KITZ

High Pressure Valve Series for Hydrogen Stations

KITZ CORPORATION

KITZ Clean Energy Supply Technology for Future Generation

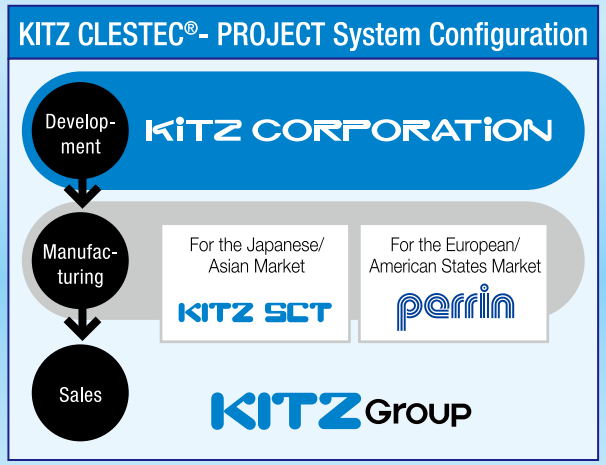
KITZ CLESTEC®-Series

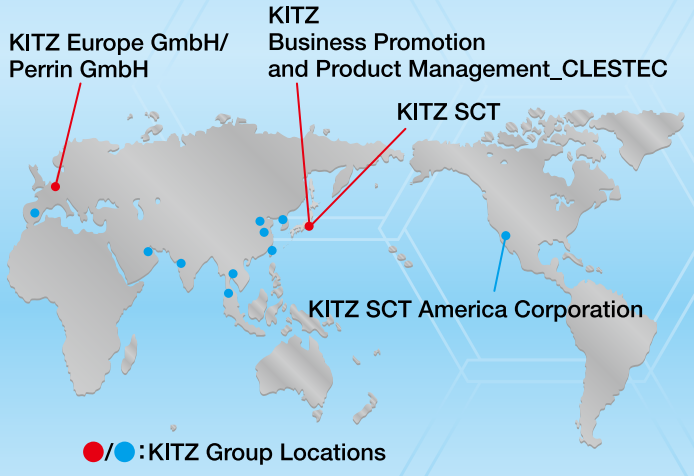
High Pressure Valve Series for Hydrogen Stations

- KITZ started the development of low cost highly durable 70 MPa class high pressure ball valves for hydrogen from 2008. Substantiating the performance through various demonstration tests, KITZ finally completed a “103 MPa trunnion mounted type metal/soft seat ball valve with excellent sealing performance and durability less subjected to the influence of fluid temperature.” In addition, manual needle valves and in-line check valves with a Cv-value of 1.1 were added to form a line-up known as the KITZ CLESTEC®-Series (High Pressure Valve Series for Hydrogen Stations)!

“KITZ CLESTEC®-PROJECT”

As a joint enterprise of the group, development has been conducted by KITZ, manufacturing by KITZ SCT and Perrin GmbH, and sales promoted by the whole group.

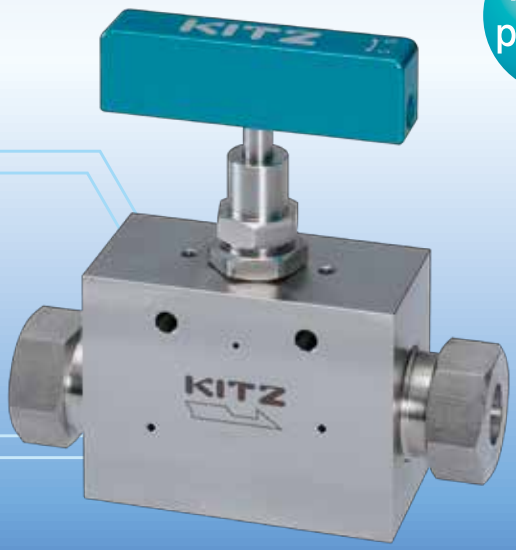




Manual Ball Valve

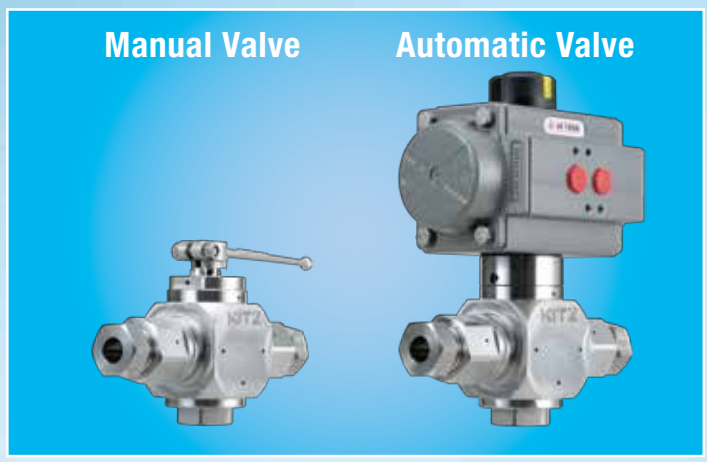
Automatic Ball Valve

Patent pending



Needle Valve

Check Valve



■Specifications of Ball Valves <Automatic, Manual>

Maximum Allowable Pressure	103 MPa: 85 ℃
Fluid Temperature Range	−50 to +85 ℃
Cv-Value	2.1 (for 9/16" 40,000 psi)
Body Material	F316/F316L-1.4401/04
Fitting	Coned & Thread
Actuator	Manual/Automatic (Pneumatic Spring Return)

■Actuator Specifications

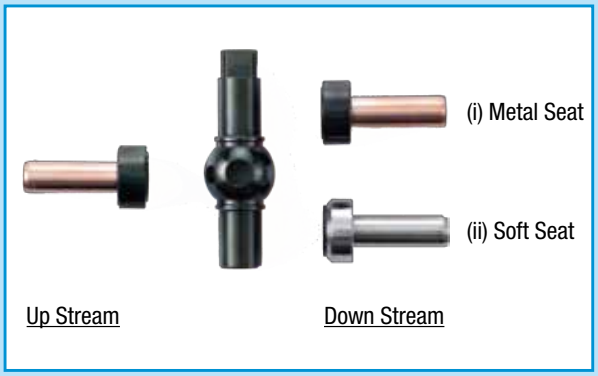
Operating Fluid	Instrumentation Air
Operation Pressure Range	0.4 to 0.6 MPa
Pressure Resistance of Cylinder	0.98 MPa
Volume of Cylinder (L)	0.14 L
Operation Temperature Range	−20 ℃ to +60 ℃

《Features of Ball Valves》

1. DLC coated metal seat structure

An excellent durability has been achieved by incorporating DLC coating which sufficiently endures the high loads (surface pressure) generated by fluid pressure of 103 MPa and does not degrade the super precision machining on stem/ball and seat portions.

* DLC: Diamond-Like Carbon



2. Metal seat structure less susceptible to variation of hydrogen temperature

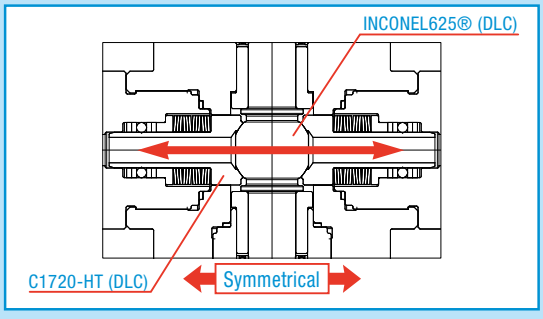
Selection of ball-seat types available in accordance with the intended use.

(i) Metal Seat:
High durability (Open/Close operation durability: 40,000 cycles) has been achieved. Allowable leakage: 10 cc/min.

(ii) Soft Seat:
High sealing performance has been achieved. Allowable leakage: 0 cc/min. (at shipment), 0.3 cc/min. (after 20,000 cycles of operation)

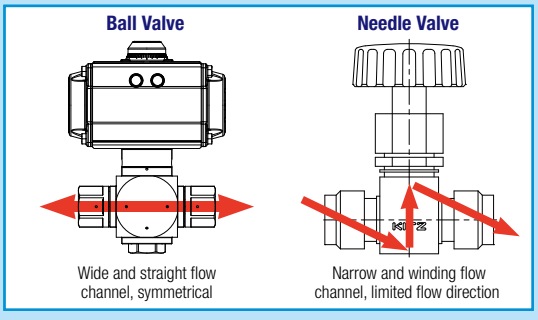
3. No restriction on flow directions provided by the symmetric structure (Metal seat only)

Improved freedom of pipework layout based on no restriction on flow directions.



4. Cv-value almost 10 times as high as needle valve (in-house comparison)

Cv-value 2.1 (for 9/16" 40,000 psi)

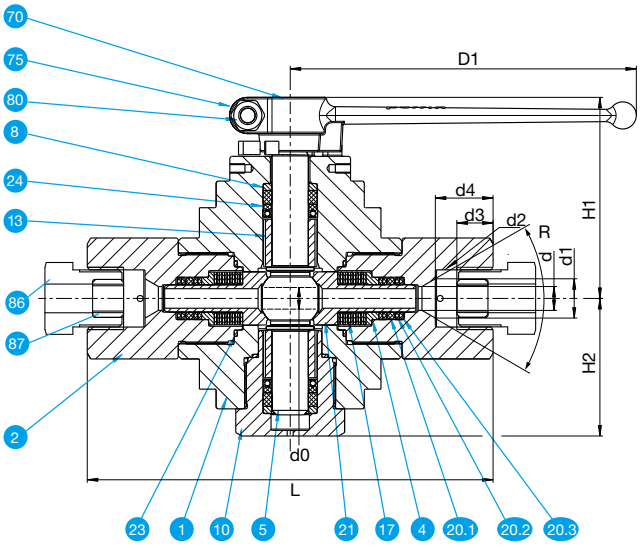


《KITZ Product Code》

Metal Seated Ball Valve : KH19-M

Soft Seated Ball Valve : KH19-S

KH19 (LEVER HANDLE)



■Component List

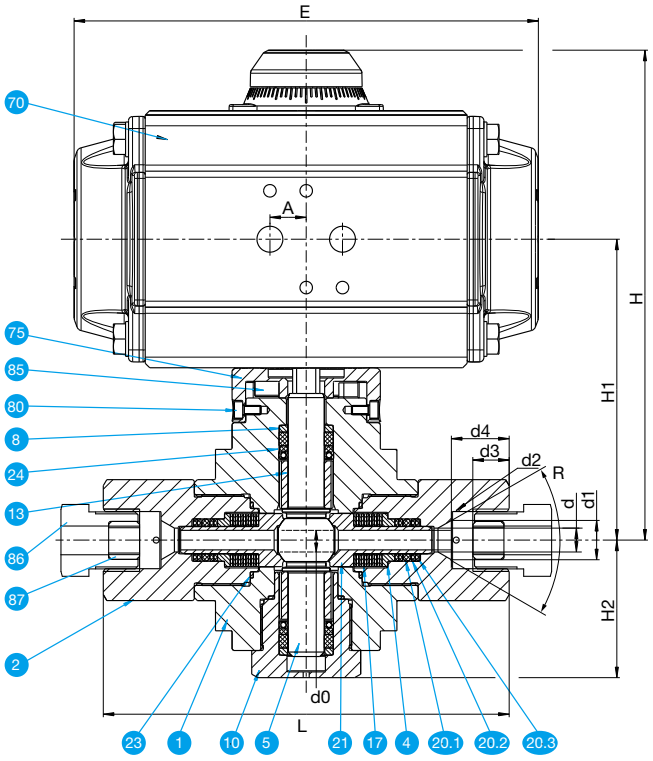
P/N	Parts Name	Material
1	Body	F316/F316L-1.4401/04
2	Body Cap	F316/F316L-1.4401/04
4	Retainer Ring	F316/F316L-1.4401/04
5	Ball	2.4856 + DLC
8	Spacer Ring	2.0936
10	Bottom Cover	F316/F316L-1.4401/04
13	Bearing	2.0936
17	Disk Spring	A167 TYPE316
20.1	O-Ring	EPDM
20.2	Back-Up Ring	PTFE-25% GLAS
20.3	Back-Up Ring	PEEK
21	Seat Retainer	2.1247 + DLC
23	Gasket	2.0090
24	Stem Sealing	KITZ Standard
70	Lever	1.4308
75	Hex. Screw M6x25	A2.70
80	Hex. Nut M6	A4
86	Gland	A479 TYPE316
87	Collar	A479 TYPE316

■Dimension Table

Unit: mm

Nominal Size	Inch Tubing End	d0	d	d1	d2	d3	d4	R	H1	H2	D1	L	Weight
9/16	9/16" 20,000 psi	6.4	7.9	12.7	13/16"-16UNF	11.2	19.1	60	66.5	45.5	114.5	134.2	2.8 kg
9/16	9/16" 60,000 psi	6.4	4.8	9.7	1-1/8"-12UNF	15.7	19.1	60	66.5	45.5	114.5	134.2	
3/8	3/8" 20,000 psi	6.4	5.2	7.9	9/16"-18UNF	9.7	15.7	60	66.5	45.5	114.5	134.2	
3/8	3/8" 60,000 psi	6.4	3.2	6.6	3/4"-16UNF	13.5	15.7	60	66.5	45.5	114.5	134.2	
1/4	1/4" 20,000 psi	6.4	2.8	4.8	7/16"-20UNF	7.1	12.7	60	66.5	45.5	114.5	134.2	
1/4	1/4" 60,000 psi	6.4	2.4	4.3	9/16"-18UNF	9.7	11.2	60	66.5	45.5	114.5	134.2	

KH19 (ACTUATOR)



■Component List

P/N	Parts Name	Material
1	Body	F316/F316L-1.4401/04
2	Body Cap	F316/F316L-1.4401/04
4	Retainer Ring	F316/F316L-1.4401/04
5	Ball	2.4856 + DLC
8	Spacer Ring	2.0936
10	Bottom Cover	F316/F316L-1.4401/04
13	Bearing	2.0936
17	Disk Spring	A167 TYPE316
20.1	O-Ring	EPDM
20.2	Back-Up Ring	PTFE-25% GLAS
20.3	Back-Up Ring	PEEK
21	Seat Retainer	2.1247 + DLC
23	Gasket	2.0090
24	Stem Sealing	KITZ Standard
70	Pn. Actuator	—
75	Extension F03	F316/F316L-1.4401/04
80	Screw M3 x 6	A2.70
85	Screw M5 x 10	A2.70
86	Gland	A479 TYPE316
87	Collar	A479 TYPE316

■Dimension Table

Unit: mm

Nominal Size	Inch Tubing End	d0	d	d1	d2	d3	d4	R	H	H1	H2	Actuator		L	Weight
												E	A		
9/16	9/16" 20,000 psi	6.4	7.9	12.7	13/16-16UNF"	11.2	19.1	60	162	99.5	45.5	153.5	12	134.2	4.5 kg
9/16	9/16" 60,000 psi	6.4	4.8	9.7	1-1/8-12UNF"	15.7	19.1	60	162	99.5	45.5	153.5	12	134.2	
3/8	3/8" 20,000 psi	6.4	5.2	7.9	9/16-18UNF"	9.7	15.7	60	162	99.5	45.5	153.5	12	134.2	
3/8	3/8" 60,000 psi	6.4	3.2	6.6	3/4-16UNF"	13.5	15.7	60	162	99.5	45.5	153.5	12	134.2	
1/4	1/4" 20,000 psi	6.4	2.8	4.8	7/16-20UNF"	7.1	12.7	60	162	99.5	45.5	153.5	12	134.2	
1/4	1/4" 60,000 psi	6.4	2.4	4.3	9/16-18UNF"	9.7	11.2	60	162	99.5	45.5	153.5	12	134.2	

■Specifications of Needle Valves

Maximum Allowable Pressure	103 MPa: 85°C
Fluid Temperature Range	−40 to +85°C
Cv-Value	0.23 (for 3/8 60,000 psi)
Body Material	ASTM A276 TYPE316
Fitting	Coned & Thread
Actuator	Manual

《Features of Needle Valves》

1. Needle valve incorporates non-rotational structure

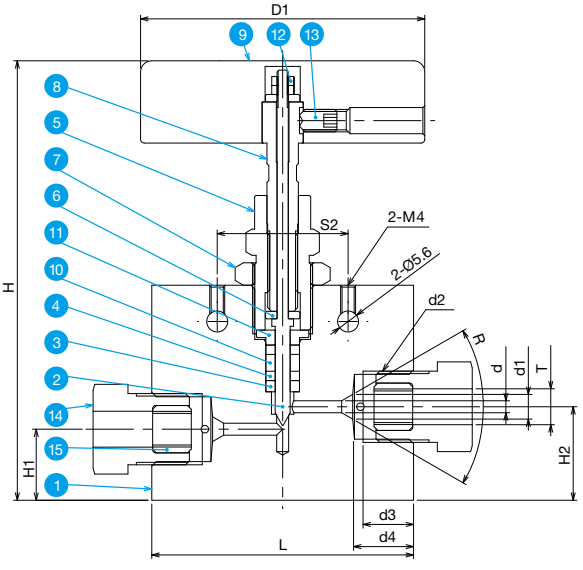
The adopted non-rotational structure secures an excellent sealing performance by preventing galling or scratching due to the up/down sealing motion of a valve body while rotating.

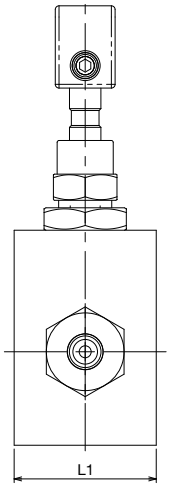
2. Secure shaft sealing structure

《KITZ Product Code》

HNV6

HNV6





■Component List

P/N	Parts Name	Material
1	Body	A276 TYPE316
2	Needle	A276 TYPE316
3	Gland Ring	A276 TYPE316L
4	Gland Packing A	PEEK
5	Cap	A276 TYPE316
6	Washer	B194 C17200
7	Hexagon Nut	A194 Gr.8
8	Sleeve	A276 TYPE303
9	Bar Handle	6061-T6
10	Gland Packing B	KITZ STANDARD
11	Gland	A276 TYPE316
12	Hexagon Nut	A194 Gr.8
13	Hexagon Socket Head Set Screw	Stainless Steel
14	Gland	A479 TYPE316
15	Collar	A479 TYPE316

■Dimension Table

Unit: mm

Nominal Size	Inch Tubing End	d	d1	d2	d3	d4	R	H	H1	H2	D1	L	L1	S2	Weight
3/8	3/8" 60,000 psi	3.2	6.6	3/4"-16UNF	13.5	15.7	60	104 (Full Open)	19	25	76	70	38	35	1.5 kg
1/4	1/4" 20,000 psi	2.8	4.8	7/16"-20UNF	7.1	12.7	60	104 (Full Open)	19	25	76	70	38	35	
1/4	1/4" 60,000 psi	2.4	4.3	9/16"-18UNF	9.7	11.2	60	104 (Full Open)	19	25	76	70	38	35	
3/8	3/8" 20,000 psi	3.2	7.9	9/16"-18UNF	9.7	15.7	60	104 (Full Open)	19	25	76	70	38	35	

■Specifications of Check Valves

Maximum Allowable Pressure	103 MPa: 85 ℃
Fluid Temperature Range	−40 to +85°C
Cv-Value	1.1 (for 9/16 40,000 psi)
Body Material	ASTM A276 TYPE316
Minimum Sealing Pressure	10.0 MPa
Fitting	Coned & Thread
Cracking Pressure	0.01 MPa

《Features of Check Valves》

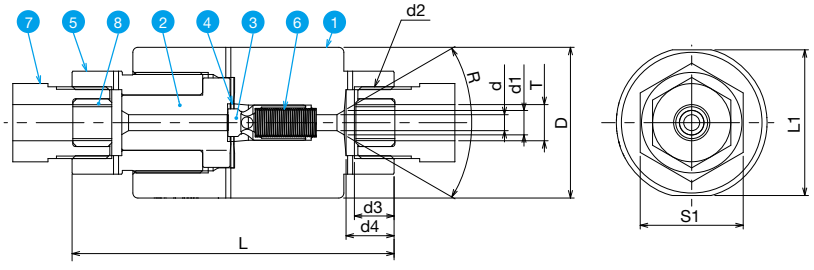
1. **High flow type in-line check valve never seen before**
   The diameter identical with the pipe bore of φ6.4, 9/16” 40,000 psi specification is adopted as flow channel diameter.
   Cv-value = 1.1 has been achieved.

2. **Excellent valve seat sealing performance**

《KITZ Product Code》

HIC9

HIC9



■Component List

P/N	Parts Name	Material
1	Body	A276 TYPE316
2	Sleeve	A276 TYPE316
3	Poppet	PEEK
4	Gasket	B187 C10200
5	Cap	A276 TYPE316
6	Spring	A313 TYPE316
7	Gland	A479 TYPE316
8	Collar	A479 TYPE316

■Dimension Table

Unit: mm

Nominal Size	Inch Tubing End	d	d1	d2	d3	d4	R	D	L	L1	S1	Weight
9/16	9/16" 40,000 psi	6.4	11.4	1-1/8"-12UNF	15.7	19.1	60	60	128.2	58	41	2.5 kg
1/4	1/4" 20,000 psi	2.8	4.8	7/16"-20UNF	7.1	12.7	60	60	128.2	58	41	
1/4	1/4" 60,000 psi	2.4	4.3	9/16"-18UNF	9.7	11.2	60	60	128.2	58	41	
3/8	3/8" 20,000 psi	5.2	7.9	9/16"-18UNF	9.7	15.7	60	60	128.2	58	41	
3/8	3/8" 60,000 psi	3.2	6.6	3/4"-16UNF	13.5	15.7	60	60	128.2	58	41	
9/16	9/16" 20,000 psi	7.9	12.7	13/16"-16UNF	11.2	19.1	60	60	128.2	58	41	
9/16	9/16" 60,000 psi	4.8	9.7	1-1/8"-12UNF	15.7	19.1	60	60	128.2	58	41	

1 Transportation

1-1 Cautions for Transportation

⚠ Caution

Pay special attention to cardboard packing, if used. The package may suffer a loss of integrity from moisture etc. and damage the product.

1-2 Transportation

- Please maintain the package/packing style at delivery as it is when moving or transporting the valves to pipework site.
- Do not throw, drop, drag, or roll etc. as this will apply shock to the valve.

2 Storage

2-1 Cautions for Storage

⚠ Caution

- Do not store in the corrosive gas atmosphere. The corrosion will occur from the thread and damage the function.
- Do not drop, upset, vibrate, or apply heavy loads during storage. The valve function may be affected.
- Do not pile up for storing. Load collapse may occur to cause human injury and product damage.

3 Pipework-1

3-1 Cautions on Pipework

⚠ Warning

When working in high places, pay special attention to safety such as preventing a person from going underneath.

⚠ Caution

- Do not disassemble the valve when fitting to the pipework.
- Never use a pipe wrench on the valve. Please use a proper tool such as a spanner.
- At fitting on the pipework, do not apply torque in the direction of loosening the connecting thread of body and cap. (left turn) It will cause leakage at the connection.

- Apply a lubricant to the thread of gland nut suitable for temperature and environment etc. for use.
- For mounting and removing a valve, be sure to use a spanner on hexagonal collar at the near side to pipework. If a spanner is used on the far side collar, it may cause the leakage from valve main unit. In the case of a needle valve, the midsection may be adjusted for mounting and removing.
- Avoid applying a bending moment from the pipework to the valve at installation. If an excessive bending moment is applied, the valve body may be deformed and cause leakage at the connection.

3 Pipework-2

3-2 Please check the following items before mounting a valve to the pipework.

- The fluid pressure and valve specification are matching.
- Proper tube size, material, and thickness are used.
- No damage on the valve and fitting portion. No missing parts.
- Remove dusts and scales etc. in the pipework before connecting a valve.
- Do not throw, drop, drag, or roll etc. to apply shock to a valve.
- Remove the protector for the valve immediately before mounting on the pipework.
- For detailed instructions on thread cutting and end machining, etc., please contact our company.
- Attach the gland nut and collar on the tube. Thoroughly screw in the collar until one or two thread can be seen at the tip of tube. (Ref. Fig.1)

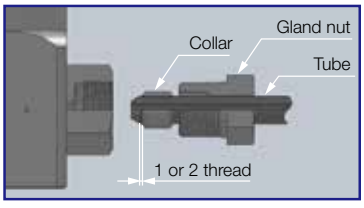


Fig.1

- Insert the tube in the valve body, and fasten the gland nut as tight as possible with your fingers.
- Use a torque wrench and re-tighten to the specified torque. Please refer to the table below for standard torques.

Fitting Tube Size	Fastening Torque (N-m)
1/4" 20,000 psi	27
3/8" 20,000 psi	41
9/16" 20,000 psi	75
1/4" 60,000 psi	34
3/8" 60,000 psi	68
9/16" 40,000 psi	136
9/16" 60,000 psi	136

- After mounting on the pipework, be sure to check every fastening portion, and re-tighten if loose.
- After mounting on the pipework, be sure to fully open all the valves in the pipe line, and remove the foreign matters by flushing. Never operate a valve for open/close during flushing.
- If you want to disassemble the joint after having connected the pipe once and re-connect to the pipework again, paint a pair of match marks using a marking pen (Ref. thick lines in Fig. 2) to indicate the position of gland nut before loosening. Check the secure re-tightening to the match marks at re-assembly.

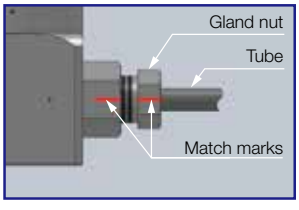


Fig. 2

4 Regular Checks

4-1 Maintenance Inspections

- If a piping installation with mounted valves is opened for a maintenance inspection, the check on valve seats and external leakage and on operation shall be conducted as necessity. If any sign of malfunctioning on valve seats, external leakage etc. is found, conduct an overhaul inspection, and the valve has to pass this inspection.

4-2 Cautions at removing from and mounting to pipework

⚠ Warning

- When removing a valve from pipework, be sure to drain the liquid and return to the atmospheric pressure.
- A ball valve may have some sealed pressure or fluid under fully closed status. Be sure to half open the valve to release pressure and fluid before removing a valve.
- If the fluid inside the pipework is toxic, inflammable or corrosive, please completely remove such fluid from inside the pipework and valves.
- Be careful enough during work to prevent the fluid from contacting your body, or catching fire.
- When working in high places, pay special attention to safety such as preventing a person from going underneath, etc.

⚠ Caution

- Wear protective goods such as safety glasses, safety gloves, safety shoes, etc.
- Secure a necessary foothold for working for removing and mounting a valve.
- For mounting and removing a valve, be sure to use a spanner on the hexagonal collar at the near side to pipework. If a far side collar or body barrel is used, it may cause the leakage from main unit.

MEMO

MEMO

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⚠ CAUTION

Pressure-temperature ratings and other performance date 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 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.