

Low-Temperature, Cryogenic Valves





Low-Temperature, Cryogenic Valves

GATE VALVE

GLOBE VALVE

CHECK VALVE

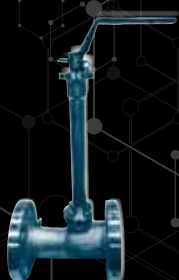
BALL VALVE

KITZ valves have been developed to meet the most advanced and demanding technological standards of Japan, the world's leading importer of environmentally friendly, clean-energy LNG (Liquefied Natural Gas). KITZ offers a series of cryogenic valves of proven high quality, as demonstrated by repeated testing.

We offer stainless steel and cast carbon steel gate, globe, check, and ball valves for processing, storage, shipment, and distribution of ethylene, LPG (Liquefied Petroleum Gas), LNG, and other low-temperature or cryogenic fluids, down to -196°C (-321°F).

Use applications

- LNG (Liquefied Natural Gas): LNG Liquefaction plants, Terminal
- Ethylene plants
- Industrial low-temperature gases plants



KITZ Cryogenic Manufacturing



/Perrin GmbH

• Ball Valves

"Jso"

/KITZ Corporation of Europe, S.A.

• Ball Valves



● / ● : KITZ Group Locations

Casting technology

Our cryogenic service valve castings are typically made of modified ASTM CF8M austenitic stainless steel, which contains a higher percentage of nickel so as to minimize transformation of the austenitic structure to the martensitic structure. This undesirable transformation occurs when valve parts are machined during the production process (or subjected to mechanical stress), which makes them vulnerable to distortion when valve assemblies are exposed to extremely low temperatures in the field. This property must be prevented during production, because it results in subsequent degradation of seat face precision, and therefore, concerns about seat leakage. Additionally, a higher nickel content typically lowers the temperature at which the martensitic transformation begins (Martensitic Transformation Temperature or MTT below). For this reason, our foundries ensure proper adjustment of other chemicals such as carbon and chromium to reduce the MTT.

Standard Material Variation & Operational Temperature Range

Category	Temperature Range	-196	-104	-80	-46	0°C	Service	Valve Shell Materials (Standard)	
I	-196°C (-321°F)	[Blue bar from -196 to -46]						For LNG service • LNG Liquefaction plants • LNG Receiving Terminals	Stainless Steel A351 Gr.CF8 A351 Gr.CF8M A351 Gr.CF3M
II	-104°C (-155°F)		[Light blue bar from -104 to -46]					For Ethylene service • Ethylene plants	Stainless Steel A351 Gr.CF8 A351 Gr.CF8M A351 Gr.CF3M
III	-46°C (-51°F)				[Dark blue bar from -46 to 0°C]		For Industrial service • Industrial gas plants • Low-temperature gas plants	Stainless Steel A351 Gr.CF8 A351 Gr.CF8M A351 Gr.CF3M	
						Carbon Steel A352 Gr.LCB A352 Gr.LCC			

Color tags corresponding to usage temperature are provided.

ic Valve Series

ing Network



TZ
KITZ Corporation
 • Gate, Globe & Check Valves
 • Ball Valves



Standard Product Range

Category	Valve	Valve Type	Wall thickness	Standard Material	Class	Size	Connection	Product Code	Page													
I -196°C/-321°F	Gate	Bolted Bonnet	ASME B16.34	CF8,CF8M,CF3M	150	2"-24"	Flanged	150UMALMY	10													
					300			300UMALMY														
					600	2"-12"		600UMALMY														
					150			150UMCLMY														
					300	1/2"-24"		300UMCLMY														
					600			600UMCLMY														
			150		2"-24"	(T)W150UMCLMY																
			300			(T)W300UMCLMY																
			600			(T)W600UMCLMY																
			300		1/2"-2"	(T)SW300UMCLMY																
			600			(T)SW600UMCLMY																
			Globe		Bolted Bonnet	API623	API600	150		2"-8"	Flanged	150UPCRLMD	11									
	300	300UPCRLMD																				
	600	600UPCRLMD																				
	150	1/2"-8"						150UPCLMY														
	300							300UPCLMY														
	600							600UPCLMY														
	150	2"-8"				(T)W150UPCLMY																
	300					(T)W300UPCLMY																
	600					(T)W600UPCLMY																
	300	1/2"-2"				(T)SW300UPCLMY																
	600					(T)SW600UPCLMY																
	Check	Swing				ASME B16.34	API600	150	2"-4"	Butt weld	W150UPDCL	12										
			300		1/2"-2"			SW300UPDAL														
150			1/2"-24"	150UOCLMY																		
300				300UOCLMY																		
600				600UOCLMY																		
150			2"-24"	(T)W150UOCLMY																		
300				(T)W300UOCLMY																		
600				(T)W600UOCLMY																		
300			2"-12"	(T)SW300UOCLMY																		
300				2"	(T)SW300UOCLMY																	
600					(T)SW600UOCLMY																	
Ball			Floating / 1piece		ASME B16.34	CF8,CF8M	150	1/2"-10"	Flanged	150UTAZLM	13											
	300	300UTAZLM																				
	150	150UTDZL																				
	300	300UTDZL																				
	Floating / 2piece	ASME B16.34		F316,CF8M			150			2"-16"		Butt weld	150UPG14K	14								
							300						300UPG14K									
			600		600UPG14K																	
			150		1"-8"	150UPG67K																
			300			300UPG67K																
			Gate			Bolted Bonnet	ASME B16.34	CF8,CF8M,CF3M	150		1/2"-16"		Flanged		150UMAXY	15						
	300	1/2"-24"		300UMAXY																		
	300	1/2"-11/2"		SW300UMAXY																		
150	2"-12"			W150UMCXY																		
300				W300UMCXY																		
600		W600UMCXY																				
Globe	Bolted Bonnet	ASME B16.34		CF8,CF8M,CF3M	150		1/2"-12"	Flanged	150UPXY	15												
					300				1/2"-8"		300UPXY											
					300		1/2"-11/2"		SW300UPXY													
					150				2"-12"		W150UPCXY											
					300						W300UPCXY											
					600		W600UPCXY															
		150	2"-4"	W150UPDCX																		
		300		1/2"-2"	SW300UPDX																	
		Check			Swing	ASME B16.34	CF8,CF8M,CF3M	150	11/2"-16"	Flanged	150UOAXY	16										
			300					300UOAXY														
			150	1/2"-11/2"				150UNAXY														
			300					300UNAXY														
300	SW300UNXY																					
Lift	API600		ASME B16.34	CF8,CF8M,CF3M				150			2"-12"		Butt weld	W150UOCXY	※							
						300	W300UOCXY															
						600	W600UOCXY															
						Ball	Floating / 1piece	ASME B16.34	CF8,CF8M	150		1/2"-10"		Flanged		150UTAZXLM	17					
										300						300UTAZXLM						
										150						150UTDZXL						
300	300UTDZXL																					
Floating / 2piece	ASME B16.34	CF8,CF8M	CF8,CF8M	150	2"-12"					Butt weld	W150UOCXY		※									
				300							W300UOCXY											
				600							W600UOCXY											
				Gate							Bolted Bonnet				ASME B16.34	CF8,CF8M,CF3M		150	1/2"-16"	Flanged	150UMAXY	15
																		300			1/2"-24"	
																		300	1/2"-11/2"		SW300UMAXY	
150	2"-12"	W150UMCXY																				
300		W300UMCXY																				
600		W600UMCXY																				
Globe	Bolted Bonnet	ASME B16.34	CF8,CF8M,CF3M		150	1/2"-12"	Flanged	150UPXY	15													
					300			1/2"-8"		300UPXY												
					300	1/2"-11/2"		SW300UPXY														
					150			2"-12"		W150UPCXY												
					300					W300UPCXY												
					600	W600UPCXY																
		150	2"-4"	W150UPDCX																		
		300		1/2"-2"	SW300UPDX																	
		Check			Swing	ASME B16.34	CF8,CF8M,CF3M	150	11/2"-16"	Flanged	150UOAXY	16										
			300					300UOAXY														
			150	1/2"-11/2"				150UNAXY														
			300					300UNAXY														
300	SW300UNXY																					
Lift	API600		ASME B16.34	CF8,CF8M,CF3M				150			2"-12"		Butt weld	W150UOCXY	※							
						300	W300UOCXY															
						600	W600UOCXY															
						Ball	Floating / 1piece	ASME B16.34	CF8,CF8M	150		1/2"-10"		Flanged		150UTAZXLM	17					
										300						300UTAZXLM						
										150						150UTDZXL						
300	300UTDZXL																					
Floating / 2piece	ASME B16.34	CF8,CF8M	CF8,CF8M	150	2"-12"					Butt weld	W150UOCXY		※									
				300							W300UOCXY											
				600							W600UOCXY											

II

-104°C/-155°F

Standard Product Range

Category	Valve	Valve Type	Wall thickness	Standard Material	Class	Size	Connection	Product Code	Page					
III -46°C/-51°F	Gate	Bolted Bonnet	API600	LCB,LCC	150	1 1/2"-24"	Flanged	150SCLSXBLY	18					
					300	2"-20"		300SCLSXBLY						
					600			600SCLSXBLY						
					150	1 1/2"-24"	Butt weld	W150SCLSXBLY						
					300	2"-20"		W300SCLSXBLY						
					600			W600SCLSXBLY						
	Globe				150	2"-12"	Flanged	150SCJSXBLY	19					
					300	2"-8"		300SCJSXBLY						
					600	2"-10"		600SCJSXBLY						
	Check				ASME B16.34	LCB,LCC	150	2"-24"		Butt weld	W150SCJSXBLY			
							300				W300SCJSXBLY			
							600				W600SCJSXBLY			
		150	Flanged	150SCOSXBLY										
		300		300SCOSXBLY										
		600		600SCOSXBLY										
		Ball	Floating / 1piece	ASME B16.34			LCC	150		1/2"-10"	Flanged	150SCTAZXCL		
			Floating / 2piece					300				300SCTAZXCL		
	150							150SCTDZXCL						
	300							300SCTDZXCL						
	Ball		Floating / 2piece					ASME B16.34	LCB	150		1/2"-10"	150SCTDZXBL	21
										300		1/2"-8"	300SCTDZXBL	
300		1/2"-8"		300SCTDZXBL										

* Please contact KITZ corporation.

KITZ Production Control

Order inflow

KITZ cryogenic valves are tailored to meet our clients' specifications. KITZ selects the most suitable valve types and analyzes the clients' needs before deciding on valve manufacturing specifications. These manufacturing specifications serve as the basis for unified control of every step of valve manufacture, from sales and design to production and shipping.

Design

KITZ's valve designs reflect know-how resulting from both a long record of achievement and proven, performance-tested technology.

Casting

Our high-quality stainless steels are manufactured from castings produced at KITZ's in-house foundry. Therefore, special materials that are required for low-temperature or cryogenic applications can be used.

Machining

We have established production technologies and performance tests based on many years of experience manufacturing valves for industrial use.

Assembly and Inspection

KITZ performs strict inspections of cryogenic valves on a dedicated assembly and inspection line. In addition to performing a variety of non-destructive tests, in house, KITZ can accommodate any type of special-method inspection that is requested by our customers.

Features of KITZ metal-seated gate valves

● Extension bonnet

The extension bonnet provides efficient cold insulation, minimizing heat conduction and transfer from cryogenic flow, while preventing exposure of the valve packing to cryogenic media and providing a secure seal.

● Surface-hardening treatment with Stellite® alloy

Stellite® alloy is used to apply a surface-hardening treatment to the sliding portions of the body and disc seat assemblies, preventing wear and improving durability.

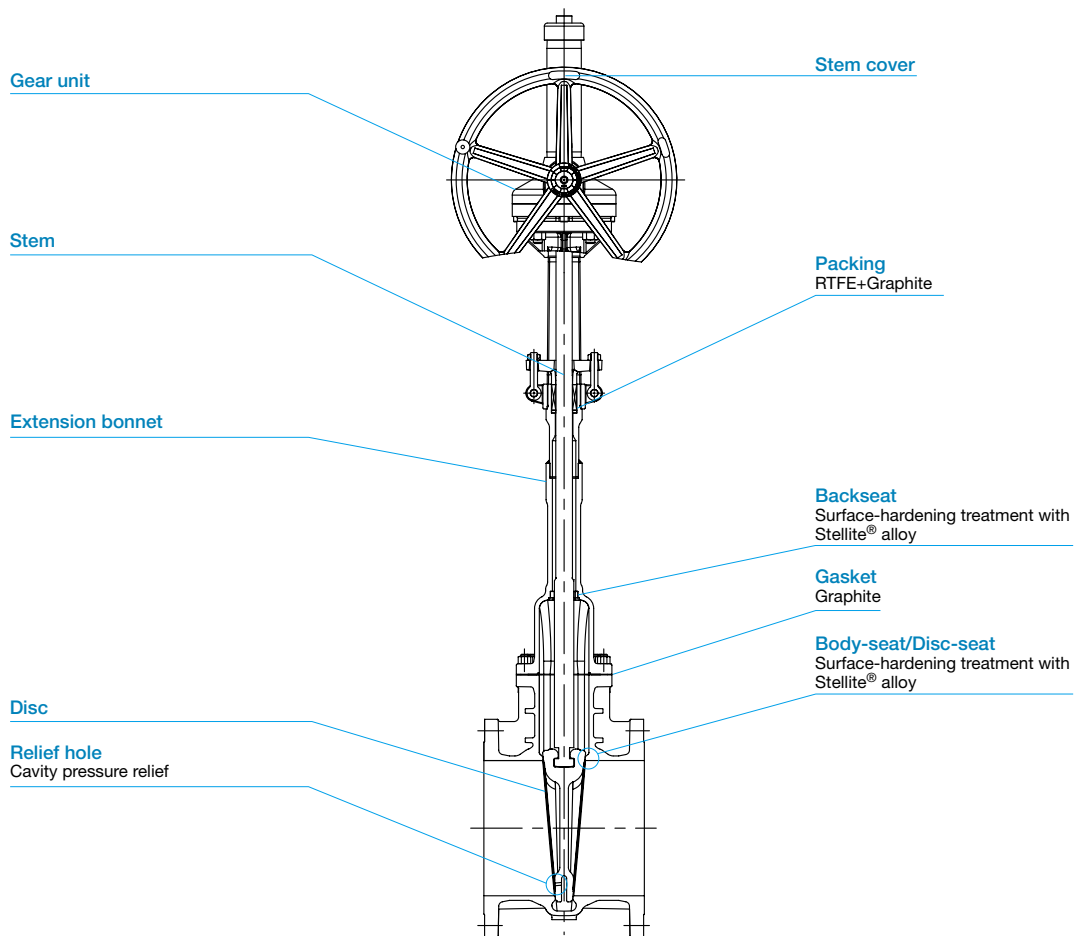
● Cavity pressure relief

A hole in the disc on the high-pressure side prevents any excessive rise in the cavity pressure. (Liquid trapped within the body cavity may evaporate, causing an excessive rise in the cavity pressure.)

● Seat lapping

We polish dry-lapped seat surfaces to compare the surface finish before and after polishing. Additionally, we compare the seat surface finish and the sealing performance of valve samples provided with only-lapped seats and lapped-and-polished seats.

Illustrated cross-section of a typical KITZ cryogenic service gate valve to show the basic design concept -196°C specification



Stellite® is a registered trademark of Mitsubishi Materials.

Features of KITZ soft-seated globe valves

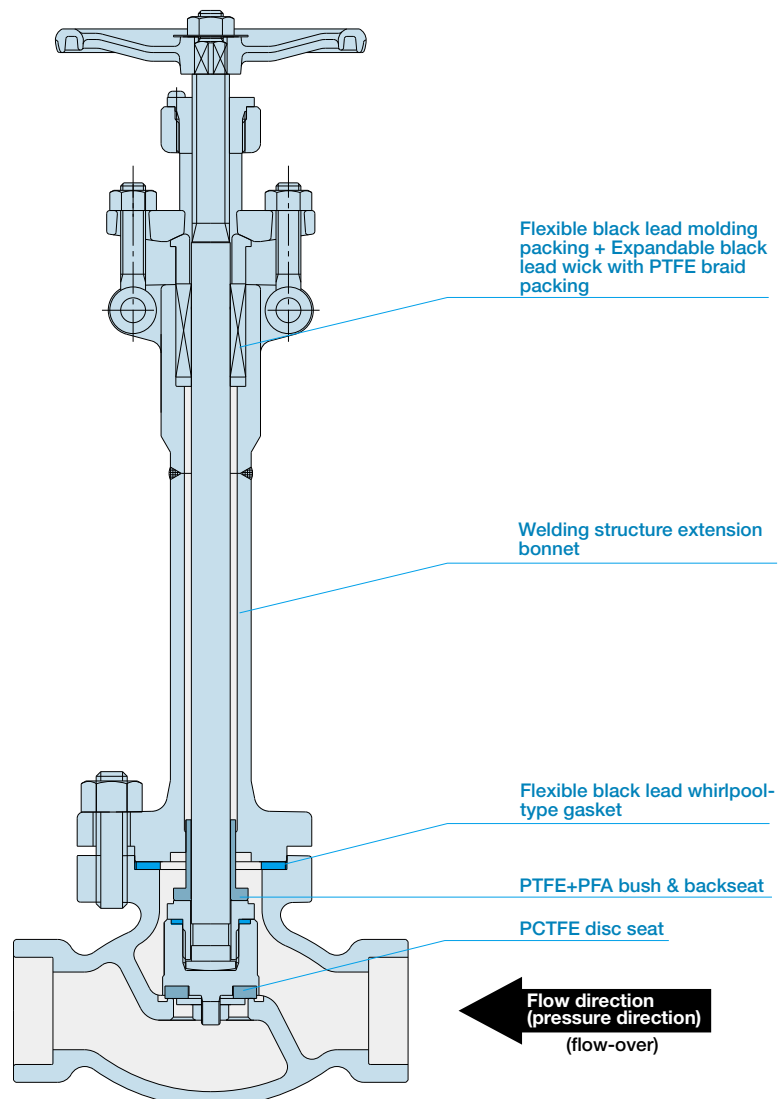
- A higher cost performance is achieved than for the disc seat structure.
- The flow direction (pressure direction) becomes flow over the disc. A low operation strength is enabled by flow-over.
- A PCTFE disc seat with excellent low-temperature characteristics and mechanical properties is used to achieve high durability and high sealant quality.
- Stem binding prevention is realized with back seat and all-in-one type PTFE+PFA construction bushing.
- The disc seats can only be replaced by removing the disc nut.
- This valve is the same low-emission type as in the metal seat structure used for the seal material of the packing/gasket. This cancels compression creep stress relief and ensures seal quality for extended periods.
- Improvement of maintenance and avoidance of binding are achieved through all-in-one design of backseat and bush PTFE+PFA.

*1 Soft structure applicable only to globe valves

*2 Even when valves are all closed with flow over, packing unit is always pressurized.

Representative structural assembly of soft-seat globe valve

-196°C specification



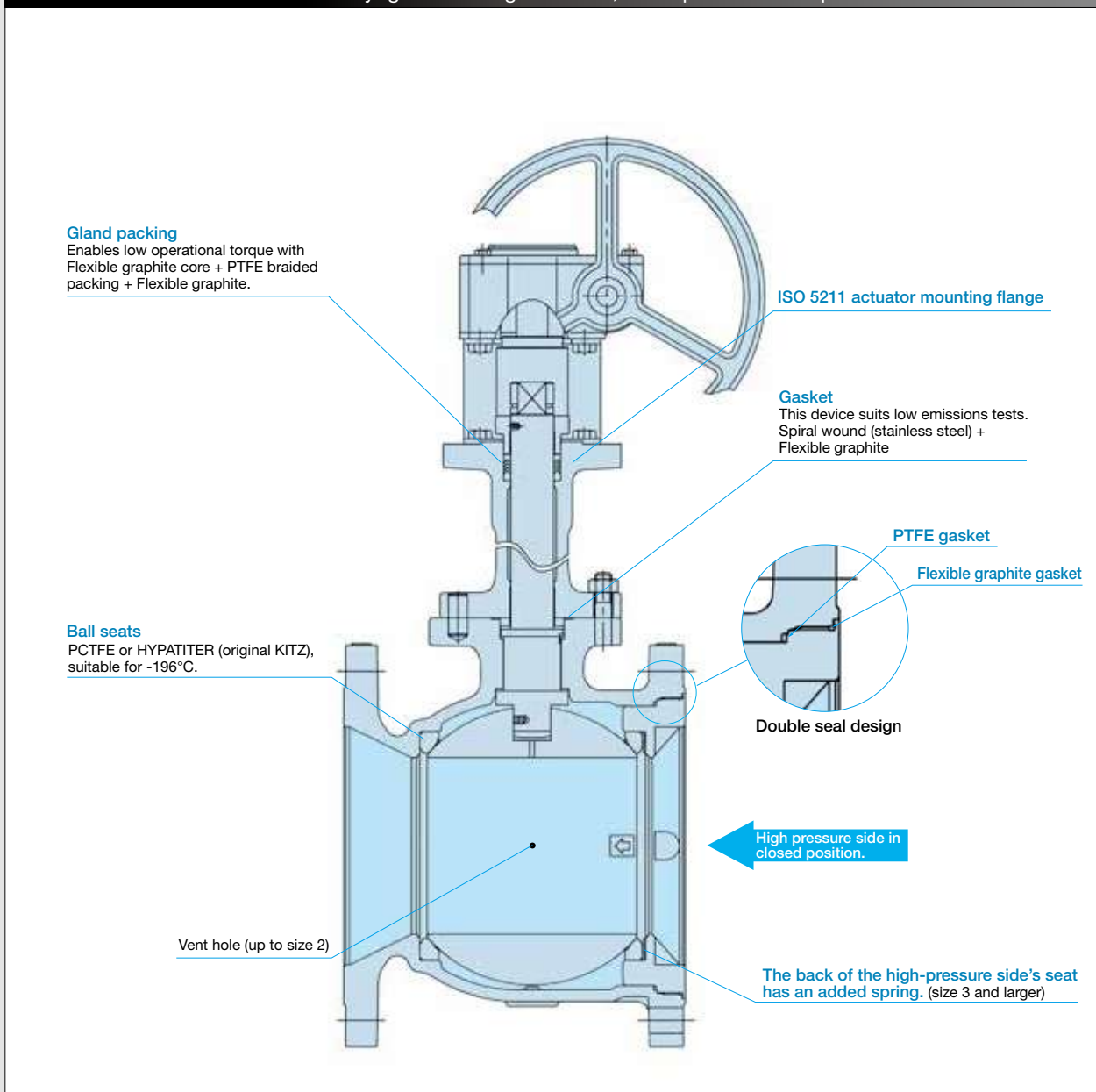
※ This figure shows the valve in the closed position.

Features of KITZ floating ball valves

-196°C Specification

- Easy opening and closing, with 90° rotation.
- There is little pressure loss.
- Extension bonnet
Thermal conduction and heat transmission from the low-temperature fluid is suppressed to a minimum while a cooling effect is provided. The packing is prevented from being exposed to the low-temperature liquid and a secure seal is realized.
- Packing/Gasket
Flexible graphite with excellent resistance to low temperatures, sealing quality, and durability is used in the packing and gasket.
- Seat structure
Size 3B and larger utilizes a seat spring and achieves a secure seal with a low operation torque.
- Prevention of abnormal pressure within cavity
Sizes ½B to 2B have vent holes, and sizes 3B to 10B have upstream-side seat springs installed. These adjustments prevent abnormal pressure within the cavity.
- Fire-safe design

Illustrated cross-section of a KITZ cryogenic floating ball valve, with operational temperature of -196°C



- The valve design that is appropriate for operational temperatures can be selected by combining an extension bonnet and ball seat.

Design comparison based on operational temperature

	-46°C	-104°C
Operational Temperature	-46°C	-104°C
Body material	A352 Gr. LCC	A351 Gr. CF8M
Bore	Reduced bore	
Body design	1-piece	
Flow direction	Bi-directional flow	
Gland packing	Flexible graphite	
Gasket	PTFE + Flexible graphite	

	-196°C
Operational Temperature	-196°C
Body material	A351 Gr. CF8
Bore	Full bore
Body design	2-piece
Flow direction	Bi-directional flow
Gland packing	Flexible graphite
Gasket	Flexible graphite
Seat spring	Size 2 and larger

	-46°C	-104°C
Operational Temperature	-46°C	-104°C
Body material	A352 Gr. LCC/LCB	A351 Gr. CF8
Bore	Full bore	
Body design	2-piece	
Flow direction	Unidirectional flow	
Gland packing	Flexible graphite	PTFE
Gasket	Flexible graphite	PTFE

	-196°C
Operational Temperature	-196°C
Body material	A351 Gr. CF8
Bore	Full bore
Body design	2-piece
Flow direction	Bi-directional flow
Gland packing	Flexible graphite
Gasket	Flexible graphite
Seat spring	Size 2 and larger

KITZ low emission service valves

In the United States, the Federal Clean Air Act was amended in 1990 to realize a new environmental protection policy that stipulates a 95% reduction in fugitive emissions or leak levels of toxic gases and chemicals from plant equipment.

From April 1994, the new law requires all plants handling toxic gases (as specified by the Environmental Protection Agency), to periodically monitor their plant equipment to detect leaks exceeding 500 ppm, and repair or replace all defective parts immediately. California has gone further than the federal law with a state regulation requiring 100 ppm maximum leak levels, representing a 99% reduction of this kind of environmental pollution for the Northern California Region since 1997.

Our current low emission valves, the result of several years of trial and error at our laboratory, are designed, engineered, manufactured, and tested to meet the 100 ppm maximum emission level. This standard specification in North America is met by KITZ Class 150, 300, and 600 Series A and C stainless and high-alloy steel valves. In other markets, similar low emission valves are available as options. Major design considerations for upgrading our standard valves to have low emission performance are introduced below.

Gland packing <Gate valves, Globe valves>

KITZ's original "SEALEVER_" graphite packing set, with a pure carbon spacer bush for Class 300 and 600.

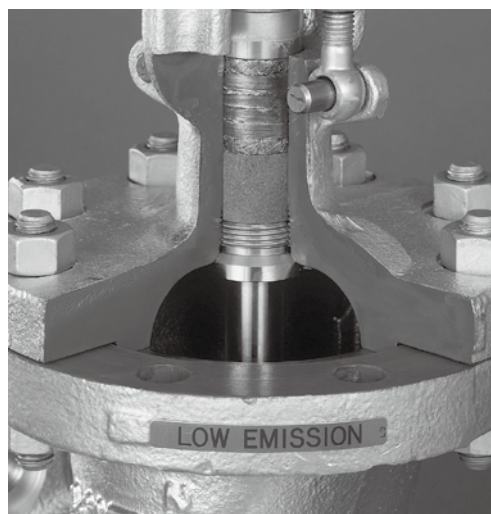
*US Patent No. 5522603 and 5573253. Other patents registered or pending worldwide.

Bonnet gaskets and check valve cover gaskets <Gate valves, Globe valves, Swing check valves>

Class 150 : Flexible graphite sheet with stainless steel insert and permeation-protective barrier for low-emission applications or spiral wound

Class 300 : Spiral wound (flexible graphite filler and stainless steel hoop) with a stainless steel inner ring

Class 600 : Spiral wound

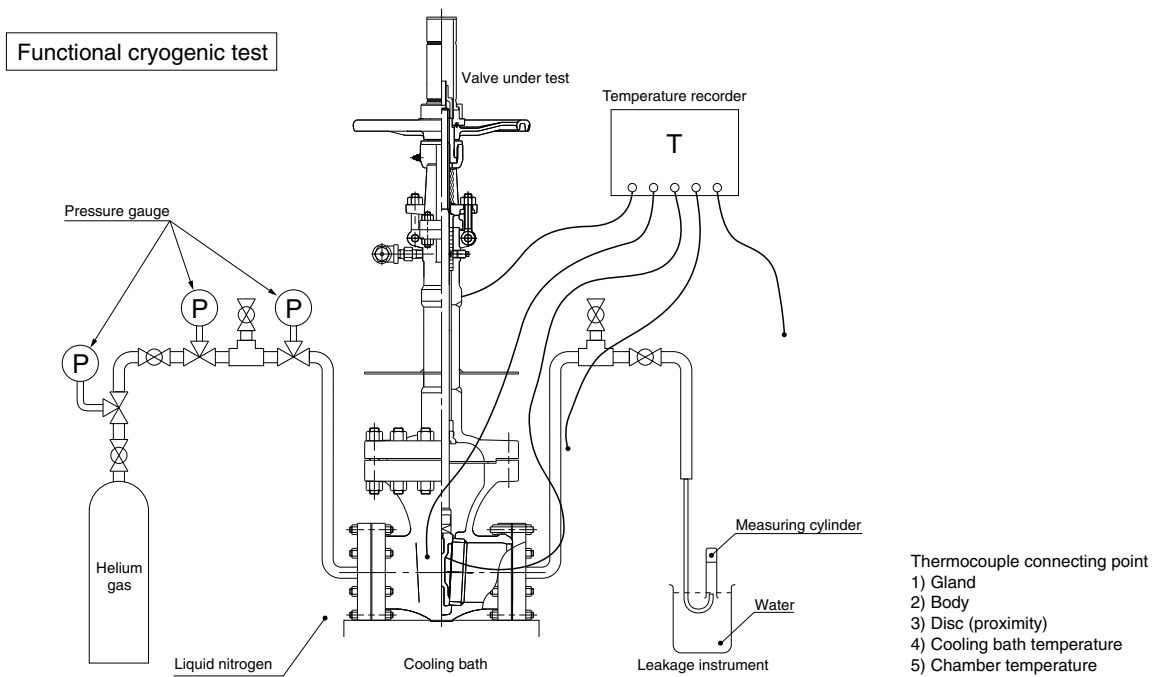


Inspection tests

Test/Inspection Item	Method	Evaluation
Chemical composition analysis		Relevant ASTM Standards
Mechanical property test	ASTM A370	Relevant ASTM Standards
Pressure tests	API 598 or BS 6755 Part 1	API 598
Radiographic inspection	ASTM E446/E146	ASME B16.34
Wet magnetic particle inspection	ASTM E 138	
Liquid penetrant inspection	ASTM E165	
Low-temperature impact test	ASTM A370	ASTM A352/ASME BPVC Sec.VIII Div.1
Dimension inspection		Relevant Valve Standards
Visual inspection		MSS SP-55
Emission test	EPA Method 21 and KITZ Std	KITZ Std.
Cryogenic test	ISO 28921-1	ISO 28921-1

* The test requirements such as test items, methods, and criteria must be agreed upon by both the customer and KITZ.

Cryogenic Valves Test

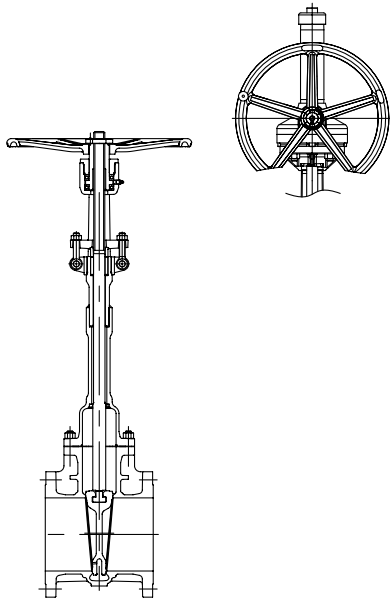


Before test



After test

CLASS 150 / 300 / 600 Stainless Steel Gate Valves



Design Specifications

Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.5

Materials

Name of parts	Materials
Body	CF8M+HF*
Bonnet	CF8M
Stem	316SS
Disc	CF8M+HF*
Gland packing	RTFE+Graphite
Gasket	Graphite
Bonnet bolt	A320 Gr. B8 CL2
Bonnet nut	A194 Gr. 8

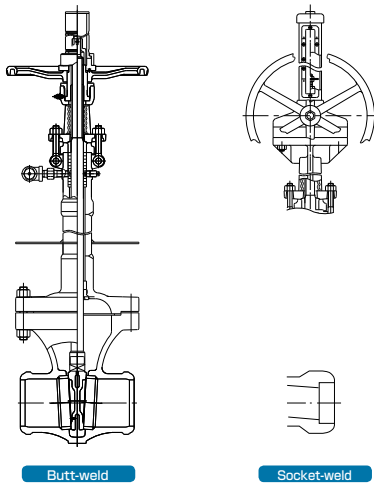
*Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Class 150	150UMALMY					●		●	●			●	●	■	■	■	■	■	■	■
Class 300	300UMALMY					●		●	●			●	■	■	■	■	■	■	■	■
Class 600	600UMALMY					●		●	●			■	■	■	■					

● : Handle operation ■ : Gear operation

Class 150 / 300 / 600 Stainless Steel Gate Valves



Design Specifications

Wall thickness	API600
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.25

Materials

Name of parts	Materials
Body	1 1/2B and smaller CF8M+HF* 2B and larger CF8M
Bonnet	1B and smaller CF8M+HF* 1 1/2B and larger CF8M
Stem	316SS+HF*
Disc	CF8M+HF*
Gland packing	Flexible graphite braided packing + Flexible graphite die mold packing
Gasket	Flexible graphite spiral wound
Body seat ring (2B and larger)	316SS+HF*
Bonnet bolt	A320 Gr. B8 CL2
Bonnet nut	A194 Gr. 8

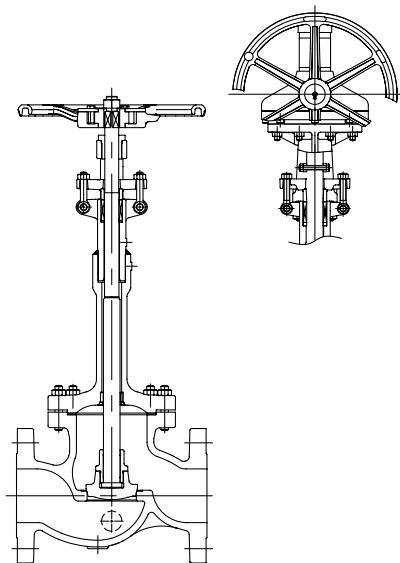
*Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20
RF-flanged	150UMCLMY	●	●	●	●	●	●	●	●	●	●	●	■	■	■	■	■	■	■
RF-flanged	300UMCLMY	●	●	●	●	●	●	●	●	●	●	■	■	■	■	■	■	■	■
RF-flanged	600UMCLMY	●	●	●	●	●	●	●	●		■	■	■	■	■	■	■	■	■
Butt-weld	(T)W150UMCLMY					●	●	●	●	●	●	■	■	■	■	■	■	■	■
Butt-weld	(T)W300UMCLMY					●	●	●	●	●	●	■	■	■	■	■	■	■	■
Butt-weld	(T)W600UMCLMY					●	●	●	●	■	■	■	■	■	■	■	■	■	■
Socket-weld	(T)SW300UMCLMY	●	●	●	●	●													
Socket-weld	(T)SW600UMCLMY	●	●	●	●														

● : Handle operation ■ : Gear operation

CLASS 150 / 300 / 600 Stainless Steel Globe Valves



Design Specifications

Wall thickness	API623
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.5

Materials

Name of parts	Materials
Body	CF8M
Bonnet	CF8M
Stem	316SS
Disc	CF8M+HF*
Gland packing	RTFE+Graphite
Gasket	Graphite
Bonnet bolt	A320 Gr. B8 CL2
Bonnet nut	A194 Gr. 8

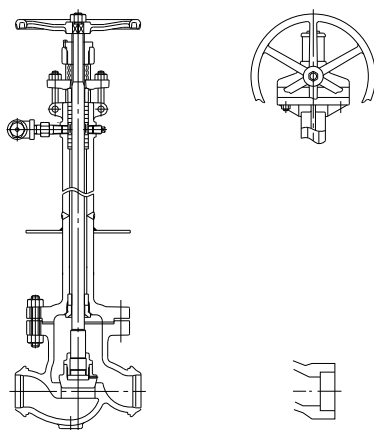
*Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Class 150	150UPCRLMD					●	●	●	●		●	■								
Class 300	300UPCRLMD					●	●	●	●		■	■								
Class 600	600UPCRLMD					●	●	●	■		■	■								

● : Handle operation ■ : Gear operation

Class 150 / 300 / 600 Stainless Steel Globe Valves



Butt-weld

Socket-weld

Design Specifications

Wall thickness	API600
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.25

Materials

Name of parts	Materials
Body	1 1/2B and smaller CF8M+HF* 2B and larger CF8M+HF*
Bonnet	1B and smaller CF8M 1 1/2B and larger 316SS+HF*
Stem	316SS+HF*
Disc	CF8M+HF*
Gland packing	Flexible graphite braided packing + Flexible graphite die mold packing
Gasket	Flexible graphite spiral wound
Bonnet bolt	A320 Gr. B8 CL2
Bonnet nut	A194 Gr. 8

*Co-Cr-W Alloy

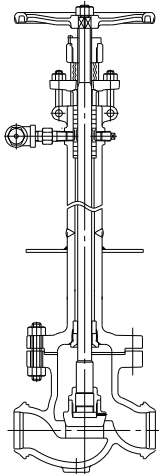
Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20
RF-flanged	150UPCLMY	●	●	●	●	●	●	●	●		●	■							
RF-flanged	300UPCLMY	●	●	●	●	●	●	●	●		■	■							
RF-flanged	600UPCLMY	●	●	●	●	●		■	■		■	■							
Butt-weld	(T)W150UPCLMY					●	●	●	●	●	●	■							
Butt-weld	(T)W300UPCLMY					●	●	●	●		■	■							
Butt-weld	(T)W600UPCLMY					●		■	■		■	■							
Socket-weld	(T)SW300UPCLMY	●	●	●	●	●													
Socket-weld	(T)SW600UPCLMY	●	●	●	●														

Category I

-196°C / -321°F

Class 150 / 300 Stainless Steel Globe Valves (Soft-Seated)



Butt-weld



Socket-weld

Design Specifications	
Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	JPI-7S-67 (Butt-weld)
	JPI-7S-36-96 (Socket-weld)
End connection dimensions	JPI-7S-67
	JIS B2316 (Socket-weld)

Materials	
Name of parts	Materials
Body	CF8
Bonnet	CF8
Stem	304SS
Valve holder	304SS or CF8 (Butt-weld) 304SS (Socket-weld)
Gland	304SS
Gland packing	Flexible graphite cored PTFE braided packing + Flexible graphite die mold packing
Handle	FCD400
Gasket	Flexible graphite spiral wound
Bonnet bolt	A320 2Gr. B8
Bonnet nut	A194 Gr. 8
Seat	PCTFE (Socket-weld)

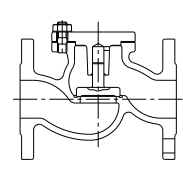
Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Butt-weld	W150UPDCL																			
Socket-weld	SW300UPDAL	●	●	●	●	●	●	●	●											

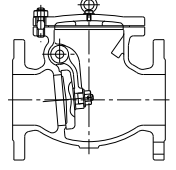
Class 150 / 300 / 600 Stainless Steel Lift Check / Swing Check Valves

Lift Check Valves

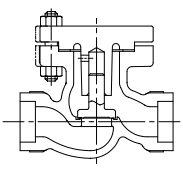
Swing Check Valves



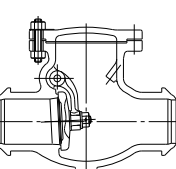
RF-flanged



RF-flanged



Socket-weld



Butt-weld

Design Specifications	
Wall thickness	API600
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.25

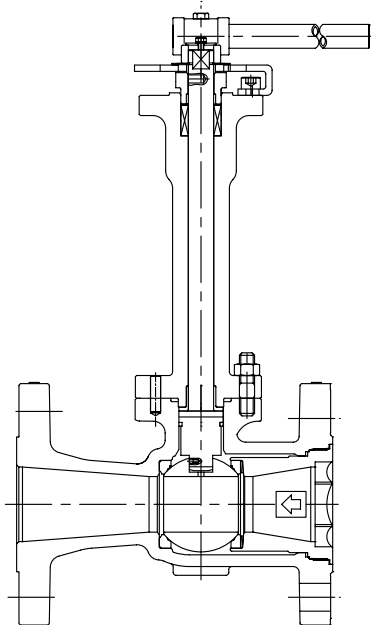
Materials	
Name of parts	Materials
Body	CF8M+HF*
Cover	CF8M
Disc	CF8M+HF*
Gasket	Flexible graphite spiral wound
Cover bolt	A320 Gr. B8 CL2
Cover nut	A194 Gr. 8

*Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20
RF-flanged	150UOCLMY	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●
RF-flanged (Swing check)	300UOCLMY					●	●	●	●		●	●	●	●	●	●	●	●	●
RF-flanged (Swing check)	600UOCLMY	●	●	●	●	●		●	●		●	●	●	●					
Butt-weld	(T)W150UOCLMY					●	●	●	●	●	●	●	●	●	●	●	●	●	●
Butt-weld (Swing check)	(T)W300UOCLMY					●	●	●	●		●	●	●	●	●	●	●	●	●
Butt-weld (Swing check)	(T)W600UOCLMY					●		●	●		●	●	●	●					
Socket-weld (Lift check)	(T)SW300UNCLMY	●	●	●	●														
Socket-weld (Swing check)	(T)SW300UOCLMY					●													
Socket-weld (Lift check)	(T)SW600UNCLMY	●	●	●	●														

Class 150 / 300 Stainless Steel Floating Ball Design, Reduced Bore



Design Specifications

Wall thickness	ASME B16.34
Face to face dimensions	ASME B16.10
Flange specifications	ASME B16.5

Materials

Name of parts	Materials
Body	CF8M
Bonnet	316SS
Insert	CF8M
Stem	SUS660
Seat spring	304SSCSP (Size 3B and larger)
Ball	CF8M
Gland	CF8M
Gland packing	Flexible graphite
Ball seat (Insert side)	HYPATITE PTFE
Ball seat (Body side)	HYPATITE PTFE
	PCTFE (Size 2B and Smaller)
Handle	FCD450-10
Gasket	Flexible graphite
	PTFE
Bonnet bolt	A320 Gr. B8M
Bonnet nut	A194 Gr. 8M

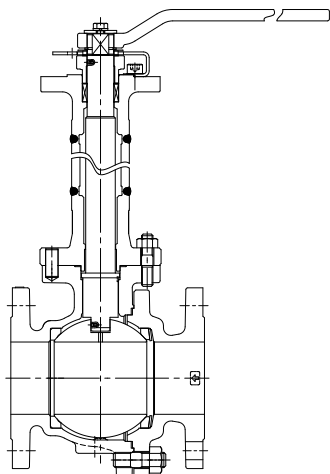
Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400
	B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16
Class 150 RF-flanged 150UTAZLM		●	●	●	●	●		●	●		■	■	■			
Class 300 RF-flanged 300UTAZLM		●	●	●	●	●		●	■		■	■	■			

● : Lever operation ■ : Gear operation

※ Page 22 for Pressure-Temperature Rating.

Class 150 / 300 Stainless Steel Floating Ball Design, Full Bore



Design Specifications

Wall thickness	ASME B16.34
Face to face dimensions	ASME B16.10
Flange specifications	ASME B16.5 (150/300)

Materials

Name of parts	Materials
Body	CF8M
Body cap	CF8M
Bonnet	304SS
Stem	304SS
Seat spring	304SSCSP (Size 2B and larger)
Ball	304SS or CF8M
Ball seat A	HYPATITE PTFE
Ball seat B	HYPATITE PTFE
	PCTFE (Size 1 1/2 B and smaller)
Gasket	Flexible graphite spiral wound
	Flexible graphite seat
Bonnet bolt	304SS(B8)
Bonnet nut	304SS(8)
Gland packing	Flexible graphite die mold packing

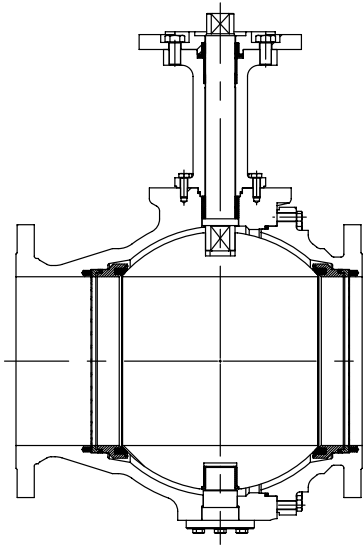
Range

Nominal size	A	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400
	B	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16
Class 150 RF-flanged 150UTDZL		●	●	●	●	●	●	●	●	■	■	■	■	■			
Class 300 RF-flanged 300UTDZL		●	●	●		●	●	●	■	■		■	■				

● : Lever operation ■ : Gear operation

※ Page 22 for Pressure-Temperature Rating.

CLASS 150 / 300 / 600 Stainless Steel Trunnion Ball Design, Full Bore



Design Specifications

Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.5

Materials

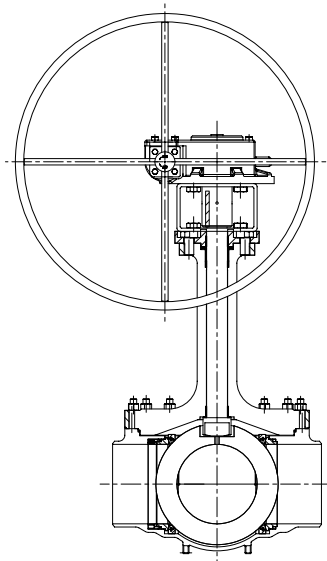
Name of parts	Materials
Body	316SS / CF8M
Bonnet	316SS / CF8M
Stem	316SS
Ball	316SS / CF8M
Ball seat	UHMW-PE
Gland packing	PTFE
Gasket	PTFE

※ Fluid temperature range
 :-196°C~100°C
 (-321°F~212°F)

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Class 150	150UPG14K					●	●	●	●		●	●	●	●	●	●				
Class 300	300UPG14K					●	●	●	●		●	●	●	●	●	●				
Class 600	600UPG14K					●	●	●	●		●	●	●	●	●	●				

CLASS 150 / 300 Stainless Steel Top Entry Ball Design, Full Bore



Design Specifications

Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.10

Materials

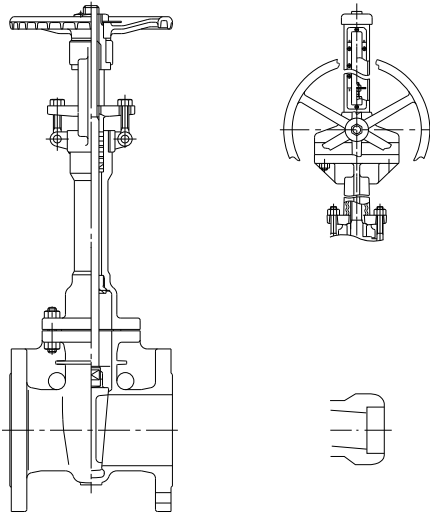
Name of parts	Materials
Body	CF8M / CF3M
Bonnet	CF8M / CF3M
Stem	UNS S66286
Ball	CF8M / CF3M
Ball seat	PCTFE
Gland packing	Graphite
Gasket	Graphite

※ Fluid temperature range
 :-196°C~100°C
 (-321°F~212°F)

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20
Class 150	150UPG67K			●	●	●	●	●	●		●	●							
Class 300	300UPG67K			●	●	●	●	●	●		●	●							

Class 150 / 300 Stainless Steel Gate Valves



RF-flanged

Socket-weld

Design Specifications

Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.5

Materials

Name of parts	Materials
Body	CF8M+HF*
Bonnet	CF8M
Stem	304SS
Disc	CF8M+HF*
Gland packing	Flexible graphite+PTFE braided
Handle	FCD400
Gasket	Ceramic PTFE(Class 150) PTFE spiral wound(Class 300)
Bonnet bolt	A193 Gr. B8 CL2
Bonnet nut	A194 Gr. 8
York sleeve	C6782BE

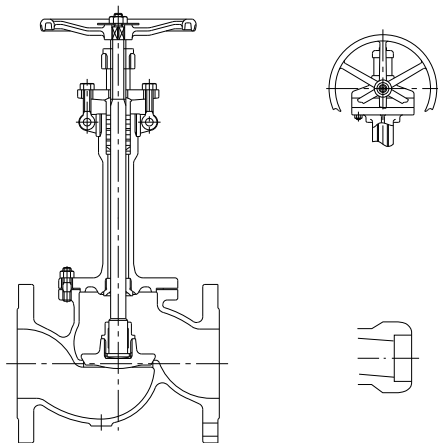
*Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
RF-flanged 150UMAXY		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
Socket-weld SW300UMXY		●	●	●	●															
RF-flanged 300UMAXY		●	●	●	●	●	●	●	●	●	●	■	■	■	■	■			■	■

● : Handle operation ■ : Gear operation

Class 150 / 300 Stainless Steel Globe Valves



RF-flanged

Socket-weld

Design Specifications

Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.5

Materials

Name of parts	Materials
Body	CF8M+HF*
Bonnet	CF8M
Stem	304SS
Disc	1 1/2 B and smaller 304SS+HF* 2B and larger CF8M+HF*
Gland packing	Flexible graphite+PTFE braided
Gasket	Ceramic PTFE
Bonnet bolt	A193 Gr. B8 CL2
Bonnet nut	A194 Gr. 8

*Co-Cr-W Alloy

Range

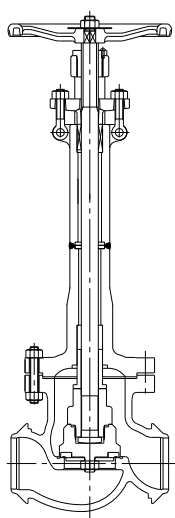
Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20
RF-flanged 150UPAXY		●	●	●	●	●	●	●	●	●	■	■		■					
Socket-weld SW300UPXY		●	●	●	●														
RF-flanged 300UPAXY		●	●	●	●	●	●	●	●	●	●	■							

● : Handle operation ■ : Gear operation

Category II

-104°C / -155°F

Class 150 / 300 Stainless Steel Globe Valves (Soft-Seated)



Butt-weld



Socket-weld

Design Specifications	
Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	JPI-7S-67(Butt-weld)
	JPI-7S-36-96(Socket-weld)
End connection dimensions	JPI-7S-67(Butt-weld)
	JIS B2316 (Socket-weld)

Materials	
Name of parts	Materials
Body	CF8M
Bonnet	CF8M
Stem	304SS
Valve holding	304SS or CF8M
Gland	304SS
Gland packing	Flexible graphite cored PTFE braided packing + Flexible graphite die mold packing
Handle	FCD400
Gasket	Flexible graphite spiral wound
Bonnet bolt	A320 2Gr. B8
Bonnet nut	A194 Gr. 8
Seat	PCTFE

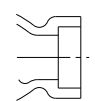
Range C series

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Butt-weld	W150UPDCX																			
Socket-weld	SW300UPDX																			

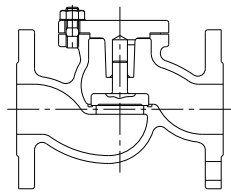
Class 150 / 300 Stainless Steel Lift Check / Swing Check Valves

Lift Check Valves

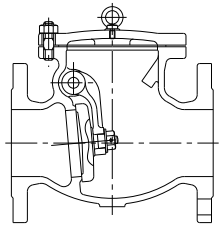
Swing Check Valves



Socket-weld



RF-flanged



RF-flanged

Design Specifications	
Wall thickness	ASME B16.34
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	ASME B16.5

Materials	
Name of parts	Materials
Body	CF8+HF*
Bonnet	CF8
Disc	Lift Check Valves: 304SS+HF* Swing Check Valves: CF8+HF*
Gasket	Ceramic PTFE(Class 150) PTFE spiral wound(Class 300)
Cover bolt	A193 Gr. B8 CL2
Cover nut	A194 Gr. 8

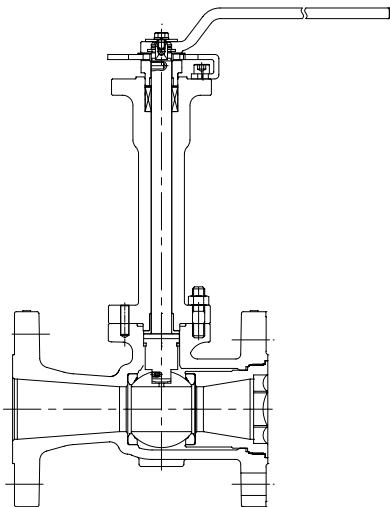
*Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20
RF-flanged (Lift check)	150UNAXY																		
RF-flanged (Swing check)	150UOAXY																		
Socket-weld (Lift check)	SW300UNXY																		
RF-flanged (Lift check)	300UNAXY																		
RF-flanged (Swing check)	300UOAXY																		



Class 150 / 300 Stainless Steel Floating Ball Design, Reduced Bore



Design Specifications

Wall thickness	ASME B16.34
Face to face dimensions	ASME B16.10
Flange specifications	ASME B16.5

Materials

Name of parts	Materials
Body	CF8M
Bonnet	CF8M
Insert	CF8M
Stem	316SS / XM-19HS
Ball	CF8M
Gland	CF8M
Gland packing	Flexible graphite
Ball seat	HYPATITE PTFE
Handle	FCD450-10
Gasket	Flexible graphite seat PTFE
Bonnet bolt	A320 Gr. B8M
Bonnet nut	A194 Gr. 8M

Range

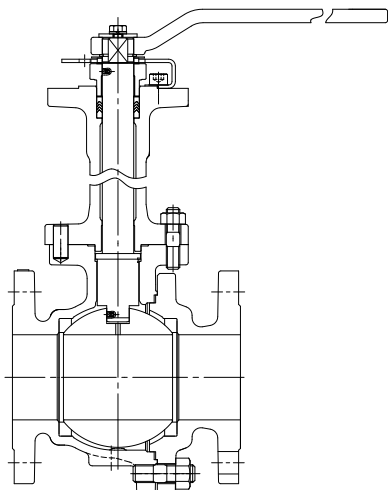
Nominal size			A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400
			B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16
Class 150	RF-flanged	150UTAZXLM		●	●	●	●	●		●	●		■	■	■			
Class 300	RF-flanged	300UTAZXLM		●	●	●	●	●		●	●		■	■	■			

● : Lever operation ■ : Gear operation

※ Page 22 for Pressure-Temperature Rating.



Class 150 / 300 Stainless Steel Floating Ball Design, Full Bore



Design Specifications

Wall thickness	ASME B16.34
Face to face dimensions	ASME B16.10
Flange specifications	ASME B16.5 (150 / 300)

Materials

Name of parts	Materials
Body	CF8
Body cap	CF8
Bonnet	CF8
Stem	304SS
Ball	304SS or CF8
Ball seat	HYPATITE PTFE
Gasket	Ceramic PTFE Flexible graphite spiral wound
Bonnet bolt	304SS(B8)
Bonnet nut	304SS(8)
Gland packing	PTFE

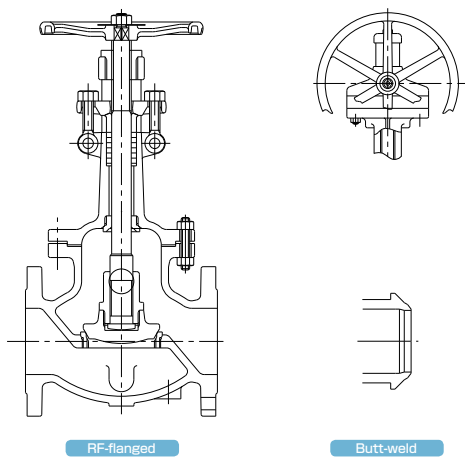
Range

Nominal size			A	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400
			B	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16
Class 150	RF-flanged	150UTDZXL		●	●	●	●	●	●	●	●	●	■	■	■	■			
Class 300	RF-flanged	300UTDZXL		●	●	●		●	●	●	●	●		■	■	■			

● : Lever operation ■ : Gear operation

※ Page 22 for Pressure-Temperature Rating.

Class 150 / 300 / 600 Cast Carbon Steel / Low Alloy Globe Valves



Design Specifications

Wall thickness	API600
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	RF-flanged ASME B16.5 Butt-weld ASME B16.25

Materials

Name of parts	Materials
Body	*
Bonnet	*
Stem	304SS
Disc	4B and smaller 304SS+HF* 6B and larger *
Gland packing	Flexible graphite
Gasket	Flexible graphite spiral wound
Body seat ring (2B and larger)	304SS+HF*
Bonnet bolt	A320 Gr. L7
Bonnet nut	A194 Gr. 8

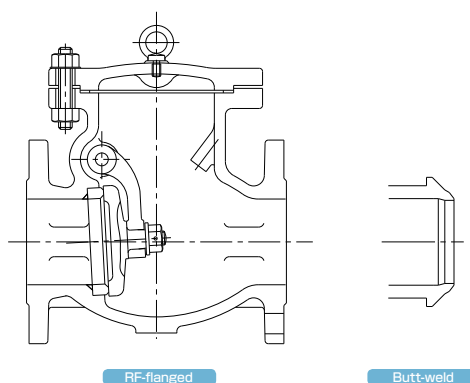
* The minimum working temperatures are dependent on the material.
 Class150: Flexible graphite seat Class300: Flexible graphite seat
 Class600: Soft iron
 *Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Butt-weld	W150SCJSXBLY					●	●	●	●		●	●		■						
RF-flanged	150SCJSXBLY					●	●	●	●		●	●		■						
Butt-weld	W300SCJSXBLY					●	●	●	●		■	■								
RF-flanged	300SCJSXBLY					●	●	●	●		■	■								
Butt-weld	W600SCJSXBLY					●	●	●	■		■	■	■							
RF-flanged	600SCJSXBLY					●	●	●	■		■	■	■							

● : Handle operation ■ : Gear operation

Class 150 / 300 / 600 Cast Carbon Steel / Low Alloy Swing Check Valves



Design Specifications

Wall thickness	API600
Pressure-temperature ratings	ASME B16.34
Face to face dimensions	ASME B16.10
End connection dimensions	RF-flanged ASME B16.5 Butt-weld ASME B16.25

Materials

Name of parts	Materials
Body	*
Cover	*
Disc	4B and smaller 304SS+HF* 6B and larger *
Gasket	Flexible graphite spiral wound
Body seat ring (2B and larger)	304SS+HF*
Bonnet bolt	A320 Gr. L7
Bonnet nut	A194 Gr. 8

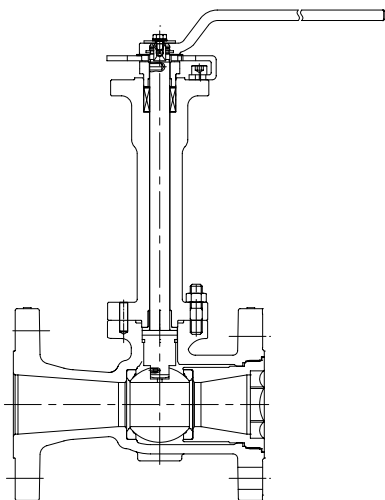
* The minimum working temperatures are dependent on the material.
 Class150: Flexible graphite seat Class300: Flexible graphite seat
 Class600: Soft iron
 *Co-Cr-W Alloy

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		B	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
Butt-weld	W150SCOSXBLY					●	●	●	●		●	●	●	●	●	●	●	●	●	●
RF-flanged	150SCOSXBLY					●	●	●	●		●	●	●	●	●	●	●	●	●	●
Butt-weld	W300SCOSXBLY					●	●	●	●		●	●	●	●	●	●	●	●	●	●
RF-flanged	300SCOSXBLY					●	●	●	●		●	●	●	●	●	●	●	●	●	●
Butt-weld	W600SCOSXBLY					●	●	●	●		●	●	●	●	●	●	●	●	●	●
RF-flanged	600SCOSXBLY					●	●	●	●		●	●	●	●	●	●	●	●	●	●



Class 150 / 300 Cast Carbon Steel Floating Ball Design, Reduced Bore



Design Specifications

Wall thickness	ASME B16.34
Face to face dimensions	ASME B16.10
Flange	ASME B16.5

Materials

Name of parts	Materials
Body	LCC
Bonnet	LF2
Insert	LCC
Stem	316SS
Ball	CF8M
Gland packing	Flexible graphite
Ball seat	HYPATITE PTFE
Handle	FCD450-10
Gasket	Flexible graphite PTFE
Bonnet bolt	A320 Gr. L7M
Bonnet nut	A194 Gr. 7M

Range

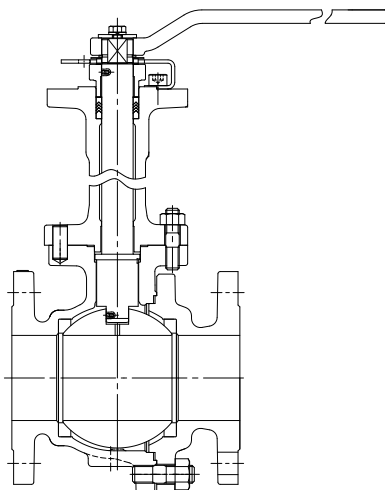
Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400
	B	½	¾	1	1 ½	2	2 ½	3	4	5	6	8	10	12	14	16
Class 150 RF-flanged 150SCTAZXCL		●	●	●	●	●		●	●		■	■	■			
Class 300 RF-flanged 300SCTAZXCL		●	●	●	●	●		●	●		■	■	■			

● : Lever operation ■ : Gear operation

※ Page 22 for Pressure-Temperature Rating.



Class 150 / 300 Cast Carbon Steel Floating Ball Design, Full Bore



Design Specifications

Wall thickness	ASME B16.34
Face to face dimensions	ASME B16.10
Flange	ASME B16.5

Materials

Name of parts	Materials
Body	LCC
Body cap	LCC
Bonnet	A350 Gr. LF2
Stem	316SS / XM-19HS
Ball	316SS · CF8M
Ball seat	HYPATITE PTFE
Gasket	Flexible graphite spiral wound Flexible graphite
Bonnet bolt	A320 Gr. L7M
Bonnet nut	A194 Gr. 7M
Gland packing	Flexible graphite

Range

Nominal size	A	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400
	B	½	¾	1	1 ½	2	2 ½	3	4	5	6	8	10	12	14	16
Class 150 RF-flanged 150SCTDZXCL		●	●	●	●	●		●	●		■	■	■			
Class 300 RF-flanged 300SCTDZXCL		●	●	●	●	●		●	●		■	■	■			

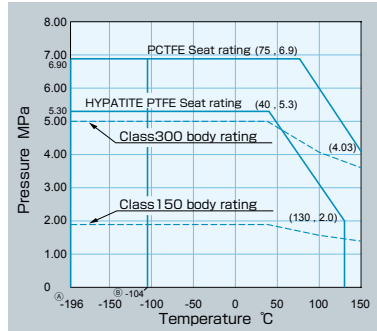
● : Lever operation ■ : Gear operation

※ Page 22 for Pressure-Temperature Rating.

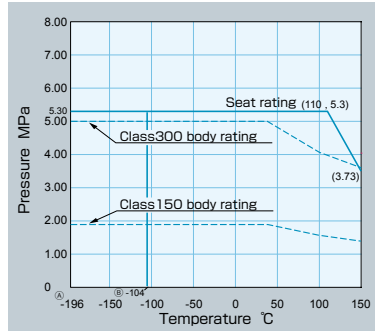
● Pressure-Temperature Rating (Seat Rating)

● Stainless Steel

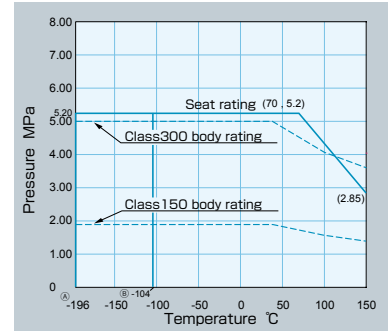
- Ⓐ UTAZLM : ½B to 2B
- Ⓐ UTDZL : ½B to 1½B
- Ⓑ UTAXLM : ½B to 1B
- Ⓑ UTDZXL : ½B to ¾B



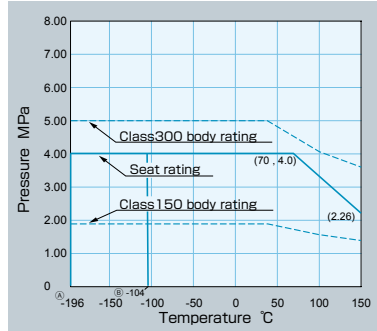
- Ⓐ UTAZLM : 3B
- Ⓐ UTDZL : 2B • 2½B
- Ⓑ UTAXLM : 1½B to 3B
- Ⓑ UTDZXL : 1B to 2½B



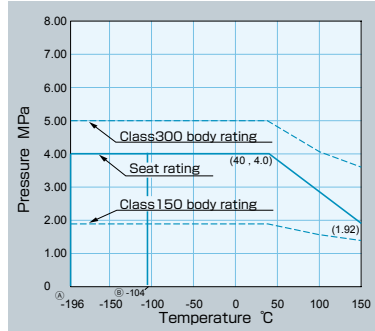
- Ⓐ UTAZLM / Ⓑ UTAXLM : 4B • 6B
- Ⓐ UTDZL / Ⓑ UTDZXL : 3B • 4B



- Ⓐ UTAZLM / Ⓑ UTAXLM : 8B • 10B
- Ⓐ UTDZL / Ⓑ UTDZXL : 5B • 6B

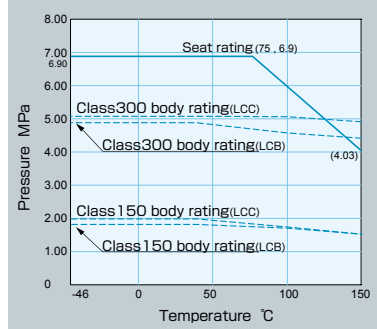


- Ⓐ UTDZL / Ⓑ UTDZXL : 8B • 10B

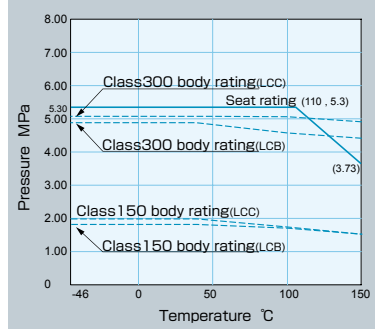


● Cast Carbon Steel

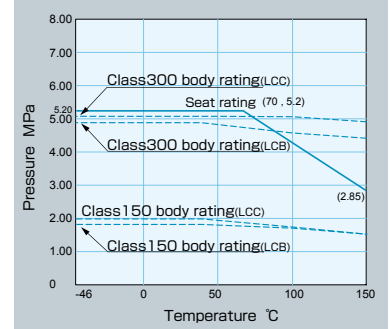
- SCTAZXCL(BODY/LCC) : ½B • 1B
- SCTDZXCL(BODY/LCC) : ½B • ¾B
- SCTDZXBL(BODY/LCB) : ½B • ¾B



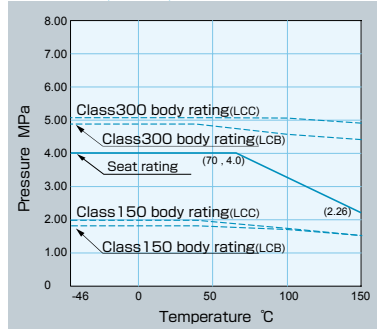
- SCTAZXCL(BODY/LCC) : 1½B • 3B
- SCTDZXCL(BODY/LCC) : 1B • 2½B
- SCTDZXBL(BODY/LCB) : 1B • 2½B



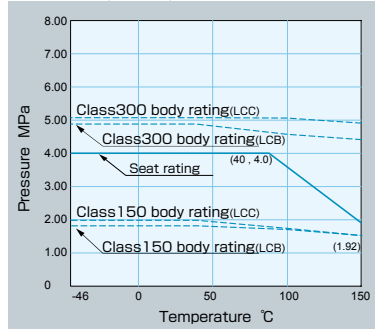
- SCTAZXCL(BODY/LCC) : 4B • 6B
- SCTDZXCL(BODY/LCC) : 3B • 4B
- SCTDZXBL(BODY/LCB) : 3B • 4B



- SCTAZXCL(BODY/LCC) : 8B • 10B
- SCTDZXCL(BODY/LCC) : 5B • 6B
- SCTDZXBL(BODY/LCB) : 5B • 6B



- SCTDZXCL(BODY/LCC) : 8B • 10B
- SCTDZXBL(BODY/LCB) : 8B • 10B



※ Please contact KITZ Corporation for details of pressure-temperature range of trunnion ball and toptentry ball valves.

Considerations when selecting a product

- The products described in this catalog are designed and produced specifically for low temperatures. Please have the person deciding on the design and specifications of the equipment and facilities determine the suitability of these valves.
- The range of usage of the products described in this catalog is based on official standards and specifications, and our internal company standards. Please confirm each product's specifications and fluid, temperature, and pressure usage conditions when selecting the appropriate product.
- When using our products in an environment in which there are legal restrictions, or voluntary specifications for standards and regulations of use have been established, please select the appropriate product after confirming all regulations and restrictions.
- Please ensure all necessary safety precautions are carried out (after confirming them with our company) when using our products in association with nuclear power, railways, aircraft, vehicles, ships, medical equipment, food processing equipment, safety equipment, and amusement park machinery.
- Our products use fluorine resin and rubber are not designed and manufactured for use in transplants into the human body or for use in medical equipment that will come into contact with bodily fluids or biological tissue. Usage for such purposes is not possible.
- The corrosion resistance of different materials used in the composition of these products can be different. Please select a product after confirming the required corrosion resistance under the conditions of usage for each material (fluid, temperature, and pressure).
- Even when used within the pressure and temperature standards for usage of the product, please confirm suitability with us when usage is close to the limitations or when used with frequent opening and closing for prolonged periods.
- Be sure to confirm with us when using these devices in a corrosive environment. Precautions must be taken when handling these products.
- Our product has oil and grease coated on the inside, outside, sliding areas, and areas contacting with fluids to prevent rust and to increase lubrication. When safety, hygiene, and functional problems arise because of oil or grease spillage, please take appropriate measures such as washing.
- Removal of foreign matter is not part of the design of our products. If the product is to be used for equipment processing beverages, food, etc., please take the appropriate measures to remove any foreign matter.
- Please use gate valves in either the completely open or the completely closed position. Using the valve partially open or closed may damage the valve or the surface of the valve seat.
- Swing check valves can be used for horizontal and vertical piping. However, the upward fluid flow is limited when used in vertical piping. Lift check valves cannot be used for vertical piping.
- Ball valves must be used in the fully open or fully closed positions. The ball seats may become deformed if the valve is not in the fully open or fully closed position during use.
- When in operation, the check valve may generate noise caused by chattering and water hammer. Please take these phenomena into consideration in the design of your pipe layout for prevention of chattering and water hammer when selecting the appropriate size of valve.
- If our product is to be exported, it is necessary to acquire export permission from the Ministry of Economy, Trade and Industry, in accordance with regulations of the Export Trade Control Ordinance for foreign currency exchange and Foreign Trade Law. Please consult our company if you require additional information.
- The figures in this catalog show representative sizes. Please access our company homepage to submit a request if detailed illustrations of the selected product are required. (Our company homepages: www.kitz.com)

Precautions when handling products

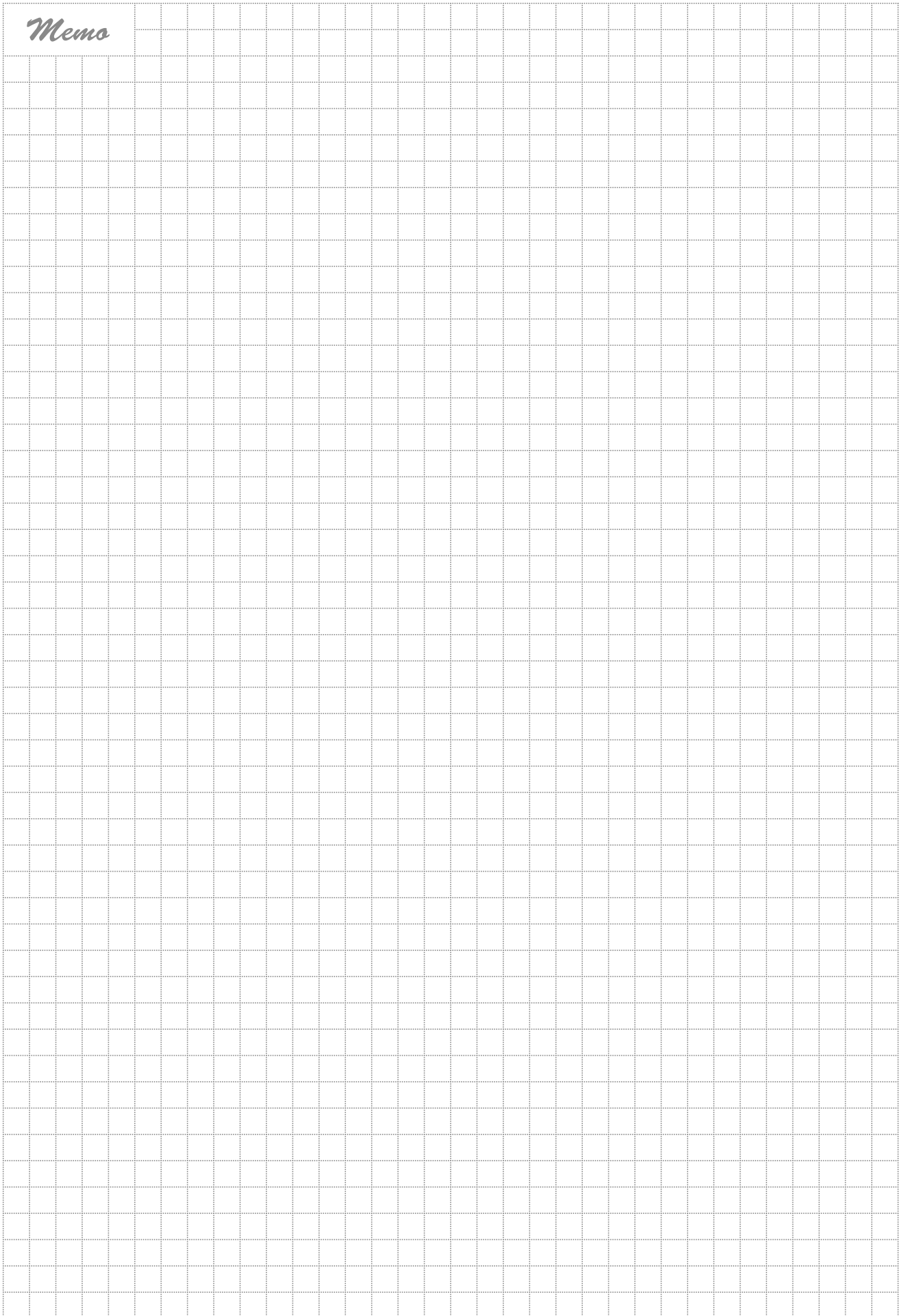
- Precautions when handling products introduced in this catalog are not described in the catalog. Make sure to obtain the applicable instruction manual for the product and observe the warnings and precautions to ensure correct, safe use of the product.

Liability Disclaimer

Our company does not assume any responsibility for damage caused by natural disasters, acts by third parties, other accidents, deliberate damage by customers, misuse, usage under abnormal conditions, or other conditions outside our responsibility. Our company does not assume any responsibility for damage when the purchaser of our product does not observe the restrictions described in the catalog,

instruction manual included with the product, or any damage caused by usage outside the specifications, either during installation or during use of the product. Our company does not assume any responsibility for damage caused by modifications to the product that are done by a company other than our own, including damage caused to other equipment.

Memo



CAUTION

Pressure-temperature ratings and other performance data published in this catalog have been developed from our design calculation, in-house testing, field reports provided by our customers and/or published official standards or specifications. They are good only to cover typical applications as a general guideline to users of KITZ products introduced in this catalog.

For any specific application, users are kindly requested to contact KITZ Corporation for technical advice, or to carry out their own study and evaluation for proving the suitability of these products to such an application. Failure to follow this request could result in property damage and/or personal injury, for which we shall not be liable.

While this catalog has been compiled with the utmost care, we assume no responsibility for errors, impropriety, or inadequacy. Any information provided in this catalog is subject to from-time-to-time change without notice for error rectification, product discontinuation, design modification, new product introduction or any other cause that KITZ Corporation considers necessary. This edition cancels all previous issues.

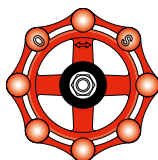
Read the instruction manual carefully before use.

NOTICE

If any products designated as strategic material in the Foreign Exchange and Foreign Trade Law, Cabinet Order Concerning Control of Export Trade, Cabinet Order Concerning Control of Foreign Exchange and other related laws and ordinances ("Foreign Exchange Laws") are exported to any foreign country or countries, an export license issued by the Japanese Government will be required under the Foreign Exchange Laws.

Further, there may be cases where an export license issued by the government of the United States or other country will be required under the applicable export-related laws and ordinances in such relevant countries.

The contract shall become effective subject to the fact that a relevant export license is obtained from the Japanese Government.



*A chrysanthemum-handle is a symbol of KITZ,
the brand of valve reliability*

ISO 9001 certified since 1989

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