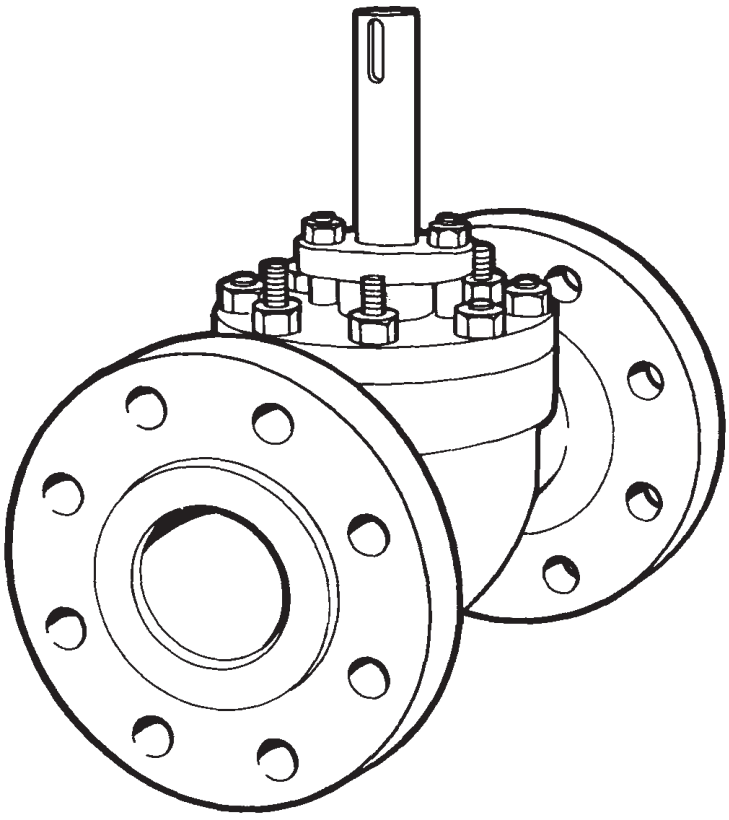
Neles™ top entry rotary control valve

Series Top5™

Installation, maintenance and operating instructions



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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1 GENERAL

1.1 Introduction

These instructions describe the installation, operation and maintenance of series Top5™ top entry rotary control valves.

Neles™ Top5™ is a generic name for a product series group comprising the following valve series:

- T5 — flanged, reduced bore, single seated
- T4 — like T5, with weld ends
- T25 — full bore, flanged, otherwise like T5, OBSOLETE
- T35 — like T25, with weld ends. OBSOLETE

When the valve is equipped with a control ball reducing the flow rate and thus preventing noise and cavitation, it is called Q-T5 etc.

Further information on the installation, operation and maintenance of actuators is given in the individual manuals for each actuator model.

NOTE:
Selection and use of the valve in a specific application requires close consideration of detailed aspects. E.g. Q2G-trim is for relatively clean gas applications, note possibility of clogging. Due to the nature of the product, this manual cannot cover all the individual situations that may occur when installing, using or servicing the valve.

If you are uncertain about use of the valve or its suitability for your intended purpose, please contact Valmet for more information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Neles document id:10O270EN.pdf).

1.2 Valve structure

The Top5 valve series is intended for either control or special shut-off applications. It is tight in one direction. The ball may be equipped with an attenuator element (Q attenuator). The ball has been mounted on the body and on the bonnet with bearings.

Thanks to its top entry structure, the valve is also applicable for use as a butt weld end version, because the valve can be serviced without removing it from the pipeline.

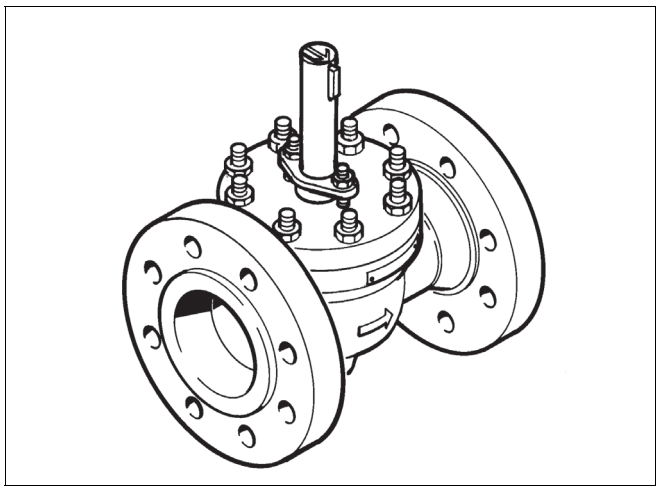


Fig. 1 The valve bonnet is bolted to the body

1.3 Markings

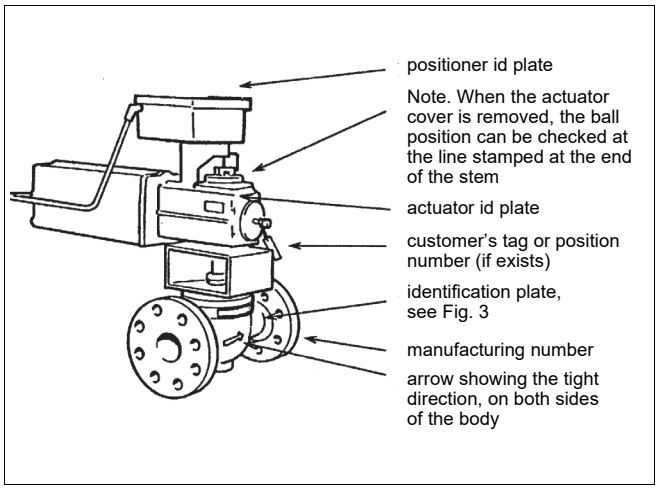
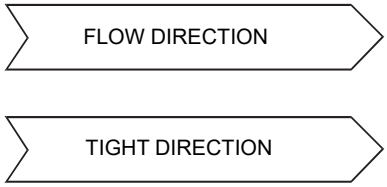


Fig. 2 Valve markings

In addition to the markings shown in Figure 2, the valve may have directional arrows:



When standard seats are used, the arrow on the body shows the tight direction.

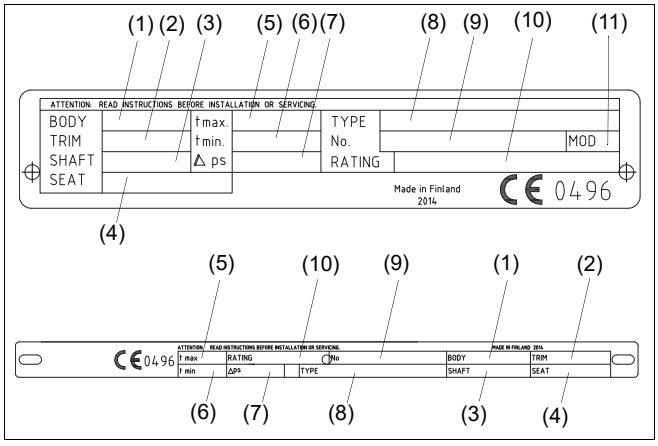


Fig. 3 Identification plate markings

Identification plate markings:

1. Body material
2. Ball material (TRIM)
3. Stem material (SHAFT)
4. Seat material
5. Maximum operating temperature
6. Minimum operating temperature
7. Maximum shut-off pressure differential
8. Type code
9. Number of the list of valve manufacturing parts
10. Pressure class
11. Model

The type designation is explained in Section 11.

1.4 Technical specifications

The identification plate must be checked for the essential safety limits in the extreme range, such as pressure and temperature resistance and the highest operable pressure difference.

The selected actuator size or the available instrument air pressure may place restrictions on the highest operable pressure so that it becomes lower than the limits determined by the mechanical strength of the valve.

Face-to-face length:	
series T5	ANSI/ISA S75.03, IEC 534-3-3
series T25, T4, T35 API	Class 600
Body pressure and temperature rating:	ANSI B16.34*), see Table 1
Bearings:	
code E	Metal-reinforced PTFE easy, low Δp use: max. +230 °C demanding, high Δp use: max +200 °C
code B	Cobalt based alloy +450 °C max. pressure difference according to a separate specification
Dimensions:	See pages 14...20
Weights:	See pages 14...20

*) Unless the selected bearings or flange standards impose a lower pressure and temperature restriction.

1.5 Valve approvals

The valve is fire safe for hydrocarbon applications according to API 607, 4th edition and BS 6755, part 2. Packing constructions to meet German "TA-Luft" and US Clean Air Act requirements..

1.6 CE marking

The valve meets the requirements of the European Directive 2014/68/EU relating to pressure equipment, and has been marked according to the Directive.

1.7 Recycling and disposal

Most valve parts can be recycled if sorted according to material. Most parts have material marking. A material list is supplied with the valve. In addition, separate recycling and disposal instructions are available from the manufacturer. A valve can also be returned to the manufacturer for recycling and disposal against a fee.

1.8 Safety precautions

CAUTION:
Do not exceed the valve performance limitations!
Exceeding the limitations marked on the valve may cause damage and lead to uncontrolled pressure release. Damage or personal injury may result.

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!
Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve. Be aware of the type of medium involved. Protect yourself and the environment from any harmful or poisonous substances. If the valve is equipped with an actuator, do not forget to close and detach the actuator pressure supply pipeline. Failure to do this may result in damage or personal injury.

CAUTION:
Beware of the cutting movement of the ball!
Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline. When the valve is actuated, the ball functions as a cutting device. Close and detach the actuator pressure supply pipeline for valve maintenance. Failure to do this may result in damage or personal injury.

CAUTION:
Protect yourself from noise!
The valve may produce noise in the pipeline. The noise level depends on the application. It can be measured or calculated using the Neles Nelprof software. Observe the relevant work environment regulations on noise emission.

CAUTION:
Beware of a very cold or hot valve!
The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

CAUTION:
Potential electrostatic charging hazard. Ensure the protection in the process.

Table 1 Body materials commonly used by Neles valves and their resistance to pressure and temperature according ANSI 16.34, (bar)

Pressure class 1)	Flange code 1)	Body material	Material code	°C								
				38	50	100	150	200	250	300	350	400
ANSI 300	D	A216 gr WCB Carbon steel	D	51.1	50.1	46.4	45.2	43.8	41.7	38.7	37.0	34.5
		A351 gr CF8M Stainless steel	A	49.6	48.1	42.2	38.5	35.7	33.4	31.6	30.4	29.1
ANSI 600	F	A216 gr WCB Carbon steel	D	102.1	100.2	92.8	90.5	87.6	83.4	77.5	73.9	69.0
		A351 gr CF8M Stainless steel	A	99.3	96.3	84.4	77.0	71.3	66.8	63.3	60.8	58.2

1) Flange codes according to PN standards, see Chapter 13. Max resistance to pressure and temperature depending to the flange and its material. Resistance in the middle part of the valve up to size DN 400 (16") according to table A600.

1.9 Welding notes

WARNING:
Welding and/or grinding stainless steel and other alloys containing chromium metal may cause the release of hexavalent chromium. Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

NOTE:
A qualified welder must do the installation welding. The welder and welding procedure should be qualified in accordance with the ASME Boiler and Pressure Vessel Code Section IX or other applicable regulation.

CAUTION:
To prevent damage to the seat and seals, do not allow the temperature of the seat and body seal area to exceed 94 °C (200 °F). It is recommended that thermal chalks be used to check the temperature in these areas during welding.

CAUTION:
Ensure that any weld splatter does not fall onto the valve closing members eg. ball or seats. This may damage critical seating surfaces and cause leaks.

2 TRANSPORTATION, RECEPTION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport. Store the valve carefully before installation, preferably indoors in a dry place. Do not take the valve to the intended location and do not remove the flow port protectors until the valve is installed. The valve is delivered in the open position, with the exception of valve packages where the actuator spring closes the valve.

NOTE:
Valves with a carbon steel body may become badly corroded on the inside if the inside is left damp during storing.

CAUTION:
Never lift the valve or valve package by the actuator, positioner, limit switch or their piping. Place the lifting ropes securely around the valve body.

3 INSTALLATION IN THE PIPELINE

Remove the protecting plates around the valve and check that the valve is clean. Flush and blow the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the valve.

Check that the pipeline is supported properly. Do not attempt to correct any pipeline misalignment by means of the flange bolting or welding of the valve. Do not support the pipeline using the valve as help.

An arrow pointing at the tight direction of a seat that is tight in one direction (the most commonly used version) is cast on both sides of the valve. This is usually the flow direction. If the flow direction and the tight direction can be opposite to each other, the piping plan must be checked for the correct position.

Check that the unbroken side of the ball faces the seat when the valve is in the CLOSED position.

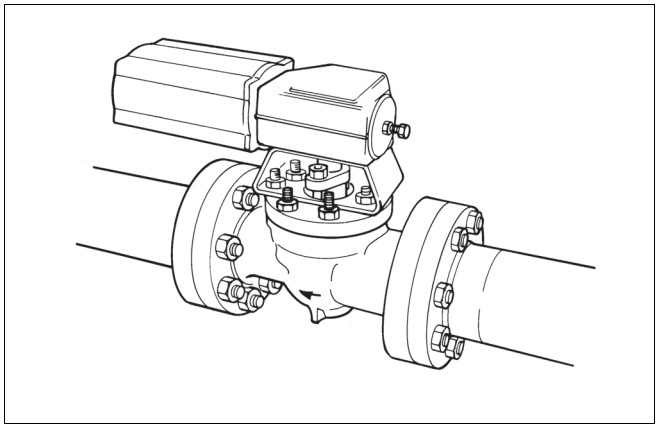


Fig. 4 Installation of the valve into the pipeline

Install the valve in the position shown in the piping installation drawing. The position code shows the installation position that should be used when the actuator has been installed at the factory. The position code has been given either on the specification sheet or in the dimensional drawing of the valve.

There should be enough free space around the valve so that the actuator can be removed and the valve dismantled without detaching the valve from the pipeline.

Check that the indicator arrow on the actuator is parallel to the ball flow opening.

The actuator must not touch the pipeline or any permanent structures, because pipeline vibration may damage it or interfere with its operation. If the pipeline drawings show a support for the actuator, the support must be installed.

Make sure that the valve is in the OPEN position when welding a weld end valve into the pipeline.

Note! A valve equipped with a BJ actuator is in the CLOSED position when it is not pressurized. Direct compressed air into the cylinder to turn the valve open.

When welding a valve into a pipeline, protect the valve from welding spatter, see Fig. 5. Always ground the welding apparatus on the side of the pipeline.

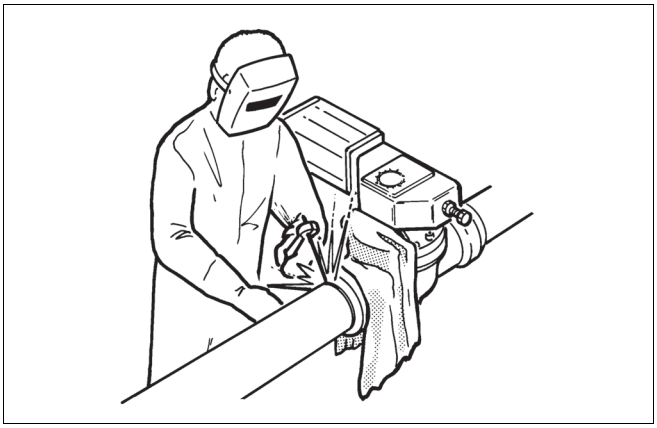


Fig. 5 Protecting the valve during welding

3.1 Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 6.

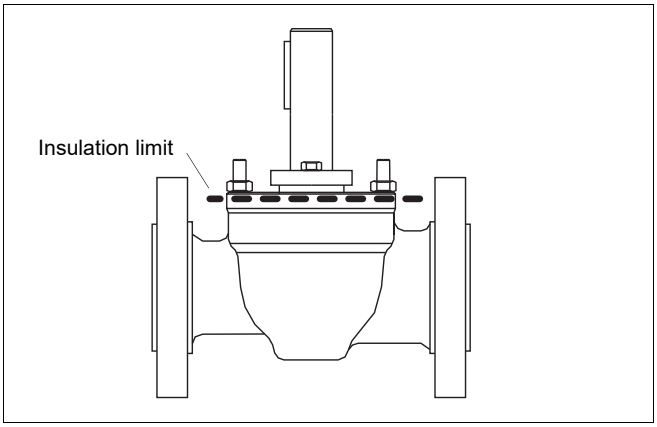


Fig. 6 Insulation of the valve

4 COMMISSIONING

The gland packing may leak after long storage. If the packing leaks, tighten it steadily until the leaking stops. Do not tighten the packing unnecessarily as this will increase the required torque and impair the control properties. (More information about the gland packing in section 5.1.).

Check that the valve has been installed correctly in relation to the flow direction.

5 MAINTENANCE

CAUTION:
Observe the safety precautions mentioned in Section 1.8 before maintenance!

CAUTION:
When handling the valve or the valve package as a whole, bear in mind the weight of the valve or the entire package.

5.1 Maintenance general

Although Neles valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership.

The inspection and maintenance interval depends on the actual application and process condition.

The inspection and maintenance intervals can be specified together with your local Valmet experts. During this periodic inspection the parts detailed in the Spare Part Set should be replaced.

Time in storage should be included in the inspection interval. Maintenance can be performed as presented below. For maintenance assistance, please contact your local Valmet office.

The part numbers in the text refer to the exploded view in section 10 and to the parts list in section 11, unless otherwise stated.

NOTE:
When sending goods to the manufacturer for repair, do not disassemble them. Clean the valve carefully and flush the valve internals.

For safety reasons, inform the manufacturer of the type of medium used in the valve (include material safety datasheets (MSDS)).

NOTE:
In order to ensure safe and effective operation, always use original spare parts to make sure that the valve functions as intended.

NOTE:
For safety reasons, replace pressure retaining bolting if the threads are damaged, have been heated, stretched or corroded.

5.2 Gland packing

The gland packing of the valve may be made of graphite with a PTFE finish or it may be a model where the lowest graphite ring has been replaced with a metallic O-ring sleeve, see Fig. 7. If the gland packing is tightened too much, the control properties of the valve may suffer. The need to tighten the packing may be reduced by means of the O-rings.

Even if the O-rings were damaged, there will be enough graphite rings to enable tightening of the packing and to ensure reliable operation.

The standard is a graphite gland packing with a PTFE finish.

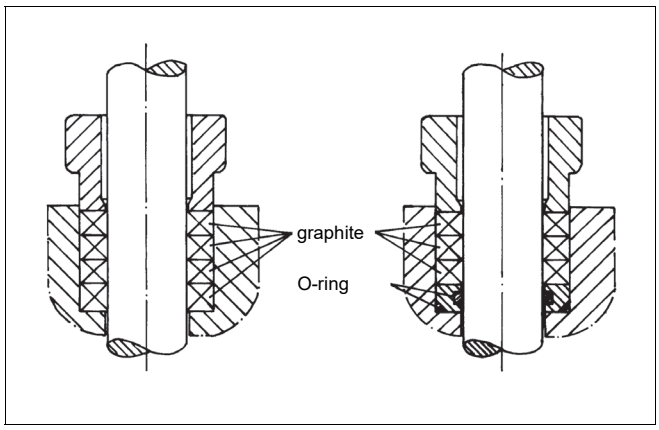


Fig. 7 Gland packing

Changing the gland packing

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

- Remove the actuator.
- Make sure the valve is not pressurized.
- Detach the gland (9).
- Remove the old packing rings (69), see Fig. 8.

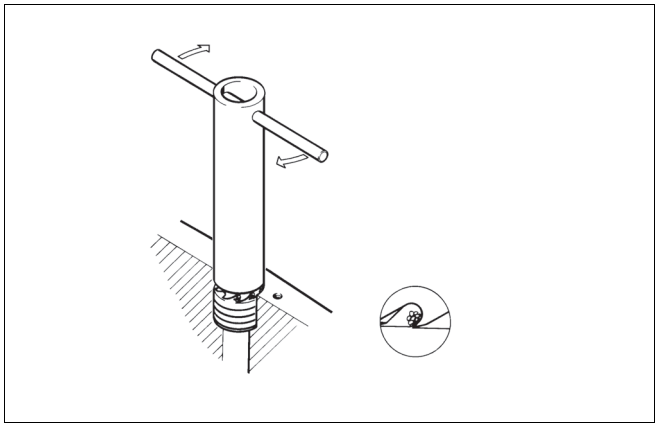


Fig. 8 Using a special tool to remove the gland packing

- Clean the packing ring counterbore.
- Check that there are no burrs on the edges of the key slot.
- Install the new packing rings one by one using the gland as a tool. Cover the stem key slot with tape, a plastic bag or other similar material that protects the O-ring when you push the gland over the key slot.

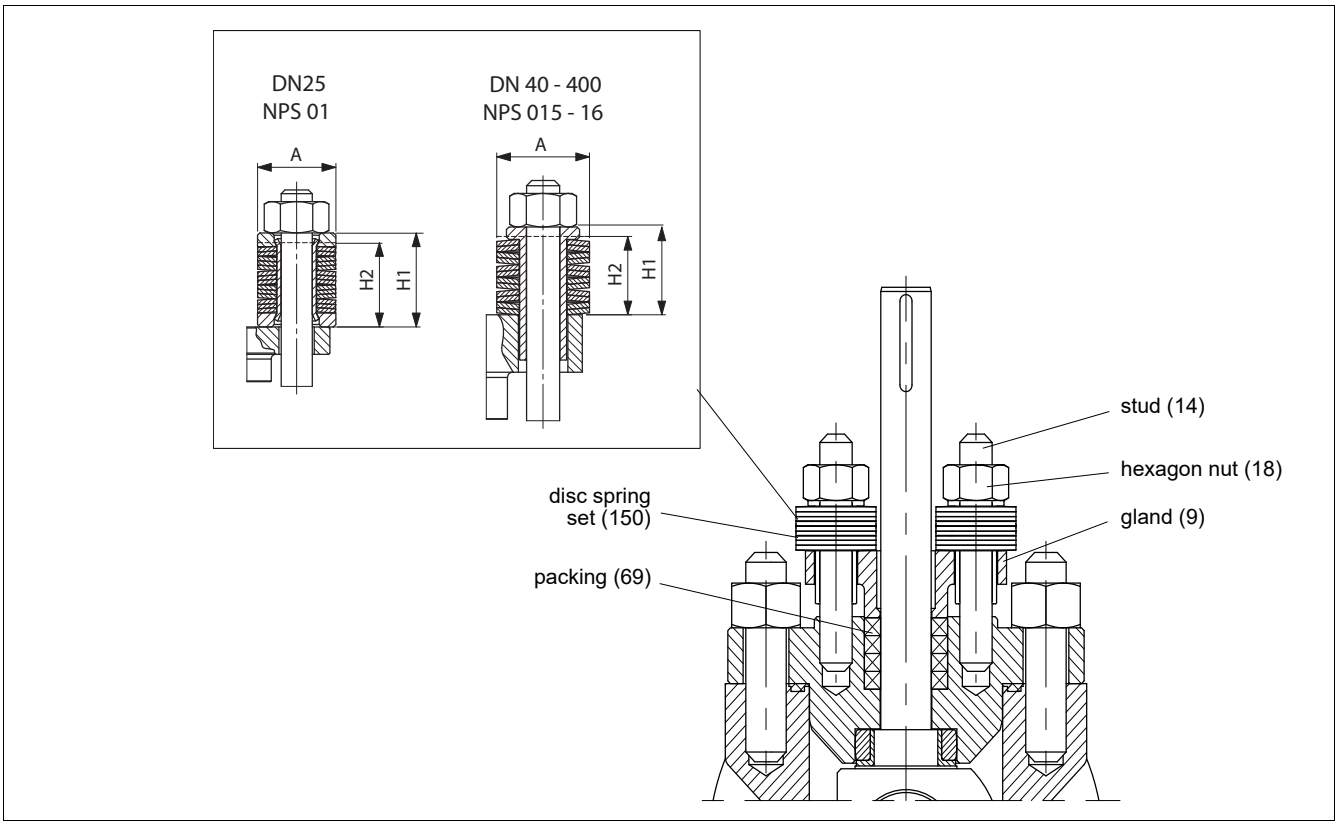


Fig. 9 Gland packing

If the packing has O-rings, lubricate them with silicone grease before installation. Put the outer O-ring on the bottom of the packing ring counterbore and the inner O-ring on the gland.

Gland packing tightening

Gland packing without disc springs:

- Pre-compress the packing rings (69) first tightening the gland nuts (18) to the torque Tt. See Fig. 9 and the value from Table 2.
- Carry out 3…5 operation cycles with the valve. Suitable range of movement is about 80 %. It is not necessary to fully close or open the valve during the operation.
- Retighten the nuts (18) to the torque Tt, see table 2.
- Check leakage when the valve is pressurized. If the leakage still occurs when the valve is pressurized, re-tighten the nuts (18) but don't exceed the torque Tt value in the Table 2 by 50 %.

Gland packing with disc springs:

- Pre-compress the packing rings (69) first tightening the disc springs (150) to the height H2. See Fig. 9 and the value from Table 2.
- Carry out 3…5 operation cycles with the valve. Suitable range of movement is about 80 %. It is not necessary to fully close or open the valve during the operation.
- Retighten the disc springs (150) to the height H2, see table 2.
- Check leakage when the valve is pressurized. If the leakage still occurs when the valve is pressurized, re-tighten the disc springs (150) but do not fully compress (totally flat) them.

Table 2 Tightening of gland packing

Valve size		Shaft dia	Spring dimensions (free)		Graphite	
					Disc spring	Nut
DN	NPS	mm	A, mm	H_1, mm(1	H_2, mm(1	T_t, Nm(2
25	01	15	20	24	23	4
40	015	20	31.5	27.2	24.5	20
50	02	20	31.5	27.2	24.5	20
80	03	25	35.5	33.6	30.9	25
100	04	35	40	35.5	31.5	50
150	06	45	50	51.3	46.3	110
200	08	55	50	45.6	40.7	120
250	10	60	50	45.6	40.7	130
300	12	70	63	53.5	47.6	170
350	14	85	63	53.5	47.2	200
400	16	85	63	53.5	47.2	200

(1 Use H_1 and H_2 dimensions (mm) when construction is with liveloaded packing.
(2 Use torque (Nm) values when construction is without liveloaded packing.

5.3 Dismantling the valve

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

- Remove the actuator and the actuator mounting shelf.
- Remove the key (10). Check that there are no burrs on the edges of the key slot.
- Loosen the gland packing by unscrewing the nuts (18).
- Remove the hexagon nuts (16) on the bonnet.
- Lift the bonnet. You may use an extractor as help, see Fig. 10.

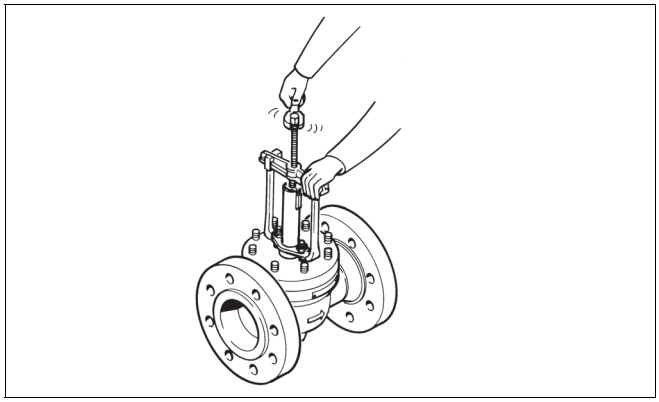


Fig. 10 Detaching the bonnet

- Turn the valve ball 180 degrees from the CLOSED position, see Fig. 11.

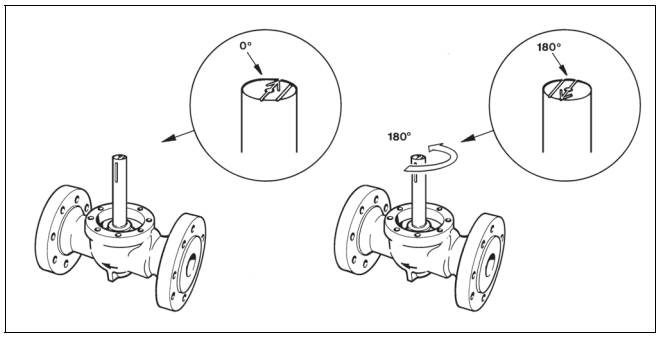


Fig. 11 Turning the ball

- Lift the ball. Check that the unbroken side of the ball does not rest on the seat, see Fig. 12.

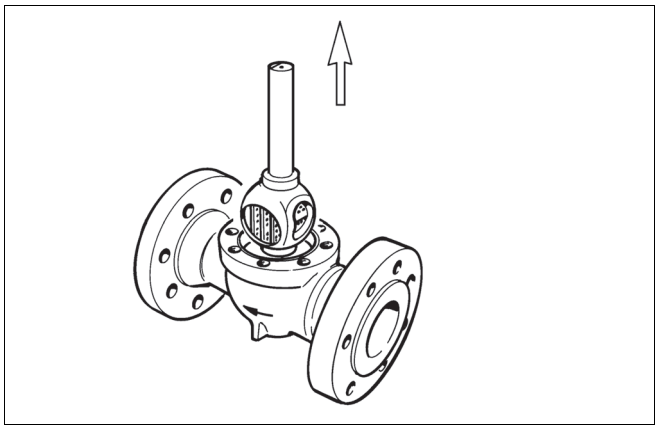


Fig. 12 Lifting the ball from the body

- Remove the seat (7).

5.4 Assembly

Check all sealing surfaces with care. If necessary, lap the sealing surfaces with diamond powder and thereafter with water sanding paper no. 1200. Clean all parts carefully.

Spray the sealing surfaces of the ball and the seat thinly with e.g. Molykote 321R dry lubricant. Wipe the surfaces with a soft cloth after the lubricant has dried. Check the gland packing. If it shows any signs of damage, remove it and clean the packing ring counterbore. Do not install a new gland packing until you have put the bonnet back.

Installing a seat

The same seat selection is available for all Top5 series valves. The dimensions of seat recesses have been standardized to be of equal sizes since June, 1990.

Push the seat into the body by hand (see Fig. 13).

Final installation can be done using a plastic hammer if needed.

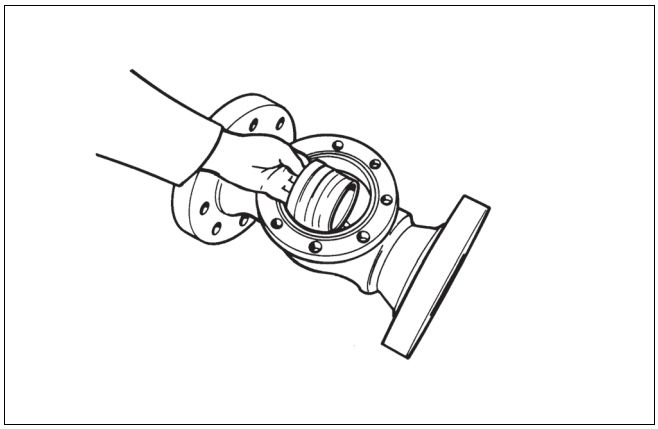


Fig. 13 Installing the seat

A-seat (A, A1, A3),

Metal seat

See Fig. 14.

- Check the sealing surfaces.
- Install the back seal (130) on the seat (7).
- Install the ring (129).
- Install the spring (62) into the seat body.
- Install the support ring (35).
- Spread some anticorrosive agent, e.g. Cortec VCI-369, in the seat recess of a carbon steel body.
- Push the seat into its place.

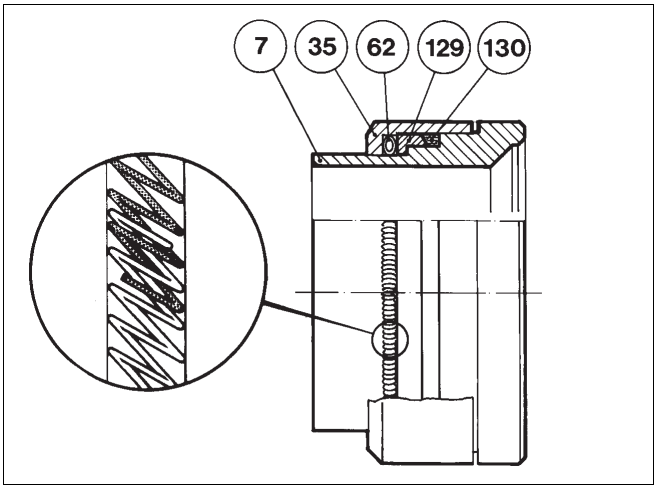


Fig. 14 A seat

F-seat (F, F1, F3, F7, F8)

Bellows seat, (SS steel, Monel 400, Inconel 626)

See Fig. 15.

- Check the sealing surfaces.
- Check the sealing surfaces at the ends of the spring (62).
- Check the spring countersurface in the body.
- Spray both ends of the spring and their countersurfaces thinly with dry lubricant.
- Install the spring on the seat (7).
- Spread some anticorrosive agent, e.g. Cortec VCI-369, on the countersurface of the spring in a carbon steel body.
- Push the seat into its place.

R-seat (R63)

Soft seat, Fire safe -design

See Figs. 16 and 17.

- Check the sealing surfaces.
- Lubricate the O-ring (63) with silicone grease before installation.
- Install the O-ring (63).
- Install the support ring (64) into its groove. Cut the ribbon ends diagonally to make a flexible seam.
- Only in the Fire Safe version:
  Install the back seal (130) and the ring (129). See Fig. 19.
- Install the spring (62) into the seat body (7).

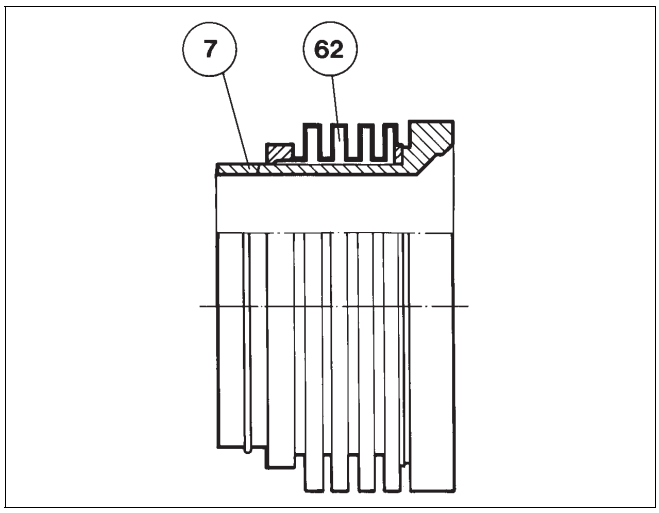


Fig. 15 F seat

- Install the spring support ring (131).

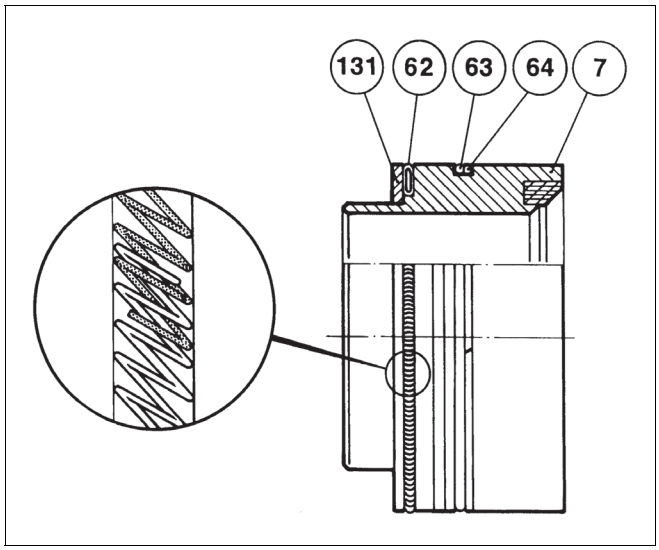


Fig. 16 R-seat. Delivered after 4/95 only as a spare part.

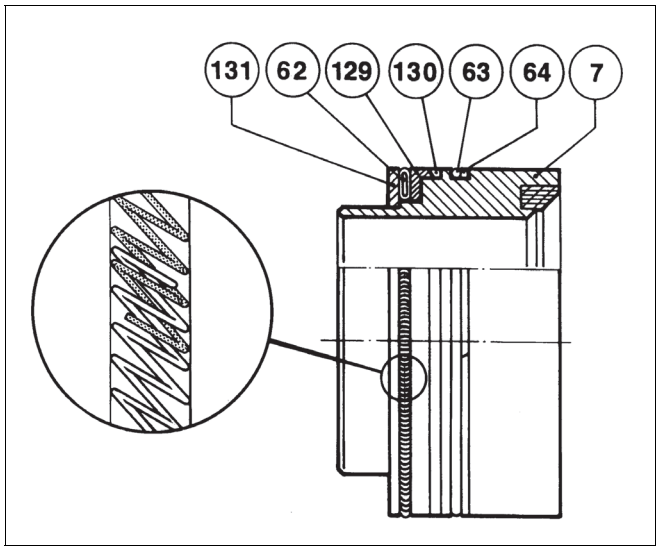


Fig. 17 R-seat (Fire Safe)

E1-seat (E1, E2, E4)

Metal seat for control service.

See Fig. 18.

- Check the sealing surfaces.
- Install the back seal (130) on the seat (7).
- Install the ring (129).
- Install the spring (62) into the seat body.
- Install the ring (133).
- Install the seal (135).
- Install the support ring (35).
- Spread some anticorrosive agent, e.g. Cortec VCI-369, in the seat recess of a carbon steel body.
- Push the seat into its place.

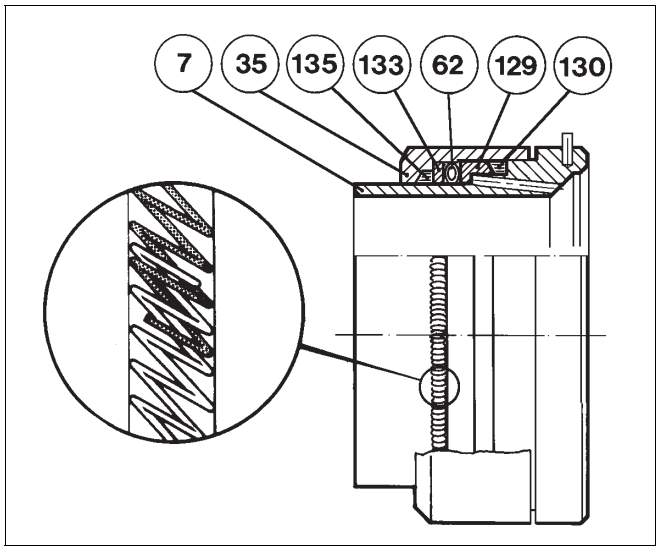


Fig. 18 E1-seat

Installation of bearings

Check the bearings and the bearing surfaces. If necessary, grind the bearing surfaces with an abrasive cloth and replace worn bearings. Spray the bearing surfaces lightly with dry lubricant.

Standard bearings

The bearing material is PTFE reinforced with an acid-resistant steel net. If the bearings are so worn that the net is visible on the wear surface, you should replace the bearings (60, 61, 89, 94). See Fig. 19.

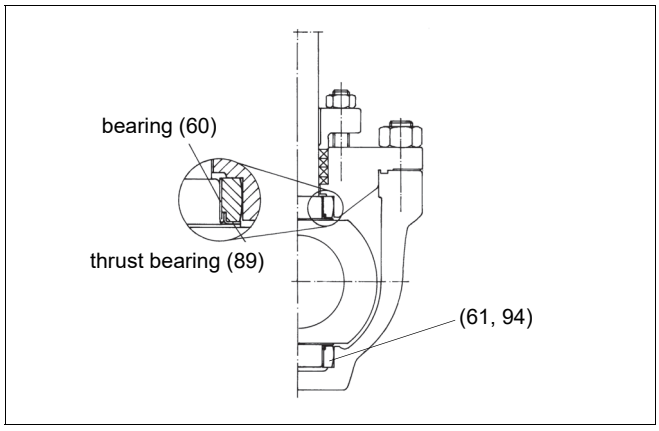


Fig. 19 Standard bearings

Heat-resistant bearings

The position of the ball in the direction of the stem is determined by means of the bearings (4, 60). Pipeline pressure causes a pressure force towards the cross section of the ball stem; this force removes the clearances against the bearings (4, 60) supported on the bonnet.

The bearings (4, 5) are precision-machined cobalt based alloy sleeves.

The bearing countersurface is a sleeve (60, 61) of special steel, which has been installed against the ball using a press-on fit. See Fig. 20.

If the surfaces are badly damaged and cannot be ‘restored’ using an abrasive cloth, the bearings and the ball must be replaced.

When installing new bearings (4, 5), lock them securely to the bonnet and the body using a nail punch.

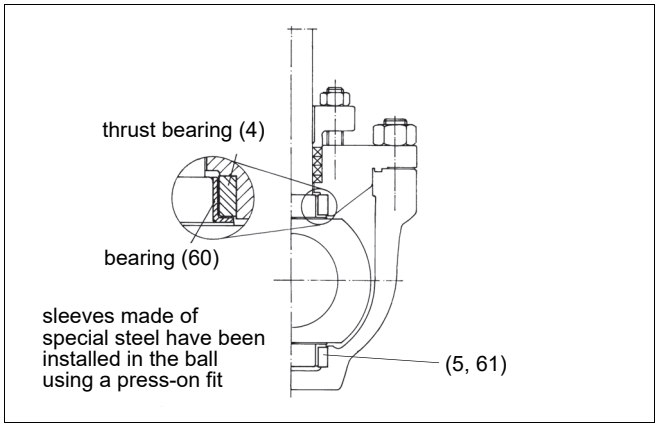


Fig. 20 Heat-resistant bearings

Installing the ball

If the ball surface has deep scratches that cannot be removed using an abrasive cloth or if it is not completely round, you should send the ball to the manufacturer for repair.

Adjust the seat to the ball by lapping them together with diamond powder before you install the ball (and the seat) into the body.

Install the ball into the body with the ‘cut’ side against the seat. Take care not to damage the bearing and the seat with the ball. In valves that have PTFE bearings and have a size of 6" or more, the bearings (94, 61, 5) are ready-fitted on the ball and locked using a lock ring (27).

When the ball is in its place, turn the ball against the seat and check visually that the ball has enough room to complete the operating circle and that it turns easily against the seat.

Installing the bonnet

The bonnet is installed in the reverse order compared to the disassembly, see section 5.2. Spray the bolts lightly with Molykote 321R dry lubricant.

Twist the bonnet gasket (graphite ribbon) around two times so that the ends overlap for about 25 mm, see Fig. 21.

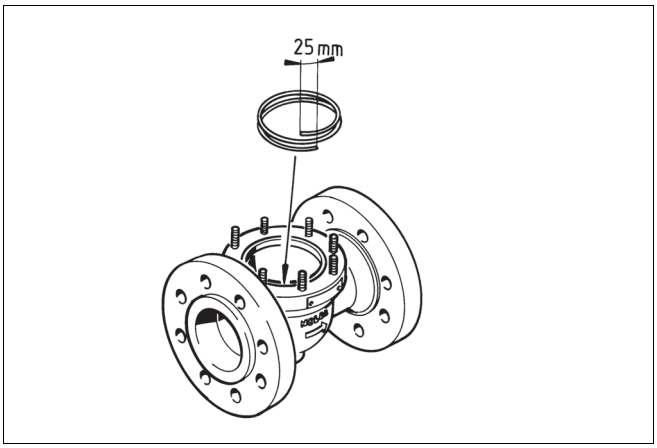


Fig. 21 Installing a gasket for the bonnet

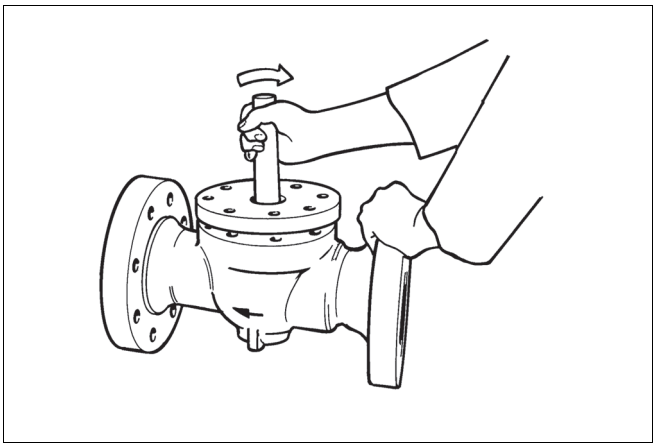


Fig. 22 Adjusting the bonnet by pulling at the ball stem

Pull at the stem to make the ball perpendicular. The bonnet settles in the correct position, and the necessary pre-compression between the ball and the seat is achieved, see Fig. 22.

Tighten the bonnet nuts crosswise as shown in Table 3.

Stages 1 to 4: all bolts are tightened crosswise.
Stage 5: the bolts are tightened in succession along the circumference.

Install the gland packing as explained in section 5.1.

Table 3 Torques for the bonnet nuts

Valve size NPS	Screws			Stage 1 $0,2xM_{final}$ (Nm)	Stage 2 $0,5xM_{final}$ (Nm)	Stage 3 $0,8xM_{final}$ (Nm)	Stage 4 $1xM_{final}$ (Nm)	Stage 5 $1xM_{final}$ (Nm)
	Size UNC	Pcs.	Wrench opening					
01	3/8	8	1 1/16	4	10	16	20	20
015	5/8	6	1 1/16	20	50	80	100	100
02	5/8	6	1 1/16	20	50	80	100	100
03	5/8	8	1 1/16	20	50	80	100	100
04	3/4	8	1 1/4	35	90	145	180	180
06	1	8	1 5/8	80	200	320	400	400
08	1	12	1 5/8	80	200	320	400	400
10	1	16	1 5/8	80	200	320	400	400
12	1 1/4	16	2	165	415	665	830	830
14	1 1/4	22	2	165	415	665	830	830
16	1 1/4	22	2	165	415	665	830	830

Note! torque values shown on table 3 apply only for standard bolt materials B8M/8M and L7M/2HM. In case of non-standard bolt material, please consult manufacturer.

6 TESTING THE VALVE

CAUTION:
Pressure testing should be carried out using equipment conforming to the correct pressure class!

We recommend that the valve body be pressure tested after the valve has been assembled.

The pressure test should be carried out in accordance with an applicable standard using the pressure rating required by the pressure class or flange bore of the valve. The valve must be in an open position during the test.

If you also want to test the tightness of the closure member, contact the manufacturer.

7 INSTALLING THE ACTUATOR

CAUTION:
Beware of the cutting movement of the ball!

Installation of the actuator must not cause bearing loads on the valve. The valve has two bearings, and the actuator serves as the third bearing. They must all be aligned.

If the actuator causes extra torsion on the stem, it is seen as increased need for torque and impaired control properties.

More detailed information on actuators can be obtained from the installation, operation and maintenance instructions for each actuator type.

1. The above represents common actuator mounting positions. For the code of other positions, consult your local Valmet representative.
2. If the desired position is not specified, the factory will mount the actuator in position: B-HR when the valve size is ≤ DN 100, and in B-HU when the valve size is ≥ DN 150.
3. Recommended mounting positions are B-HR, B-HU and A-VU.

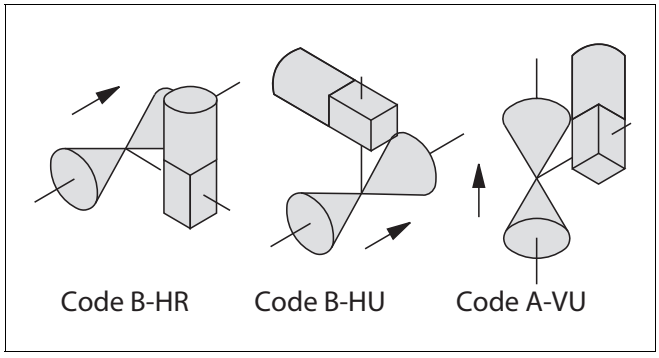


Fig. 23 Mounting positions

7.1 Installing the BC/B1C-series actuator

- Drive the actuator piston to the extreme outward end and turn the valve into the closed position.
- Clean the stem bore and file off any burrs.
- If a coupling is needed between the actuator and the valve stem, install it into the stem bore. Lubricate the coupling and stem bore. Note the correct position. The line at the end of the stem indicates the direction of the ball flow bore.
- Fasten the bracket loosely to the valve.
- Push the actuator carefully onto the valve stem. Avoid forcing it, since this may damage the ball and seats. We recommend mounting the actuator so that the cylinder is pointing upwards.
- Align the actuator as accurately as possible using the valve as help. Lubricate the mounting screws. Install the washers and tighten all screws. Final tightening may not change the position of the fixture.
- Adjust the ball open and closed positions (limits to piston movement) by means of the actuator stop screws (see Fig. 25). An accurate open position can be seen in the body flow bore. Check that the yellow arrow indicates the direction of the ball flow bore. **Keep your fingers out of the flow bore!**

There is no need to adjust the stop screw if the actuator is re-installed in the same valve. Drive the actuator piston to the housing end (open position). Turn the actuator by hand until the valve is in the open position (unless it is already open). Fasten the actuator in this position.

- Check the tightness of the stop screw at the end of the cylinder during cylinder operation. An O-ring is used for sealing.
- Check that the actuator is functioning correctly. Check the ball flow bore position and the actuator movement relative to the valve (clockwise: close, counterclockwise: open) after installing the actuator. The valve should be closed when the piston is in the extreme outward position.
- Check that the yellow arrow indicates the direction of the flow bore. If necessary, change the position of the arrow.

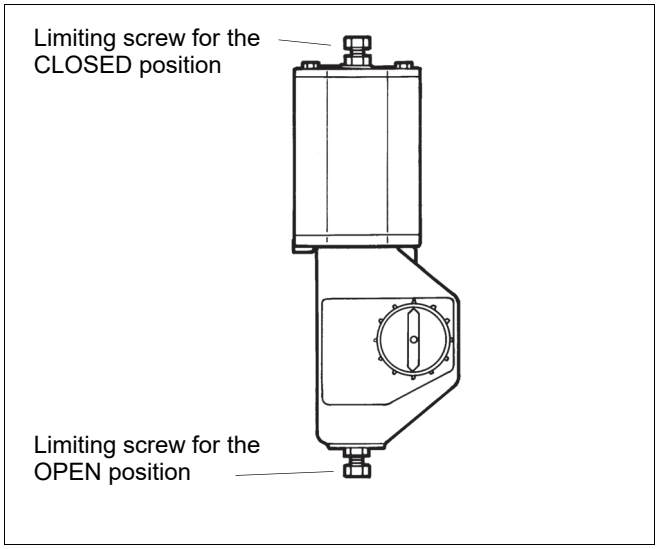


Fig. 24 Open and closed position in a B1 actuator

7.2 Installing the BJ/B1J-series actuator

Spring-return actuators are used in applications where valve opening or closing movement is needed in case the air supply is interrupted. The BJ/B1J type is used for spring-to-close operation; the spring pushes the piston towards the cylinder end, the extreme outward position. In turn, the BJA/B1JA type is used for spring-to-open operation; the spring is between the piston and the cylinder end and pushes the piston towards the housing.

Spring-return actuators are installed in a manner similar to BC/B1C-series actuators, taking into account the following.

BJ/B1J-type

Install the actuator so that the piston is in the extreme outward position. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the closed position.

BJA/B1JA-type

Install the actuator so that the piston is in the cylinder-end position at housing side. The cylinder must not be pressurized and the air supply connection must be open. The valve must be in the open position.

The rest of the installation procedure is the same as for the BC/B1C actuator.

8 TROUBLE SHOOTING TABLE

Table 4 lists malfunctions that might occur after prolonged use.

Table 4 Trouble shooting

Symptom	Possible fault	Recommended action
Leakage through a closed valve	Wrong stop screw adjustment of the actuator	Adjust the stop screw for closed position
	Faulty zero setting of the positioner	Adjust the positioner
	Damaged seat	Replace seat
	Damaged closing member	Replace the closing member
	Closing member in a wrong position relative to the actuator	Select the correct keyway in the actuator
Leakage through body joint	Damaged gasket	Replace the gasket
	Loose body joint	Tighten the nuts or screws
Irregular valve movements	Actuator or positioner malfunction	Check the operation of the actuator and positioner
	Process medium accumulated on the sealing surface	Clean the sealing surfaces
	Closing member or seat damaged	Replace the closing member or seat
	Crystallizing medium has entered the bearing spaces	Flush the bearing spaces
Gland packing leaking	Gland packing worn or damaged	Replace the gland packing
	Loose packing	Tighten the packing nuts

9 TOOLS

To remove the actuator:

- Extractor tool (ID-code table in actuator's IMO)

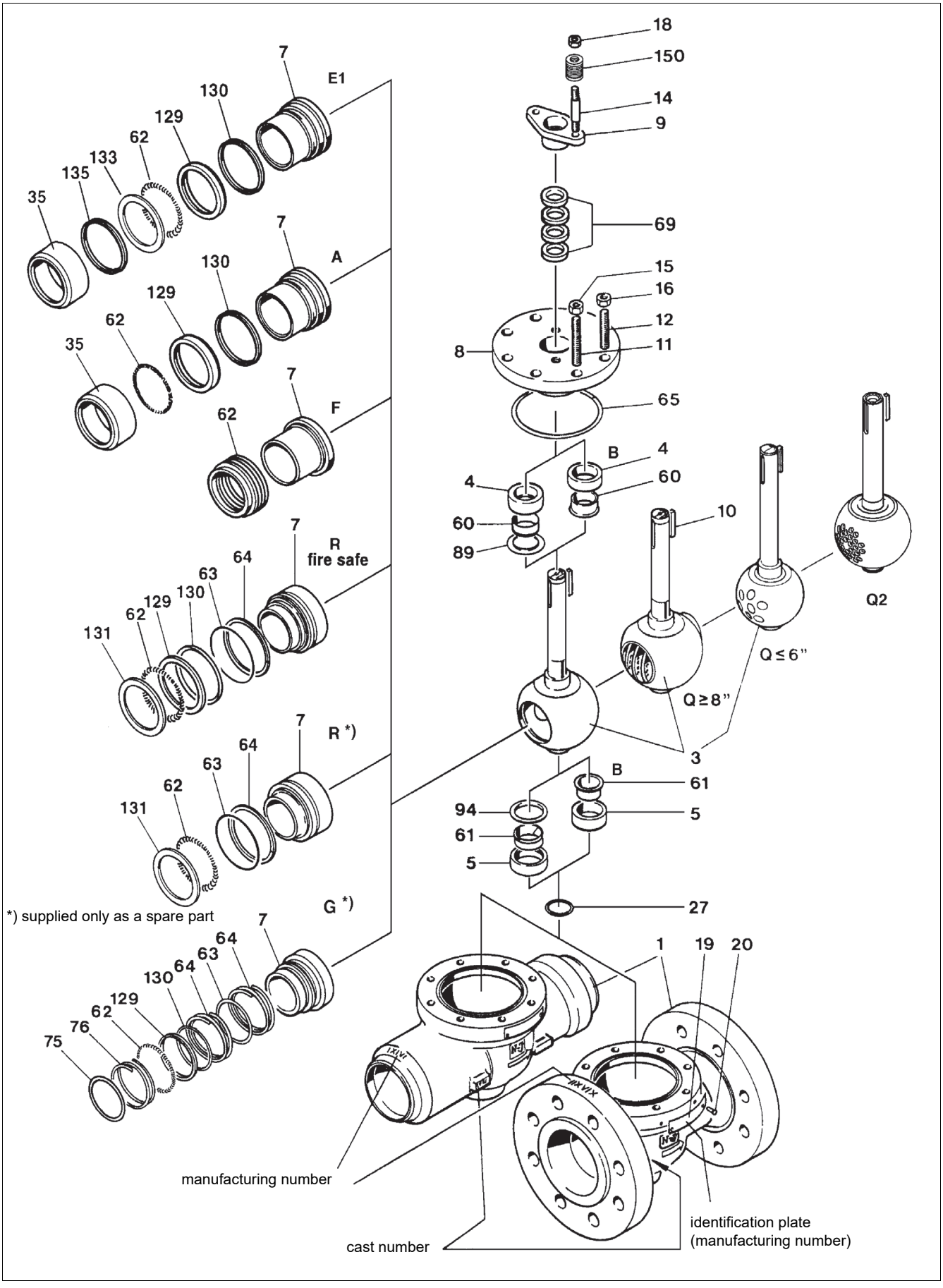
10 ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- type code, sales order number, serial number (stamped on a valve body)
- number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

11 EXPLODED VIEW

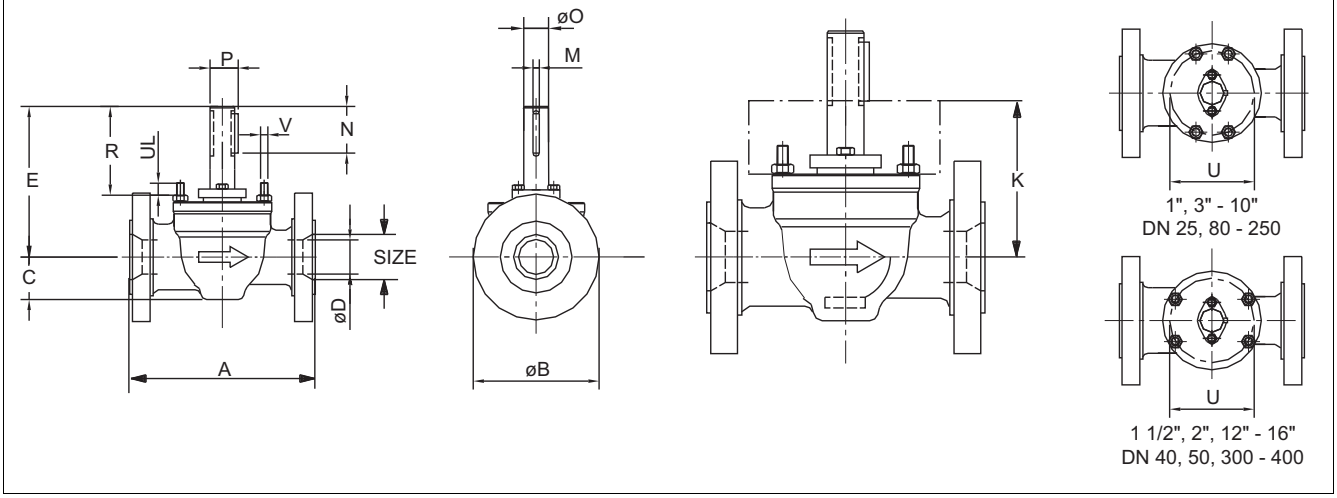


12 PARTS LIST

Item	Qty.	Description	Spare part category
1	1	Body	
3	1	Ball	3
4	1	Thrust bearing	3
5	1	Trunnion bearing	3
7	1	Seat	2
8	1	Bonnet	
9	1	Gland	
10	1	Key	3
11		Stud	
12		Stud	
14		Stud	
15		Hexagon nut	
16		Hexagon nut	
18		Hexagon nut	
19	1	Identification plate	
20	2	Screw	
27	1	Lock ring	
35	1	Supportr ing	2
60	1	Bearing	3
61	1	Bearing	3
62	1	Spring	2
63	1	O-ring	
64	1 (G-seat: 2)	Support ring	
65	1	Gasket	1
69		Gland packing	1
75	1	O-ring	
76	1 (4")	Support ring	
89	1	Thrust bearing	1***
94	1	Thrust bearing	1***
125	1	O-ring sleeve	
129	1	Ring	2
130	1	Back seal	2
131	1	Spring retainer	
133	1	Ring	
135	1	Seal	

Spare part set category 1: Recommended soft parts, always needed for the repair. Delivered as a set.
***) Bearing set
Spare part category 2: Parts for replacing of the seat. Available also as a set.
Spare part category 3: Parts for replacing of the closing element.
Spares for the full overhaul: All parts from the categories 1, 2 and 3

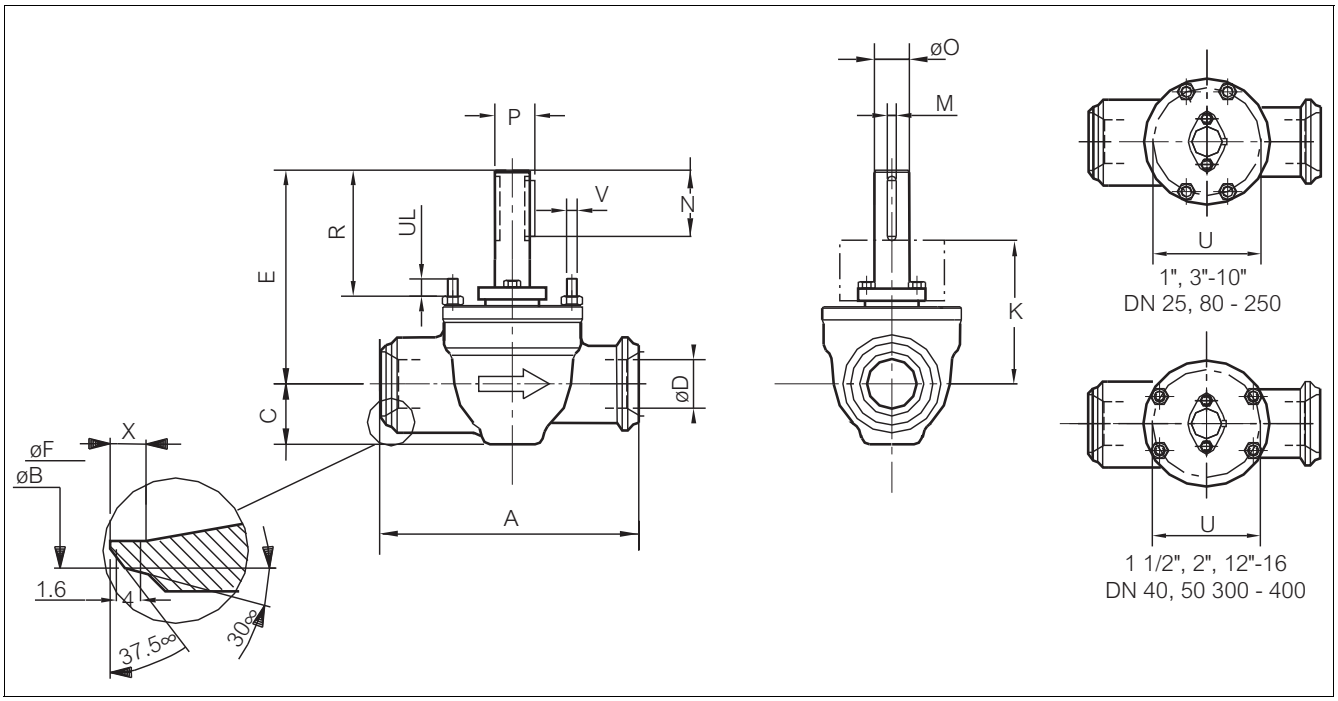
13 DIMENSIONS AND WEIGHTS



T5

Type	DN	T5D/T5M			T5F/T5N/T5P				DIMENSIONS, mm												T5D/T5M	T5F/T5N/T5P
		A	B		A	B															ASME 300 / PN 40	ASME 600 / PN 63, 100
			ASME 300	PN40		ASME 600	PN63	PN100	C	ø D	E	K	M	N	ø O	P	R	U	UL	V	kg	kg
T5_01	25	197	124	115	210	124	140	140	38	25	158	133	4.76	25	15	16.96	89	84	22	3/8 UNC	10	11
T5_015	40	235	155	150	251	155	170	170	60	38	200	165	4.76	35	20	22.22	105	110	30	5/8 UNC	15	17
T5_02	50	267	165	165	286	165	180	195	60	38	200	165	4.76	35	20	22.22	105	110	30	5/8 UNC	19	21
T5_03	80	317	210	200	337	210	215	230	71	50	230	184	6.35	46	25	27.8	124	128	28	5/8 UNC	32	36
T5_04	100	368	254	235	394	273	250	265	90	76	280	222	9.52	58	35	39.1	138	173	43	3/4 UNC	56	69
T5_06	150	473	318	300	508	356	345	355	122	102	362	280	12.7	80	45	50.4	185	220	44	1 UNC	115	147
T5_08	200	568	381	375	610	419	415	430	140	125	415	325	12.7	90	55	60.6	208	272	44	1 UNC	239	287
T5_10	250	708	445	450	752	508	470	505	170	152	420	330	12.7	90	55	60.6	195	319	40	1 UNC	315	403
T5_12	300	775	521	515	819	559	530	585	210	202	520	401	19.05	119	70	78.2	235	400	56	1 1/4 UNC	530	613
T5_14	350	927	584	580	972	603	600	655	275	254	730	584	22.225	146	85	94.6	389	480	60	1 1/4 UNC	1050	1123
T5_16	400	1057	648	660	1108	686	670	-	275	254	730	584	22.225	146	85	94.6	389	480	60	1 1/4 UNC	1100	1228

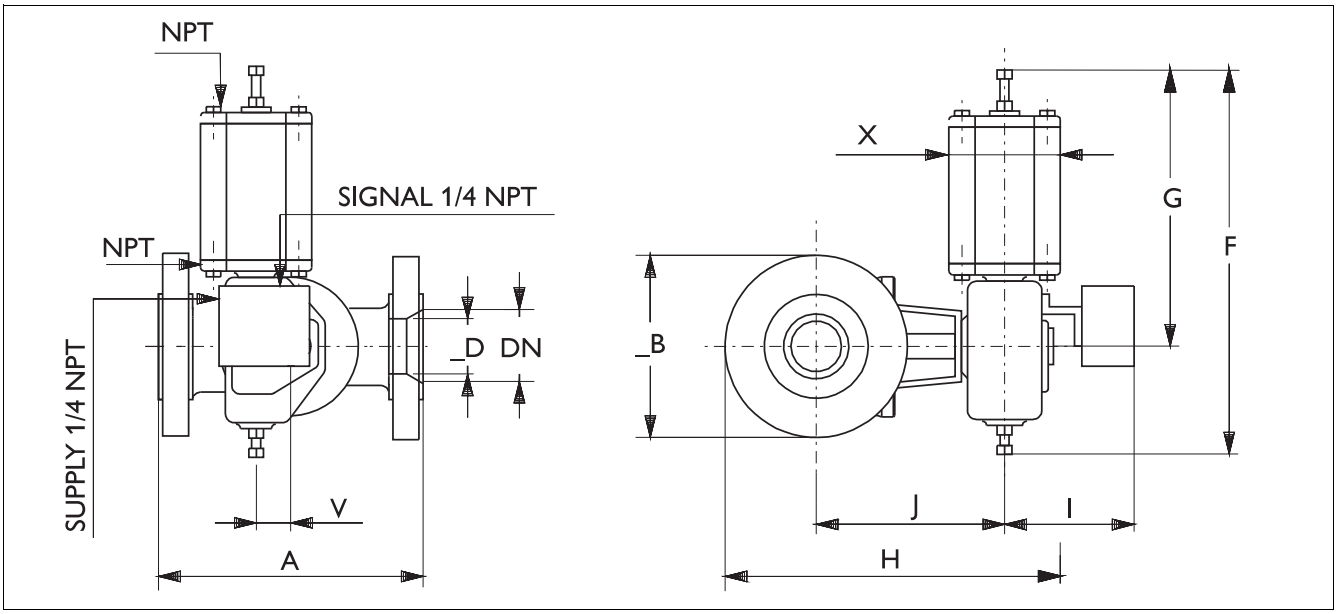
Type	DN	T5D/T5M			T5F/T5N/T5P				DIMENSIONS, inch												T5D	T5F
		A	B		A	B															ASME 300	ASME 600
			ASME 300	PN40		ASME 600	PN63	PN100	C	ø D	E	K	M	N	ø O	P	R	U	UL	V	lbs	lbs
T5_01	1	7.76	4.88	4.53	8.27	4.88	5.51	5.51	1.50	0.98	6.22	5.24	0.19	0.98	0.59	0.67	3.50	3.31	0.87	3/8 UNC	22	24
T5_015	1.5	9.25	6.10	5.91	9.88	6.10	6.69	6.69	2.36	1.50	7.87	6.50	0.19	1.38	0.79	0.87	4.13	4.33	1.18	5/8 UNC	33	37
T5_02	2	10.51	6.50	6.50	11.26	6.50	7.09	7.68	2.36	1.50	7.87	6.50	0.19	1.38	0.79	0.87	4.13	4.33	1.18	5/8 UNC	42	46
T5_03	3	12.48	8.27	7.87	13.27	8.27	8.46	9.06	2.80	1.97	9.06	7.24	0.25	1.81	0.98	1.09	4.88	5.04	1.10	5/8 UNC	70	79
T5_04	4	14.49	10.00	9.25	15.51	10.75	9.84	10.43	3.54	2.99	11.02	8.74	0.37	2.28	1.38	1.54	5.43	6.81	1.69	3/4 UNC	123	152
T5_06	6	18.62	12.52	11.81	20.00	14.02	13.58	13.98	4.80	4.02	14.25	11.02	0.50	3.15	1.77	1.98	7.28	8.66	1.73	1 UNC	253	323
T5_08	8	22.36	15.00	14.76	24.02	16.50	16.34	16.93	5.51	4.92	16.34	12.80	0.50	3.54	2.17	2.39	8.19	10.71	1.73	1 UNC	526	631
T5_10	10	27.87	17.52	17.72	29.61	20.00	18.50	19.88	6.69	5.98	16.54	12.99	0.50	3.54	2.17	2.39	7.68	12.56	1.57	1 UNC	693	887
T5_12	12	30.51	20.51	20.28	32.24	22.01	20.87	23.03	8.27	7.95	20.47	15.79	0.75	4.69	2.76	3.08	9.25	15.75	2.20	1 1/4 UNC	1166	1349
T5_14	14	36.50	22.99	22.83	38.27	23.74	23.62	25.79	10.83	10.00	28.74	22.99	0.88	5.75	3.35	3.72	15.31	18.90	2.36	1 1/4 UNC	2310	2471
T5_16	16	41.61	25.51	25.98	43.62	27.01	26.38	-	10.83	10.00	28.74	22.99	0.88	5.75	3.35	3.72	15.31	18.90	2.36	1 1/4 UNC	2420	2702



T4D/T4F

DIMENSIONS, mm																				
Type	DN	A	ø B	C	ø D	E	T4D	T4F	K	M	N	ø O	P	R	U	V	UL	T4D	T4F	kg
							ø F	ø F										Xmin	Xmin	
T4_01	25	210	36	38	25	158	26.6	24.4	133	4.76	25	15	16.95	89	84	3/8 UNC	22	-	-	10
T4_015	40	251	52	60	38	200	40.6	37.8	165	4.76	35	20	22.22	105	110	5/8 UNC	30	-	-	15
T4_02	50	292	62	60	38	200	52.5	49.3	165	4.76	35	20	22.22	105	110	5/8 UNC	30	7	9.5	18
T4_03	80	356	91	71	50	230	77.9	73.7	184	6.35	46	25	27.8	124	128	5/8 UNC	28	10	13	32
T4_04	100	432	117	90	76	280	102.3	97.1	222	9.52	58	35	39.1	138	173	3/4 UNC	43	11	15	65
T4_06	150	559	172	122	102	362	154.1	146.3	280	12.7	80	45	50.4	185	220	1 UNC	44	13	20	125
T4_08	200	660	223	140	125	415	202.7	188.9	325	12.7	90	55	60.6	208	272	1 UNC	44	15.2	25.5	210
T4_10	250	787	278	170	152	420	254.4	242.8	330	12.7	90	55	60.6	195	319	1 UNC	40	17.7	26.5	275
T4_12	300	838	329	210	202	520	303.2	288.8	401	19.05	119	70	78.2	235	400	1 1/4-8 UN	56	19.3	30	475
T4_14	350	889	362	275	254	730	333.4	317.6	584	22.225	146	85	94.6	389	480	1 1/4-8 UN	60	30	30	930
T4_16	400	991	413	275	254	730	381	363.6	584	22.225	146	85	94.6	389	480	1 1/4-8 UN	60	35	30	960

DIMENSIONS, inch																				
Type	DN	A	ø B	C	ø D	E	T4D	T4F	K	M	N	ø O	P	R	U	V	UL	T4D	T4F	lbs
							ø F	ø F										Xmin	Xmin	
T4_01	1	8.27	1.42	1.50	0.98	6.22	1.05	0.96	5.24	0.19	0.98	0.59	0.67	3.50	3.31	3/8 UNC	0.87	-	-	22
T4_015	1.5	9.88	2.05	2.36	1.50	7.87	1.60	1.49	6.50	0.19	1.38	0.79	0.87	4.13	4.33	5/8 UNC	1.18	-	-	33
T4_02	2	11.50	2.44	2.36	1.50	7.87	2.07	1.94	6.50	0.19	1.38	0.79	0.87	4.13	4.33	5/8 UNC	1.18	0.28	0.37	39.6
T4_03	3	14.02	3.58	2.80	1.97	9.06	3.07	2.90	7.24	0.25	1.81	0.98	1.09	4.88	5.04	5/8 UNC	1.10	0.39	0.51	70.4
T4_04	4	17.01	4.61	3.54	2.99	11.02	4.03	3.82	8.74	0.37	2.28	1.38	1.54	5.43	6.81	3/4 UNC	1.69	0.43	0.59	143
T4_06	6	22.01	6.77	4.80	4.02	14.25	6.07	5.76	11.02	0.50	3.15	1.77	1.98	7.28	8.66	1 UNC	1.73	0.51	0.79	275
T4_08	8	25.98	8.78	5.51	4.92	16.34	7.98	7.44	12.80	0.50	3.54	2.17	2.39	8.19	10.71	1 UNC	1.73	0.60	1.00	462
T4_10	10	30.98	10.94	6.69	5.98	16.54	10.02	9.56	12.99	0.50	3.54	2.17	2.39	7.68	12.56	1 UNC	1.57	0.70	1.04	605
T4_12	12	32.99	12.95	8.27	7.95	20.47	11.94	11.37	15.79	0.75	4.69	2.76	3.08	9.25	15.75	1 1/4-8 UN	2.20	0.76	1.18	1045
T4_14	14	35.00	14.25	10.83	10.00	28.74	13.13	12.50	22.99	0.88	5.75	3.35	3.72	15.31	18.90	1 1/4-8 UN	2.36	1.18	1.18	2046
T4_16	16	39.02	16.26	10.83	10.00	28.74	15.00	14.31	22.99	0.88	5.75	3.35	3.72	15.31	18.90	1 1/4-8 UN	2.36	1.38	1.18	2112



T05D-BC, B1C

Type	DN	A	_B	_D	F	G	H	I	J	V	X	NPT	kg
T5D01 - B1C6	25	197	124	25	400	260	335	215	191	36	90	1/4	14
T5D01 - B1C9	25	197	124	25	455	315	330	220	192	43	110	1/4	20
T5D015 - B1C6	40	235	155.4	38	400	260	380	215	223	36	90	1/4	19
T5D015 - B1C9	40	235	155.4	38	455	315	380	220	225	43	110	1/4	25
T5D015 - B1C11	40	235	155.4	38	540	375	390	225	230	51	135	3/8	31
T5D02 - B1C6	50	267	165.1	38	400	260	385	215	223	36	90	1/4	23
T5D02 - B1C9	50	267	165.1	38	455	315	385	220	225	43	110	1/4	29
T5D02 - B1C11	50	267	165.1	38	540	375	395	225	230	51	135	3/8	35
T5D03 - B1C11	80	317	209.5	50	540	375	430	225	245	51	135	3/8	48
T5D03 - B1C13	80	317	209.5	50	635	445	460	235	260	65	175	3/8	63
T5D04 - B1C13	100	368	254	76	635	445	525	235	303	65	175	3/8	87
T5D04 - B1C17	100	368	254	76	770	545	555	255	315	78	215	1/2	110
T5D04 - B1C20	100	368	254	76	840	575	590	270	337	97	215	1/2	129
T5D06 - B1C17	150	473	317.5	102	770	545	645	255	375	78	215	1/2	169
T5D06 - B1C20	150	473	317.5	102	840	575	680	270	397	97	215	1/2	188
T5D06 - B1C25	150	473	317.5	102	1040	710	735	310	415	121	265	1/2	245
T5D08 - B1C20	200	568	381	125	840	575	755	270	440	97	215	1/2	312
T5D08 - B1C25	200	568	381	125	1040	710	815	310	465	121	265	1/2	369
T5D08 - B1C32	200	568	381	125	1330	910	895	350	505	153	395	3/4	489
T5D10 - B1C25	250	708	444.5	152	1040	710	865	310	480	121	265	1/2	445
T5D10 - B1C32	250	708	444.5	152	1330	910	940	350	515	153	395	3/4	565
T5D10 - B1C40	250	708	444.5	152	1660	1150	1040	370	565	194	505	3/4	760
T5D12 - B1C25	300	775	520.7	202	1040	710	960	310	539	121	265	1/2	660
T5D12 - B1C32	300	775	520.7	202	1330	910	1040	350	576	153	395	3/4	780
T5D12 - B1C40	300	775	520.7	202	1660	1150	1140	370	626	194	505	3/4	975
T5D14 - B1C32	350	927	584.2	254	1330	910	1250	350	755	153	395	3/4	1300
T5D14 - B1C40	350	927	584.2	254	1660	1150	1350	370	805	194	505	3/4	1495
T5D14 - B1C50	350	927	584.2	254	1970	1350	1455	415	855	242	610	1	1880
T5D16 - B1C32	400	1057	647.7	254	1330	910	1280	350	755	153	395	3/4	1350
T5D16 - B1C40	400	1057	647.7	254	1660	1150	1385	370	805	194	505	3/4	1545
T5D16 - B1C50	400	1057	647.7	254	1970	1350	1485	415	855	242	610	1	1930

T5F-BC, B1C

Type	DN	A	_B	_D	F	G	H	I	J	V	X	NPT	kg
T5F01 - B1C6	25	210	124	25	400	260	298	215	191	36	90	1/4	15
T5F01 - B1C9	25	210	124	25	455	315	309	220	192	43	110	1/4	21
T5F015 - B1C6	40	251	155.4	38	400	260	350	215	223	36	90	1/4	21
T5F015 - B1C9	40	251	155.4	38	455	315	380	220	225	43	110	1/4	27
T5F015 - B1C11	40	251	155.4	38	540	375	390	225	230	51	135	3/8	33
T5F02 - B1C6	50	286	165.1	38	400	260	385	215	223	36	90	1/4	25
T5F02 - B1C9	50	286	165.1	38	455	315	385	220	225	43	110	3/8	31
T5F02 - B1C11	50	286	165.1	38	540	375	395	225	230	51	135	3/8	37
T5F03 - B1C11	80	337	209.5	50	540	375	430	225	245	51	135	3/8	52
T5F03 - B1C13	80	337	209.5	50	635	445	460	235	260	65	175	3/8	67
T5F04 - B1C13	100	394	273.1	76	635	445	535	235	303	65	175	3/8	100
T5F04 - B1C17	100	394	273.1	76	770	545	565	255	315	78	215	1/2	123
T5F04 - B1C20	100	394	273.1	76	840	575	600	270	337	97	215	1/2	142
T5F06 - B1C17	150	508	355.6	102	770	545	665	255	375	78	215	1/2	201
T5F06 - B1C20	150	508	355.6	102	840	575	700	270	397	97	215	1/2	220
T5F06 - B1C25	150	508	355.6	102	1040	710	755	310	415	121	265	1/2	277
T5F08 - B1C20	200	610	419.1	125	840	575	775	270	440	97	215	1/2	360
T5F08 - B1C25	200	610	419.1	125	1040	710	835	310	465	121	265	1/2	417
T5F08 - B1C32	200	610	419.1	125	1330	910	915	350	505	153	395	3/4	537
T5F10 - B1C25	250	752	508	152	1040	710	895	310	480	121	265	1/2	533
T5F10 - B1C32	250	752	508	152	1330	910	970	350	515	153	395	3/4	653
T5F10 - B1C40	250	752	508	152	1660	1150	1075	370	565	194	505	3/4	848
T5F12 - B1C25	300	819	558.8	202	1040	710	980	310	539	121	265	1/2	743
T5F12 - B1C32	300	819	558.8	202	1330	910	1060	350	576	153	395	3/4	863
T5F12 - B1C40	300	819	558.8	202	1660	1150	1160	370	626	194	505	3/4	1058
T5F14 - B1C32	350	972	603.3	254	1330	910	1260	350	755	153	395	3/4	1373
T5F14 - B1C40	350	972	603.3	254	1660	1150	1360	370	805	194	505	3/4	1568
T5F14 - B1C50	350	972	603.3	254	1970	1350	1465	415	855	242	610	1	1953
T5F16 - B1C32	400	1108	685.8	254	1330	910	1300	350	755	153	395	3/4	1478
T5F16 - B1C40	400	1108	685.8	254	1660	1150	1400	370	805	194	505	3/4	1673
T5F16 - B1C50	400	1108	685.8	254	1970	1350	1505	415	855	242	610	1	2058

T5D-BJ/BJA, B1J/B1JA

Type	DN	A	_B	_D	F	G	H	I	J	V	X	NPT	kg
T5D01 - B1J/B1JA6	25	197	124	25	485	368	313	219	191	36	110	3/8	23
T5D01 - B1J/B1JA8	25	197	124	25	560	420	320	220	192	43	135	3/8	27
T5D01 - B1J10	25	197	124	25	650	490	350	225	198	51	175	3/8	40
T5D015 - B1J/B1JA8	40	235	155.4	38	560	420	380	220	225	43	135	3/8	32
T5D015 - B1J/ B1JA10	40	235	155.4	38	650	490	395	225	230	51	175	3/8	45
T5D015 - B1J12	40	235	155.4	38	800	620	440	235	255	65	215	1/2	72
T5D02 - B1J/B1JA8	50	267	165.1	38	560	420	385	220	225	43	135	3/8	36
T5D02 - B1J/B1JA10	50	267	165.1	38	650	490	400	225	230	51	175	3/8	49
T5D02 - B1J12	50	267	165.1	38	800	620	445	235	255	65	215	1/2	76
T5D03 - B1J/B1JA10	80	317	209.5	50	650	490	440	225	245	51	175	3/8	62
T5D03 - B1J/B1JA12	80	317	209.5	50	800	620	475	235	260	65	215	1/2	89
T5D03 - B1J/B1JA16	80	317	209.5	50	990	760	515	255	275	78	265	1/2	132
T5D04 - B1J/B1JA12	100	368	254	76	800	620	540	235	303	65	215	1/2	113
T5D04 - B1J/B1JA16	100	368	254	76	990	760	575	255	315	78	265	1/2	156
T5D04 - B1J/B1JA20	100	368	254	76	1200	935	660	270	337	97	395	3/4	231
T5D06 - B1J/B1JA16	150	473	317.5	102	990	760	670	255	378	78	265	1/2	215
T5D06 - B1J/B1JA20	150	473	317.5	102	1200	935	755	270	395	97	395	3/4	290
T5D06 - B1J/B1JA25	150	473	317.5	102	1530	1200	830	310	415	121	505	3/4	465
T5D08 - B1J/B1JA20	200	568	381	125	1200	935	830	270	440	97	395	3/4	414
T5D08 - B1J/B1JA25	200	568	381	125	1530	1200	910	310	465	121	505	3/4	589
T5D08 - B1J/B1JA32	200	568	381	125	1830	1410	965	350	505	153	540	1	909
T5D10 - B1J/B1JA20	250	708	444.5	152	1200	935	865	270	445	97	395	3/4	490
T5D10 - B1J/B1JA25	250	708	444.5	152	1530	1200	955	310	480	121	505	3/4	665
T5D10 - B1J/B1JA32	250	708	444.5	152	1830	1410	1010	350	515	153	540	1	985
T5D12 - B1J/B1JA25	300	775	520.7	202	1530	1410	1055	270	539	121	505	3/4	880
T5D12 - B1J/B1JA32	300	775	520.7	202	1830	1410	1110	350	576	153	540	1	1200
T5D14 - B1J/B1JA32	350	927	584.2	254	1830	1410	1320	350	755	153	540	1	1720
T5D16 - B1J/B1JA32	400	1057	647.7	254	1830	1410	1350	350	755	153	540	1	1770

T5F-BJ/BJA, B1J/B1JA

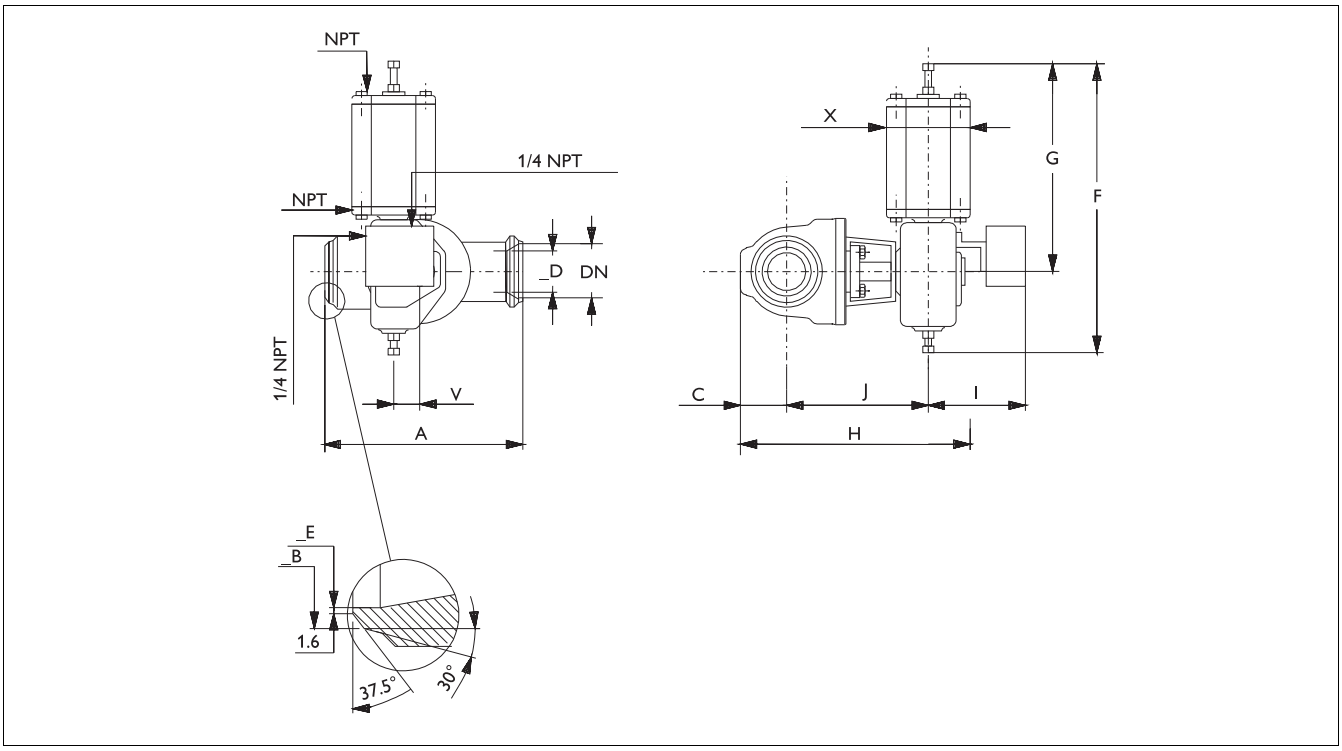
Type	DN	A	_B	_D	F	G	H	I	J	V	X	NPT	kg
T5F01 - B1J/B1JA6	25	210	124	25	485	368	313	219	191	36	110	3/8	24
T5F01 - B1J/B1JA8	25	210	124	25	560	420	320	220	192	43	135	3/8	28
T5F01 - B1J10	25	210	124	25	650	490	350	225	198	51	175	3/8	41
T5F015 - B1J/B1JA8	40	251	155.4	38	560	420	380	220	225	43	135	3/8	34
T5F015 - B1J/B1JA10	40	251	155.4	38	650	490	395	225	230	51	175	3/8	47
T5F015 - B1J12	40	251	155.4	38	800	620	440	235	255	65	215	1/2	74
T5F02 - B1J/B1JA8	50	286	165.1	38	560	420	385	220	225	43	135	3/8	38
T5F02 - B1J/B1JA10	50	286	165.1	38	650	490	400	225	230	51	175	3/8	51
T5F02 - B1J12	50	286	165.1	38	800	620	445	235	255	65	215	1/2	78
T5F03 - B1J/B1JA10	80	337	209.5	50	650	490	440	225	245	51	175	3/8	66
T5F03 - B1J/B1JA12	80	337	209.5	50	800	620	475	235	260	65	215	1/2	93
T5F03 - B1J/B1JA16	80	337	209.5	50	990	760	515	255	275	78	265	1/2	136
T5F04 - B1J/B1JA12	100	394	273.1	76	800	620	550	235	303	65	215	1/2	126
T5F04 - B1J/B1JA16	100	394	273.1	76	990	760	585	255	315	78	265	1/2	169
T5F04 - B1J/B1JA20	100	394	273.1	76	1200	935	670	270	337	97	395	3/4	244
T5F06 - B1J/B1JA16	150	508	355.6	102	990	760	690	255	378	78	265	1/2	247
T5F06 - B1J/B1JA20	150	508	355.6	102	1200	935	770	270	395	97	395	3/4	322
T5F06 - B1J/B1JA25	150	508	355.6	102	1530	1200	845	310	415	121	505	3/4	497
T5F08 - B1J/B1JA20	200	610	419.1	125	1200	935	850	270	440	97	395	3/4	467
T5F08 - B1J/B1JA25	200	610	419.1	125	1530	1200	930	310	465	121	505	3/4	637
T5F08 - B1J/B1JA32	200	610	419.1	125	1830	1410	985	350	505	153	540	1	957
T5F10 - B1J/B1JA20	250	752	508	152	1200	935	900	270	445	97	395	3/4	578
T5F10 - B1J/B1JA25	250	752	508	152	1530	1200	990	310	480	121	505	3/4	753
T5F10 - B1J/B1JA32	250	752	508	152	1830	1410	1040	350	515	153	540	1	1073
T5F12 - B1J/B1JA25	300	819	558.8	202	1530	1200	1070	310	539	121	505	3/4	963
T5F12 - B1J/B1JA32	300	819	558.8	202	1830	1410	1125	350	576	153	540	1	1283
T5F14 - B1J/B1JA32	350	927	603.3	254	1830	1410	1330	350	755	153	540	1	1793
T5F16 - B1J/B1JA32	400	1108	685.8	254	1830	1410	1370	350	755	153	540	1	1898

T25F-BC, B1C

Type	DN	A	_B	_D	F	G	H	I	J	V	X	NPT	kg
T25F02 - B1C11	50	292	165.1	50	540	375	410	225	245	51	135	3/8	53
T25F02 - B1C13	50	292	165.1	50	635	445	440	235	260	65	175	3/8	68
T25F03 - B1C13	80	356	209.5	76	635	445	500	235	300	65	175	3/8	107
T25F03 - B1C17	80	356	209.5	76	770	545	530	255	315	78	215	1/2	130
T25F03 - B1C20	80	356	209.5	76	840	575	570	270	337	97	215	1/2	145
T25F04 - B1C17	100	432	273.1	102	770	545	625	255	375	78	215	1/2	205
T25F04 - B1C20	100	432	273.1	102	840	575	660	270	397	97	215	1/2	218
T25F04 - B1C25	100	432	273.1	102	1040	710	715	310	415	121	265	1/2	285
T25F06 - B1C25	150	559	355.6	152	1040	710	820	310	480	121	265	1/2	445
T25F06 - B1C32	150	559	355.6	152	1330	910	895	350	515	153	395	3/4	565
T25F06 - B1C40	150	559	355.6	152	1660	1150	995	370	565	194	505	3/4	760
T25F08 - B1C25	200	660	419.1	202	1040	710	910	310	539	121	265	1/2	630
T25F08 - B1C32	200	660	419.1	202	1330	910	990	350	576	153	395	3/4	770
T25F08 - B1C40	200	660	419.1	202	1660	1150	1090	370	626	194	505	3/4	970
T25F10 - B1C32	250	787	508.0	254	1330	910	1210	350	755	153	395	3/4	1080
T25F10 - B1C40	250	787	508.0	254	1660	1150	1315	370	805	194	505	3/4	1270
T25F10 - B1C50	250	787	508.0	254	1970	1350	1415	415	855	242	610	1	1660

T25F-BJ/BJA, B1J/B1JA

Type	DN	A	_B	_D	F	G	H	I	J	V	X	NPT	kg
T25F02 - B1J/B1JA10	50	292	165.1	50	650	490	415	225	245	51	175	3/8	67
T25F02 - B1J/B1JA12	50	292	165.1	50	800	620	450	235	260	65	215	1/2	95
T25F02 - B1J/B1JA16	50	292	165.1	50	990	760	490	255	275	78	265	1/2	140
T25F03 - B1J/B1JA12	80	356	209.5	76	800	620	515	235	303	65	215	1/2	129
T25F03 - B1J/B1JA16	80	356	209.5	76	990	760	555	255	315	78	265	1/2	175
T25F03 - B1J/B1JA20	80	356	209.5	76	1200	935	640	270	335	97	395	3/4	250
T25F04 - B1J/B1JA16	100	432	273.1	102	990	760	650	255	378	78	265	1/2	245
T25F04 - B1J/B1JA20	100	432	273.1	102	1200	935	730	270	395	97	395	3/4	330
T25F04 - B1J/B1JA25	100	432	273.1	102	1530	1200	805	310	415	121	505	3/4	500
T25F06 - B1J/B1JA20	150	559	355.6	152	1200	935	820	270	445	97	395	3/4	480
T25F06 - B1J/B1JA25	150	559	355.6	152	1530	1200	910	310	480	121	505	3/4	660
T25F06 - B1J/B1JA32	150	559	355.6	152	1830	1410	965	350	515	153	540	1	980
T25F08 - B1J/B1JA25	200	660	419.1	202	1530	1200	1005	310	539	121	505	3/4	860
T25F08 - B1J/B1JA32	200	660	419.1	202	1830	1410	1060	350	576	153	540	1	1180
T25F10 - B1J/B1JA32	250	787	508	254	1830	1410	1280	350	755	153	540	1	1490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T4D-BC, B1C

Type	DN	A	_B	C	_D	_E	F	G	H	I	J	V	X	NPT	kg
T4D01 - B1C6	25	210	36	38	25	26.6	400	260	275	215	191	36	90	1/4	20
T4D01 - B1C9	25	210	36	38	25	26.6	455	315	365	220	192	43	110	1/4	26
T4D015 - B1C6	40	251	52	60	38	40.6	400	260	365	215	223	51	135	1/4	22
T4D015 - B1C9	40	251	52	60	38	40.6	455	315	360	220	225	43	110	1/4	27
T4D015 - B1C11	40	251	52	60	38	40.6	540	375	370	225	230	51	135	3/8	33
T4D02 - B1C6	50	292	62	60	38	52.5	400	260	365	215	223	43	110	1/4	22
T4D02 - B1C9	50	292	62	60	38	52.5	455	315	360	220	225	43	110	1/4	30
T4D02 - B1C11	50	292	62	60	38	52.5	540	375	370	225	230	51	135	3/8	36
T4D03 - B1C11	80	356	91	68	50	77.9	540	375	395	225	245	51	135	3/8	50
T4D03 - B1C13	80	356	91	68	50	77.9	635	445	425	235	260	65	175	3/8	65
T4D04 - B1C13	100	432	117	90	76	102.3	635	445	425	235	300	65	175	3/8	100
T4D04 - B1C17	100	432	117	90	76	102.3	770	545	515	255	315	78	215	1/2	125
T4D04 - B1C20	100	432	117	90	76	102.3	840	575	552	270	337	97	215	1/2	205
T4D06 - B1C17	150	559	172	122	102	154.1	770	545	610	255	375	78	215	1/2	185
T4D06 - B1C20	150	559	172	122	102	154.1	840	575	645	270	397	97	215	1/2	198
T4D06 - B1C25	150	559	172	122	102	154.1	1040	710	700	310	415	121	265	1/2	265
T4D08 - B1C20	200	660	223	140	125	202.7	840	575	705	270	440	97	265	1/2	283
T4D08 - B1C25	200	660	223	140	125	202.7	1040	710	765	310	465	121	265	1/2	350
T4D08 - B1C32	200	660	223	140	125	202.7	1330	910	845	350	505	153	395	3/4	480
T4D10 - B1C25	250	787	278	170	152	254.4	1040	710	810	310	480	121	265	1/2	425
T4D10 - B1C32	250	787	278	170	152	254.4	1330	910	885	350	515	153	395	3/4	545
T4D10 - B1C40	250	787	278	170	152	254.4	1660	1150	995	370	565	194	505	3/4	735
T4D12 - B1C25	300	838	329	210	202	303.2	1040	710	960	310	539	121	265	1/2	605
T4D12 - B1C32	300	838	329	210	202	303.2	1330	910	990	350	576	153	395	3/4	745
T4D12 - B1C40	300	838	329	210	202	303.2	1660	1150	1090	370	626	194	505	3/4	945
T4D14 - B1C32	350	889	362	275	254	333.4	1330	910	1230	350	755	153	395	3/4	1210
T4D14 - B1C40	350	889	362	275	254	333.4	1660	1150	1335	370	805	194	505	3/4	1400
T4D14 - B1C50	350	889	362	275	254	333.4	1970	1350	1435	415	855	242	610	1	1790
T4D16 - B1C32	400	991	413	275	254	381.0	1330	910	1230	350	755	153	395	3/4	1260
T4D16 - B1C40	400	991	413	275	254	381.0	1660	1150	1335	370	805	194	505	3/4	1450
T4D16 - B1C50	400	991	413	275	254	381.0	1970	1350	1435	415	855	242	610	1	1840

T4F-BC, B1C

Type	DN	A	_B	C	_D	_E	F	G	H	I	J	V	X	NPT	kg
T4F01 - B1C6	25	210	36	38	25	24.4	400	260	275	215	191	36	90	1/4	20
T4F01 - B1C9	25	210	36	38	25	24.4	455	315	365	220	192	43	110	1/4	26
T4F015 - B1C6	40	251	52	60	38	37.8	400	260	365	225	223	51	135	1/4	22
T4F015 - B1C9	40	251	52	60	38	37.8	455	315	360	220	225	43	110	1/4	27
T4F015 - B1C11	40	251	52	60	38	37.8	540	375	370	225	230	51	135	3/8	33
T4F02 - B1C6	50	292	62	60	38	49.3	400	260	365	225	223	51	135	1/4	22
T4F02 - B1C9	50	292	62	60	38	49.3	455	315	360	220	225	43	110	1/4	30
T4F02 - B1C11	50	292	62	60	38	49.3	540	375	370	225	230	51	135	3/8	36
T4F03 - B1C11	80	356	91	68	50	73.7	540	375	395	225	245	51	135	3/8	50
T4F03 - B1C13	80	356	91	68	50	73.7	635	445	425	235	260	65	175	3/8	65
T4F04 - B1C13	100	432	117	90	76	97.1	635	445	425	235	303	65	175	3/8	100
T4F04 - B1C17	100	432	117	90	76	97.1	770	545	515	255	315	78	215	1/2	125
T4F04 - B1C20	100	432	117	90	76	97.1	840	575	552	270	337	97	215	1/2	205
T4F06 - B1C17	150	559	172	122	102	146.3	770	545	610	255	375	78	215	1/2	185
T4F06 - B1C20	150	559	172	122	102	146.3	840	575	645	270	397	97	215	1/2	198
T4F06 - B1C25	150	559	172	122	102	146.3	1040	710	700	310	415	121	265	1/2	265
T4F08 - B1C20	200	660	223	140	125	188.9	840	575	705	270	440	97	265	1/2	283
T4F08 - B1C25	200	660	223	140	125	188.9	1040	710	765	310	465	121	265	1/2	350
T4F08 - B1C32	200	660	223	140	125	188.9	1330	910	845	350	505	153	395	3/4	480
T4F10 - B1C25	250	787	278	170	152	242.8	1040	710	810	310	480	121	265	1/2	425
T4F10 - B1C32	250	787	278	170	152	242.8	1330	910	885	350	515	153	395	3/4	545
T4F10 - B1C40	250	787	278	170	152	242.8	1660	1150	955	370	565	194	505	3/4	735
T4F12 - B1C25	300	838	329	210	202	288.8	1040	710	960	310	539	121	265	1/2	605
T4F12 - B1C32	300	838	329	210	202	288.8	1330	910	990	350	576	153	395	3/4	745
T4F12 - B1C40	300	838	329	210	202	288.8	1660	1150	1090	370	626	194	505	3/4	945
T4F14 - B1C32	350	889	362	275	254	317.6	1330	910	1230	350	755	153	395	3/4	1210
T4F14 - B1C40	350	889	362	275	254	317.6	1660	1150	1335	370	805	194	505	3/4	1400
T4F14 - B1C50	350	889	362	275	254	317.6	1970	1350	1435	415	855	242	610	1	1790
T4F16 - B1C32	400	991	413	275	254	363.6	1330	910	1230	350	755	153	395	3/4	1260
T4F16 - B1C40	400	991	413	275	254	363.6	1660	1150	1335	370	805	194	505	3/4	1450
T4F16 - B1C50	400	991	413	275	254	363.6	1970	1350	1435	415	855	242	610	1	1840

T4D-BJ/BJA, B1J/B1JA

Type	DN	A	_B	C	_D	_E	F	G	H	I	J	V	X	NPT	kg
T4D01 - B1J/B1JA6	25	210	36	38	25	26.6	485	368	303	219	191	36	110	3/8	29
T4D01 - B1J/B1JA8	25	210	36	38	25	26.6	560	420	305	220	192	43	135	3/8	33
T4D01 - B1J10	25	210	36	38	25	26.6	650	490	325	225	198	51	175	3/8	45
T4D015 - B1J/B1JA8	40	251	52	60	38	40.6	560	420	360	220	225	43	135	3/8	34
T4D015 - B1J/B1JA10	40	251	52	60	38	40.6	650	490	380	225	230	51	175	3/8	47
T4D015 - B1J12	40	251	52	60	38	40.6	800	620	425	235	255	65	215	1/2	74
T4D02 - B1J/B1JA8	50	292	62	60	38	52.5	560	420	360	220	225	43	135	3/8	37
T4D02 - B1J/B1JA10	50	292	62	60	38	52.5	650	490	380	225	230	51	175	3/8	50
T4D02 - B1J12	50	292	62	60	38	52.5	800	620	425	235	255	65	215	1/2	78
T4D03 - B1J/B1JA10	80	356	91	68	50	77.9	650	490	400	225	245	51	175	3/8	64
T4D03 - B1J/B1JA12	80	356	91	68	50	77.9	800	620	435	235	260	65	215	1/2	92
T4D03 - B1J/B1JA16	80	356	91	68	50	77.9	990	760	475	255	275	78	265	1/2	137
T4D04 - B1J/B1JA12	100	432	117	90	76	102.3	800	620	500	235	303	65	215	1/2	122
T4D04 - B1J/B1JA16	100	432	117	90	76	102.3	990	760	540	255	315	78	265	1/2	175
T4D04 - B1J/B1JA20	100	432	117	90	76	102.3	1200	935	625	270	337	97	395	3/4	245
T4D06- B1J/B1JA16	150	559	172	122	102	154.1	990	760	635	255	378	78	265	1/2	225
T4D06 - B1J/B1JA20	150	559	172	122	102	154.1	1200	935	715	270	395	97	395	3/4	300
T4D06 - B1J/B1JA25	150	559	172	122	102	154.1	1530	1200	790	310	415	121	505	3/4	485
T4D08 - B1J/B1JA20	200	660	223	140	125	202.7	1200	935	765	270	425	97	395	3/4	395
T4D08 - B1J/B1JA25	200	660	223	140	125	202.7	1530	1200	860	310	465	121	505	3/4	570
T4D08 - B1J/B1JA32	200	660	223	140	125	202.7	1830	1410	915	350	505	153	540	1	890
T4D10 - B1J/B1JA20	250	787	278	170	152	254.4	1200	935	815	270	445	97	395	3/4	450
T4D10 - B1J/B1JA25	250	787	278	170	152	254.4	1530	1200	905	310	480	121	505	3/4	645
T4D10 - B1J/B1JA32	250	787	278	170	152	254.4	1830	1410	955	350	515	153	540	1	965
T4D12 - B1J/B1JA25	300	838	329	210	202	303.2	1530	1200	1005	310	539	121	505	3/4	845
T4D12 - B1J/B1JA32	300	838	329	210	202	303.2	1830	1410	1060	350	576	153	540	1	1165
T4D14 - B1J/B1JA32	350	889	362	275	254	333.4	1830	1410	1300	350	755	153	540	1	1530
T4D16 - B1J/B1JA32	400	991	413	275	254	381.0	1830	1410	1300	350	755	153	540	1	1680

T4F-BJ/BJA, B1J/B1JA

Type	DN	A	_B	C	_D	_E	F	G	H	I	J	V	X	NPT	kg
T4F01 - B1J/B1JA6	25	210	36	38	25	24.4	485	368	303	219	191	36	110	3/8	29
T4F01 - B1J/B1JA8	25	210	36	38	25	24.4	560	420	305	220	192	43	135	3/8	33
T4F01 - B1J10	25	210	36	38	25	24.4	650	490	325	225	198	51	175	3/8	45
T4F015 - B1J/B1JA8	40	251	52	60	38	37.8	560	420	360	220	225	43	135	3/8	34
T4F015 - B1J/B1JA10	40	251	52	60	38	37.8	650	490	380	225	230	51	175	3/8	47
T4F015 - B1J12	40	251	52	60	38	37.8	800	620	425	235	255	65	215	1/2	74
T4F02 - B1J/B1JA8	50	292	62	60	38	49.3	560	420	360	220	225	43	135	3/8	37
T4F02 - B1J/B1JA10	50	292	62	60	38	49.3	650	490	380	225	230	51	175	3/8	50
T4F02 - B1J12	50	292	62	60	38	49.3	800	620	425	235	255	65	215	1/2	78
T4F03 - B1J/B1JA10	80	356	91	68	50	73.7	650	490	400	225	245	51	175	3/8	64
T4F03 - B1J/B1JA12	80	356	91	68	50	73.7	800	620	435	235	260	65	215	1/2	92
T4F03 - B1J/B1JA16	80	356	91	68	50	73.7	990	760	475	255	275	78	265	1/2	137
T4F04 - B1J/B1JA12	100	432	117	90	76	97.1	800	620	500	235	303	65	215	1/2	122
T4F04 - B1J/B1JA16	100	432	117	90	76	97.1	990	760	540	255	315	78	265	1/2	175
T4F04 - B1J/B1JA20	100	432	117	90	76	97.1	1200	935	625	270	337	97	395	3/4	245
T4F06 - B1J/B1JA16	150	559	172	122	102	146.3	990	760	635	255	378	78	265	1/2	225
T4F06 - B1J/B1JA20	150	559	172	122	102	146.3	1200	935	715	270	395	97	395	3/4	300
T4F06 - B1J/B1JA25	150	559	172	122	102	146.3	1530	1200	790	310	415	121	505	3/4	485
T4F08 - B1J/B1JA20	200	660	223	140	125	188.9	1200	935	765	270	425	97	395	3/4	395
T4F08 - B1J/B1JA25	200	660	223	140	125	188.9	1530	1200	860	310	465	121	505	3/4	570
T4F08 - B1J/B1JA32	200	660	223	140	125	188.9	1830	1410	915	350	505	153	540	1	890
T4F10 - B1J/B1JA20	250	787	278	170	152	242.8	1200	935	815	270	445	97	395	3/4	450
T4F10 - B1J/B1JA25	250	787	278	170	152	242.8	1530	1200	905	310	480	121	505	3/4	645
T4F10 - B1J/B1JA32	250	787	278	170	152	242.8	1830	1410	955	350	515	153	540	1	965
T4F12 - B1J/B1JA25	300	838	329	210	202	288.8	1530	1200	1005	310	539	121	505	3/4	845
T4F12 - B1J/B1JA32	300	838	329	210	202	288.8	1830	1410	1060	350	576	153	540	1	1165
T4F14 - B1J/B1JA32	350	889	362	275	254	317.6	1830	1410	1300	350	755	153	540	1	1530
T4F16 - B1J/B1JA32	400	991	413	275	254	363.6	1830	1410	1300	350	755	153	540	1	1680

T35F-BC, B1C

Type	DN	A	_B	C	_D	_E	F	G	H	I	J	V	X	NPT	kg
T35F02 - B1C11	50	292	91	68	50	73.7	540	375	375	225	245	51	135	3/8	49
T35F02 - B1C13	50	292	91	68	50	73.7	635	445	425	235	260	65	175	3/8	63
T35F03 - B1C13	80	356	117	90	76	97.1	635	445	485	235	300	65	175	3/8	97
T35F03 - B1C17	80	356	117	90	76	97.1	770	545	515	255	315	78	215	1/2	120
T35F03 - B1C20	80	356	117	90	76	97.1	840	575	550	270	337	97	215	1/2	135
T35F04 - B1C17	100	432	172	122	102	146.3	770	545	610	255	375	78	215	1/2	185
T35F04 - B1C20	100	432	172	122	102	146.3	840	575	645	270	397	97	215	1/2	203
T35F04 - B1C25	100	432	172	122	102	146.3	1040	710	700	310	415	121	265	1/2	265
T35F06 - B1C25	150	559	278	170	152	242.8	1040	710	810	310	480	121	265	1/2	415
T35F06 - B1C32	150	559	278	170	152	242.8	1330	910	885	350	515	153	395	3/4	535
T35F06 - B1C40	150	559	278	170	152	242.8	1660	1150	990	370	565	194	505	3/4	730
T35F08 - B1C25	200	660	329	210	202	288.8	1040	710	910	310	539	121	265	1/2	595
T35F08 - B1C32	200	660	329	210	202	288.8	1330	910	990	350	576	153	395	3/4	725
T35F08 - B1C40	200	660	329	210	202	288.8	1660	1150	1090	370	626	194	505	3/4	920
T35F10 - B1C32	250	787	362	275	254	317.6	1330	910	1230	350	755	153	395	3/4	1010
T35F10 - B1C40	250	787	362	275	254	317.6	1660	1150	1335	370	805	194	505	3/4	1205
T35F10 - B1C50	250	787	362	275	254	317.6	1970	1350	1435	415	855	242	610	1	1590

T35F-BJ/BJA, B1J/B1JA

Type	DN	A	_B	C	_D	_E	F	G	H	I	J	V	X	NPT	kg
T35F02 - B1J/B1JA10	50	292	91	68	50	73.7	650	490	400	225	245	51	175	3/8	63
T35F02 - B1J/B1JA12	50	292	91	68	50	73.7	800	620	435	235	260	65	215	1/2	92
T35F02 - B1J/B1JA16	50	292	91	68	50	73.7	990	760	475	255	275	78	265	1/2	135
T35F03 - B1J/B1JA12	80	356	117	90	76	97.1	800	620	500	235	303	65	215	1/2	119
T35F03 - B1J/B1JA16	80	356	117	90	76	97.1	990	760	540	255	315	78	265	1/2	165
T35F03 - B1J/B1JA20	80	356	117	90	76	97.1	1200	935	625	270	335	97	395	3/4	240
T35F04 - B1J/B1JA16	100	432	172	122	102	146.3	990	760	635	255	378	78	265	1/2	230
T35F04 - B1J/B1JA20	100	432	172	122	102	146.3	1200	935	715	270	395	97	395	3/4	315
T35F04 - B1J/B1JA25	100	432	172	122	102	146.3	1530	1200	790	310	415	121	505	3/4	485
T35F06 - B1J/B1JA20	150	559	278	170	152	242.8	1200	935	815	270	445	97	395	3/4	445
T35F06 - B1J/B1JA25	150	559	278	170	152	242.8	1530	1200	905	310	480	121	505	3/4	635
T35F06- B1J/B1JA32	150	559	278	170	152	242.8	1830	1410	955	350	515	153	540	1	945
T35F08 - B1J/B1JA25	200	660	329	210	202	288.8	1530	1200	1005	310	539	121	505	3/4	825
T35F08 - B1J/B1JA32	200	660	329	210	202	288.8	1830	1410	1060	350	576	153	540	1	1145
T35F10 - B1J/B1JA32	250	787	362	275	254	317.6	1830	1410	1300	350	755	153	540	1	1430

14 TYPE CODING

Neles™ top entry rotary valve, Top5™ series T5											
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.		11.
	T5	F	B	04	A	A	F	03		/	-

1.	PRODUCT DESIGN Q- TRIM and V-PORT OPTIONS
Q	Low noise trim for gas and liquid applications (in sizes NPS 08" and larger).
QX	Multichannel Q-ball for gas and liquid applications. (in sizes NPS 06" and smaller)
Q2G	Q2-trim for gas applications
Q2GH	Q2-trim for gas applications, high capacity version
QA	Low noise trim + attenuator plate in downstream flow port of body for gas applications. (in sizes NPS 08" and larger).
QXA	Multichannel Q-ball + attenuator plate in downstream flow port of body for gas applications. (in sizes NPS 06" and smaller).
A	Attenuator plate in downstream flow port of body for gas application *
QXR	Reduced capacity multichannel Q-ball for gas and liquid applications. (in sizes NPS 06" and smaller)
QRA	Reduced capacity multichannel Q-ball + attenuator plate in downstream flow port of body for gas applications. (in sizes NPS 06" and smaller).
V_ _	V-port (only for T5/T4 1", 1 1/2", 2"/DN 25, 40, 50).

*) For liquid applications customized baffle plates are used. Code “A” must be replaced with “Y” and explanation must be given.

2.	SERIES / DESIGN
	T5 SERIES **Top entry body, trunnion mounted**
T5	Reduced bore, flanged, single seated, face-to-face lenght acc. to IEC 534-3 and ANSI/ISA S75.03-1985.
T4	Reduced bore 2" - 16", full bore 1" & 11/2", weld-ends.
T25	Full bore, flanged. OBSOLETE
T35	Full bore, weld ends, OBSOLETE

3.	PRESSURE RATING
C	ASME Class 150, face-to-face is according to Class 300
D	ASME Class 300
F	ASME Class 600
L	PN 25, DIN 2544, size 08" and bigger (sizes 01" - 06", use PN40)
M	PN 40, DIN 2545, size 01" and bigger
N	PN 63, DIN 2546, size 02" and bigger (sizes 01" and 1H", use PN100)
P	PN 100, DIN 2547, size 01" and bigger
U	JIS 30K
W	JIS 40K
Z	JIS 63K

4.	CONSTRUCTION
E	General, PTFE bearings. Temperature range -50 °C ... +230 °C.
B	High and low temperature, metal bearings. Temperature range -50 °C...+450 °C.
C	Cryogenic, metal or PTFE bearings F-seat only. Temperature ranges: PTFE bearings -200 to +230 °C and metal bearings -200 to +400 °C.
Z	OXYGEN CONSTRUCTION BAM tested non-metallic materials - T = -50 °C… +200 °C - Max pressure based on body rating - Metal bearings, cobalt based alloy - seat type F, WC-Co coated ball and seats - Oxygen cleaning acc. to Neles internal procedure

5.	SIZE
	inch(es) 1, 1.5, 2, 3, 4, 6, 8, 10, 12, 14, 16 code01, 015, 02, 03, 04, 06, 08, 10, 12, 14, 16,

6.	BODY	BOLTING
A	CF8M	B8M / 8M
D	WCB	L7M / 2HM

7.	BALL
A	CF8M + hard chrome with metal seats
D	CF8M + NiBo
R1	CF8M / AISI 316 + WC-Co, Dry gas, high pressure, T < 400 °C
R3	CF8M / AISI 316 + CrC, High temperature, T > 400 °C

8.	SEAT
A	Metal seat, T= -50 ... +450 °C. General service and fire safe applications.
E	Metal seat for control service. T= -50...+450 °C. Ejector style seat, lower torque in modulating control.
F	Bellows seat, T= -200 ... +400 °C (600 °C). Shut-off applications at low and high temperatures.
R	Standard soft seat, T= -30 ... +100 °C. Control and shut-off applications for high pressure gas.

9.	Seat seal	Bonnet gasket	Gland packing	Spring / Bellows	Bearings
02	Graphite, (seat A or E)	Graphite	Graphite	Inconel X-750 / W.no. 1.4418	PTFE
03	Graphite, (seat A or E)	Graphite	Graphite	Inconel X-750 / W.no. 1.4418	Metal
63	Viton G O-ring and Graphite (seat R)	Graphite	Graphite	Inconel X-750	PTFE or metal

10.	GLAND PACKING OPTION
G	Standard, Live loaded graphite packing,
G1	Live loaded graphite packing, ISO 15848-1 certified construction.
-	Without sign, Graphite packing

11.	FLANGE FACING
-	ASME B16.5 Raised Face (Ra 3.2-6.3) EN 1092-1 Type B1 (Ra 3.2 - 12.5) without sign
05	ASME B16.5 Ring Joint

12.	CONSTRUCTION CODE
+D	Drain plug

Valmet Flow Control Oy
Vanha Porvoontie 229, 01380 Vantaa, Finland.
Tel. +358 10 417 5000.
www.valmet.com/flowcontrol