe valve M10KFGB
- 20K MALL<sup>®</sup> flange-type bellows seal globe valve M20KFGB
- 150lb MALL<sup>®</sup> flange-type bellows seal globe valve M150FGB
- 300lb MALL<sup>®</sup> flange-type bellows seal globe valve M300FGB

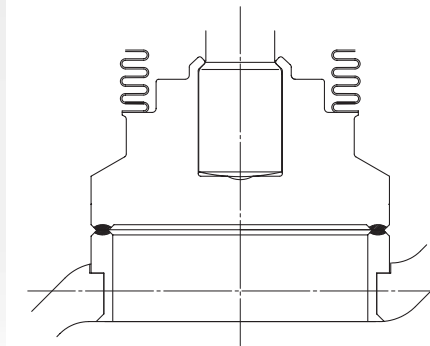
## Soft seat

- 10K MALL<sup>®</sup> flange-type bellows seal globe valve M10KFDB
- 20K MALL<sup>®</sup> flange-type bellows seal globe valve M20KFDB
- 150lb MALL<sup>®</sup> flange-type bellows seal globe valve M150FDB
- 300lb MALL<sup>®</sup> flange-type bellows seal globe valve M300FDB

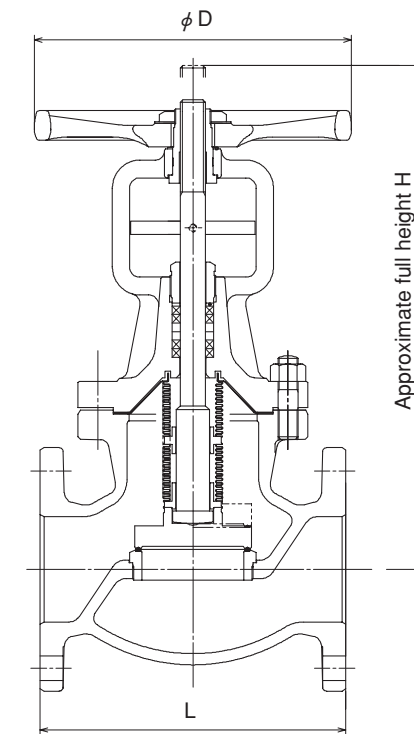
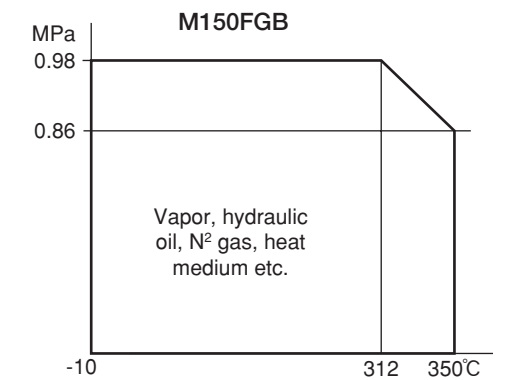
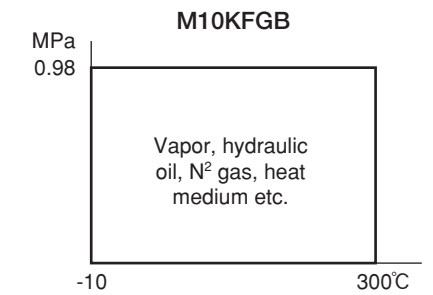
For MALL<sup>®</sup> bellows seal globe valve 10K (150lb)

10K flange-type bellows seal globe valve (stellite seat) Brevity code: M10KFGB

150lb flange-type bellows seal globe valve (stellite seat) Brevity code: M150FGB



Seat view



### Major components

| Part name      | Material       | Remarks          |
|----------------|----------------|------------------|
| Body           | FCD-S          |                  |
| Bonnet         | FCD-S          |                  |
| Stem           | SUS403         |                  |
| Body seat ring | SUS403         | Hard facing      |
| Disc           | SUS304         | Hard facing      |
| Bellows        | SUS316L        |                  |
| Hand wheel     | FCMB370        | Painted in black |
| Upper gasket   | SUS304+Grafoil | H1215            |
| Lower gasket   | SUS304+Grafoil | H1215            |
| Packing        | SUS304+Grafoil | H350+H2200       |

### Inspection pressure

| Part      | 10K / 150lb            |
|-----------|------------------------|
| Body      | Water pressure 1.47MPa |
| Body seat | Water pressure 1.08MPa |

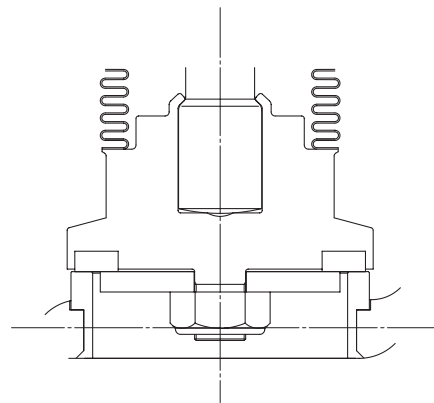
### Size list M10KFGB·M150FGB

| Nominal diameter (A) | 15  | 20  | 25  | 32  | 40  | 50  | 65  | 80  | 100 | 125 | 150 | 200 | 250 |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L                    | 108 | 117 | 127 | 140 | 165 | 203 | 216 | 241 | 292 | 356 | 406 | 495 | 622 |
| H                    | 181 | 190 | 195 | 208 | 241 | 251 | 312 | 381 | 398 | 493 | 560 | 714 | 872 |
| D                    | 100 | 100 | 120 | 120 | 160 | 180 | 224 | 250 | 300 | 355 | 400 | 450 | 560 |

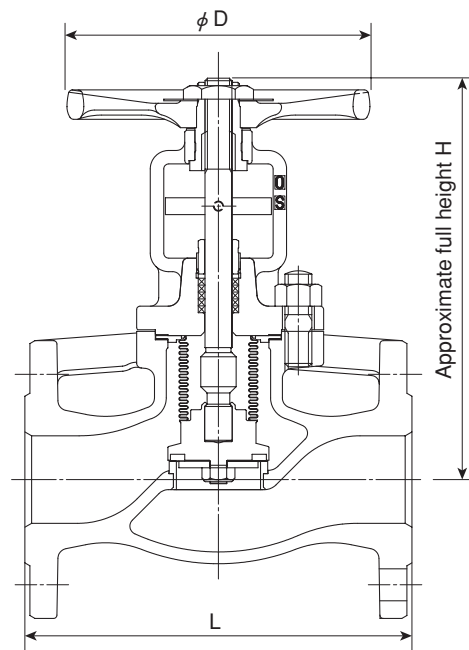
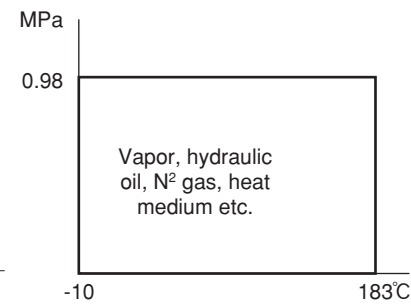
## For MALL<sup>®</sup> bellows seal globe valve 10K (150lb)

10K flange-type bellows seal globe valve (Soft seat)  
150lb flange-type bellows seal globe valve (Soft seat)

Brevity code: M10KFDB  
Brevity code: M150FDB



Seat view



### Major components

| Part name      | Material                    | Remarks          |
|----------------|-----------------------------|------------------|
| Body           | FCD-S                       |                  |
| Bonnet         | FCD-S                       |                  |
| Stem           | SUS403                      |                  |
| Body seat ring | SUS403                      |                  |
| Disc seat      | PTFE reinforced with filler |                  |
| Disc           | SUS304                      |                  |
| Bellows        | SUS316L                     |                  |
| Hand wheel     | FCMB370                     | Painted in black |
| Upper gasket   | SUS304+Grafoil              | H1215            |
| Lower gasket   | SUS304+Grafoil              | H1215            |
| Packing        | SUS304+Grafoil              | H350+H2200       |

### Inspection pressure

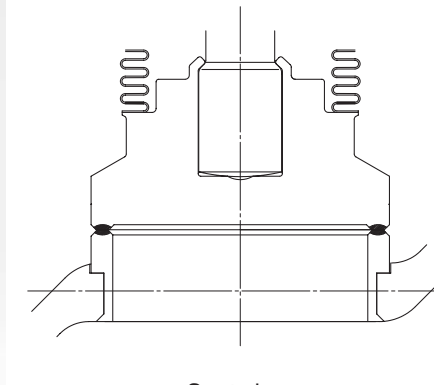
| Part      | 10K / 150lb            |
|-----------|------------------------|
| Body      | Water pressure 1.47MPa |
| Body seat | Water pressure 1.08MPa |

### Size list M10KFDB•M150FDB

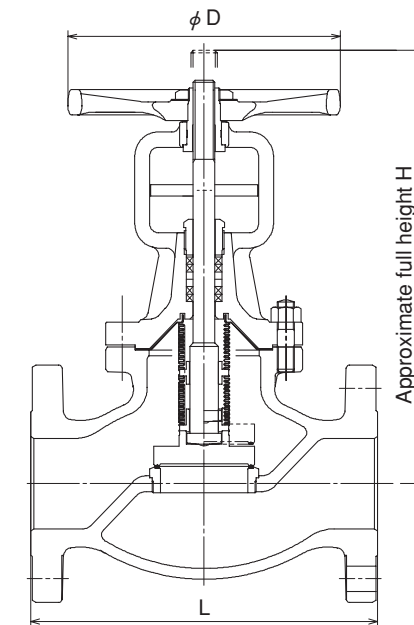
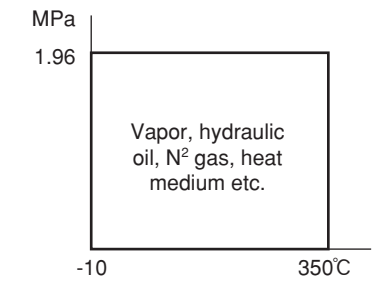
| Nominal diameter (A) | 15  | 20  | 25  | 32  | 40  | 50  | 65  | 80  | 100 | 125 | 150 | 200 | 250 |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L                    | 108 | 117 | 127 | 140 | 165 | 203 | 216 | 241 | 292 | 356 | 406 | 495 | 622 |
| H                    | 181 | 190 | 195 | 208 | 241 | 251 | 312 | 381 | 398 | 493 | 560 | 714 | 872 |
| D                    | 100 | 100 | 120 | 120 | 160 | 180 | 224 | 250 | 300 | 355 | 400 | 450 | 560 |

## For MALL<sup>®</sup> bellows seal globe valve 20K (300lb)

20K flange-type bellows seal globe valve (stellite seat) Brevity code: M20KFGB  
300lb flange-type bellows seal globe valve (stellite seat) Brevity code: M300FGB



Seat view



### Major components

| Part name      | Material       | Remarks          |
|----------------|----------------|------------------|
| Body           | FCD-S          |                  |
| Bonnet         | FCD-S          |                  |
| Stem           | SUS403         |                  |
| Body seat ring | SUS403         | Hard facing      |
| Disc           | SUS304         | Hard facing      |
| Bellows        | SUS316L        |                  |
| Hand wheel     | FCMB370        | Painted in black |
| Upper gasket   | SUS304+Grafoil | H1215            |
| Lower gasket   | SUS304+Grafoil | H1215            |
| Packing        | SUS304+Grafoil | H350+H2200       |

### Inspection pressure

| Part      | 20K / 300lb            |
|-----------|------------------------|
| Body      | Water pressure 2.94MPa |
| Body seat | Water pressure 2.16MPa |

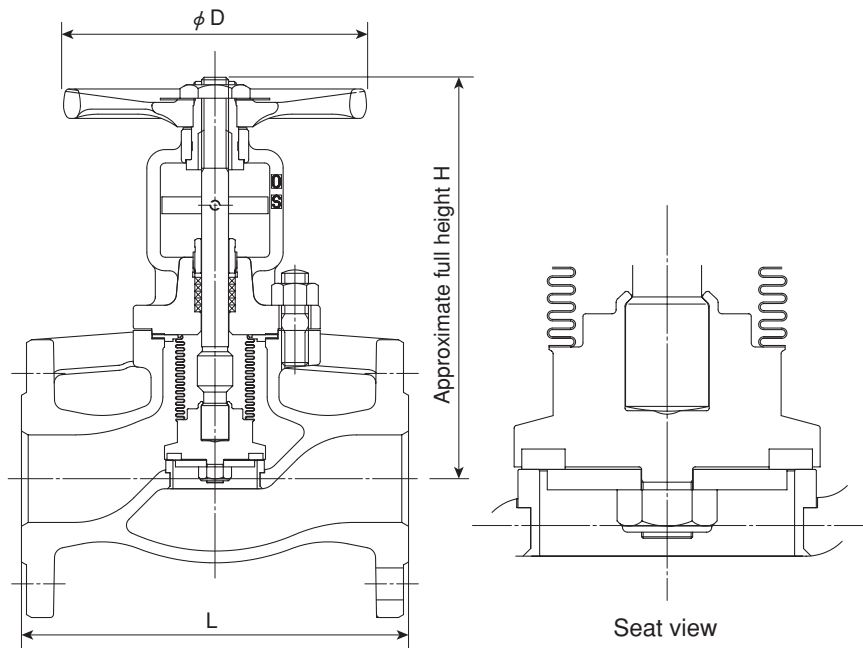
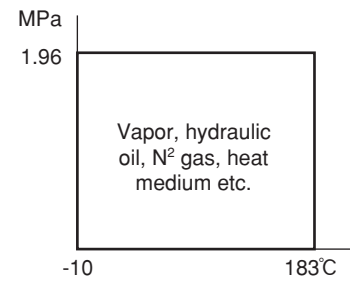
### Size list M20KFGB•M300FGB

| Nominal diameter (A) | 15  | 20  | 25  | 32  | 40  | 50  | 65  | 80  | 100 | 125 | 150 | 200 | 250 |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L                    | 110 | 120 | 130 | 160 | 180 | 230 | 292 | 318 | 356 | 400 | 444 | 559 | 622 |
| H                    | 181 | 190 | 195 | 208 | 241 | 251 | 312 | 381 | 398 | 493 | 560 | 714 | 872 |
| D                    | 100 | 100 | 120 | 120 | 160 | 180 | 224 | 250 | 300 | 355 | 400 | 450 | 560 |

# For MALL<sup>®</sup> bellows seal globe valve 20K (300lb)

20K flange-type bellows seal globe valve (Soft seat)  
 300lb flange-type bellows seal globe valve (Soft seat)

Brevity code: M20KFDB  
 Brevity code: M300FDB



### Major components

| Part name      | Material                    | Remarks          |
|----------------|-----------------------------|------------------|
| Body           | FCD-S                       |                  |
| Bonnet         | FCD-S                       |                  |
| Stem           | SUS403                      |                  |
| Body seat ring | SUS403                      |                  |
| Disc seat      | PTFE reinforced with filler |                  |
| Disc           | SUS304                      |                  |
| Bellows        | SUS316L                     |                  |
| Hand wheel     | FCMB370                     | Painted in black |
| Upper gasket   | SUS304+Grafoil              | H1215            |
| Lower gasket   | SUS304+Grafoil              | H1215            |
| Packing        | SUS304+Grafoil              | H350+H2200       |

### Inspection pressure

| Part      | 20K / 300lb            |
|-----------|------------------------|
| Body      | Water pressure 2.94MPa |
| Body seat | Water pressure 2.16MPa |

### Size list M20KFDB•M300FDB

| Nominal diameter (A) | 15  | 20  | 25  | 32  | 40  | 50  | 65  | 80  | 100 | 125 | 150 | 200 | 250 |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L                    | 110 | 120 | 130 | 160 | 180 | 230 | 292 | 318 | 356 | 400 | 444 | 559 | 622 |
| H                    | 181 | 190 | 195 | 208 | 241 | 251 | 312 | 381 | 398 | 493 | 560 | 714 | 872 |
| D                    | 100 | 100 | 120 | 120 | 160 | 180 | 224 | 250 | 300 | 355 | 400 | 450 | 560 |

# MEMO



# Stainless Steel Bellows Valve

## Metal seat (Stainless)

- 10K Stainless (13A) steel flange-type bellows seal globe valve U10FGB
- 150lb Stainless (13A) steel flange-type bellows seal globe valve U150FGB
  
- 10K Stainless (13A) steel flange-type bellows seal gate valve U10FSB
- 150lb Stainless (13A) steel flange-type bellows seal gate valve U150FSB
  
- 10K Stainless (14A) steel flange-type bellows seal globe valve U10FGBM
- 150lb Stainless (14A) steel flange-type bellows seal globe valve U150FGBM
  
- 10K Stainless (14A) steel flange-type bellows seal gate valve U10FSBM
- 150lb Stainless (14A) steel flange-type bellows seal gate valve U150FSBM

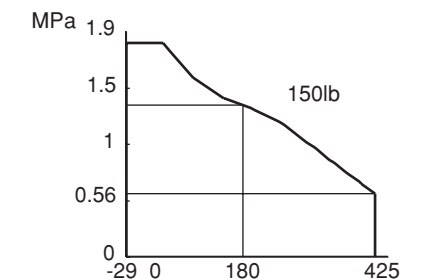
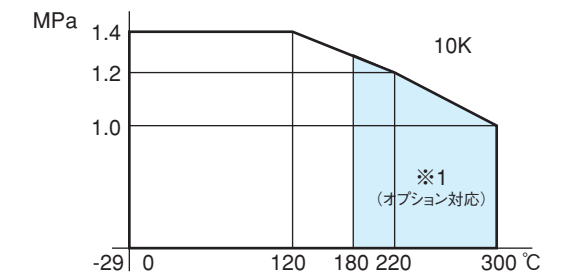
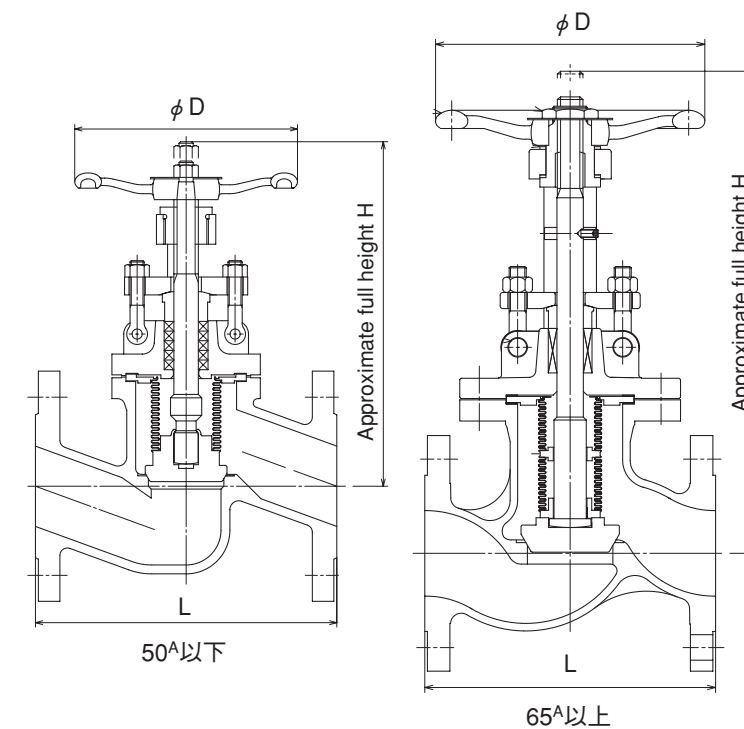
## Soft seat

- 10K Stainless (13A) steel flange-type bellows seal globe valve U10FDB
- 150lb Stainless (13A) steel flange-type bellows seal globe valve U150FDB
  
- 10K Stainless (14A) steel flange-type bellows seal globe valve U10FDBM
- 150lb Stainless (14A) steel flange-type bellows seal globe valve U150FDBM

## For stainless steel bellows seal globe valve 10K (150lb)

10K flange-type bellows seal globe valve (stainless seat)  
150lb flange-type bellows seal globe valve (stainless seat)

Brevity code U10FGB (M)  
Brevity code U150FGB (M)



### Major components

| Part name    | Material                         |                     | Remarks                        |
|--------------|----------------------------------|---------------------|--------------------------------|
| Product code | U10FGB<br>U150FGB                | U10FGBM<br>U150FGBM |                                |
| Body         | SCS13A                           | SCS14A              |                                |
| Bonnet       | SCS13A                           |                     |                                |
| Stem         | SUS304                           |                     |                                |
| Disc         | SUS304                           | SUS316              |                                |
| Bellows      | SUS316L                          |                     |                                |
| Hand wheel   | FCMB340                          |                     | Painted in black               |
| Upper gasket | SUS304+Grafoil                   |                     | H1215                          |
| Lower gasket | PTFE reinforced with filler      |                     | ※1 H1215 (SUS304+Grafoil)      |
| Packing      | PTFE reinforced with filler+PTFE |                     | ※1 H350+H2200 (SUS304+Grafoil) |

※1 When working temperature exceeds 180°C.

### Inspection pressure

| Part      | 10K                    | 150lb                  |
|-----------|------------------------|------------------------|
| Body      | Water pressure 2.06MPa | Water pressure 2.85MPa |
| Body seat | Water pressure 1.51MPa | Water pressure 2.09MPa |

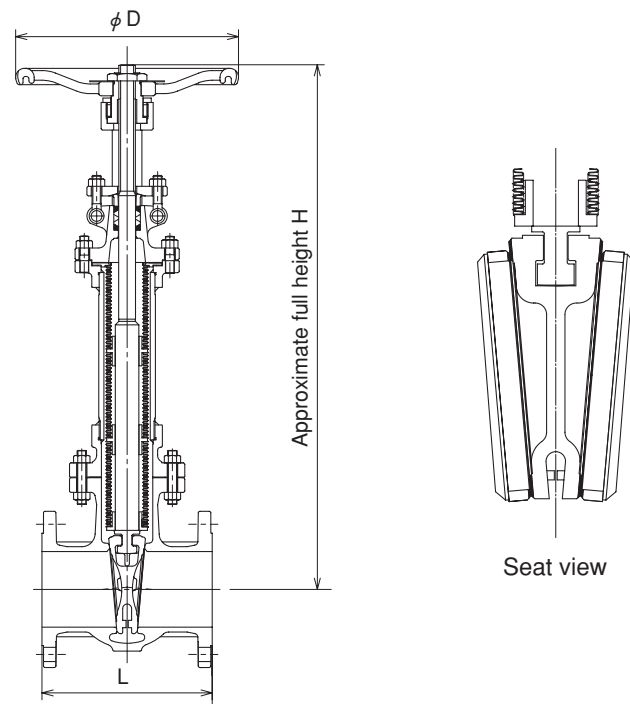
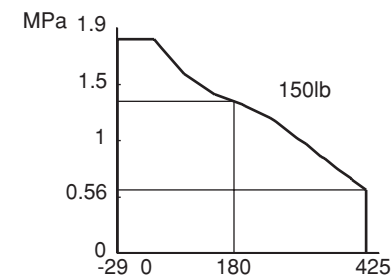
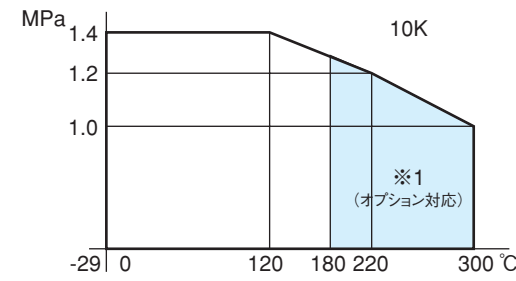
### Size list U10FGB・U150FGB

| 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 | 171 | 215 | 220 | 232 | 358 | 395 | 428 | 506 | 520 | 634 |
| D                    | 100 | 100 | 100 | 100 | 150 | 150 | 150 | 200 | 300 | 300 | 350 | 350 | 450 |

# For stainless steel bellows seal gate valve 10K (150lb)

10K flange-type bellows seal gate valve (stainless seat)  
150lb flange-type bellows seal gate valve (stainless seat)

Brevity code U10FSB (M)  
Brevity code U150FSB (M)



### Major components

| Part name     | Material                           | Remarks                        |
|---------------|------------------------------------|--------------------------------|
| Product code  | U10FGB U10FGBM<br>U150FGB U150FGBM |                                |
| Body          | SCS13A SCS14A                      |                                |
| Bonnet        | SCS13A                             |                                |
| Stem          | SUS304                             |                                |
| Disc          | SUS304 SUS316                      |                                |
| Bellows       | SUS316L                            |                                |
| Hand wheel    | FCMB340                            | Painted in black               |
| Upper gasket  | SUS304+Grafoil                     | H1215                          |
| Lower gasket  | PTFE reinforced with filler PTFE   | ※1 H1215 (SUS304+Grafoil)      |
| Bonnet gasket | PTFE reinforced with filler PTFE   | ※1 H1215 (SUS304+Grafoil)      |
| Packing       | PTFE reinforced with filler+PTFE   | ※1 H350+H2200 (SUS304+Grafoil) |

※1 When working temperature exceeds 180°C.

### Inspection pressure

| Part      | 10K                    | 150lb                  |
|-----------|------------------------|------------------------|
| Body      | Water pressure 2.06MPa | Water pressure 2.85MPa |
| Body seat | Water pressure 1.51MPa | Water pressure 2.09MPa |

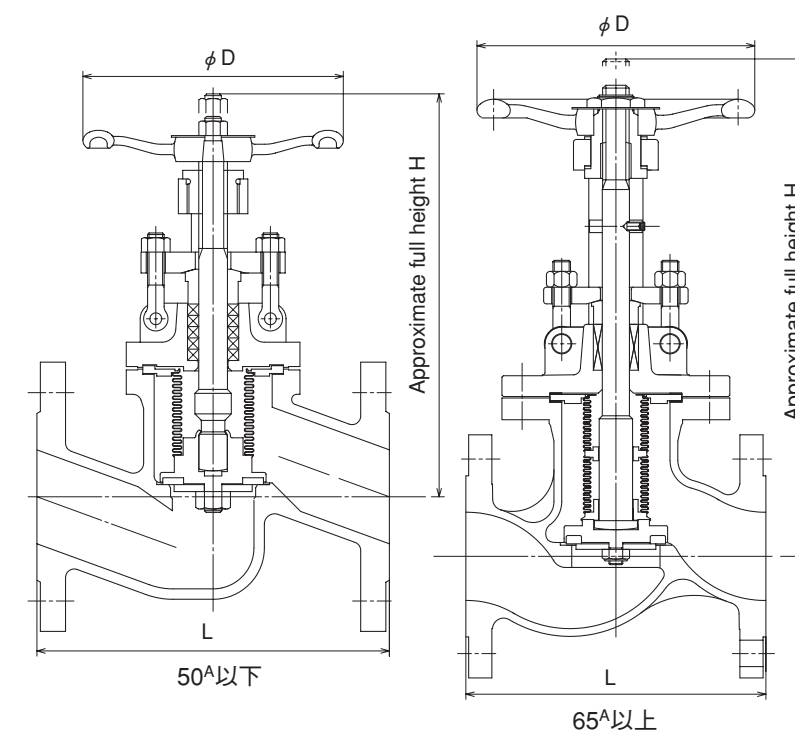
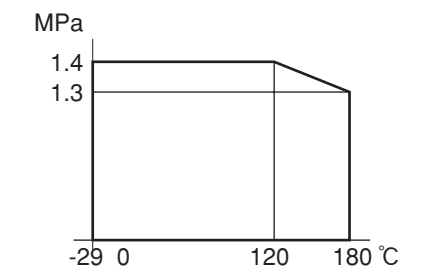
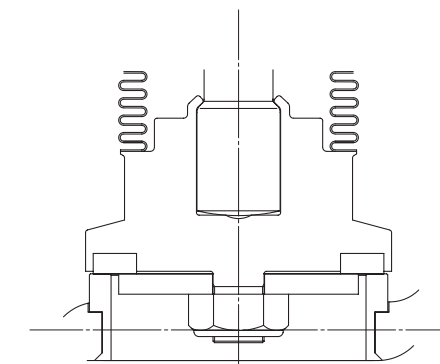
### Size list U10KFSB・U150FSB

| 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                    | 316 | 340 | 379 | 421 | 447 | 523 | 616 | 700 | 820 | 1000 | 1110 | 1418 |
| D                    | 100 | 100 | 170 | 170 | 170 | 170 | 200 | 200 | 300 | 300  | 300  | 350  |

# For stainless steel bellows seal globe valve 10K (150lb)

10K flange-type bellows seal globe valve (soft seat)  
150lb flange-type bellows seal globe valve (soft seat)

Brevity code U10FDB (M)  
Brevity code U150FDB (M)



### Major components

| Part name    | Material                           | Remarks          |
|--------------|------------------------------------|------------------|
| Product code | U10FGB U10FGBM<br>U150FGB U150FGBM |                  |
| Body         | SCS13A SCS14A                      |                  |
| Bonnet       | SCS13A                             |                  |
| Stem         | SUS304                             |                  |
| Disc seat    | PTFE reinforced with filler        |                  |
| Disc         | SUS304 SUS316                      |                  |
| Bellows      | SUS316L                            | Painted in black |
| Hand wheel   | FCMB340                            |                  |
| Upper gasket | SUS304+Grafoil                     | H1215            |
| Lower gasket | PTFE reinforced with filler        |                  |
| Packing      | PTFE reinforced with filler+PTFE   |                  |

### Inspection pressure

| Part      | 10K                    | 150lb                  |
|-----------|------------------------|------------------------|
| Body      | Water pressure 2.06MPa | Water pressure 2.85MPa |
| Body seat | Water pressure 1.51MPa | Water pressure 2.09MPa |

### Size list U10FDB・U150FDB

| 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 | 171 | 215 | 220 | 232 | 358 | 395 | 428 | 506 | 520 | 634 |
| D                    | 100 | 100 | 100 | 100 | 150 | 150 | 150 | 200 | 300 | 300 | 350 | 350 | 450 |

# Forged Steel Bellows Valve

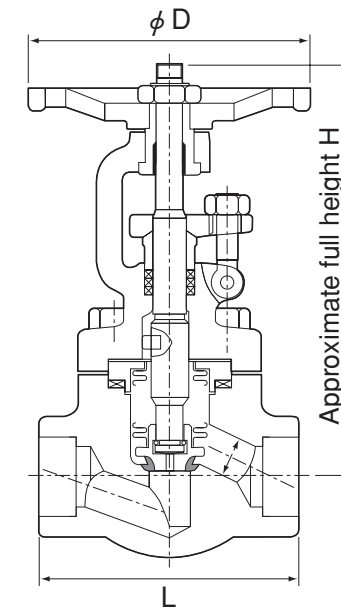
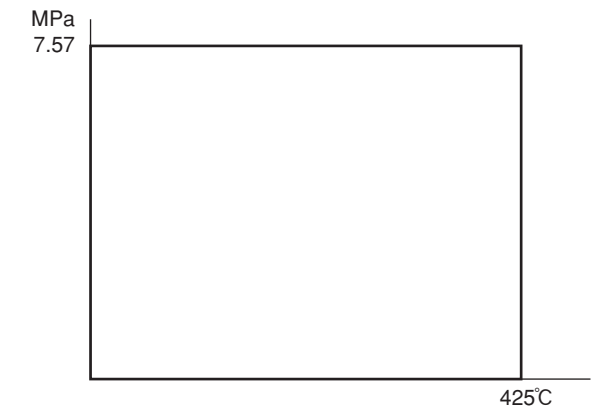
## Metal seat (Stellite seat)

- 800Lb forged steel socket weld ends-type bellows seal globe valve T800WGB1
- 10K forged steel flange-type bellows seal globe valve T10FGBL1
- 20K forged steel flange-type bellows seal globe valve T20KFGB1
- 30K forged steel flange-type bellows seal globe valve T30KFGB1
- 40K forged steel flange-type bellows seal globe valve T40KFGB1
- 150Lb forged steel socket weld ends-type bellows seal globe valve T150FGB1
- 300Lb forged steel socket weld ends-type bellows seal globe valve T300FGB1
- 600Lb forged steel socket weld ends-type bellows seal globe valve T600FGB1
- 800Lb forged steel socket weld ends-type bellows seal gate valve T800WSB1
- 10K forged steel socket weld ends-type bellows seal gate valve T10KFSB1
- 20K forged steel socket weld ends-type bellows seal gate valve T20KFSB1
- 30K forged steel socket weld ends-type bellows seal gate valve T30KFSB1
- 40K forged steel socket weld ends-type bellows seal gate valve T40KFSB1
- 150Lb forged steel socket weld ends-type bellows seal gate valve T150FSB1
- 300Lb forged steel socket weld ends-type bellows seal gate valve T300FSB1
- 600Lb forged steel socket weld ends-type bellows seal gate valve T600FSB1

## For forged steel bellows seal globe valve 800lb

800lb socket weld ends-type bellows seal globe valve (stainless seat)

Brevity code T800WGB1



### Major components

| Part name    | Material       | Remarks           |
|--------------|----------------|-------------------|
| Body         | A105           | HF                |
| Bonnet       | A105           |                   |
| Stem         | A276-410       |                   |
| Disc         | A276-304       | HF                |
| Bellows      | A240-316L      |                   |
| Hand wheel   | A47            |                   |
| Lower gasket | SUS304+Grafoil | V/#6590           |
| Upper gasket | SUS304         | V/#500            |
| Bonnet bolt  | A193GrB7       |                   |
| Packing      | Grafoil        | V/#VF-20L+V/#6267 |

### Inspection pressure MPa

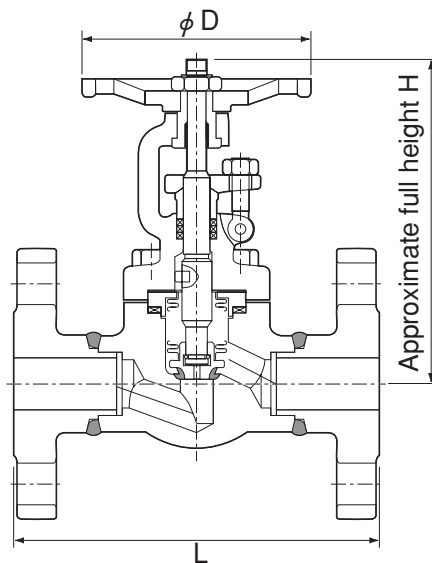
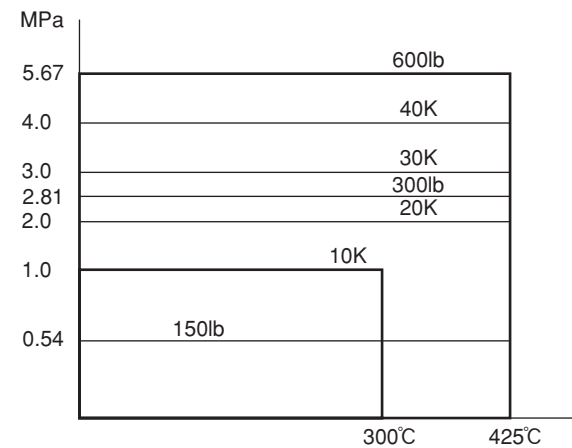
| Pressure  | Withstand pressure of valve casing (water pressure) | Seat leakage (water pressure) | Tightness leak test (air pressure) |
|-----------|---|-------------------------------|------------------------------------|
| 8 0 0 l b | 10.00   | 10.00                         | (0.59)                             |

### Size list 800lb mm

| Nominal diameter (B) | 1/2 | 3/4 | 1   | 1 1/2 | 2   |
|----------------------|-----|-----|-----|-------|-----|
| L                    | 79  | 92  | 111 | 152   | 172 |
| H                    | 146 | 146 | 177 | 216   | 253 |
| D                    | 100 | 100 | 125 | 160   | 180 |

## For forged steel bellows seal globe valve (10K·20K·30K·40K) (150lb·300lb·600lb)

|  |                       |
|--|-----------------------|
| 10K frange-type bellows seal globe valve (stellite seat)   | Brevity code T10FGBL1 |
| 20K frange-type bellows seal globe valve (stellite seat)   | Brevity code T20KFGB1 |
| 30K frange-type bellows seal globe valve (stellite seat)   | Brevity code T30KFGB1 |
| 40K frange-type bellows seal globe valve (stellite seat)   | Brevity code T40KFGB1 |
|  |                       |
| 150lb frange-type bellows seal globe valve (stellite seat) | Brevity code T150FGB1 |
| 300lb frange-type bellows seal globe valve (stellite seat) | Brevity code T300FGB1 |
| 600lb frange-type bellows seal globe valve (stellite seat) | Brevity code T600FGB1 |



### Major components

| Part name    | Material       | Remarks           |
|--------------|----------------|-------------------|
| Body         | A105           | HF                |
| Bonnet       | A105           |                   |
| Stem         | A276-410       |                   |
| Disc         | A276-304       | HF                |
| Bellows      | A240-316L      |                   |
| Hand wheel   | A47            |                   |
| Lower gasket | SUS304+Grafoil | V/#6590           |
| Upper gasket | SUS304         | V/#500            |
| Bonnet bolt  | A193GrB7       | A193GrB7          |
| Packing      | Grafoil        | V/#VF-20L+V/#6267 |

### Size list 150lb·300lb mm

| Nominal diameter (B) | 1/2 | 3/4 | 1   | 1 1/2 | 2   |
|----------------------|-----|-----|-----|-------|-----|
| L                    | 152 | 178 | 203 | 229   | 267 |
| H                    | 146 | 146 | 177 | 216   | 253 |
| D                    | 100 | 100 | 125 | 160   | 180 |

### Size list 40K·600lb mm

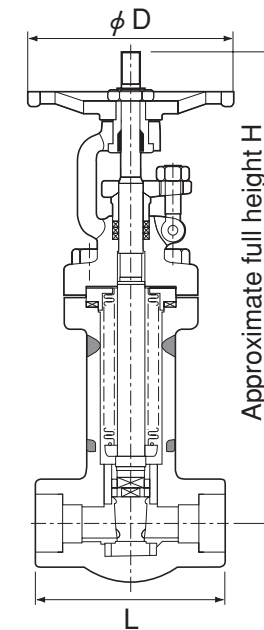
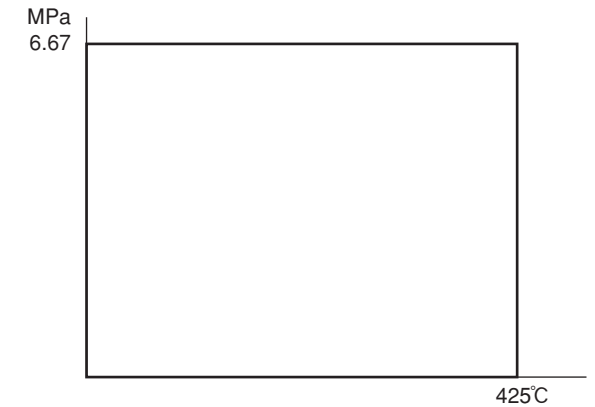
| Nominal diameter (B) | 1/2 | 3/4 | 1   | 1 1/2 | 2   |
|----------------------|-----|-----|-----|-------|-----|
| L                    | 165 | 190 | 216 | 241   | 292 |
| H                    | 146 | 146 | 177 | 216   | 253 |
| D                    | 100 | 100 | 125 | 160   | 180 |

### Inspection pressure MPa

| Pressure    | Withstand pressure of valve casing (water pressure) | Seat leakage (water pressure) | Tightness leak test (air pressure) |
|-------------|---|-------------------------------|------------------------------------|
| 8 0 0 l b   | 10.00   | 10.00                         | (0.59)                             |
| J I S 1 0 K | 2.06  | 1.51                          | (0.59)                             |
| J I S 2 0 K | 5.00  | 3.67                          | (0.59)                             |
| J I S 3 0 K | 7.50  | 5.50                          | (0.59)                             |
| J I S 4 0 K | 10.00   | 7.34                          | (0.59)                             |
| 1 5 0 l b   | 3.10  | 2.16                          | (0.59)                             |
| 3 0 0 l b   | 7.76  | 5.61                          | (0.59)                             |
| 6 0 0 l b   | 10.00   | 10.00                         | (0.59)                             |

## For forged steel bellows seal gate valve 800lb

800lb socket weld ends-type bellows seal gate valve (stellite seat)  
Brevity code T800WSB1



### Major components

| Part name      | Material       | Remarks           |
|----------------|----------------|-------------------|
| Body           | A105           |                   |
| Body seat ring | A276-410       | HF                |
| Stem           | A276-410       | HF                |
| Disc           | A217-CA15      |                   |
| Bellows        | A240-316L      |                   |
| Bonnet         | A105           |                   |
| Lower gasket   | SUS304+Grafoil | V/#6590           |
| Upper gasket   | SUS304         | V/#500            |
| Bonnet bolt    | A193GrB7       | A193Gr B7         |
| Packing        | Grafoil        | V/#VF-20L+V/#6267 |
| Hand wheel     | A47            |                   |

### Inspection pressure MPa

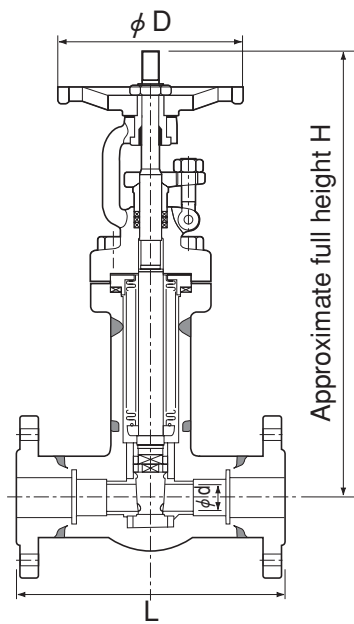
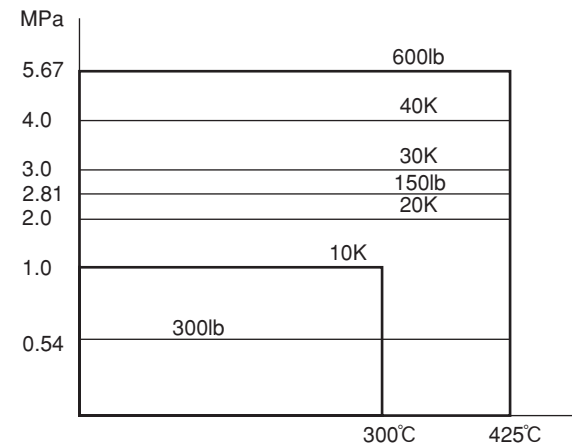
| Pressure  | Withstand pressure of valve casing (water pressure) | Seat leakage (water pressure) | Tightness leak test (air pressure) |
|-----------|---|-------------------------------|------------------------------------|
| 8 0 0 l b | 10.00   | 10.00                         | (0.59)                             |

### Size list 800lb mm

| Nominal diameter (B) | 1/2 | 3/4 | 1   | 1 1/2 | 2   |
|----------------------|-----|-----|-----|-------|-----|
| L                    | 79  | 92  | 111 | 120   | 140 |
| H                    | 228 | 228 | 286 | 384   | 456 |
| D                    | 100 | 100 | 125 | 160   | 180 |

# For forged steel bellows seal gate valve (10K·20K·30K·40K) (150lb·300lb·600lb)

|   |                       |
|---|-----------------------|
| 10K frange-type bellows seal gate valve (stellite seat)   | Brevity code T10KFSB1 |
| 20K frange-type bellows seal gate valve (stellite seat)   | Brevity code T20KFSB1 |
| 30K frange-type bellows seal gate valve (stellite seat)   | Brevity code T30KFSB1 |
| 40K frange-type bellows seal gate valve (stellite seat)   | Brevity code T40KFSB1 |
| <hr/>   |                       |
| 150lb frange-type bellows seal gate valve (stellite seat) | Brevity code T150FSB1 |
| 300lb frange-type bellows seal gate valve (stellite seat) | Brevity code T300FSB1 |
| 600lb frange-type bellows seal gate valve (stellite seat) | Brevity code T600FSB1 |



### Major components

| Part name    | Material       | Remarks           |
|--------------|----------------|-------------------|
| Body         | A105           |                   |
| Body seat    | A276-410       | HF                |
| Stem         | A276-410       | HF                |
| Disc         | A217-CA15      |                   |
| Bellows      | A240-316L      |                   |
| Bonnet       | A105           |                   |
| Lower gasket | SUS304+Grafoil | V/#6590           |
| Upper gasket | SUS304         | V/#500            |
| Bonnet bolt  | A193GrB7       | A193Gr B7         |
| Packing      | Grafoil        | V/#VF-20L+V/#6267 |
| Hand wheel   | A47            |                   |

### Size list 150lb·300lb mm

| Nominal diameter (B) | 1/2 | 3/4 | 1   | 1 1/2 | 2   |
|----------------------|-----|-----|-----|-------|-----|
| L                    | 140 | 152 | 165 | 190   | 216 |
| H                    | 228 | 228 | 286 | 384   | 456 |
| D                    | 100 | 100 | 125 | 160   | 180 |

### Size list 40K·600lb mm

| Nominal diameter (B) | 1/2 | 3/4 | 1   | 1 1/2 | 2   |
|----------------------|-----|-----|-----|-------|-----|
| L                    | 165 | 190 | 216 | 241   | 292 |
| H                    | 228 | 228 | 286 | 384   | 456 |
| D                    | 100 | 100 | 125 | 160   | 180 |

### Inspection pressure MPa

| Pressure    | Withstand pressure of valve casing (water pressure) | Seat leakage (water pressure) | Tightness leak test (air pressure) |
|-------------|---|-------------------------------|------------------------------------|
| 8 0 0 l b   | 20.51   | 14.98                         | (0.59)                             |
| J I S 1 0 K | 2.06  | 1.51                          | (0.59)                             |
| J I S 2 0 K | 5.00  | 3.67                          | (0.59)                             |
| J I S 3 0 K | 7.50  | 5.50                          | (0.59)                             |
| J I S 4 0 K | 10.00   | 7.34                          | (0.59)                             |
| 1 5 0 l b   | 3.10  | 2.16                          | (0.59)                             |
| 3 0 0 l b   | 7.76  | 5.61                          | (0.59)                             |
| 6 0 0 l b   | 15.34   | 11.22                         | (0.59)                             |

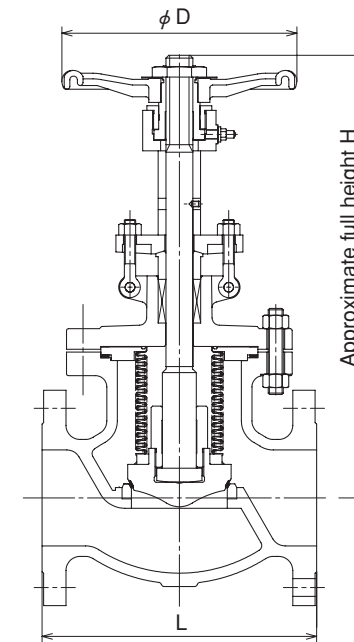
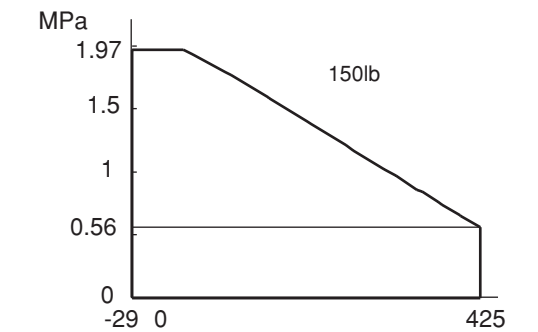
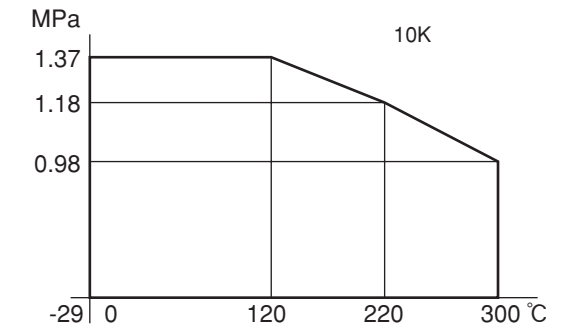
# Cast Steel Bellows Valve

## Metal seat (Stellite seat)

- 10K cast steel flange-type bellows seal globe valve S10KFGB
- 20K cast steel flange-type bellows seal globe valve S20KFGB
- 30 cast steel flange-type bellows seal globe valve S30KFGB
- S150 cast steel flange-type bellows seal globe valve S150FGB
- S300 cast steel flange-type bellows seal globe valve S300FGB
  
- 10K cast steel flange-type bellows seal gate valve S10KFGB
- 20K cast steel flange-type bellows seal gate valve S20KFGB
- 30K cast steel flange-type bellows seal gate valve S30KFGB
- 150lb cast steel flange-type bellows seal gate valve S150FGB
- 300lb cast steel flange-type bellows seal gate valve S300FGB

## For cast steel bellows seal globe valve 10K (150lb)

10K flange-type bellows seal globe valve (stellite seat) Brevity code S10KFGB  
 150lb flange-type bellows seal globe valve (stellite seat) Brevity code S150FGB



### Major components

| Part name      | Material              | Remarks          |
|----------------|-----------------------|------------------|
| Body           | A216-WCB              |                  |
| Bonnet         | A216-WCB              |                  |
| Stem           | A276-410              |                  |
| Body seat ring | A105                  | Hard facing      |
| Disc           | A276-CA15             | Hard facing      |
| Bellows        | SUS316L               |                  |
| Hand wheel     | DUCTILE               | Painted in black |
| Upper gasket   | SUS304+Grafoil        | H1215            |
| Lower gasket   | SUS316+Grafoil        | H1806GR          |
| Packing        | Inconel alloy+Grafoil | H500+H2200       |

### Inspection pressure

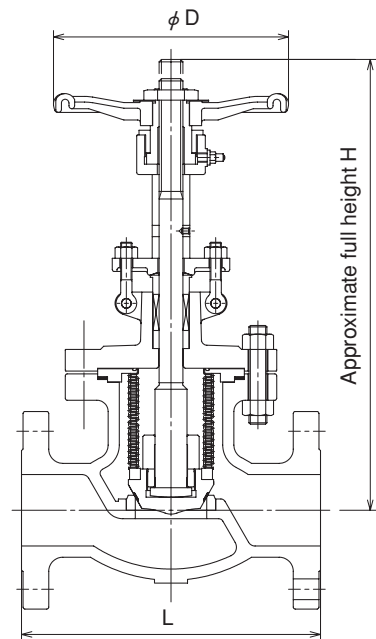
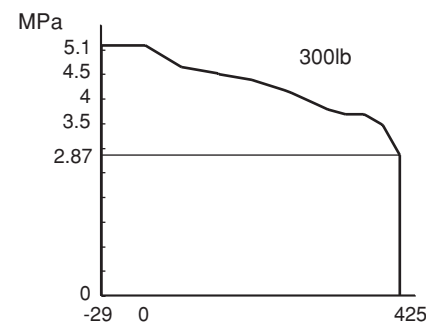
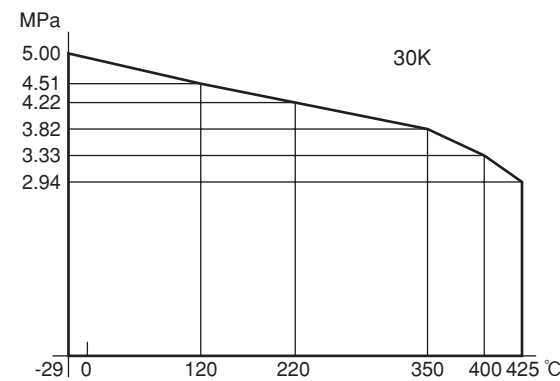
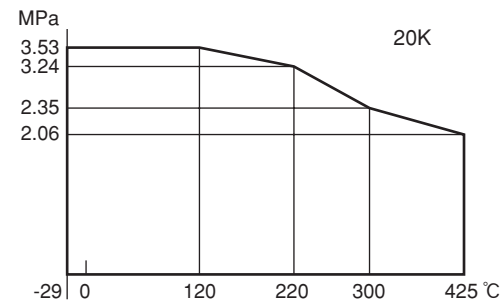
| Part      | 10K                    | 150lb                  |
|-----------|------------------------|------------------------|
| Body      | Water pressure 2.06MPa | Water pressure 3.10MPa |
| Body seat | Water pressure 1.51MPa | Water pressure 2.16MPa |

### Size list S10KFGB•S150FGB

| Nominal diameter (B) | 2   | 2½  | 3   | 4   | 5   | 6   | 8   | 10  | 12  |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L                    | 203 | 216 | 241 | 292 | 356 | 406 | 495 | 622 | 698 |
| H                    | 368 | 417 | 448 | 496 | 516 | 550 | 679 | 850 | 945 |
| D                    | 200 | 250 | 250 | 250 | 300 | 350 | 500 | 600 | 600 |

## For cast steel bellows seal globe valve 20K·30K (300lb)

20K frange-type bellows seal globe valve (stellite seat) Brevity code S20KFGB  
 30K frange-type bellows seal globe valve (stellite seat) Brevity code S30KFGB  
 300lb frange-type bellows seal globe valve (stellite seat) Brevity code S300FGB



### Major components

| Part name      | Material              | Remarks          |
|----------------|-----------------------|------------------|
| Body           | A216-WCB              |                  |
| Bonnet         | A216-WCB              |                  |
| Stem           | A276-410              |                  |
| Body seat ring | A105                  | Hard facing      |
| Disc           | A217-CA15             | Hard facing      |
| Bellows        | SUS316L               |                  |
| Hand wheel     | DUCTILE               | Painted in black |
| Upper gasket   | SUS304+Grafoil        | H1215            |
| Lower gasket   | SUS316+Grafoil        | H1806GR          |
| Packing        | Inconel alloy+Grafoil | H500+H2200       |

### Inspection pressure

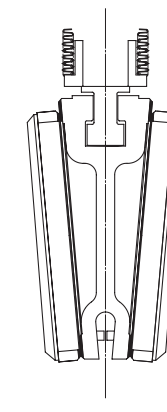
| Part      | 20K                    | 30K                    | 300lb                  |
|-----------|------------------------|------------------------|------------------------|
| Body      | Water pressure 5.78MPa | Water pressure 7.55MPa | Water pressure 7.76MPa |
| Body seat | Water pressure 3.92MPa | Water pressure 5.58MPa | Water pressure 5.61MPa |

### Size list S20KFGB·S30KFGB·S300FGB

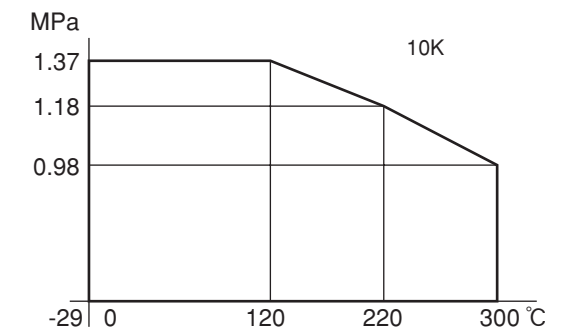
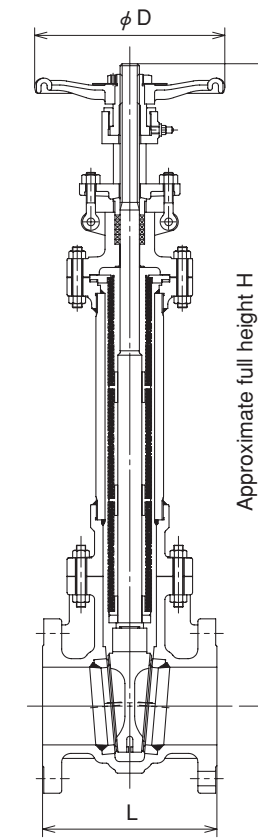
| Nominal diameter (B) | 2   | 2½  | 3   | 4   | 5   | 6   | 8   | 10   | 12   |
|----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|
| L                    | 267 | 292 | 318 | 356 | 400 | 444 | 559 | 622  | 711  |
| H                    | 427 | 486 | 509 | 579 | 599 | 804 | 968 | 1090 | 1249 |
| D                    | 200 | 250 | 250 | 350 | 350 | 450 | 600 | 600  | 700  |

## For cast steel bellows seal gate valve 10K (150lb)

10K frange-type bellows seal gate valve (stellite seat) Brevity code S10KFGB  
 150lb frange-type bellows seal gate valve (stellite seat) Brevity code S150FGB



シート図



### Major components

| Part name      | Material              | Remarks          |
|----------------|-----------------------|------------------|
| Body           | A216-WCB              |                  |
| Bonnet         | A216-WCB              |                  |
| Stem           | A276-410              |                  |
| Body seat ring | A105                  | Hard facing      |
| Disc           | A216-WCB              | Hard facing      |
| Bellows        | SUS316L               |                  |
| Hand wheel     | DUCTILE               | Painted in black |
| Upper gasket   | SUS304+Grafoil        | H1215            |
| Lower gasket   | SUS316+Grafoil        | H1806GR          |
| Bonnet gasket  | SUS304+Grafoil        | H1215            |
| Packing        | Inconel alloy+Grafoil | H500+H2200       |

### Inspection pressure

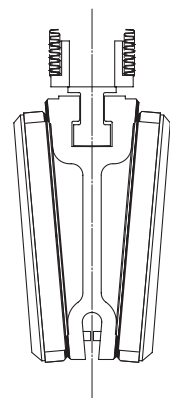
| Part      | 10K                    | 150lb                  |
|-----------|------------------------|------------------------|
| Body      | Water pressure 2.06MPa | Water pressure 3.10MPa |
| Body seat | Water pressure 2.16MPa | Water pressure 2.16MPa |

### Size list S10KFGB·S150FGB

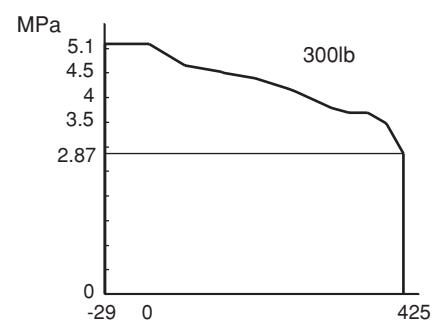
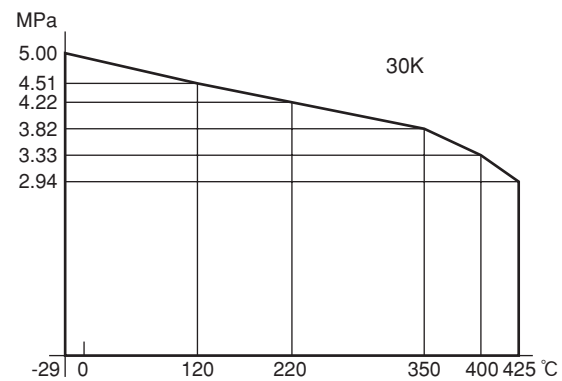
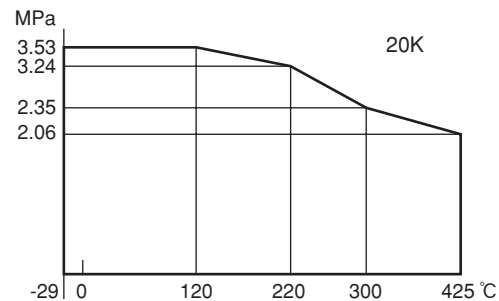
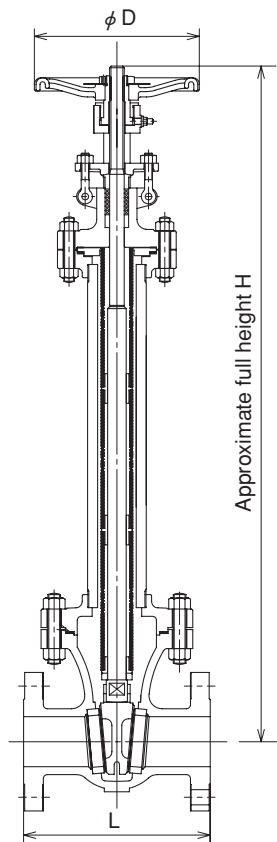
| Nominal diameter (B) | 2   | 2½  | 3   | 4   | 5   | 6    | 8    | 10   | 12   |
|----------------------|-----|-----|-----|-----|-----|------|------|------|------|
| L                    | 178 | 190 | 203 | 229 | 254 | 267  | 292  | 330  | 356  |
| H                    | 646 | 795 | 833 | 959 | 998 | 1127 | 1420 | 1735 | 2041 |
| D                    | 200 | 200 | 250 | 250 | 300 | 300  | 350  | 450  | 500  |

# For cast steel bellows seal gate valve (10K·30K·300lb)

20K frange-type bellows seal gate valve (stellite seat) Brevity code S20KFSB  
 30K frange-type bellows seal gate valve (stellite seat) Brevity code S30KFSB  
 300lb frange-type bellows seal gate valve (stellite seat) Brevity code S300FSB



Seat view



### Major components

| Part name      | Material              | Remarks          |
|----------------|-----------------------|------------------|
| Body           | A216-WCB              |                  |
| Bonnet         | A216-WCB              |                  |
| Stem           | A276-410              |                  |
| Body seat ring | A105                  | Hard facing      |
| Disc           | A216-WCB              | Hard facing      |
| Bellows        | SUS316L               |                  |
| Hand wheel     | DUCTILE               | Painted in black |
| Upper gasket   | SUS304+Grafoil        | H1215            |
| Lower gasket   | SUS316+Grafoil        | H1806GR          |
| Bonnet gasket  | SUS304+Grafoil        | H1806GR          |
| Packing        | Inconel alloy+Grafoil | H500+H2200       |

### Inspection pressure

| Part      | 20K                    | 30K                    | 300lb                  |
|-----------|------------------------|------------------------|------------------------|
| Body      | Water pressure 5.78MPa | Water pressure 7.55MPa | Water pressure 7.76MPa |
| Body seat | Water pressure 3.92MPa | Water pressure 5.58MPa | Water pressure 5.61MPa |

### Size list S20KFSB·S30KFSB·S300FSB

| Nominal diameter (A) | 2   | 2½  | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
|----------------------|-----|-----|------|------|------|------|------|------|------|
| L                    | 216 | 241 | 283  | 305  | 381  | 403  | 419  | 457  | 502  |
| H                    | 836 | 971 | 1112 | 1326 | 1345 | 1414 | 1816 | 2142 | 2808 |
| D                    | 200 | 200 | 250  | 300  | 300  | 350  | 400  | 500  | 600  |

# MEMO

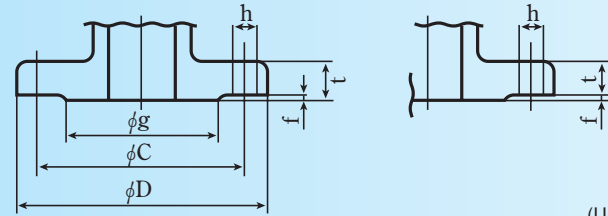


# Technical information

## Dimensions of flange

### ●Dimensions of pipe flange

ASME B 16.5—1996  
PIPE FLANGES AND FLANGED FITTINGS  
Class 150/300/600



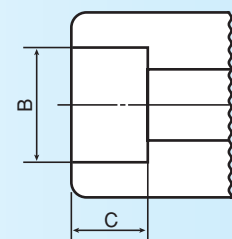
(Unit: mm)

| Nominal diameter (B) | Class 150 |     |      |     |       |        |    |                       | Class 300 |     |      |     |       |        |    |                       | Class 600 |     |       |     |       |        |    |                       |
|----------------------|-----------|-----|------|-----|-------|--------|----|-----------------------|-----------|-----|------|-----|-------|--------|----|-----------------------|-----------|-----|-------|-----|-------|--------|----|-----------------------|
|                      | D         | g   | t    | f   | C     | Number | h  | Nominal bolt diameter | D         | g   | t    | f   | C     | Number | h  | Nominal bolt diameter | D         | g   | t     | f   | C     | Number | h  | Nominal bolt diameter |
| 1/2                  | 89        | 35  | 11.2 | 1.6 | 60.5  | 4      | 16 | 1/2                   | 95        | 35  | 14.2 | 1.6 | 66.5  | 4      | 16 | 1/2                   | 95        | 35  | 14.2  | 6.4 | 66.5  | 4      | 16 | 1/2                   |
| 3/4                  | 98        | 43  | 12.7 | 1.6 | 70.0  | 4      | 16 | 1/2                   | 117       | 43  | 15.7 | 1.6 | 82.5  | 4      | 19 | 5/8                   | 117       | 43  | 15.7  | 6.4 | 82.5  | 4      | 19 | 5/8                   |
| 1                    | 108       | 51  | 14.2 | 1.6 | 79.5  | 4      | 16 | 1/2                   | 124       | 51  | 17.5 | 1.6 | 89.0  | 4      | 19 | 5/8                   | 124       | 51  | 17.5  | 6.4 | 89.0  | 4      | 19 | 5/8                   |
| 1 1/4                | 117       | 64  | 15.7 | 1.6 | 89.0  | 4      | 16 | 1/2                   | 133       | 64  | 19.0 | 1.6 | 98.5  | 4      | 19 | 5/8                   | 133       | 64  | 20.6  | 6.4 | 98.5  | 4      | 19 | 5/8                   |
| 1 1/2                | 127       | 73  | 14.3 | 1.6 | 98.5  | 4      | 16 | 1/2                   | 156       | 73  | 20.7 | 1.6 | 114.5 | 4      | 22 | 3/4                   | 156       | 73  | 22.3  | 6.4 | 114.5 | 4      | 22 | 3/4                   |
| 2                    | 152       | 92  | 15.9 | 1.6 | 120.5 | 4      | 19 | 5/8                   | 165       | 92  | 22.3 | 1.6 | 127.0 | 8      | 19 | 5/8                   | 165       | 92  | 25.4  | 6.4 | 127.0 | 8      | 19 | 5/8                   |
| 2 1/2                | 178       | 105 | 17.5 | 1.6 | 139.5 | 4      | 19 | 5/8                   | 190       | 105 | 25.4 | 1.6 | 149.0 | 8      | 22 | 3/4                   | 190       | 105 | 28.6  | 6.4 | 149.0 | 8      | 22 | 3/4                   |
| 3                    | 190       | 127 | 19.1 | 1.6 | 152.5 | 4      | 19 | 5/8                   | 210       | 127 | 28.6 | 1.6 | 168.0 | 8      | 22 | 3/4                   | 210       | 127 | 31.8  | 6.4 | 168.0 | 8      | 22 | 3/4                   |
| 4                    | 229       | 157 | 23.9 | 1.6 | 190.5 | 8      | 19 | 5/8                   | 254       | 157 | 31.8 | 1.6 | 200.0 | 8      | 22 | 3/4                   | 273       | 157 | 38.1  | 6.4 | 216.0 | 8      | 25 | 7/8                   |
| 5                    | 254       | 186 | 23.9 | 1.6 | 216.0 | 8      | 22 | 3/4                   | 279       | 186 | 35.0 | 1.6 | 235.0 | 8      | 22 | 3/4                   | 330       | 186 | 44.5  | 6.4 | 266.5 | 8      | 29 | 1                     |
| 6                    | 279       | 216 | 25.4 | 1.6 | 241.5 | 8      | 22 | 3/4                   | 318       | 216 | 36.6 | 1.6 | 270.0 | 12     | 22 | 3/4                   | 356       | 216 | 47.7  | 6.4 | 292.0 | 12     | 29 | 1                     |
| 8                    | 343       | 270 | 28.6 | 1.6 | 298.5 | 8      | 22 | 3/4                   | 381       | 270 | 41.3 | 1.6 | 330.0 | 12     | 25 | 7/8                   | 419       | 270 | 55.6  | 6.4 | 349.0 | 12     | 32 | 1 1/8                 |
| 10                   | 406       | 324 | 30.2 | 1.6 | 362.0 | 12     | 25 | 7/8                   | 444       | 324 | 47.7 | 1.6 | 387.5 | 16     | 29 | 1                     | 508       | 324 | 63.5  | 6.4 | 432.0 | 16     | 35 | 1 1/4                 |
| 12                   | 483       | 381 | 31.8 | 1.6 | 432.0 | 12     | 25 | 7/8                   | 521       | 381 | 50.8 | 1.6 | 451.0 | 16     | 32 | 1 1/8                 | 559       | 381 | 66.7  | 6.4 | 489.0 | 20     | 35 | 1 1/4                 |
| 14                   | 533       | 413 | 35.0 | 1.6 | 476.0 | 12     | 29 | 1                     | 584       | 413 | 54.0 | 1.6 | 514.5 | 20     | 32 | 1 1/8                 | 603       | 413 | 69.9  | 6.4 | 527.0 | 20     | 38 | 1 3/8                 |
| 16                   | 597       | 470 | 36.6 | 1.6 | 539.5 | 16     | 29 | 1                     | 648       | 470 | 57.2 | 1.6 | 571.5 | 20     | 35 | 1 1/4                 | 686       | 470 | 76.2  | 6.4 | 603.0 | 20     | 41 | 1 1/2                 |
| 18                   | 635       | 533 | 39.7 | 1.6 | 578.0 | 16     | 32 | 1 1/8                 | 711       | 533 | 60.4 | 1.6 | 628.5 | 24     | 35 | 1 1/4                 | 743       | 533 | 82.6  | 6.4 | 654.0 | 20     | 45 | 1 5/8                 |
| 20                   | 698       | 584 | 42.9 | 1.6 | 635.0 | 20     | 32 | 1 1/8                 | 775       | 584 | 63.5 | 1.6 | 686.0 | 24     | 35 | 1 1/4                 | 813       | 584 | 88.9  | 6.4 | 724.0 | 24     | 45 | 1 5/8                 |
| 24                   | 813       | 692 | 47.7 | 1.6 | 749.5 | 20     | 35 | 1 1/4                 | 914       | 692 | 69.9 | 1.6 | 813.0 | 24     | 41 | 1 1/2                 | 940       | 692 | 101.6 | 6.4 | 838.0 | 24     | 51 | 1 7/8                 |

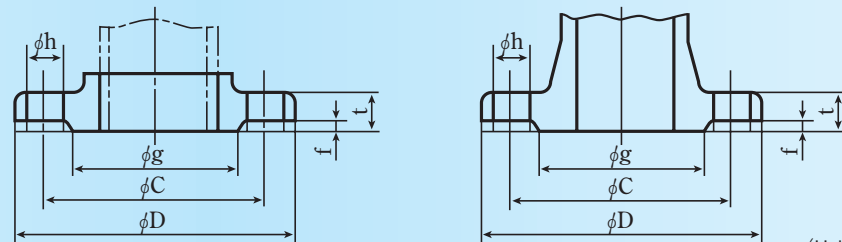
### ●Shape and dimensions of socket part of socket welding end valve

(Unit: mm)

| Nominal diameter (B) | Class 600/Class 800 |      |
|----------------------|---------------------|------|
|                      | B                   | C    |
| 1/2                  | 22.2                | 9.6  |
| 3/4                  | 27.7                | 12.7 |
| 1                    | 34.5                | 12.7 |
| 1 1/4                | 43.2                | 12.7 |
| 1 1/2                | 49.1                | 12.7 |
| 2                    | 61.1                | 15.9 |



### ●Basic dimensions of flange with 20K nominal pressure JIS B 2238



(Unit: mm)

| Nominal diameter | External diameter of applicable steel pipe | External diameter of flange D | Dimensions of each part of flange |   |            | Bolt hole                   |        | Nominal diameter of screw of bolt |            |
|------------------|--|-------------------------------|-----------------------------------|---|------------|-----------------------------|--------|-----------------------------------|------------|
|                  |  |                               | t                                 | f | Diameter g | Diameter of center circle C | Number |                                   | Diameter h |
| 15               | 21.7                                       | 95                            | 14                                | 1 | 51         | 70                          | 4      | 15                                | M12        |
| 20               | 27.2                                       | 100                           | 16                                | 1 | 56         | 75                          | 4      | 15                                | M12        |
| 25               | 34.0                                       | 125                           | 16                                | 1 | 67         | 90                          | 4      | 19                                | M16        |
| 32               | 42.7                                       | 135                           | 18                                | 2 | 76         | 100                         | 4      | 19                                | M16        |
| 40               | 48.6                                       | 140                           | 18                                | 2 | 81         | 105                         | 4      | 19                                | M16        |
| 50               | 60.5                                       | 155                           | 18                                | 2 | 96         | 120                         | 8      | 19                                | M16        |
| 65               | 76.3                                       | 175                           | 20                                | 2 | 116        | 140                         | 8      | 19                                | M16        |
| 80               | 89.1                                       | 200                           | 22                                | 2 | 132        | 160                         | 8      | 23                                | M20        |
| (90)             | 101.6                                      | 210                           | 24                                | 2 | 145        | 170                         | 8      | 23                                | M20        |
| 100              | 114.3                                      | 225                           | 24                                | 2 | 160        | 185                         | 8      | 23                                | M20        |
| 125              | 139.8                                      | 270                           | 26                                | 2 | 195        | 225                         | 8      | 25                                | M22        |
| 150              | 165.2                                      | 305                           | 28                                | 2 | 230        | 260                         | 12     | 25                                | M22        |
| 200              | 216.3                                      | 350                           | 30                                | 2 | 275        | 305                         | 12     | 25                                | M22        |
| 250              | 267.4                                      | 430                           | 34                                | 2 | 345        | 380                         | 12     | 27                                | M24        |
| 300              | 318.5                                      | 480                           | 36                                | 3 | 395        | 430                         | 16     | 27                                | M24        |

Note 1: Do not use the flange having nominal diameter described with ( ) in the table as much as possible.

## Certified usage range list of high pressure gas (As of August 21, 2004)

| Certification number | MAB-281-N-4         |                        |                    |              | Type of machine            | Valves                     |
|----------------------|---------------------|------------------------|--------------------|--------------|----------------------------|----------------------------|
| Model name (type)    | Model name (type)   |                        | Preset temperature |              | Designed pressure (MPa)    | Bore diameter (A)          |
|                      | Segment             | Material               | Maximum (°C)       | Minimum (°C) |                            |                            |
| Gate valve           | Carbon steel        | A105, SFVC2A           | 450                | 0            | 22.1 or less               | 50 or less                 |
|                      | Malleable cast iron | FCMB-S35               | 350                | -30※1        | 2.4 or less                | 300 or less                |
|                      | Ductile cast iron   | FCD-S                  | 350                | -30※1        | 2.4 or less<br>1.0 or less | 100 or less<br>350 or less |
| Globe valve          | Carbon steel        | A105, SFVC2A           | 450                | 0            | 29.5 or less               | 50 or less                 |
|                      | Stainless steel     | SCS13A<br>SCS14A       | 800                | -196<br>※2   | 21.3 or less               | 100 or less                |
|                      |                     | A182-F304<br>A182-F316 | 800                | -253         |                            |                            |
|                      |                     | A182-F304L             | 425                | -269         |                            |                            |
|                      |                     | A182-F316L             | 450                | -269         |                            |                            |
|                      | Malleable cast iron | FCMB-S35               | 350                | -30※1        | 2.4 or less<br>1.5 or less | 200 or less<br>250 or less |
|                      | Ductile cast iron   | FCD-S                  | 350                | -30※1        | 2.4 or less                | 80 or less                 |

(Note) \*1: Consult us when using it at the temperature under -5°C.

\*2: Consult us when using it at the temperature under -30°C.

## Technical Data

### Chemical resistance of packing and gasket

The packing and gasket are made of high corrosion resistant PTFE or expanded graphite.  
We are ready to meet any other requests, so please contact us if you need a specific packing or a gasket.

### Chemical resistance of bellows body materials

| Fluid                      | Body material             |                           |                           |                           |                           | Remarks                              |
|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------------------|
|                            | FCD-S                     | SCS13A                    | SCS14A                    | WCB                       | A105                      |                                      |
| Hydrogen                   | ○                         | ○                         | ○                         | ○                         | ○                         | Degreasing inside of valve           |
| Argon                      | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Hydrogen cyanide           | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Ethylene oxide             | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Chlorine (dry gas)         | ○ (≥30°C)                 | ○ (≥30°C)                 | ○ (≥30°C)                 | ○ (≥30°C)                 | ○ (≥30°C)                 |                                      |
| Ammonia                    | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Hydrogen sulfide (dry gas) | ○                         | ○                         | ○                         | ○                         | ○                         | HF                                   |
| Hydrogen sulfide (wet gas) | ×                         | ○                         | ○                         | ○                         | ○                         | HF                                   |
| Chloromethyl               | ○ (room temperature, dry) | ○ (room temperature, dry) | ○ (room temperature, dry) | ○ (room temperature, dry) | ○ (room temperature, dry) |                                      |
| Trimethylamine             | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Ethanol                    | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Amine                      | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Heat transfer oil          | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Oxygen                     | ○                         | ○                         | ○                         | ○                         | ○                         | Degreasing inside of valve, P/G:PTFE |
| Liquefied petroleum gas    | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Natural gas                | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| City gas                   | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Nitric acid                | ×                         | ○ (≥50%/≥70°C)            | ○ (≥50%/≥70°C)            | ○ (≥50%/≥70°C)            | ○ (≥50%/≥70°C)            | P/G:PTFE                             |
| Sulfuric acid              | ○ (98%≤/≥100°C)           | ○ (98%≤/≥150°C)           | ○ (98%≤/≥150°C)           | ○ (98%≤/≥150°C)           | ○ (98%≤/≥150°C)           | P/G:PTFE                             |
| Carbon dioxide (dry gas)   | ○                         | ○                         | ○                         | ○                         | ○                         |                                      |
| Sodium hydroxide           | ○ (≥50%/≥80°C)            | ○ (≥70%/≥250°C)           | ○ (≥70%/≥250°C)           | ○ (≥70%/≥80°C)            | ○ (≥70%/≥80°C)            |                                      |
| Acetylene                  | ○                         | ○                         | ○                         | ○                         | ○                         | Copper-series prohibited             |
| Phosgene                   | ×                         | ○                         | ○                         | ○                         | ○                         | P/G:PTFE                             |

### Use of bellows valve in vacuum line

Table 6 below shows the use range of our general valves and bellows valves on vacuum equipments.

Table 6: Use range of our valves for vacuum equipments

| Valve type                              | Range of use                                      | Leakage rate                            |   |
|---|---|---|---|
|   |   | Main body                               | Valve sheet   |
| Standard general valve                  | ~10 <sup>2</sup> Pa(abs) (1 Torr)                 | 10 <sup>-2</sup> Pa m <sup>3</sup> /sec | Metal sheet:10 <sup>-1</sup> Pa m <sup>3</sup> /sec<br>Teflon sheet:10 <sup>-2</sup> Pa m <sup>3</sup> /sec |
| General valve with vacuum specification | ~10 <sup>-1</sup> Pa(abs) (10 <sup>-3</sup> Torr) | 10 <sup>-4</sup> Pa m <sup>3</sup> /sec | Metal sheet:10 <sup>-3</sup> Pa m <sup>3</sup> /sec<br>Teflon sheet:10 <sup>-4</sup> Pa m <sup>3</sup> /sec |
| Bellows valve                           | ~10 <sup>-2</sup> Pa(abs) (10 <sup>-4</sup> Torr) | 10 <sup>-7</sup> Pa m <sup>3</sup> /sec | Metal sheet:10 <sup>-6</sup> Pa m <sup>3</sup> /sec<br>Teflon sheet:10 <sup>-7</sup> Pa m <sup>3</sup> /sec |

Vacuum means a pressure lower than normal atmospheric pressure (1.013×10<sup>5</sup>Pa(abs)). In the vacuum industry, pressures are classified into the areas as shown in Table 2 for convenience. For reference, Table 3 shows allowable leakage rates of major vacuum equipments.

Table 2: Vacuum classification

| Classification                 | Pressure   |
|--------------------------------|--|
| Low vacuum                     | Vacuum greater than 10 <sup>2</sup> Pa(abs)          |
| Medium vacuum                  | Vacuum of 10 <sup>2</sup> -10 <sup>-1</sup> Pa(abs)  |
| High vacuum (HV)               | Vacuum of 10 <sup>-1</sup> -10 <sup>-5</sup> Pa(abs) |
| Ultra-high vacuum (UHV)        | Vacuum less than 10 <sup>-5</sup> Pa(abs)            |
| absolute vacuum/perfect vacuum | Vacuum of 0Pa(abs) (unattainable)                    |

Table 3: Allowable leak rate of major vacuum equipments

| Vacuum equipment                   | Allowable leak rate                       |
|------------------------------------|---|
| Reduced- pressure drying equipment | ~1 Pa m <sup>3</sup> /sec                 |
| Vacuum distillation equipment      | ~10 <sup>-2</sup> Pa m <sup>3</sup> /sec  |
| Freeze-drying equipment            | ~10 <sup>-3</sup> Pa m <sup>3</sup> /sec  |
| Medium-vacuum evaporation system   | ~10 <sup>-6</sup> Pa m <sup>3</sup> /sec  |
| High-vacuum system                 | ~10 <sup>-9</sup> Pa m <sup>3</sup> /sec  |
| Ultra-high vacuum system           | ~10 <sup>-11</sup> Pa m <sup>3</sup> /sec |
| Braun tube / vacuum tube           | ~10 <sup>-12</sup> Pa m <sup>3</sup> /sec |

#### Inspection method of vacuum valve

There are mainly two methods, the pressure method and the vacuum method, for checking any leakage from a vacuum valve. Table 5 shows some examples of it.

Table 5: Inspection method and leakage limit

| Test method     |  | Detected leak rate                        |
|-----------------|--|---|
| Pressure method | Leaving method                         | 0.1~1 Pa m <sup>3</sup> /sec              |
|                 | Underwater foaming method              | 10 <sup>-5</sup> Pa m <sup>3</sup> /sec   |
|                 | Soap water foaming method              | 5×10 <sup>-6</sup> Pa m <sup>3</sup> /sec |
|                 | Ammonia gas method                     | 10 <sup>-8</sup> Pa m <sup>3</sup> /sec   |
|                 | Helium gas method                      | 10 <sup>-8</sup> Pa m <sup>3</sup> /sec   |
| Vacuum method   | Leaving method                         | 10 <sup>-2</sup> Pa m <sup>3</sup> /sec   |
|                 | Geissler method                        | 10 <sup>-4</sup> Pa m <sup>3</sup> /sec   |
|                 | A method using Ionization vacuum gauge | 10 <sup>-8</sup> Pa m <sup>3</sup> /sec   |
|                 | Helium gas method                      | 10 <sup>-10</sup> Pa m <sup>3</sup> /sec  |

## Technical Data

### List of main materials for Bellows Seal Valves

| Part name      | Ductile iron valves | Stainless steel valve |                       | Cast steel valve                  |            | Forged steel valve |            |
|----------------|---------------------|-----------------------|-----------------------|-----------------------------------|------------|--------------------|------------|
|                |                     | Globe valve           | Gate valve            | Globe valve                       | Gate valve | Globe valve        | Gate valve |
| Body           | FCD-S               | SCS13A<br>SCS14A      | SCS13A<br>SCS14A      | A216-WCB                          | A216-WCB   | A105               | A105       |
| Bonnet         | FCD-S               | SCS13A<br>SCS14A      | SCS13A<br>SCS14A      | A216-WCB                          | A216-WCB   | A105               | A105       |
| Stem           | SUS403              | A276-304              | A276-304              | A276-410                          | A276-410   | A276-410           | A276-410   |
| Disc           | SUS304              | A276-304<br>A276-316  | A351-CF8<br>A351-CF8M | A276-410 (≥4B)<br>A217-CA15 (5B≤) | A216-WCB   | A276-304           | A217-CA15  |
| Body seat ring | SUS403              | —                     | —                     | A105                              | A105       | A105               | A276-410   |
| Bellows        | SUS316L             | SUS316L               | SUS316L               | SUS316L                           | SUS316L    | SUS316L            | SUS316L    |

### Materials used and applied standards

| Part name                              | Material code | Material name                                      | Specification No.         |                 |                          |
|--|---------------|--|---------------------------|-----------------|--------------------------|
|  |               |  | JIS                       | ASTM            | DIN                      |
| Body/<br>Bonnet<br>(Body<br>seat ring) | FCD-S         | Ductile iron casting                               | B 8270 (Appendix-5) FCD-S | A536 Gr60-40-18 | —                        |
|  | SCS13A        | Stainless-steel casting                            | G 5121 SCS13A             | A351 CF-8       | 17445 G-XCrNi18 9        |
|  | SCS14A        | Stainless-steel casting                            | G 5121 SCS14A             | A351 CF8M       | 17445 G-X6CrNiMo18 10    |
|  | A216-WCB      | Steel casting for high temperature & high pressure | G 5151 SCPH2              | A216 WCB        | —                        |
|  | A105          | Carbon steel forging for pressure vessel           | G 3202 SFVC2A             | A105            | —                        |
| Stem                                   | SUS403        | Stainless-steel bar                                | G 4303 SUS 403            | A276 S 40300    | —                        |
| Body seat<br>ring                      | A276-304      | Stainless-steel bar                                | G 4303 SUS 304            | A276 S 30400    | —                        |
|  | A276-410      | Stainless-steel bar                                | G 4303 SUS 410            | A276 S 41000    | 1654-5 X10Cr13           |
| Disc                                   | SUS304        | Stainless-steel bar                                | G 4303 SUS 304            | A276 S 30400    | —                        |
|  | A276-306      | Stainless-steel bar                                | G 4303 SUS 316            | A276 S31600     | 1654-5 X5CrCrNiMo17 12 2 |
|  | A351-CF8      | Stainless-steel casting                            | G 5121 SCS13A             | A351 CF-8       | 17445 G-XCrNi18 9        |
|  | A351-CF8M     | Stainless-steel casting                            | G 5121 SCS14A             | A351 CF8M       | 17445 G-X6CrNiMo18 10    |
|  | A276-CA15     | Stainless-steel casting                            | G 5121 SCS1               | A217-CA15       | 17445 G-X20Cr14          |
| Bellows                                | SUS316L       | Stainless-steel plate                              | G 4304 SUS316L            | A167 S31603     | 17445 X2CrNiMo17 13 2    |

## Example of installation



# Handling Instructions of Bellows Valve

## 1. Transport

- ①When lifting a large-size valve, lift it with a rope tied to the valve casing or the yoke.
- ②Never tie the rope to the handle. Also, make sure not to let the valve fall over and cause the handle to hit hard.
- ③Do not carry the valve at its handle. Otherwise, the handle may turn and cause you a hazard.

## 2. Storage

- ①Leave the delivered valve in the style of packing sent out from the factory until it is installed locally.
- ②Even for a short period of time, store the valve indoors with little moisture or dust instead of storing it at an open-air location.
- ③Do not remove the protection seal or the polyethylene cap at the end of the valve casing until just before the installation. Otherwise, a foreign substance may enter, resulting in leakage from the valve sheet or damage to the bellows.

## 3. Range of use

- ①Check the actual product and actual use conditions before use. Use the product within the range of "applicable fluids, pressures and temperatures" on this catalog. For use beyond this range, please consult with us.
- ②Use the "high-pressure gas approved valve" within the conditions listed on the Remarks of the certification.

## 4. Installation

- ①Carefully clean inside the pipe to remove foreign substances such as welding spatters, pipe chips, scales and gravels to avoid leakage from the valve sheet or damage to the bellows.
- ②Install a valve that has a flow direction arrow on the valve casing to be such that the direction matches with the fluid flow direction.
- ③For flange type valves, check if there is any hazardous scratch on the gasket contact surface of the flange between the valve casings.
- ④Do not apply excessive sealing agent to the gasket. Otherwise, it may result in leakage from the valve sheet or damage to the bellows.
- ⑤When installing the valve, tighten the flange equally while paying attention not to let the piping gasket protrude into the bore. Gradually tighten the bolt diagonally.
- ⑥For welding-type valve, remove the protection cap at the groove or the socket just before piping or welding.
- ⑦Weld the valve and the piping with the valve closed. Otherwise, the heat may deform the valve sheet surface. Before welding, tighten the valve not so hard but until the valve disc touches the sheet slightly, and turn the handle a 1/4 turn in the open direction to allow the valve shaft to have play.
- ⑧A rough guide for the range of preheating and postheating treatment is approximately 3 times of weld surfacing width at the end face of the valve connection. Keep the range to the minimum and be careful not to heat the valve sheet abnormally. Also, try to prevent the temperature of other parts from rising as much as possible. Pay particular attention to the cooling rate.

## 5. Handling of valves

### 5.1 Points to be checked before operation

- ①If the pipe has not been flushed fully, the valve may not be closed fully due to interference of foreign substances remaining inside the pipe. In this case, do not forcibly close the valve but open the valve slightly once and blow off the foreign substance before re-closing the valve.

- ②The valve needs to be closed with sufficient strength applied to the handle in order to keep the tightness of the valve sheet. However, do not forcibly turn the handle with a wrench or a jig since manual operation is sufficient. Similarly, when using a supplementary handle etc, do not forcibly turn it.

- ③The PTFE disc has high sealing characteristics, and is suitable for liquids containing gaseous body or scales. However, pay particular attention not to forcibly close the disc as it is made of soft resin and can easily be damaged.

- ④Check that the bolts/nuts are not loose.

### 5.2 Precautions for use

- ①Do not apply higher pressure than the maximum allowable working pressure.
- ②Avoid impact pressure such as by the water hammer.
- ③Do not let the liquid inside the pipe freeze.
- ④Do not use corrosive liquids.

Examples of corrosive liquids:  
Hydrochloride, nitric acid, dilute sulfuric acid, bromine, hypochlorous acid, acetic acid, formic acid, ammonium persulfate, aluminum chloride, etc.

- ⑤When using high viscosity liquid, avoid it from sticking to the bellows.
- ⑥Do not use the valve for pipes with strong vibration.
- ⑦Do not suddenly open or close the valve with a cylinder etc.

## 6. Disassembly and assembly

Before disassembling the valve, make sure that you are well-acquainted with the valve structure, the disassembling parts are limited to the minimum and the disassembling procedure has been determined.

- ①The disassembling/assembling work must be performed by experienced workers who have taken the training.
- ②When disassembling, check that no residual pressure is left inside the valve.

6.1 Disassembling must be conducted in the procedure shown below, and assembling must be conducted in reverse order.

- ①Loosen the eyebolt nut.
- ②Open the valve fully, remove the bonnet bolt (nut), and gently remove the bonnet in the straight direction from the body. (Remove the entire bonnet with the bellows installed.)
- ③Fix the bonnet such as with a vise and turn the handle in the close (clockwise) direction until the valve shaft comes off from the sleeve. Then, pull the disc or push the valve shaft to take out the valve shaft unit from the bonnet. (The valve shaft and the disc cannot be separated from each other.)

## 7. Maintenance

- ①The gaskets are located on the upper surface of the valve casing and the bellows flange. If the gasket on the valve casing side has been stuck to the seating surface, cleanly remove it from the seating surface without damaging the surface.
- ②Install a replacement gasket without being protruded from the seating surface.
- ③If you find a scratch on the sheet, please bring it to us for repair. We will repair such as by wrapping it but have difficulty doing so on the spot.
- ④Please ask us for replacement of the bellows. It is difficult to be replaced in the workplace.

