Neles™ Neldisc™ high performance butterfly valves

Series L6, LW & LG Model D

Installation, maintenance and operating instructions

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EAC This product meets the requirements set by the Customs Union of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation.

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.

L series Neles™ Neldisc™ high performance butterfly valves

These instructions provide the customer/operator with important information in addition to the customer/operator's normal operation and maintenance procedures. Since operation and maintenance philosophies vary, Valmet does not attempt to dictate specific procedures, but to provide basic limitations and requirements created by the type of equipment provided.

These instructions assume that operators already have a general understanding of the requirements for safe operation of mechanical and electrical equipment in potentially hazardous environments. Therefore, these instructions should be interpreted and applied in conjunction with the safety rules and regulations applicable at the site and the particular requirements for operation of other equipment at the site.

These instructions do not intend to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the customer/ operator's purposes the matter should be referred to Valmet.

The rights, obligations and liabilities of Valmet and the customer/operator are strictly limited to those expressly provided in the contract relating to the supply of the equipment. No additional representations or warranties by Valmet regarding the equipment or its use are given or implied by the issue of these instructions.

INTRODUCTION

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. Addresses and phone numbers are printed on the back cover. See also www.valmet.com/flowcontrol/valves for the latest documentation.

SAVE THESE INSTRUCTIONS!

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.

Valmet has highly skilled personnel available for startup, maintenance and repair of our valves and component parts. Arrangements for this service can be made through your local Valmet representative or sales department. When performing maintenance use only Valmet replacement parts. Parts are obtainable through your local representative or spare parts department.

When ordering parts, always include Model and Serial Number of the unit being repaired.

1. GENERAL

These installation and maintenance instructions apply to 3"-24" (DN 80-600), pressure class 150 and 300 Model D L series valves regardless of the type of material used. The L series valves are designed with built in versatility making them well-suited to handle a wide variety of process applications.

Recommended spare parts required for maintenance refer to section 9. The model number, size, rating and serial number of the valve are shown on the identification tag located on the valve.

1.1 Scope of this manual

This installation, operation and maintenance manual provides essential information on the L series Neldisc triple eccentric disc valves. The actuators and instrumentation to be used with the L series valves are also discussed briefly. Refer to the separate actuator and control equipment instruction manuals for further 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 Description

Neles™ Neldisc™series L is a metal seated triple eccentric butterfly valve available in wafer, lugged and double flanged styles. The valve operates both in control and shut-off applications.

Offset Design

The disc is elliptical and triple eccentric. When the valve is closed, the elliptical disc at the major axis displaces the seat ring outward, causing the seat ring to contact the disc at the minor axis. When the valve is opened, the contact is released, and the seat ring returns to its original circular shape (see Figure 1).
The disc is connected to the shafts with pins and there are no holes through the disc. Construction details of individual valves are included in the type code shown on the valve identification plate. To interpret the type code, please refer to Section 12.

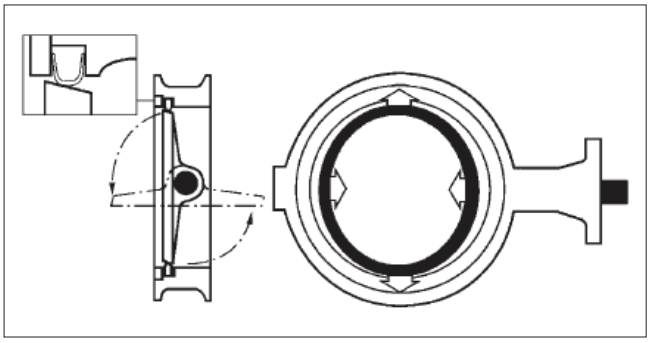


Fig. 1 Neldisc sealing principle

Positive Stop Feature

To prevent seat damage from over-travel of the disc beyond the closed position (usually during field mounting of a handle or actuator), a "positive stop" feature has been designed into the valve. The location of this feature is shown in (Figure 2).

IMPORTANT NOTE: Maximum shut-off pressure rating depends on the materials chosen. Refer to the tag attached to each valve for this rating. Do not use a valve at service conditions that exceed the rating of the tag.

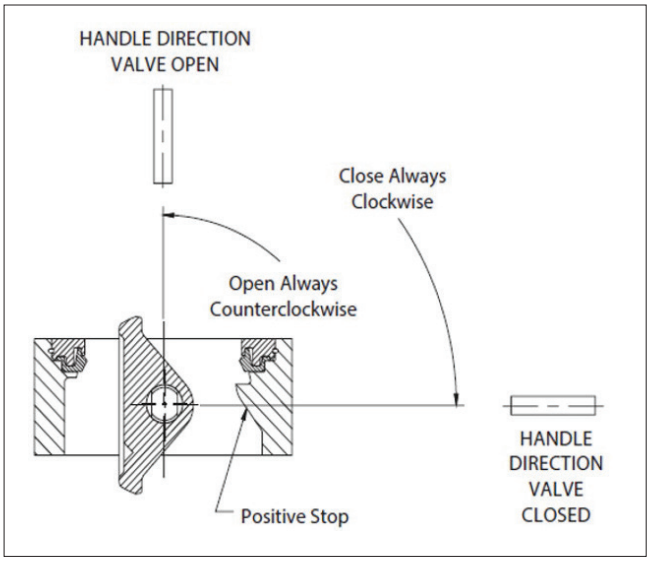


Fig. 2 Positive Stop Feature

1.3 Valve markings

Body markings are cast or stamped on the body. The valve also has an identification plate attached to it (see Figure 3).

Fig. 3 Identification plate

Identification plate marking:

1. Size
2. Pressure class
3. Type code
4. Body material
5. Seat material
6. Model number
7. Date
8. Trim material
9. Shaft material
10. Maximum shut-off pressure
11. Maximum temperature
12. Certification and approvals, eg. CE, Atex etc.

1.4 Technical specifications

The following designs are available in sizes 3”–24” (DN 80–600):

	Wafer	Lugged	Double Flanged
Design	API 609	API 609	API 609
	ASME B16.34	ASME B16.34	ASME B16.34
	EN 593	EN 593	EN 593
Pressure Class	ASME Class 150 & 300	ASME Class 150 & 300	ASME Class 150 & 300
	PN 10–40	PN 10–40	PN 10–40
Face to Face	API 609 Cat B EN 558 Part 1, Table 5 Basic Series 16, 20 & 25	API 609 Cat B EN 558 Part 1, Table 5 Basic Series 16, 20 & 25	API 609 Cat B Short Pattern EN 558 Part 1, Table 5 Basic Series 13 ISO 5752 Series 13
Flange Connection/Drilling	ASME B16.5 EN 1092-1	ASME B16.5 EN 1092-1	ASME B16.5 EN 1092-1
Temp Range	-50 °C ... +600 °C (-58 °F ... +1120 °F)		

1.5 Valve approvals

API 607 Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats

ISO 15848 INDUSTRIAL VALVES. MEASUREMENT, TEST AND QUALIFICATION PROCEDURES FOR FUGITIVE EMISSIONS

Group II Category 2 according to directive 2014/34/EU (ATEX).

NACE MR0103 & MR0175

1.6 CE and ATEX 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.

When applicable, the valve meets the requirements of the European Directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres, 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

WARNING:
DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!
Exceeding the pressure or temperature limitations marked on the valve identification plate may cause damage and lead to uncontrolled pressure release. Damage or personal injury may result.

WARNING:
SEAT AND BODY RATINGS!
The practical and safe use of this product is determined by both the seat and body ratings. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some of the seat materials have pressure ratings that are less than the body ratings. All of the body and seat ratings are dependent on valve type and size, seat material, and temperature. Do not exceed these ratings!

WARNING:
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 people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance. Failure to do this may result in damage or personal injury.

WARNING:
BEWARE OF DISC MOVEMENT!
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 disc functions as a cutting device. Disconnect any pneumatic supply lines, any electrical power sources and make sure springs in spring-return actuators are in the full extended/relaxed state before performing any valve maintenance. Failure to do this may result in damage or personal injury!

WARNING:
WHEN HANDLING THE VALVE OR VALVE/ACTUATOR ASSEMBLY, TAKE ITS WEIGHT INTO ACCOUNT!
Never lift the valve or valve/actuator assembly by the actuator, positioner, limit switch or their piping. Place lifting devices securely around the valve body. Failure to follow these instructions may result in damage or personal injury from falling parts .
Please consult separate document: instructions for lifting Neles products. (See Neles document id: 10LIFT70EN.PDF).

CAUTION:
BEWARE OF NOISE EMISSIONS!
The valve may produce noise in the pipeline. The noise level depends on the application. Observe the relevant work environment regulations on noise emission. This can be measured or calculated using Neles Nelprof software.

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.

NOTE:
Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

NOTE:
Contact Valmet experts for dead-end service compliance. Wafer type is not applicable for dead-end service.

ATEX/Ex Safety

CAUTION!
Potential electrostatic hazard, ensure the protection (grounding, etc.) in the process.

CAUTION!
The actual surface temperature of valve is dependent on the process temperature. The protection from high or low temperature must be considered by the end user before valve is put into service.

CAUTION!
Ensure the general process and worker protection from static electricity in the facilities.
Note! Within series there is possibility to Category 2, Category 3 and non-ATEX valve.

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. trim 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 remove the flow port protectors until installing the valve. Move the valve to its intended location just before installation. The valve is usually delivered in the closed position. A valve equipped with a spring-return actuator is delivered in a position determined by the spring. During storage the valve must be lightly closed.
If the valve(s) are to be stored for a long duration, follow the recommendations of M-1147-En.

2.1 Unpacking

Care must be exercised when unpacking the valve to prevent damage to the accessories and component parts. Contact the local Valmet Sales office or Service Center with any issues or problems. Be sure to note the valve model number and serial number in all correspondence.

3. INSTALLATION

1. Read all **WARNINGS!**
2. **IMPORTANT:** Only operating handle stops or actuator stop screws must be used to stop the disc position. DO NOT use the “positive stop” by itself to limit travel.
3. Before installing a closed valve in the pipeline, be sure that the handle or actuator is attached so that a counter-clockwise rotation, viewed from above, opens the valve (See Figure 2). Fully close the valve again before installing in the pipeline.
4. The valve must be centered between flanges to avoid disc-pipe contact which could damage the disc and shaft. Any flange or pipeline welding should be done prior to installation of the valves. If this is impossible, protective covering or shields must be placed in the pipeline between the valve and the area being welded prior to welding. Not only must the valve be protected against weld slag, but also against any excessive heat, which could cause seat damage. It is essential that all weld slag, rods, debris, tools, etc., be removed from the pipeline before valves are installed or cycled.
5. It is not recommended to install the valve with the stem on the underneath side because dirt in the pipeline may then enter the body cavity and potentially damage the stem packing (see Figure 4).
6. For installation of the cryogenic extension to the valve, the extension and the valve should be typically in vertical position. For installation of the valve in cryogenic applications the valve package as a whole should be typically in vertical position.

3.1 General

Remove the flow port protectors and check that the valve is undamaged and clean inside.

Before installing the valve in the line, clean piping and valve of all foreign material such as welding chips, scale, oil, grease or dirt. Gasket surfaces should be thoroughly cleaned to ensure leak-proof joints.

3.2 Installing in the pipeline

WARNING:
The valve should be tightened between flanges using appropriate gaskets and fasteners compatible with the application, and in compliance with applicable piping codes and standards. Center the flange gaskets carefully when fitting the valve between flanges. Do not attempt to correct pipeline misalignment by means of flange bolting!

Flush or blow the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the disc sealing surface and seat.

The valve may be installed in any position and offers tightness in both directions. For lowest operating torque it is recommended that the valve is installed with the clamp ring towards the higher pressure (shaft downstream).

Install the valve in the pipeline so that the shaft is horizontal if possible. However, Valmet does not recommend installing the valve with the actuator on the underside (Figure 4) because dirt in the pipeline may damage the gland packing.

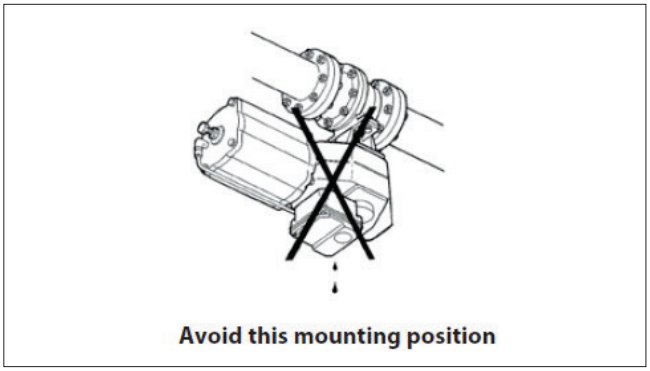


Fig. 4 Avoid this mounting position

Select flange gaskets according to the operating conditions.

Do not attempt to correct pipeline misalignment by means of flange bolting.

It may be necessary to firmly support the pipeline to protect the valve from excess stress. Sufficient support will also reduce pipeline vibrations and this ensures proper functioning of the positioner. Do not fasten supports to the flange bolting or to the actuator.

It is recommended that the length of any straight pipe preceding the control valve is at least 2 x pipe diameter.

The flow causes a so-called dynamic torque against the valve disc which attempts to close the valve. In a pipe elbow the pressure on the outer edge is higher than on the inner edge.

When installing the triple eccentric disc valve immediately after a pipe elbow, the valve shaft must be directed toward the center point of the pipe (see Fig. 5). This is especially important when the valve is used as a control valve.

The shaft of a valve mounted after the centrifugal pump must be perpendicular to the pump shaft (see Fig. 6).

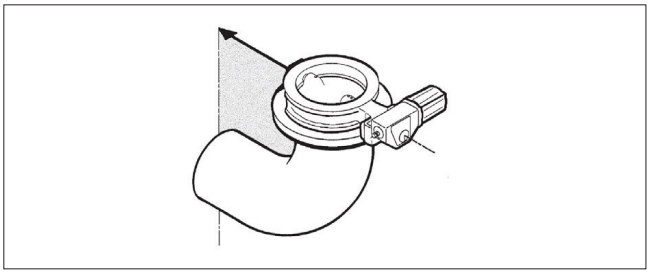


Fig. 5 Mounting after a pipe elbow

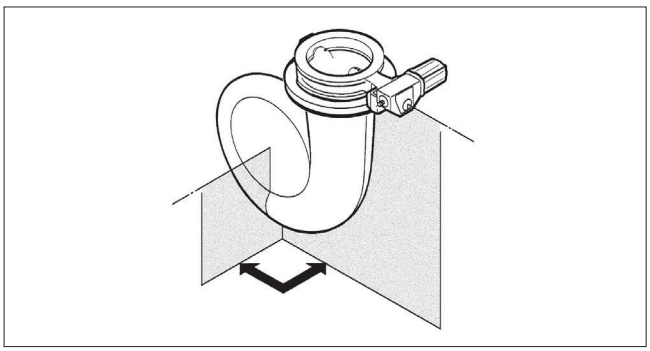


Fig. 6 Mounting after the centrifugal pump

When thus installed, the valve disc will be more evenly loaded and vibrations otherwise possible in the intermediate positions will be eliminated.

When mounting the valve it must be in a closed position and be carefully centered between the pipe flanges so that the turning disc does not touch the pipe edge or flange gaskets, see Fig.7 and Table 1.

Use caution when installing valve with Spring-to-open actuator.

In case of sudden shutdown of the energy supply the valve will open unexpectedly due to pre-stressed spring package. This may cause significant harm to people and material around the valve.

In valves with certain nominal sizes some flange bolts do not pass the valve body. The valve body is thus equipped with holes, see Fig. 8...9 and Tables 2...4.

Ensure that the disc can turn to the open position after preliminary tightening of the flange bolts. The actuators of control valves can be equipped with position stops to limit the allowable travel of the disc.

See Figures 8...9 and Tables 2...4, length of stud bolts are based on:

- gasket thickness of 3 mm
- heavy nuts with washers
- flange thickness of weldneck flanges according DIN or ISO standard

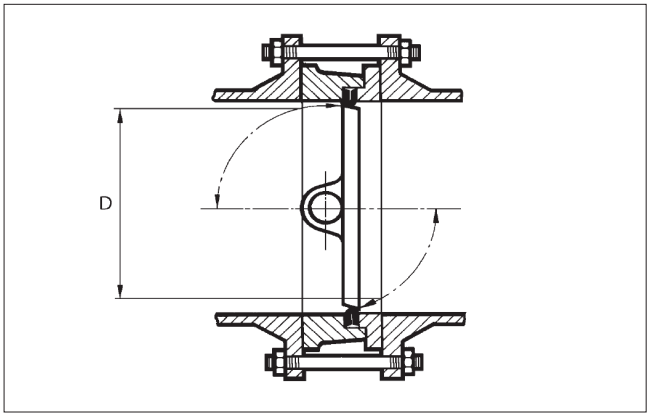


Fig. 7 Minimum pipe inside dimensions

Table 1 Minimum pipe inside dimensions (as in API 609)

Valve size (NPS)	ASME 150 EN PN 10-16	Inside dimension (mm)	ASME 300 EN PN 25-40	Inside dimension (mm)
3	Standard weight	77.9	Extra Strong	73.7
4	Standard weight	102.3	Extra Strong	97.2
6	Standard weight	154.1	Extra Strong	146.3
8	Standard weight	202.7	Extra Strong	193.7
10	Standard weight	254.5	Extra Strong	247.6
12	Standard weight	304.8	Extra Strong	298.4
14	Standard weight	336.6	Extra Strong	330.2
16	Standard weight	387.4	Extra Strong	381.0
18	Standard weight	438.2	Schedule 40	428.7
20	Standard weight	489.0	Schedule 40	477.8
24	Standard weight	590.6	Schedule 40	574.6

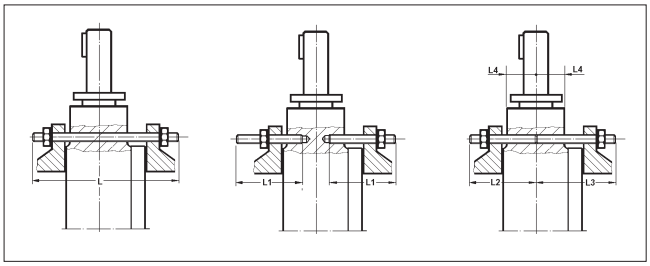


Fig. 8 Stud bolt length for wafer and lug types

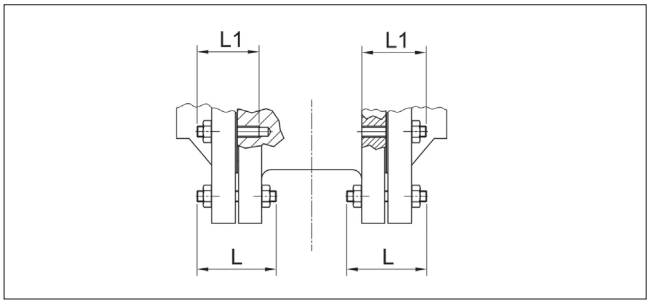


Fig. 9 Stud bolt length for double flange type

Below are presented the minimum dimensions for the stud bolts. Next size standard length bolt can be used.

Table 2 Minimum stud bolt dimensions, LW

LW6	ASME 150					PN10					PN16				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	5/8 UNC	150	4	-	-	M16	150	8	-	-	M16	150	8	-	-
100 / 4	5/8 UNC	160	8	-	-	M16	150	8	-	-	M16	150	8	-	-
150 / 6	3/4 UNC	180	8	-	-	M20	170	8	-	-	M20	170	8	-	-
200 / 8	3/4 UNC	190	8	-	-	M20	180	8	-	-	M20	180	12	-	-
250 / 10	7/8 UNC	220	12	-	-	M20	190	12	-	-	M24	200	12	-	-
300 / 12	7/8 UNC	240	12	-	-	M20	220	12	-	-	M24	220	12	-	-
350 / 14	1 UNC	260	12	-	-	M20	220	16	-	-	M24	240	16	-	-
400 / 16	1 UNC	280	16	-	-	M24	240	16	-	-	M27	260	16	-	-
450 / 18	1-1/8 - 8UN	320	16	-	-	M24	260	16	90	8	M27	300	16	150	8
500 / 20	1-1/8 - 8UN	340	16	130	8	M24	280	16	140	8	M30	320	16	160	8
600 / 24	1-1/4 - 8UN	380	16	130	8	M27	320	16	110	8	M33	380	16	190	8

LW7	ASME 150					PN10					PN16				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	5/8 UNC	150	4	-	-	M16	150	8	-	-	M16	150	8	-	-
100 / 4	5/8 UNC	160	8	-	-	M16	150	8	-	-	M16	150	8	-	-
150 / 6	3/4 UNC	190	8	-	-	M20	170	8	-	-	M20	180	8	-	-
200 / 8	3/4 UNC	200	8	-	-	M20	190	8	-	-	M20	190	12	-	-
250 / 10	7/8 UNC	220	12	-	-	M20	200	12	-	-	M24	220	12	-	-
300 / 12	7/8 UNC	240	12	-	-	M20	220	12	-	-	M24	220	12	-	-
350 / 14	1 UNC	260	12	-	-	M20	220	16	-	-	M24	240	16	-	-
400 / 16	1 UNC	280	16	-	-	M24	240	16	-	-	M27	260	16	-	-
450 / 18	1-1/8 - 8UN	320	16	-	-	M24	260	16	90	8	M27	300	16	150	8
500 / 20	1-1/8 - 8UN	340	16	130	8	M24	280	16	140	8	M30	320	16	160	8
600 / 24	1-1/4 - 8UN	380	16	130	8	M27	320	16	110	8	M33	380	16	190	8

LW8	ASME 150					PN10					PN16				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	5/8 UNC	160	4	-	-	M16	160	8	-	-	M16	160	8	-	-
100 / 4	5/8 UNC	170	8	-	-	M16	160	8	-	-	M16	160	8	-	-
150 / 6	3/4 UNC	200	8	-	-	M20	190	8	-	-	M20	190	8	-	-
200 / 8	3/4 UNC	220	8	-	-	M20	220	8	-	-	M20	220	12	-	-
250 / 10	7/8 UNC	260	12	-	-	M20	240	12	-	-	M24	260	12	-	-
300 / 12	7/8 UNC	260	12	-	-	M20	240	12	-	-	M24	260	12	-	-
350 / 14	1 UNC	300	12	-	-	M20	260	16	-	-	M24	280	16	-	-
400 / 16	1 UNC	320	16	-	-	M24	280	16	-	-	M27	300	16	-	-
450 / 18	1-1/8 - 8UN	340	16	-	-	M24	300	16	130	8	M27	320	16	190	8
500 / 20	1-1/8 - 8UN	360	16	150	8	M24	300	16	160	8	M30	340	16	190	8
600 / 24	1-1/4 - 8UN	400	16	160	8	M27	340	16	130	8	M33	400	16	220	8

LW5	ASME 300					PN25					PN40				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	3/4 UNC	180	8	-	-	M16	150	8	-	-	M16	150	8	-	-
100 / 4	3/4 UNC	190	8	-	-	M20	170	8	-	-	M20	170	8	-	-
150 / 6	3/4 UNC	220	12	-	-	M24	200	8	-	-	M24	200	8	-	-
200 / 8	7/8 UNC	240	12	-	-	M24	220	12	-	-	M27	240	12	-	-
250 / 10	1 UNC	280	12	150	8	M27	240	12	-	-	M30	260	12	-	-
300 / 12	1-1/8 - 8UN	300	12	140	8	M27	260	12	120	8	M30	280	12	130	8
350 / 14	1-1/8 - 8UN	340	16	140	8	M30	300	12	120	8	M33	320	12	130	8
400 / 16	1-1/4 - 8UN	380	16	150	8	M33	320	12	130	8	M36	360	12	140	8
450 / 18	1-1/4 - 8UN	400	20	160	8	M33	360	16	130	8	M36	380	16	150	8
500 / 20	1-1/4 - 8UN	420	20	170	8	M33	360	16	140	8	M39	400	16	160	8
600 / 24	1-1/2 - 8UN	460	20	170	8	M36	420	16	150	8	M45	480	16	180	8

LW8	ASME 300					PN25					PN40				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	3/4 UNC	190	8			M16	170	8			M16	170	8		
100 / 4	3/4 UNC	200	8			M20	180	8			M20	180	8		
150 / 6	3/4 UNC	220	12			M24	220	8			M24	220	8		
200 / 8	7/8 UNC	260	12			M24	240	12			M27	260	12		
250 / 10	1 UNC	300	12	170	8	M27	280	12			M30	300	12		
300 / 12	1-1/8 - 8UN	320	12	160	8	M27	280	12	140	8	M30	300	12	150	8
350 / 14	1-1/8 - 8UN	360	16	150	8	M30	300	12	130	8	M33	340	12	140	8
400 / 16	1-1/4 - 8UN	380	16	160	8	M33	340	12	130	8	M36	360	12	150	8
450 / 18	1-1/4 - 8UN	400	20	160	8	M33	360	16	130	8	M36	380	16	150	8
500 / 20	1-1/4 - 8UN	420	20	160	8	M33	380	16	140	8	M39	400	16	160	8
600 / 24	1-1/2 - 8UN	460	20	170	8	M36	420	16	150	8	M45	480	16	180	8

LW7	PN25				
DN / NPS	Thread	L	Qty	L1	Qty
80 / 3	M16	150	8		
100 / 4	M20	170	8		
150 / 6	M24	220	8		
200 / 8	M24	220	12		
250 / 10	M27	240	12		
300 / 12	M27	240	12		
350 / 14	M30	280	16		
400 / 16	M33	300	16		
450 / 18	M33	320	16	130	8
500 / 20	M33	320	16	130	8
600 / 24	M36	400	16	150	8

Table 3 Stud bolt dimensions, LG

LG6	ASME 150						PN10						PN16					
DN / NPS	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4
80 / 3	5/8 UNC	80	4	70	4	17	M16	80	8	80	8	17	M16	80	8	80	8	17
100 / 4	5/8 UNC	80	8	80	8	24	M16	80	8	80	8	24	M16	80	8	80	8	24
150 / 6	3/4 UNC	90	8	90	8	22	M20	90	8	90	8	22	M20	90	8	90	8	22
200 / 8	3/4 UNC	100	8	90	8	22	M20	100	8	90	8	22	M20	100	12	90	12	22
250 / 10	7/8 UNC	110	12	100	12	26	M20	100	12	90	12	26	M24	110	12	100	12	26
300 / 12	7/8 UNC	120	12	110	12	26	M20	110	12	100	12	26	M24	120	12	110	12	26
350 / 14	1 UNC	110	12	110	12	26												
400 / 16	1 UNC	130	16	130	16	28												
450 / 18	1-1/8 - 8UN	130	16	130	16	30												
500 / 20	1-1/8 - 8UN	130	20	130	20	30												
600 / 24	1-1/4 - 8UN	140	20	140	20	34												

LG7	ASME 150						PN10						PN16					
DN / NPS	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4
80 / 3	5/8 UNC	80	4	70	4	17	M16	80	8	80	8	17	M16	80	8	80	8	17
100 / 4	5/8 UNC	80	8	80	8	24	M16	80	8	80	8	24	M16	80	8	80	8	24
150 / 6	3/4 UNC	110	8	90	8	22	M20	90	8	90	8	22	M20	100	8	90	8	22
200 / 8	3/4 UNC	110	8	90	8	22	M20	110	8	90	8	22	M20	110	12	90	12	22
250 / 10	7/8 UNC	120	12	100	12	26	M20	110	12	90	12	26	M24	120	12	100	12	26
300 / 12	7/8 UNC	120	12	110	12	26	M20	110	12	100	12	26	M24	120	12	110	12	26
350 / 14	1 UNC	110	12	110	12	26												
400 / 16	1 UNC	130	16	130	16	28												
450 / 18	1-1/8 - 8UN	130	16	130	16	30												
500 / 20	1-1/8 - 8UN	130	20	130	20	30												
600 / 24	1-1/4 - 8UN	140	20	140	20	34												

LG8	ASME 150						PN10						PN16					
DN / NPS	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4
80 / 3	5/8 UNC	100	4	70	4	17	M16	90	8	80	8	17	M16	90	8	80	8	17
100 / 4	5/8 UNC	90	8	80	8	24	M16	90	8	80	8	24	M16	90	8	80	8	24
150 / 6	3/4 UNC	110	8	90	8	22	M20	110	8	90	8	22	M20	110	8	90	8	22
200 / 8	3/4 UNC	130	8	90	8	22	M20	130	8	90	8	22	M20	130	12	90	12	22
250 / 10	7/8 UNC	160	12	100	12	26	M20	150	12	90	12	26	M24	150	12	100	12	26
300 / 12	7/8 UNC	150	12	110	12	26	M20	140	12	100	12	26	M24	150	12	110	12	26
350 / 14	1 UNC	150	12	110	12	26												
400 / 16	1 UNC	170	16	130	16	28												
450 / 18	1-1/8 - 8UN	170	16	130	16	30												
500 / 20	1-1/8 - 8UN	160	20	130	20	30												
600 / 24	1-1/4 - 8UN	170	20	140	20	34												

LG5	ASME 300						PN25						PN40					
DN / NPS	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4
80 / 3	3/4 UNC	90	8	90	8	20	M16	80	8	80	8	20	M16	80	8	80	8	20
100 / 4	3/4 UNC	100	8	100	8	24	M20	90	8	90	8	24	M20	90	8	90	8	24
150 / 6	3/4 UNC	110	12	100	12	26	M24	100	8	100	8	26	M24	100	8	100	8	26
200 / 8	7/8 UNC	130	12	120	12	29	M24	120	12	110	12	29	M27	130	12	110	12	29
250 / 10	1 UNC	140	16	130	16	32	M27	130	12	120	12	32	M30	140	12	130	12	32
300 / 12	1-1/8 - 8UN	160	16	140	16	38	M27	140	16	120	16	38	M30	150	16	140	16	38
350 / 14	1-1/8 - 8UN	150	20	150	20	34												
400 / 16	1-1/4 - 8UN	170	20	170	20	36												
450 / 18	1-1/4 - 8UN	170	24	170	24	36												
500 / 20	1-1/4 - 8UN	180	24	180	24	42												
600 / 24	1-1/2 - 8UN	190	24	190	24	46												

LG8	ASME 300						PN25						PN40					
DN / NPS	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4	Thread	L3	Qty	L2	Qty	L4
80 / 3	3/4 UNC	110	8	90	8	20	M16	100	8	80	8	20	M16	100	8	80	8	20
100 / 4	3/4 UNC	110	8	100	8	24	M20	100	8	90	8	24	M20	100	8	90	8	24
150 / 6	3/4 UNC	120	12	100	12	26	M24	120	8	100	8	26	M24	120	8	100	8	26
200 / 8	7/8 UNC	140	12	120	12	29	M24	130	12	110	12	29	M27	140	12	110	12	29
250 / 10	1 UNC	170	16	130	16	32	M27	160	12	120	12	32	M30	170	12	130	12	32
300 / 12	1-1/8 - 8UN	180	16	140	16	38	M27	150	16	120	16	38	M30	170	16	140	16	38
350 / 14	1-1/8 - 8UN	160	20	150	20	34												
400 / 16	1-1/4 - 8UN	170	20	170	20	36												
450 / 18	1-1/4 - 8UN	170	24	170	24	36												
500 / 20	1-1/4 - 8UN	180	24	180	24	42												
600 / 24	1-1/2 - 8UN	190	24	190	24	46												

Table 4 Stud bolt dimensions, L6

L64	ASME 150					PN10					PN16				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	5/8 UNC	100	4	65	4	M16	100	12	70	4	M16	100	12	70	4
100 / 4	5/8 UNC	110	12	75	4	M16	100	8	70	8	M16	100	8	70	8
150 / 6	3/4 UNC	120	12	90	4	M20	110	12	80	4	M20	110	12	80	4
200 / 8	3/4 UNC	120	12	100	4	M20	120	12	90	4	M20	120	20	90	4
250 / 10	7/8 UNC	140	20	100	4	M20	120	20	90	4	M24	130	20	100	4
300 / 12	7/8 UNC	140	20	110	4	M20	120	20	90	4	M24	140	20	100	4
350 / 14	1 UNC	160	20	140	4										
400 / 16	1 UNC	190	28	120	4										
450 / 18	1-1/8 - 8UN	190	28	120	4										
500 / 20	1-1/8 - 8UN	190	34	150	6										
600 / 24	1-1/4 - 8UN	220	34	160	6										

L64	ASME 300					PN25					PN40				
DN / NPS	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty	Thread	L	Qty	L1	Qty
80 / 3	3/4 UNC	120	12	90	4	M16	100	12	75	4	M16	100	12	75	4
100 / 4	3/4 UNC	130	12	80	4	M20	120	12	75	4	M20	120	12	75	4
150 / 6	3/4 UNC	140	20	90	4	M24	140	12	100	4	M24	140	12	100	4
200 / 8	7/8 UNC	160	20	100	4	M24	140	20	90	4	M27	160	20	100	4
250 / 10	1 UNC	180	24	140	8	M27	150	20	100	4	M30	170	20	110	4
300 / 12	1-1/8 - UN	200	24	120	8	M27	160	24	100	8	M30	180	24	120	8
350 / 14	1-1/8 - UN	220	28	170	12										
400 / 16	1-1/4 - UN	260	28	190	12										
450 / 18	1-1/4 - UN	260	36	200	12										
500 / 20	1-1/4 - UN	260	36	200	12										
600 / 24	1-1/2 - UN	280	36	220	12										

3.3 Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve (see Figures 10 to 11).

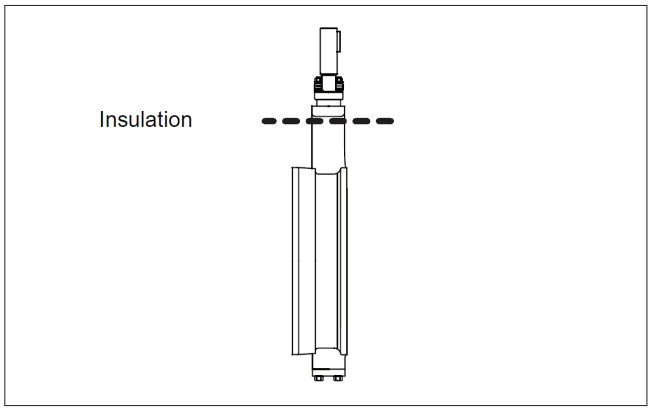


Fig. 10 Insulation of the valve

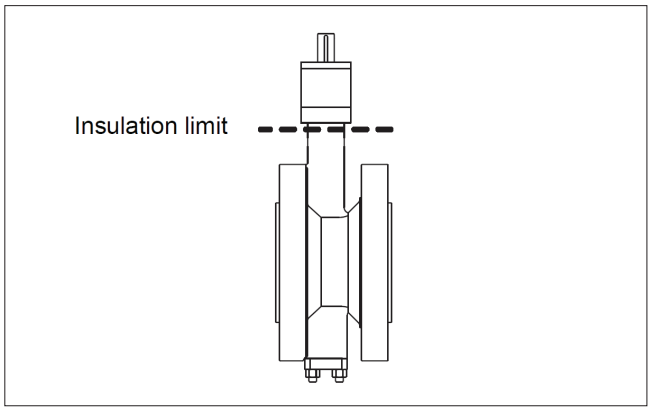


Fig. 11 Insulation of the valve

3.4 Actuator

CAUTION:
The actuator must not touch the pipeline, because pipeline vibration may damage it or interfere with its operation. In some certain cases, when a large-size actuator is used, extended stems are required or when the pipeline vibrates heavily, supporting the actuator is recommended.

When installing the actuator on the valve, make sure that the valve package functions properly. See instructions for installing in Section 6.

Observe the space needed for removal of the actuator. The actuator should be installed in a manner that allows plenty of room for its removal.

The upright position is recommended for the actuator cylinder.

In some cases, e.g. when a large-size actuator is used or when the pipeline vibrates heavily, supporting the actuator is recommended.

Please contact Valmet for further information.

4. COMMISSIONING

Ensure that no dirt or foreign objects are left inside the valve or pipeline. Flush the pipeline carefully. Keep the valve 30-40° open during flushing.

When starting up the pump, ensure that the valve in the pipeline is closed or, at the very most, 20° open.

A waterhammer, which follows the start-up of high-capacity pumps, creates a torque peak in the disc. This can damage the pin connection between disc and shaft when the valve is 30-90° open.

5. MAINTENANCE

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

CAUTION:
When handling the valve or the valve package as a whole, be mindful of the weight of the valve or the entire package.

WARNING:
For safety reasons the retaining plates MUST always be installed according to Section 5.3.

5.1 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. Valmet recommends inspecting valves at least every five (5) years. The inspection and maintenance frequency 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 category 1 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 and to the parts list in Section 9, unless otherwise stated.

Overhaul maintenance consists of replacing seats and seals. A standard spare part set consisting of these parts may be obtained through Valmet or your authorized Valmet Distributor.

NOTE: Spare part set include body gasket (32), blind flange gasket (31) and packing ring set (22). Refer to section 10.

WARNING:
FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:

1. Wear any protective clothing or equipment normally required when working with the fluid involved.
2. Depressurize the pipeline and cycle the valve as follows:
   - Place the valve in the open position and drain the pipeline.

After removal and before any disassembly, cycle the valve again several times.

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 Removing the valve from the pipeline

It is generally most convenient to detach the actuator and its auxiliary devices before removing the valve from the pipeline. If the valve package is small or if it is difficult to access, it may be more practical to remove the entire assembly.

NOTE:
To ensure proper reassembly, observe the position of the actuator and positioner/limit switch with respect to the valve before detaching the actuator.

WARNING:
Always disconnect the actuator from its power source, pneumatic, hydraulic or electrical, before attempting to remove it from the valve!

WARNING:
Do not remove a spring-return actuator unless a stop-screw is carrying the spring force!

1. Detach the air supply, electrical supply, hydraulic supply and control signal cables or pipes from their connectors.
2. Unscrew the actuator mounting bracket screws.
3. Lift the actuator straight up in line with the valve stem until the coupling between actuator drive and valve stem is completely disengaged.
4. Place actuator in a safe location to avoid damage or personal injury.

WARNING:
Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

CAUTION:
Valve must be fully closed before removing it from the pipeline.

CAUTION:
Valves equipped with spring-to-open (air-to-close) actuators must be disconnected from the actuators and then closed.

Ensure that the valve is not pressurized and the pipeline is empty. Ensure that the medium cannot flow into the section where servicing is to take place. Support the valve carefully with a hoist. Place ropes carefully and unscrew the pipe flange bolts. Ensure that the ropes are positioned correctly.

5.3 Replacing the gland packing

WARNING:
Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

PTFE V-rings are used as a standard gland packing and graphite rings for high temperature constructions. The packing construction is live loaded as standard.

The gland packing (22) must be changed if leakage occurs even after the hex nuts (43) have been tightened as recommended.

- Make sure the valve is not pressurized.
- Unfasten the nuts (43) and remove the disc spring sets (21), the retaining plates (24) and the gland (9).
- Remove old packing rings (22). Do not damage the surfaces of the packing ring counterbore and shaft. It is not necessary to change anti-extrusion ring (23).
- Ensure that there are no burrs in the keyway groove which could damage the packing. Clean the gland packing and packing ring counterbore. Install new set of packings (V-ring or graphite). Slip the rings onto the shaft.
- The installation order of packing is to first slide in one anti-extrusion ring with chamfer downward, then the packing rings, finally the other anti-extrusion ring with chamfer upward. For graphite packing rings make sure the seam in the ring is in 90 degree angle compared with the ring below it.
- Install the gland.
- Install one stud
- Install the retainer plates, one on top of another on the stud and the opposite another way around (Figure 12). Once the retainer plates are in the right place, install the other stud.

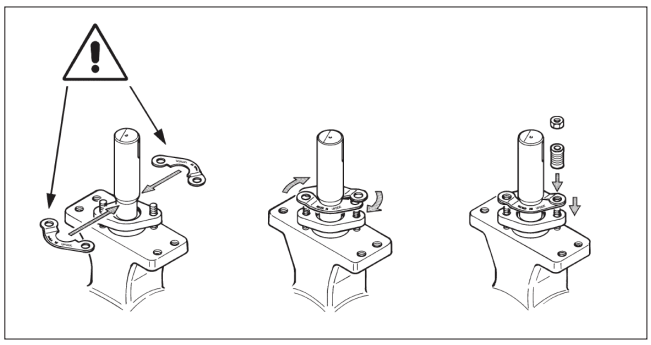


Fig. 12 Mounting the retainer

- Mount the disc spring sets.
- Place the nuts on the studs.
- For the standard live-loading option (Figure 13), please refer to Table 5 for the tightening torques. Install the disc springs one at a time, in opposite orientations, make sure the first installed disc spring has its wider area pointing down.
- For the high performance live-loading option (Figure 14), pre compress the gland packing by X length until the top cap reach the shell holder (housing) to ensure proper force in use.
- 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.

Table 5 Tightening of gland packing

TORQUE FOR B8M CL2 & 8M	
Thread size (mm)	**Torque (Nm)**
M5	7.5
M6	13
M8	31
M10	60
M12	100
M14	170
M16	260
M20	420
M24	720

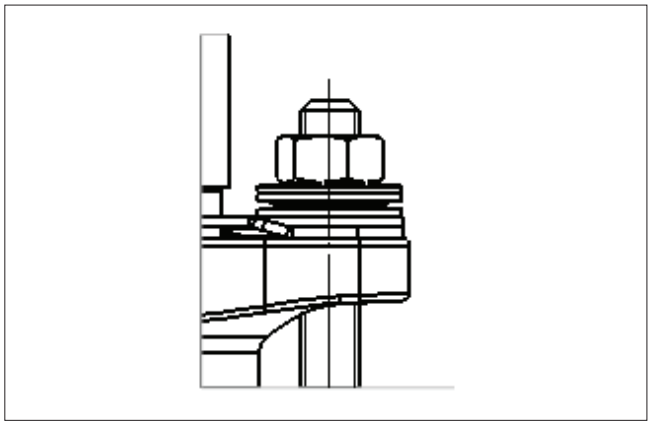


Fig. 13 Standard live-loading

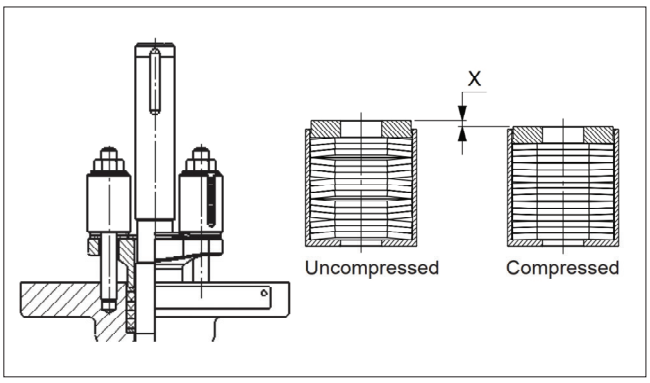


Fig. 14 High performance live-loading

- If the leakage still occurs when the valve is pressurized, re-tighten the nuts but don't exceed the values in the Table 5 by 50 % or do not fully compress the disc springs.

5.4 Valve leakage

Valve leakage is not always caused by a damaged seat ring or disc. The reason can also be that the disc is not in the closed position.

- Check the position of the actuator relative to the valve. The screws may be loose or the bracket damaged.
- Check the adjustment in the closed position (see Section 6.5).

The marking line parallel to the disc on the valve shaft head shows roughly the closed position of the disc (see Fig. 15). Pressure shocks can cause loosening of the pin connection between disc and shaft; consequently the shaft moves while the disc remains in place and this prevents full closing of the disc. If the reason for the leakage does not become apparent after doing the above, the valve must be disassembled for replacing the parts.

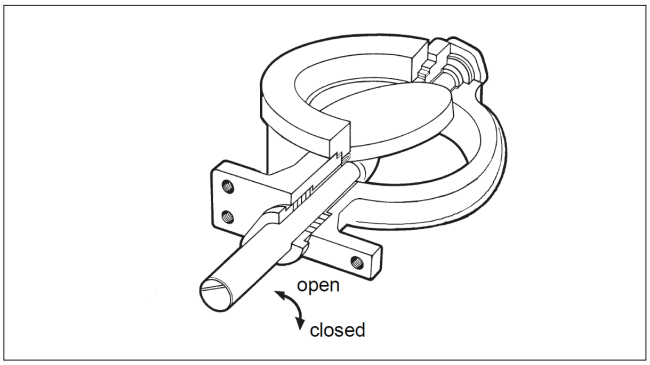


Fig. 15 Open and closed positions of the valve

5.5 Replacing the seat ring

WARNING:
Do not dismantle the valve or remove it from pipeline while the valve is pressurized.

- Ensure that the valve is not pressurized.
- Remove the valve from the pipeline. The valve must be in a closed position during removal.
- Remove the clamp ring (2) by untightening the screws (45).

- Remove the old body gasket (32) and the seat ring (4). Change the seat ring if it is damaged.
- Clean all the surfaces of the seats and check the surface of the seat ring.
- Check also the condition of the disc. A damaged disc must be changed (see Section 5.6).
- Check the condition of the pin connection. Repair it if necessary (see Section 5.6).
- Install a new body gasket.
- Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, to the sealing surface of body, disc and clamp ring.
- Install the seat ring (4) carefully into the seat groove on the body and turn the disc to maintain light contact with the seat. Make sure the seam on the seat is pointing 2 o'clock when the shaft is pointing at 12 o'clock.
- Install the graphite gasket carefully.
- Mount the clamp ring and tighten the screws (45) lightly.
- Turn the disc slightly open and pull it back to set the seat into the proper position.
- Tighten the screws (45) crosswise and evenly. Recommended torque values for screws are listed in Table 6. An unevenly tightened flange may damage the seat ring.

Table 6 Clamp ring / blind flange screw torque, Nm ± 10 %

TORQUE FOR B8M CL2 & 8M		TORQUE FOR L7M		TORQUE FOR B16 & 16		TORQUE FOR INC625	
Thread size (mm)	Torque (Nm)	Thread size (mm)	Torque (Nm)	Thread size (mm)	Torque (Nm)	Thread size (mm)	Torque (Nm)
M5	7.5	M5	6	M5	8	M5	5
M6	13	M6	10	M6	14	M6	8
M8	31	M8	25	M8	33	M8	19
M10	60	M10	50	M10	66	M10	38
M12	100	M12	85	M12	110	M12	65
M14	170	M14	140	M14	180	M14	100
M16	260	M16	210	M16	280	M16	160
M20	420	M20	420	M20	550	M20	310
M24	720	M24	720	M24	950	M24	540

- Check the position between the seat ring and the disc. The valve closes clockwise (see Fig. 15).
- Mount the actuator into the valve. Adjust the closed position limit and check the open position limit (see Section 6).

5.6 Replacing the disc, shafts and bearings

Disassembling the valve

The pin connection of the disc must be opened by drilling for changing the disc (3), shafts (5, 6) and bearings (11, 12).

- Remove the valve from the pipeline and the actuator from the valve.
- Remove the clamp ring (2) and seat ring (4) according to section 5.
- Set the valve horizontally on a sturdy surface so that the flat side of the disc lays against the surface (see Fig. 16).

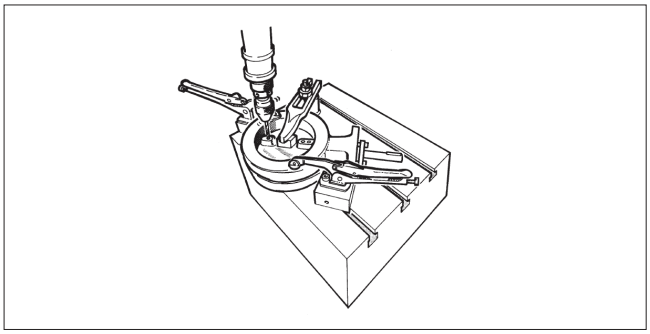


Fig. 16 Drilling the pins

- Drill the holes carefully to the center of the pins (18). Choose a drill 0.2-0.5 mm smaller than the diameter of the pin.
- Drill the holes deep, but not enough to reach the disc.
- Pull the pins out.
- Dismantle the gland packing including anti-extrusion ring (23) according to Section 5.3.
- Detach the screws (44) and the blind flange (8) and remove the gasket (31).
- Place rubber strips or other protection between the disc edge and the body and remove the shafts (see Fig. 17).
- Remove the bearings (11, 12).
- Clean and check all parts carefully.

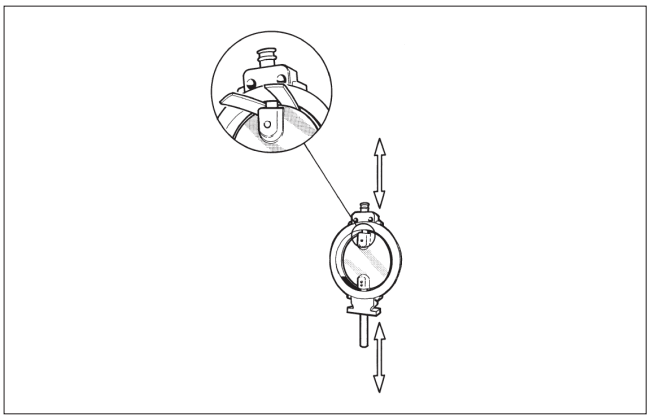


Fig. 17 Protecting the disc during disassembly and assembly

Checking Parts

1. Clean all disassembled parts.
2. Check the shaft (5, 6) and disc (3) for damage. Pay particular attention to the sealing areas.
3. Check all sealing and gasket surfaces of the body (1) and clamp ring (2).
4. Replace any damaged parts.

NOTE: When ordering spare parts, always include the following information:

- Valve type code from Identification plate,
- If the valve is serialized – the serial number (stamped on the valve body)

Assembling the valve

- Replace damaged parts with new ones.
- Mount the bearings (11, 12) into the body (1) from flow port side.

- High temperature-construction: Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the inside surface of the bushing and the shaft bearing area. Mount the bearing on the shaft. Press the bushing with a tightening clamp on the shaft´s bearing area and fit the shaft with the bearings carefully into the body.
- Place thrust bearings (13, 14) at the end of the shaft
- Place the disc horizontally on a surface so that the flat side of the disc lays against the surface. Lift the body around the disc so that the shaft bores are aligned with the bores in the disc. Protect the disc (see Fig. 17).
- Press the shafts into the disc drillings. Align the pin holes. The shaft (5) position against the disc must be according to Figure 18.

NOTE:
Use only pins supplied by the manufacturer!

NOTE:
The pins must be pressed with enough force to deform them so that the connection will be free from backlash.

- Support the disc well in a horizontal position during mounting of the pins. Push the new pins into the holes and press them in a press to final form (see Fig. 18). Use slightly larger pressing tool than the pin diameter. See Table 7 for forces.

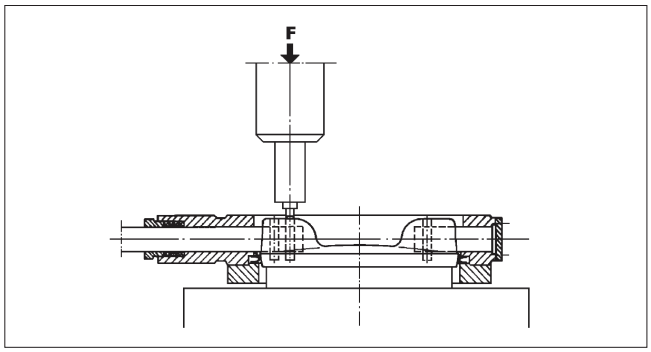


Fig. 18 Pressing the pins

Table 7 Pin Pressing force, kN

PIN material	DIAMETER OF PIN (mm)											
	5.1	6.9	8.4	10.2	11.9	13.4	15.4	16.9	18.9	23.9	28.9	32.4
	DIA OF PRESSING TOOL (TOOL MUST BE SAME AS PIN OR SIZE BIGGER)											
	6	8	10	12	12	15	20	20	20	25	30	35
	PIN PRESSING FORCE (kN)											
AISI316 strain hardened	25	45	67	99	135	171	226	272	340	544	795	1000
Nimonic80A	47	87	129	190	259	328	433	522	652	1043	1525	1917
XM-19HS, Nitronic 50	51	93	139	204	278	353	466	561	701	1122	1640	2061
Inconel 718	65	119	177	260	355	450	594	715	894	1430	2091	2628
UNS S31254, SMO 254	35	64	94	139	189	240	317	381	477	763	1115	1402
MONEL K 500	49	90	134	197	268	340	449	541	677	1082	1583	1989
17-4PH H1150D	44	80	119	176	239	303	400	482	603	965	1410	1773

- Install the gasket (31) and the blind flange (8). Screws of the blind flange must be tightened evenly. An unevenly tightened flange will damage the gasket.
- Install the seat ring. See details in Section 5.5.
- Install the body gasket (32) and the clamp ring (2). See details in Section 5.5.
- Install the gland packing (see Section 5.3).
- Check the contact line between the seat ring and the disc.

6. INSTALLING AND DETACHING THE ACTUATOR

6.1 General

WARNING:
Before installing the valve and actuator, be sure that the indicator pointer on top of the actuator is correctly indicating the valve position. Failure to assemble these products to indicate correct valve position could result in damage or personal injury.

CAUTION:
When installing a linkage or servicing a valve/ actuator assembly, the best practice is to remove the entire assembly from service.

CAUTION:
An actuator should be remounted on the valve from which it was removed. The actuator must be readjusted for proper open and close position each time it is remounted.

WARNING:
The linkage has been designed to support the weight of the Neles actuators and recommended accessories. Use of this linkage to support additional equipment such as people, ladders, etc. may result in the failure of the linkage, valve or actuator and may cause personal injury.

CAUTION:
Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch so as to ensure that the package can be properly reassembled. Mounting an open actuator to a closed valve may result in valve stem damage.

CAUTION:
When handling the valve or the valve package, bear in mind its weight!

WARNING:
Do not detach a spring-return actuator unless a stopscrew is carrying the spring force!

CAUTION:
Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

NOTE:
When Valmet supplies whole valve-actuator assembly, the actuator is mounted at Valmet factory on the valve and the stroke limit stops are adjusted by Valmet.

6.2 Installing the B1 series actuator

- Turn the valve to the closed position before mounting the actuator.
- Clean the shaft and the shaft bore and file off any burrs which could interfere with mounting. Protect the joint surfaces from corrosion, e.g. with Cortec VCI 369.
- If a bushing is required between the actuator shaft bore and the valve shaft, mount it first in the actuator shaft bore.
- The valve shaft has two keyways set 180° apart. The actuator shaft bore has two keyways set 90° apart.
- For double-acting cylinder actuator, B1C, and spring return cylinder actuator, B1J (spring-to-close), choose the keyway which establishes the piston in its upper position (at the top end of the cylinder) when the valve is closed.
- In the spring-return cylinder actuator B1JA (spring to-open), choose the keyway which establishes the piston in its lower position when the valve is open.
- Check visually that the actuator is correctly positioned relative to the valve. Tighten all the fastening screws.
- Adjust the stop screws to the closed position (see Section 6.5).
- The opening angle in a control valve can be limited by a stop screw to 80°. The opening angle of a shutoff valve is 90°.
- When a shaft extension is required, the sizing of the shaft extension must be discussed with the valve manufacturer.

6.3 Detaching the B1 series actuator

- Disconnect the actuator from its power source; detach the air supply pipe and control signal cables or pipes from their connectors.
- Unscrew the bracket screws.
- Detach the actuator using a suitable extractor. The correct tool can be ordered from the manufacturer (see Fig. 19).
- Remove the bracket and coupling, if any.

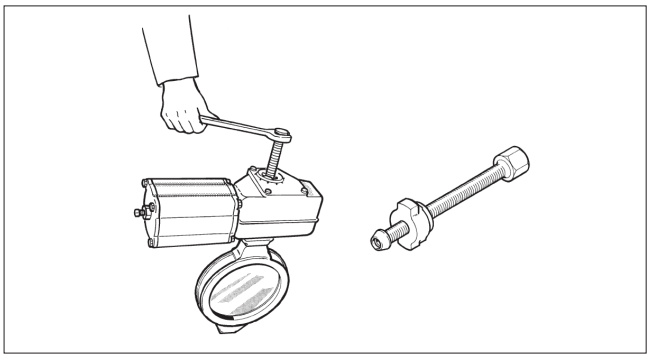


Fig. 19 Actuator removal, B1 series

6.4 Detaching and installing other actuator types

See actuator's manual for details.

6.5 Stop screw adjustment

General

Close the metal seated triple eccentric disc valve by turning the disc with a torque against the seat. Choose the torque from Tables 9 to 12 for adjusting the stop screw to the closed position of the actuator. Try not to exceed the given values since excessive torque would strain the seat and the joint between the disc and the shaft. Always readjust the stop screw after changing the seat and after mounting the actuator.

Actuators other than tabulated

Close the valve as per the tabulated torque Mc and adjust the stops accordingly. Note the increased torque created by the actuator while the valve is closed.

NOTE:
Valmet accepts no responsibility for compatibility of actuators not installed by Valmet.

Changing the mounting position

WARNING:
The actuator must not be removed from the valve in a pipeline under pressure as it will result dynamic torque!

Always remove the actuator from the valve shaft before mounting it into another key groove. Readjust the closed position limit as instructed.

If manually operated, the valve should close when the handwheel is turned clockwise. In a double-action cylinder, the piston must be in the upper position of the cylinder when the valve is closed. In this position the actuator creates maximum torque. Do not turn the disc more than 90° as this could damage the seat.

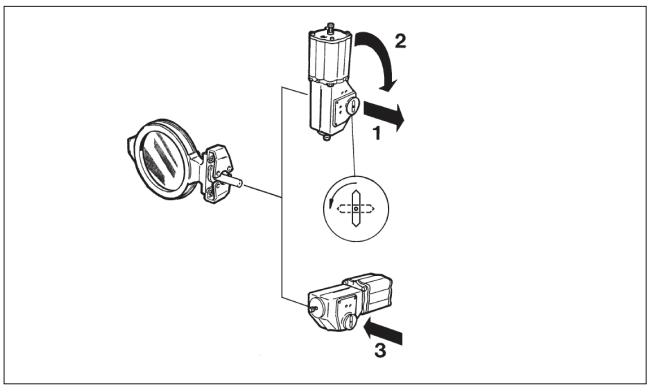


Fig. 20 Changing the mounting position

Double-acting cylinder actuator B1C

- Apply the tabulated shut-off pressure Pc to the air connection at the cylinder base.

- With the stop screw removed, check through the air connection hole that the piston does not touch the cylinder end. If it does, loosen the bracket screws and turn the actuator clockwise to increase the adjusting margin.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leakproofing the stop screw.
- An extra long screw is needed for opening angles < 80°.

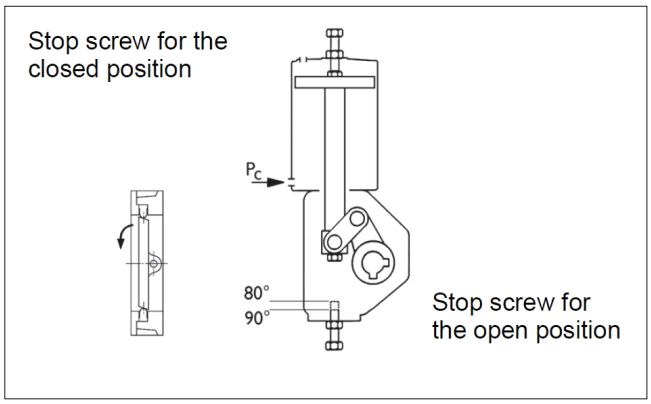


Fig. 21 Cylinder actuator, series B1C

Spring return cylinder actuator B1J

“Spring-to-close”

- Before mounting the cylinder, screw in the closed position stop screw completely.
- The table indicates *) spring when the spring-created torque does not exceed the maximum permitted closing torque Mc. Otherwise, apply the tabulated pressure Pc into the air connection at the cylinder end against the spring force. The stop screw must not be removed when the cylinder is pressurized! Open the stop screw until it does not touch the piston.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leakproofing the stop screw.
- After adjusting, check the adjusting margin through the air connection hole. The piston must not touch the cylinder end. If necessary, increase the margin by loosening the bracket screws and turning the actuator clockwise.
- An extra long screw is needed for opening angles < 80°.

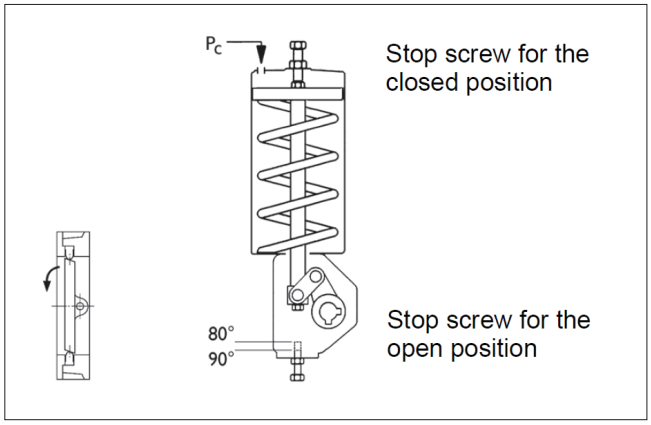


Fig. 22 Cylinder actuator, series B1J

Spring return cylinder actuator B1JA

“Spring-to-open”

- The actuator being unpressurized the valve is open. Unscrew the close limit stop screw (actuator housing). Apply tabulated shut-off pressure Pc to the air connection at the cylinder bottom end against the spring force to close the valve.
- Check through the stop screw hole that the piston rod does not touch the cylinder top end. If it does, loosen the bracket screws and turn the actuator clockwise to increase the adjusting margin.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leakproofing the stop screw.
- An extra long screw is needed for opening angles < 80°.

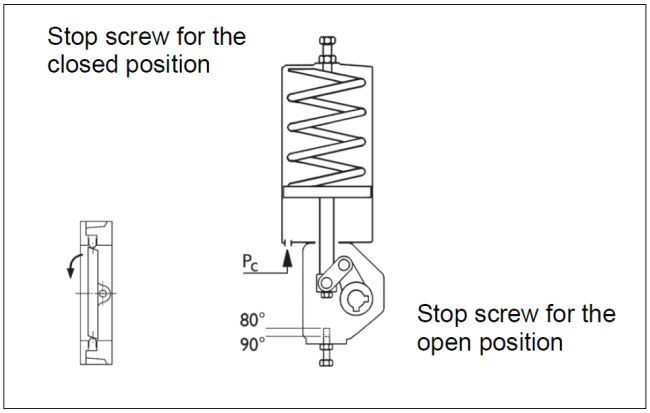


Fig. 23 Cylinder actuator, series B1JA

M series operator

- Close the valve as per the tabulated primary torque M1 (handwheel torque) given in Tables 9 to 12.
- Tighten the closed position stop screw until it touches the linkage, then turn back 1/4 turn and lock up with Loctite locking glue.

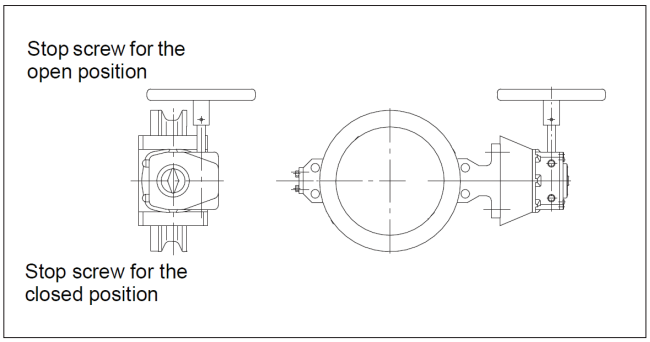


Fig. 24 Actuator, series M

7. TROUBLESHOOTING TABLE

Table 8 Troubleshooting

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 the 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 surface
	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

8. TOOLS

No special tools are needed for servicing the valve. However, we recommend an extractor tool (ID-code table in actuator's IMO) for removing the actuator from the valve. The tool can be ordered from the manufacturer.

9. 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.

Table 9 LW, LG, L6 ASME 150 & PN10-16 closing torques for zero leakage (Rate A) butterfly valves

DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA **) pc		BJK pc		BJKA **) pc		BJV pc		BJVA **) pc		Q-P							
																		spring close			**) spring open		Manual operator	Input torque M1	
	(Nm)	(lbf ft)	SIZE	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	actuator	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbf ft)
80 3"	60	44	**6**	3.3	47.9	*)spring		4.3	62.4	*)spring		3.7	53.7	*)spring		4.9	71.1	**QP2C**	0.4	5.8	3.9	56.6	**M07**	5	4
			8			0.5	7.25	3.4	49.3	0.2	2.9	2.7	39.2	1.0	14.5	3.8	55.1	**QP3C**	1.0	14.5	3.3	47.9	**M10**	5	4
			9	1.6	23.2																				
			10			0.9	13.1	2.9	42.1	0.6	8.7	2.3	33.4	1.4	20.31	3.4	49.3								
100 4"	100	74	**6**	5.4	78.32	*)spring		5.5	79.8	*)spring		4.9	71.1	*)spring		6.1	88.5	**QP2C**			4.8	69.6	**M07**	9	6
			8			*)spring		4.0	58.0	*)spring		3.3	47.9	0.4	5.8	4.4	63.8	**QP3C**	0.6	8.7	3.8	55.1	**M10**	9	6
			9	2.6	37.71													**QP4C**	1.1	15.95	3.2	46.4			
			10			0.6	8.7	3.2	46.4	0.3	4.4	2.6	37.7	1.1	16.0	3.7	53.7								
			11	1.4	20.31																				
			12			1.1	16.0	2.9	42.1	0.6	8.7	2.2	31.9	1.5	21.76	3.4	49.3								
150 6"	150	111	**6**	8.2	118.9	*)spring		7.0	101.5	*)spring		6.5	94.3	*)spring		7.7	111.7	**QP3C**	0.1	1.5	4.3	62.4	**M07**	13	10
			8			*)spring		4.7	68.2	*)spring		4.0	58.0	*)spring		5.1	74.0	**QP4C**	0.9	13.05	3.5	50.8	**M10**	13	10
			9	3.9	56.56																				
			10			0.3	4.4	3.6	52.2	*)spring		3.0	43.5	0.8	11.6	4.1	59.5								
			11	2.1	30.46																				
			12			0.9	13.1	3.1	45.0	0.5	7.3	2.4	34.8	1.3	18.85	3.6	52.2								
200 8"	350	258	**10**			*)spring		5.1	74.0	*)spring		4.5	65.3	*)spring		5.6	81.2	**QP4C**			4.6	66.7	**M10**	30	22
			11	4.9	71.07													**QP5C**	0.7	10.15	3.6	52.2	**M12**	29	21
			12			0.1	1.5	3.9	56.6	*)spring		3.2	46.4	0.6	8.7	4.4	63.8								
			13	2.4	34.81																				
			16			0.7	10.2	3.2	46.4	0.3	4.4	2.6	37.7	1.2	17.4	3.9	56.6								
			17	1.3	18.85																				
250 10"	500	369	**12**			*)spring		4.4	63.8	*)spring		3.7	53.7	0.1	1.5	4.9	71.1	**QP5C**	0.3	4.4	4.0	58.0	**M10**	43	32
			13	3.4	49.31													**QP6C**	0.9	13.1	3.3	47.9	**M12**	42	31
			16			0.4	5.8	3.5	50.8	0.1	1.5	2.9	42.1	0.9	13.1	4.2	60.9								
			17	1.8	26.11																				
			20	1.5	21.76	0.9	13.1	3.0	43.5	0.5	7.3	2.4	34.8	1.3	18.9	3.4	49.3								
300 12"	800	590	**13**	5.4	78.32													**QP6C**	0.4	5.8	3.7	53.7	**M12**	66	49
			16			*)spring		4.2	60.9	*)spring		3.5	50.8	0.3	4.4	4.8	69.6						**M14**	61	45
			17	2.9	42.06																				
			20	2.4	34.81	0.6	8.7	3.3	47.9	0.2	2.9	2.7	39.2	1.0	14.5	3.7	53.7								
350 14"	1300	959	**16**			*)spring		5.2	75.4	*)spring		4.5	65.3	*)spring		5.8	84.1						**M14**	99	73
			17	4.7	68.17																		**M15**	68	50
			20	3.8	55.11	*)spring		3.8	55.1	*)spring		3.2	46.4	0.5	7.3	4.3	62.4								
			25	2.0	29.01	0.7	10.2	3.1	45.0	0.4	5.8	2.5	36.3	1.2	17.4	3.6	52.2								
400 16"	2000	1475	**20**	5.9	85.57	*)spring		4.5	65.3	*)spring		3.9	56.6	*)spring		5.0	72.5						**M15**	105	78
			25	3.1	44.96	0.4	5.8	3.5	50.8	*)spring		2.9	42.1	0.8	11.6	4.0	58.0						**M16**	71	52
			32	1.5	21.76	0.9	13.1	3.0	43.5	0.5	7.3	2.4	34.8	1.4	20.31	3.5	50.8								
450 18"	2500	1844	**20**	7.4	107.33	*)spring		5.0	72.5	*)spring		4.4	63.8	*)spring		5.5	79.8						**M16**	88	65
			25	3.8	55.11	*)spring		3.7	53.7	*)spring		3.1	45.0	0.6	8.7	4.2	60.9						**M25**	91	67
			32	1.9	27.56	0.8	11.6	3.2	46.4	0.4	5.8	2.5	36.3	1.2	17.4	3.7	53.7								
500 20"	3500	2581	**25**	5.4	78.32	*)spring		4.2	60.9	*)spring		3.6	52.2	*)spring		4.7	68.2						**M25**	127	94
			32	2.7	39.16	0.5	7.3	3.4	49.3	*)spring		2.8	40.6	1.0	14.5	3.9	56.6								
			40	1.3	18.85	1.0	14.5	3.0	43.5	0.6	8.7	2.3	33.4	1.4	20.31	3.5	50.8								
600 24"	5000	3688	**25**	7.6	110.23	*)spring		5.0	72.5	*)spring		4.4	63.8	*)spring		5.5	79.8						**M25**	181.5	134
			32	3.8	55.11	0.2	2.9	3.8	55.1	*spring		3.1	45.0	0.6	8.7	4.3	62.4								
			40	1.8	26.11	0.8	11.6	3.2	46.4	0.4	5.8	2.5	36.3	1.2	17.4	3.7	53.7								

*) spring = spring torque not adequate to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

Table 10 LW, LG, L6 ASME 300 & PN 25–40 closing torques for zero leakage (Rate A) butterfly valves

DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA **) pc		BJK pc		BJKA **) pc		BJV pc		BJVA **) pc		Q-P							
																		spring close			**) spring open		Manual operator	Input torque M1	
	(Nm)	(lbf ft)	SIZE	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	actuator	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbf ft)
80 3"	60	44	**6**	3.3	47.9	*)spring		4.3	62.4	*)spring		3.7	53.7	*)spring		4.9	71.1	**QP2C**	0.4	5.8	3.9	56.6	**M07**	5	4
			8			0.5	7.25	3.4	49.3	0.2	2.9	2.7	39.2	1.0	14.5	3.8	55.1	**QP3C**	1.0	14.5	3.3	47.9	**M10**	5	4
			9	1.6	23.2																				
			10			0.9	13.1	2.9	42.1	0.6	8.7	2.3	33.4	1.4	20.31	3.4	49.3								
100 4"	100	74	**6**	5.4	78.32	*)spring		5.5	79.8	*)spring		4.9	71.1	*)spring		6.1	88.5	**QP2C**			4.8	69.6	**M07**	9	6
			8			*)spring		4.0	58.0	*)spring		3.3	47.9	0.4	5.8	4.4	63.8	**QP3C**	0.6	8.7	3.8	55.1	**M10**	9	6
			9	2.6	37.71													**QP4C**	1.1	16.0	3.2	46.4			
			10			0.6	8.7	3.2	46.4	0.3	4.4	2.6	37.7	1.1	16.0	3.7	53.7								
			11	1.4	20.31																				
			12			1.1	16.0	2.9	42.1	0.6	8.7	2.2	31.9	1.5	21.76	3.4	49.3								
150 6"	230	170	**9**	6.0	87.0													**QP4C**	0.4	5.8	3.9	56.6	**M07**	20	15
			10			*)spring		4.2	60.9	*)spring		3.6	52.2	0.2	2.9	4.7	68.2	**QPC5**	1.1	16.0	3.3	47.9	**M10**	20	15
			11	3.2	46.41																				
			12			0.6	8.7	3.4	49.3	0.2	2.9	2.7	39.2	1.1	16.0	3.9	56.6								
			13	1.6	23.21																				
			16			1.0	14.5	3.0	43.5	0.6	8.7	2.3	33.4	1.5	21.8	3.6	52.2								
200 8"	400	295.02	**11**	5.6	81.22													**QPC5**	0.6	8.7	3.8	55.1	**M10**	34	25
			12			*)spring		4.1	59.5	*)spring		3.4	49.3	0.4	5.8	4.6	66.7	**QP6C**	1.0	14.5	3.1	45.0	**M12**	33	24
			13	2.7	39.16																		**M14**	30	22
			16			0.6	8.7	3.3	47.9	0.2	2.9	2.7	39.2	1.1	16.0	4.0	58.0								
			17	1.4	20.31																				
			20	1.2	17.4	1.0	14.5	2.9	42.1	0.6	8.7	2.2	31.9	1.4	20.3	3.3	47.9								
250 10"	700	516	**13**	4.7	68.17													**QP6C**	0.6	8.7	3.6	52.2	**M12**	58	43
			16			*)spring		3.9	56.6	*)spring		3.3	47.9	0.5	7.3	4.6	66.7						**M14**	53	39
			17	2.5	36.26																				
			20	2.1	30.46	0.7	10.15	3.2	46.4	0.3	4.4	2.6	37.7	1.1	16.0	3.6	52.2								
300 12"	1100	811	**16**			*)spring		4.8	69.6	*)spring		4.1	59.5	*)spring		5.4	78.3	**QP6C**			4.1	59.5	**M14**	84	62
			17	4.0	58.0																		**M15**	58	43
			20	3.2	46.41	0.3	4.4	3.6	52.2	*)spring		3.0	43.5	0.7	10.2	4.0	58.0								
			25	1.7	24.66	0.8	11.6	3.0	43.5	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8								
			32	0.8	11.6	1.1	16.0	2.8	40.6	0.7	10.2	2.1	30.5	1.6	23.2	3.3	47.9								
350 14"	1600	1180	**17**	5.8	84.12																		**M15**	84	62
			20	4.7	68.17	*)spring		4.1	59.5	*)spring		3.5	50.8	0.2	2.9	4.6	66.7						**M16**	57	43
			25	2.4	34.81	0.6	8.7	3.3	47.9	0.2	2.9	2.7	39.2	1.0	14.5	3.7	53.7								
			32	1.2	17.4	1.0	14.5	2.9	42.1	0.6	8.7	2.3	33.4	1.5	21.8	3.4	49.3								
400 16"	2400	1770	**25**	3.7	53.66	0.2	2.9	3.7	53.7	*)spring		3.1	45.0	0.6	8.7	4.2	60.9						**M16**	85	62
			32	1.8	26.11	0.8	11.6	3.1	45.0	0.4	5.8	2.5	36.3	1.3	18.9	3.6	52.2						**M25**	87	64
			40	0.9	13.05	1.1	16.0	2.8	40.6	0.7	10.2	2.2	31.9	1.6	23.2	3.3	47.9								
450 18"	3200	2360	**25**	4.9	71.07	*)spring		4.1	59.5	*)spring		3.5	50.8	0.2	2.9	4.6	66.7						**M16**	113	83
			32	2.4	34.81	0.6	8.7	3.4	49.3	0.2	2.9	2.7	39.2	1.1	16.0	3.8	55.1						**M25**	116	86
			40	1.2	17.4	1.0	14.5	2.9	42.1	0.6	8.7	2.3	33.4	1.5	21.8	3.4	49.3								
500 20"	4100	3024	**25**	6.3		*)spring		4.5	65.3	*)spring		3.9	56.6	*)spring		5.0	72.5						**M25**	149	110
			32	3.1	44.96	0.4	5.8	3.6	52.2	*)spring		2.9	42.1	0.8	11.6	4.1	59.5								
			40	1.5	21.76	0.9	13.1	3.1	45.0	0.5	7.3	2.4	34.8	1.4	20.3	3.5	50.8								
600 24"	6000	4425	**32**	4.6	66.72	*)spring		4.1	59.5	*)spring		3.4	49.3	0.4	5.8	4.6	66.7						**M25**	218	161
			322			0.7	10.2	3.3	47.9	0.3	4.4	2.6	37.7	1.1	16.0	3.8	55.1								
			40	2.2	31.91	0.7	10.2	3.3	47.9	0.3	4.4	2.6	37.7	1.1	16.0	3.8	55.1								
			50	1.1	16																				

*) spring = spring torque not adequate to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

Table 11 LW, LG, L6 ASME 150 & PN10-16 closing torques for non-zero leakage butterfly valves

L/800 #150 DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA **) pc		BJK pc		BJKA **) pc		BJV pc		BJVA **) pc		Q-P								
																		spring close			**) spring open		Manual operator	Input torque M1	
	(Nm)	(lbf ft)	SIZE	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	actuator	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbf ft)
80 3"	40	30	**6**	2.2	31.9	0.2	2.9	3.7	53.7	*)spring		3.1	45.0	0.6	8.7	4.3	62.4	**QP2C**	0.8	11.6	3.5	50.8	**M07**	4	3
			8			0.8	11.6	3.1	45.0	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8	**QP3C**	1.2	17.4	3.1	45.0	**M10**	3	3
			9	1	14.5																				
			10			1.1	16.0	2.8	40.6	0.7	10.2	2.2	31.9	1.6	23.2	3.3	47.9								
100 4"	70	52	**6**	3.8	55.1	*)spring		4.6	66.7	*)spring		4	58.0	*)spring		5.2	75.4	**QP2C**	0.2	2.9	4.1	59.5	**M07**	6	5
			8			0.4	5.8	3.5	50.8	*)spring		2.9	42.1	0.8	11.6	4	58.0	**QP3C**	0.9	13.1	3.5	50.8	**M10**	6	4
			9	1.8	26.1													**QP4C**	1.3	18.9	3.1	45.0			
			10			0.9	13.1	3	43.5	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8								
			11	1	14.5																				
			12			1.2	17.4	2.8	40.6	0.8	11.6	2.1	30.5	1.6	23.2	3.3	47.9								
125 5"			**6**															**QP3C**					**M07**		
			8															**QP4C**					**M10**		
			9																						
			10																						
			11																						
			12																						
150 6" (LW7L/C_06 see LW, LG, L6 ASME 300 & PN25-40 table)	100	74	**6**	5.4	78.3	*)spring		5.5	79.8	*)spring		4.9	71.1	*)spring		6.1	88.5	**QP3C**	0.6	8.7	3.8	55.1	**M07**	9	6
			8			*)spring		4	58.0	*)spring		3.3	47.9	0.4	5.8	4.4	63.8	**QP4C**	1	14.5	4.5	65.3	**M10**	9	6
			9	2.6	37.7																				
			10			0.6	8.7	3.2	46.4	0.3	4.4	2.6	37.7	1.1	16.0	3.7	53.7								
			11	1.4	20.3																				
			12			1.1	16.0	2.9	42.1	0.6	8.7	2.2	31.9	1.5	21.8	3.4	49.3								
200 8"	240	177	**8**			*)spring		6.0	87.0	*)spring		5.3	76.9	*)spring		6.4	92.8	**QP3C**			5.3	76.9	**M07**	21	16
			9	6.2	89.9													**QP4C**	0.4	5.8	4	58.0	**M10**	21	15
			10			*)spring		4.3	62.4	*)spring		3.7	53.7	0.1	1.5	4.8	69.6	**QP5C**	1	14.5	3.3	47.9	**M12**	20	15
			11	3.4	49.3																				
			12			0.5	7.3	3.5	50.8	0.1	1.5	2.8	40.6	1	14.5	4.0	58.0								
			13	1.6	23.2																				
			16			0.9	13.1	3.0	43.5	0.6	8.7	2.3	33.4	1.4	20.3	3.7	53.7								
			17	0.9	13.1												0.0								
250 10"	350	258	**10**			*)spring		5.1	74.0	*)spring		4.5	65.3	*)spring		5.6	81.2	**QP4C**			4.6	66.7	**M12**	29	21
			11	4.9	71.1													**QP5C**	0.7	10.2	3.6	52.2			
			12			0.1		3.9	56.6	*)spring		3.2	46.4	0.6	8.7	4.4	63.8	**QP6C**	1.1	15.9	3.1	45.0			
			13	2.4	34.8		0.0																		
			16			0.7	10.2	3.2	46.4	0.3	4.4	2.6	37.7	1.2	17.4	3.9	56.6								
			17	1.3	18.9																				
			20	1	14.5	1.0	14.5	2.8	40.6	0.7	10.2	2.2	31.9	1.5	21.8	3.3	47.9								
300 12"	560	413	**12**			*)spring		4.7	68.2	*)spring		4	58.0	*)spring		5.2	75.4	**QP5C**	0.2	2.9	4.2	60.9	**M12**	47	34
			13	3.8	55.1													**QP6C**	0.8	11.6	3.4	49.3	**M14**	43	31
			16			0.3	4.4	3.7	53.7	*)spring		3.0	43.5	0.8	11.6	4.3	62.4								
			17	2	29.0																				
			20	1.7	24.7	0.8	11.6	3.0	43.5	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8								
350 14"	910	671	**12**			*)spring		6	87.0	*)spring		5.3	76.9	*)spring		6.5	94.3	**QP6C**	0.3	4.3	3.9	56.6	**M14**	69	51
			13	6.1	88.5																		**M15**	48	35
			16			*)spring		4.4	63.8	*)spring		3.7	53.7	0.1	1.5	5	72.5								
			17	3.3	47.9																				
			20	2.7	39.2	0.5	7.3	3.4	49.3	0.1	1.5	2.8	40.6	0.9	13.1	3.9	56.6								
			25	1.4	20.3																				
400 16"	1400	1033	**16**			*)spring		5.4	78.3	*)spring		4.7	68.2	*)spring		6.0	87.0						**M14**	106	78
			17	5	72.5																		**M15**	74	54
			20	4.1	59.5	*)spring		3.9	56.6	*)spring		3.3	47.9	0.4	5.8	4.4	63.8						**M16**	50	37
			25	2.1	30.5	0.7	10.2	3.2	46.4	0.3	4.4	2.6	37.7	1.1	16.0	3.6	52.2								
			32	1.1	16.0	1.1	16.0	2.9	42.1	0.7	10.2	2.2	31.9	1.5	21.8	3.4	49.3								
450 18"	1750	1291	**17**	6.3	91.4																		**M15**	92	68
			20	5.2	75.4	*)spring		4.2	60.9	*)spring		3.6	52.2	0.1	1.5	4.7	68.2						**M16**	62	46
			25	2.7	39.2	0.5	7.3	3.3	47.9	0.2	2.9	2.7	39.2	1	14.5	3.8	55.1						**M25**	64	47
			32	1.3	18.9	1	14.5	3	43.5	0.6	8.7	2.3	33.4	1.4	20.3	3.5	50.8								
500 20"	2450	1807	**20**	7.2	104.4	*)spring		5	72.5	*)spring		4.3	62.4	*)spring		5.4	78.3						**M15**	128.9	95
			25	3.7	53.7	0.2	2.9	3.7	53.7	*)spring		3.1	45.0	0.6	8.7	4.2	60.9						**M16**	86.6	64
			32	1.9	27.6	0.8	11.6	3.2	46.4	0.4	5.8	2.5	36.3	1.3	18.9	3.6	52.2						**M25**	89	66
			40	0.9	13.1	1.1	16.0	2.8	40.6	0.7	10.2	2.2	31.9	1.6	23.2	3.3	47.9								
600 24"	3500	2581	**20**			*)spring		6.0	87.0	*)spring		5.4	78.3	*)spring		6.5	94.3						**M16**	123.7	91
			25	5.4	78.3	*)spring		4.2	60.9	*)spring		3.6	52.2	0.1	1.5	4.7	68.2						**M25**	127.1	94
			32	2.7	39.2	0.5	7.3	3.4	49.3	0.1	1.5	2.8	40.6	1	14.5	3.9	56.6								
			40	1.3	18.9	1	14.5	3	43.5	0.6	8.7	2.3	33.4	1.4	20.3	3.5	50.8								

*) spring = spring torque not adequete to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

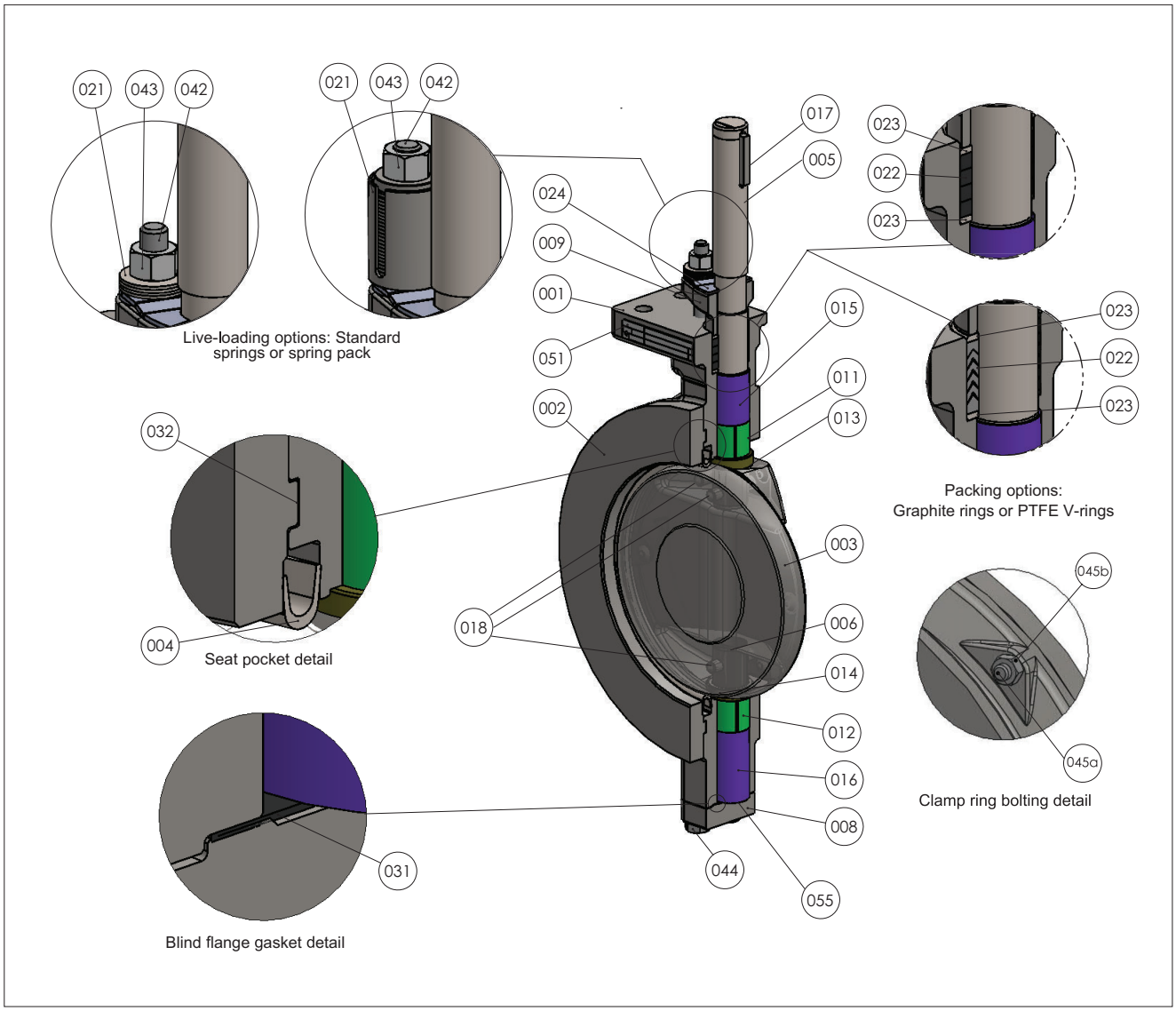
Table 12 LW, LG, L6 ASME 300 & PN 25–40 closing torques for non-zero leakage butterfly valves

L/800 #300 DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA **) pc		BJK pc		BJKA **) pc		BJV pc		BJVA **) pc		Q-P						
																		spring close			**) spring open		Manual operator	Input torque M1	
	(Nm)	(lbf ft)	SIZE	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	actuator	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbf ft)
80 3"	40	30	**6**	2.2	31.9	0.2	2.9	3.7	53.7	*)spring		3.1	45.0	0.6	8.7	4.3	62.4	**QP2C**	0.8	11.6	3.5	50.8	**M07**	4	3
			8			0.8	11.6	3.1	45.0	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8	**QP3C**	1.2	17.4	3.1	45.0	**M10**	3	3
			9	1.0	14.5																				
			10			1.1	16.0	2.8	40.6	0.7	10.2	2.2	31.9	1.6	23.2	3.3	47.9								
100 4"	70	52	**6**	3.8	55.1	*)spring		4.6	66.7	*)spring		4.0	58.0	*)spring		5.2	75.4	**QP2C**	0.2	2.9	4.1	59.5	**M07**	6	5
			8			0.4	5.8	3.5	50.8	*)spring		2.9	42.1	0.8	11.6	4	58.0	**QP3C**	0.9	13.1	3.5	50.8	**M10**	6	4
			9	1.8	26.1													**QP4C**	1.3	18.9	3.1	45.0			
			10			0.9	13.1	3.0	43.5	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8								
			11	1.0	14.5																				
			12			1.2	17.4	2.8	40.6	0.8	11.6	2.1	30.5	1.6	23.2	3.3	47.9								
125 5"			**6**															**QP3C**					**M07**		
			8															**QP4C**					**M10**		
			9																						
			10																						
			11																						
			12																						
150 6"	160	118	**8**			*)spring		4.8	69.6	*)spring		4.2	60.9	*)spring		5.3	76.9	**QP3C**			4.4	63.8	**M07**	14	10
			9	4.1	59.5													**QP4C**	0.8	11.6	3.5	50.8	**M10**	14	10
			10			0.2	2.9	3.7	53.7	*)spring		3.1	45.0	0.7	10.2	4.2	60.9	**QP5C**	1.2	17.4	3.1	45.0			
			11	2.3	33.4																				
			12			0.8	11.6	3.2	46.4	0.4	5.8	2.4	34.8	1.3	18.9	3.7	53.7								
			13	1.1	16.0																				
			16			1.1	16.0	2.9	42.1	0.7	10.2	2.2	31.9	1.6	23.2	3.5	50.8								
200 8"	280	207	**9**	7.3	105.9													**QP4C**	0.2	2.9	4.2	60.9	**M12**	23	17
			10			*)spring		4.6	66.7	*)spring		4.0	58.0	*)spring		5.1	74.0	**QP5C**	0.9	13.1	3.4	49.3	**M14**	21	16
			11	3.9	56.6													**QP6C**	1.2	17.4	3.0	43.5			
			12			0.4	5.8	3.6	52.2	*)spring		2.9	42.1	0.9	13.1	4.1	59.5								
			13	1.9	27.6																				
			16			0.9	13.1	3.1	45.0	0.5	7.3	2.4	34.8	1.4	20.3	3.7	53.7								
			17	1.0	14.5																				
			20			1.1	16.0	2.7	39.2	0.7	10.2	2.1	30.5	1.5	21.8	3.2	46.4								
250 10"	490	361	**11**	6.9	100.1													**QP5C**	0.4	5.8	4.0	58.0	**M14**	37	27
			12			*)spring		4.4	63.8	*)spring		3.7	53.7	0.1	1.5	4.9	71.1	**QP6C**	0.9	13.1	3.3	47.9			
			13	3.3	47.9																				
			16			0.4	5.8	3.5	50.8	0.1	1.5	2.8	40.6	0.9	13.1	4.2	60.9								
			17	1.8	26.1																				
			20			0.9	13.1	3.0	43.5	0.5	7.3	2.3	33.4	1.3	18.9	3.4	49.3								
300 12"	770	568	**12**			*)spring		5.5	79.8	*)spring		4.8	69.6	*)spring		6.0	87.0	**QP6C**	0.5	7.3	3.7	53.7	**M15**	41	30
			13	5.2	75.4																				
			16			*)spring		4.1	59.5	*)spring		3.4	49.3	0.4	5.8	4.7	68.2								
			17	2.8	40.6																				
			20	2.3	33.4	0.6	8.7	3.2	46.4	0.3	4.4	2.6	37.7	1.1	16.0	3.7	53.7								
			25	1.2	17.4	1.0	14.5	2.8	40.6	0.6	8.7	2.2	31.9	1.4	20.3	3.3	47.9								
			32	0.6	8.7	1.2	17.4	2.7	39.2	0.8	11.6	2.0	29.0	1.7	24.7	3.2	46.4								
350 14"	1120	826	**16**			*)spring		4.8	69.6	*)spring		4.1	59.5	*)spring		5.4	78.3						**M15**	59	43
			17	4	58.0																		**M16**	40	29
			20	3.3	47.9	0.3	4.4	3.6	52.2	*)spring		3.0	43.5	0.7	10.2	4.1	59.5								
			25	1.7	24.7	0.8	11.6	3.0	43.5	0.5	7.3	2.4	34.8	1.3	18.9	3.5	50.8								
			32	0.9	13.1	1.1	16.0	2.8	40.6	0.7	10.2	2.1	30.5	1.6	23.2	3.3	47.9								
400 16"	1680	1239	**20**	5	72.5	*)spring		4.2	60.9	*)spring		3.6	52.2	0.2	2.9	4.6	66.7						**M16**	59	44
			25	2.6	37.7	0.5	7.3	3.3	47.9	0.2	2.9	2.7	39.2	1	14.5	3.8	55.1						**M25**	61	45
			32	1.3	18.9	1	14.5	3	43.5	0.6	8.7	2.3	33.4	1.5	21.8	3.4	49.3								
			40	0.6	8.7	1.2	17.4	2.7	39.2	0.8	11.6	2.1	30.5	1.7	24.7	3.2	46.4								
450 18"	2240	1652	**20**	6.6	95.7	*)spring		4.7	68.2	*)spring		4.1	59.5	*)spring		5.2	75.4						**M16**	79	58
			25	3.4	49.3	0.3	4.4	3.6	52.2	*)spring		3.0	43.5	0.7	10.2	4.1	59.5						**M25**	81	60
			32	1.7	24.7	0.8	11.6	3.1	45.0	0.5	7.3	2.4	34.8	1.3	18.9	3.6	52.2								
			40	0.8	11.6	1.1	16.0	2.8	40.6	0.7	10.2	2.1	30.5	1.6	23.2	3.3	47.9								
500 20"	2870	2117	**20**	8.5	123.3	*)spring		5.4	78.3	*)spring		4.8	69.6	*)spring		5.8	84.1						**M25**	104	77
			25	4.4	63.8	*)spring		3.9	56.6	*)spring		3.3	47.9	0.4	5.8	4.4	63.8								
			32	2.2	31.9	0.7	10.2	3.3	47.9	0.3	4.4	2.6	37.7	1.2	17.4	3.8	55.1								
			40	1.1	16.0	1.0	14.5	2.9	42.1	0.7	10.2	2.2	31.9	1.5	21.8	3.4	49.3								
600 24"	4200	3098	**25**	6.4	92.8	*)spring		4.6	66.7	*)spring		4.0	58.0	*)spring		5.1	74.0								
			32	3.2	46.4	0.4	5.8	3.6	52.2	*)spring		2.9	42.1	0.8	11.6	4.1	59.5								
			322			0.9	13.1	3.1	45.0	0.5	7.3	2.4	34.8	1.3	18.9	3.6	52.2								
			40	1.5	21.8	0.9	13.1	3.1	45.0	0.5	7.3	2.4	34.8	1.3	18.9	3.6	52.2								
			50	0.8	11.6																				

*) spring = spring torque not adequete to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

10. ASSEMBLY AND PARTS LIST

Assembly drawing, series LW Mod D



Parts list, series LW Mod D (example)

Item	Qty (example)	Description	Material (example)	Spare part category
1	1	BODY	ASTM A216 gr. WCB / 1.0619	
2	1	CLAMP RING	A351 gr. CF8M / 1.4408	
3	1	DISC	ASTM A351 gr. CF8M	3
4	1	SEAT	UNS N08825 + HCr	2
5	1	DRIVE SHAFT	ASTM A479 gr. 316	3
6	1	TRUNNION	ASTM A479 gr. 316	3
8	1	BLIND FLANGE	A351 gr. CF8M / 1.4408	
9	1	GLAND	A351 gr. CF8M / 1.4408	
11	1	BEARING	316L + RPTFE	3
12	1	BEARING	316L + RPTFE	3
13	1	THRUST BEARING	ASTM A269 gr. 316 + HCr	3
14	1	THRUST BEARING	ASTM A269 gr. 316 + HCr	3
15	1	BEARING SPACER	AISI 316	
16	1	BEARING SPACER	AISI 316	
17	1	KEY	EN 10088-1.4460	3
18	3	PIN	ASTM A479 gr. 316	3
21	6	DISC SPRING	AISI 304	
22	1	V-RING SET	PTFE	1
23	2	ANTI EXTRUSION RING	AISI 316	
24	2	RETAINER	AISI 316	
31	1	GASKET	GRAPHITE	1
32	1	BODY GASKET	GRAPHITE	1
42	2	STUD	ASTM A193 gr. B8M cl. 2	
43	2	HEXAGON NUT	ASTM A194 gr. 8M	
44	4	HEXAGON SCREW	ASTM A193 gr. B8M cl. 2	
045a	4	STUD	ASTM A193 gr. B8M cl. 2	
045b	4	HEXAGON NUT	ASTM A194 gr. 8M	
51	1	IDENTIFICATION PLATE	AISI 316	
55	1	ANTI-STATIC SPRING	UNS N08825	

Spare part set category 1: Recommended soft parts, always needed for the repair. Delivered as a set.

Spare part set

When ordering spare part set for your valve refer to Section 1.3, Valve Markings and check area on your valve's identification plate to determine the correct seat material for your valve. Please provide the full type code from the identification plate.

Service / spare part

Valmet recommends that valves be directed to our service centers for maintenance. The service centers are equipped to provide rapid turn-around at a reasonable cost and offer new valve warranty with all reconditioned valves.

NOTE: When sending goods to the service center for repair, do not disassemble them. Clean the valve carefully and flush the valve internals. Include the material safety datasheet(s) (MSDS) for all media flowing through the valve. Valves sent to the service center without MSDS datasheet(s) will not be accepted.

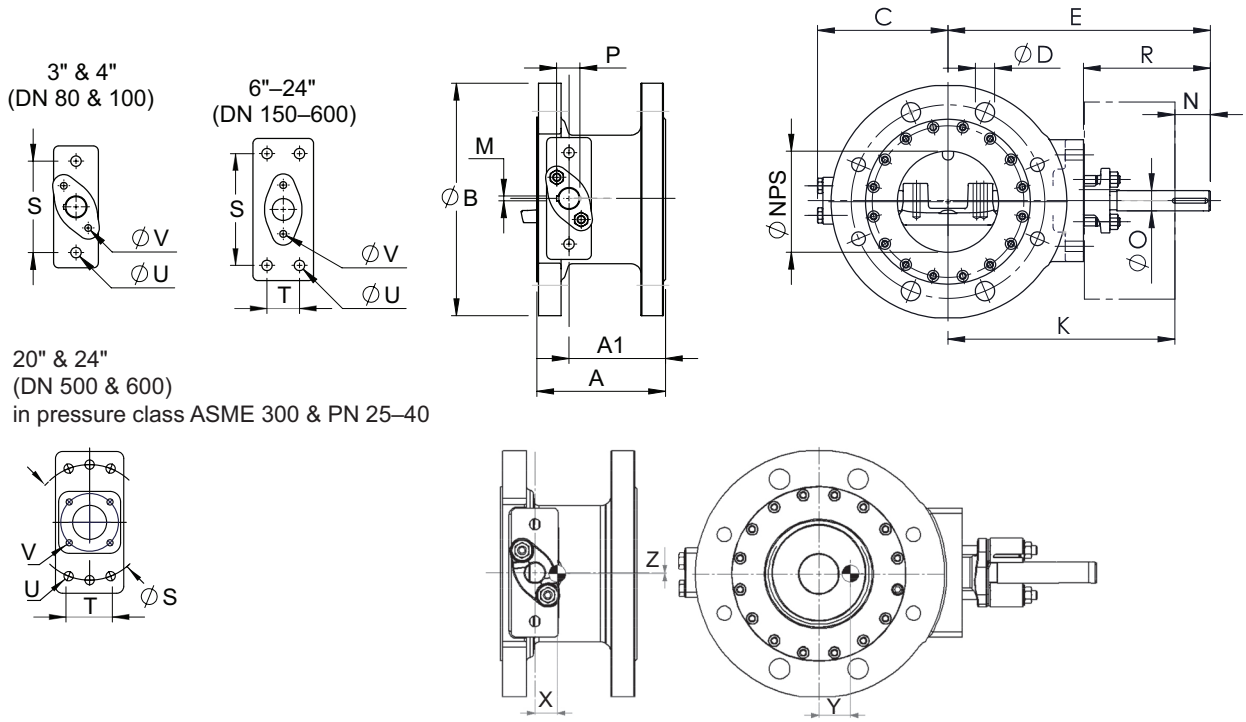
For further information on spare parts and service or assistance visit our web-site at https://www.valmet.com/flowcontrol.

NOTE: When ordering spare parts, always include the following information:

- Valve type code from identification plate
- If the valve is serialized – the serial number (from identification plate)

11. DIMENSIONS AND WEIGHTS

L6 Double flanged design



NOTE:
Weight and center of mass dimensions X, Y & Z are given for bareshaft valve without bracket, valve in closed position.
Values are approximate based on 3D-models. Please be aware the actual values may vary due to manufacturing tolerances.

L64 (ASME 150)

DN	NPS	Dimensions (mm)																Center of gravity (mm)			Weight (kg)
		A (API/ Series 13)	A1	ØB	C	ØD	E	K	M	N	O	P	R	S	T	U	V	X	Y	Z	
80	3	114	86	190	115	19	226	201	4.8	25	15	17.0	105	70	-	M10	M8	23	14	0	10
100	4	127	95	230	135	19	258	223	4.8	35	20	22.2	125	90	-	M12	M8	27	12	0	18
150	6	140	107	280	165	22	277	242	4.8	35	20	22.2	125	110	32	M12	M8	32	11	0	26
200	8	152	115	345	195	22	323	277	6.4	46	25	27.8	136	110	32	M12	M10	35	13	0	43
250	10	165	125	405	230	25	393	342	6.4	51	30	32.9	161	130	32	M12	M12	37	16	0	61
300	12	178	134	485	265	25	428	370	9.5	58	35	39.1	168	130	32	M12	M12	40	14	0	94
350	14	190	140	535	310	29	508	440	9.5	68	40	44.2	188	160	40	M16	M12	38	28	0	138
400	16	216	161	595	345	29	570	490	12.7	80	45	50.4	220	160	55	M20	M16	44	33	0	184
450	18	222	162	635	375	32	610	520	12.7	90	50	55.5	230	160	55	M20	M16	42	40	0	219
500	20	229	161	700	415	32	680	590	12.7	90	55	60.6	270	230	90	M24	M16	35	53	1	297
600	24	267	190	815	480	35	769	650	19.1	119	70	78.2	299	230	90	M24	M16	45	56	1	459

L64 (PN10)

DN	NPS	Dimensions (mm)																Center of gravity (mm)			Weight (kg)
		A (API/ Series 13)	A1	ØB	C	ØD	E	K	M	N	O	P	R	S	T	U	V	X	Y	Z	
80	3	114	86	200	115	18	226	201	4.8	25	15	17.0	105	70	-	M10	M8	23	12	0	12
100	4	127	95	220	135	18	258	223	4.8	35	20	22.2	125	90	-	M12	M8	24	14	0	16
150	6	140	107	285	165	22	277	242	4.8	35	20	22.2	125	110	32	M12	M8	31	11	0	25
200	8	152	115	340	195	22	323	277	6.4	46	25	27.8	136	110	32	M12	M10	32	14	0	39
250	10	165	125	395	230	22	393	342	6.4	51	30	32.9	161	130	32	M12	M12	35	19	0	57
300	12	178	134	445	265	22	428	370	9.5	58	35	39.1	168	130	32	M12	M12	37	21	0	76

L64 (PN16)

DN	NPS	Dimensions (mm)																Center of gravity (mm)			Weight (kg)
		A (API/ Series 13)	A1	ØB	C	ØD	E	K	M	N	O	P	R	S	T	U	V	X	Y	Z	
80	3	114	86	200	115	18	226	201	4.8	25	15	17.0	105	70	-	M10	M8	23	12	0	12
100	4	127	95	220	135	18	258	223	4.8	35	20	22.2	125	90	-	M12	M8	24	14	0	16
150	6	140	107	285	165	22	277	242	4.8	35	20	22.2	125	110	32	M12	M8	31	11	0	25
200	8	152	115	340	195	22	323	277	6.4	46	25	27.8	136	110	32	M12	M10	33	15	0	39
250	10	165	125	405	230	26	393	342	6.4	51	30	32.9	161	130	32	M12	M12	36	18	0	57
300	12	178	134	460	265	26	428	370	9.5	58	35	39.1	168	130	32	M12	M12	38	18	0	81

L64 (ASME 300)

DN	NPS	Dimensions (mm)																	Center of gravity (mm)			Weight (kg)
		A (API/ Series 13)	A1	ØB	C	ØD	E	K	M	N	O	P	R	S	ØS	T	U	V	X	Y	Z	
80	3	114	86	210	115	22	226	201	4.8	25	15	17.0	105	70	-	-	M10	M8	26	10	0	15
100	4	127	95	255	135	22	258	223	4.8	35	20	22.2	125	90	-	-	M12	M8	29	8	0	25
150	6	140	104	320	185	22	321	275	6.4	46	25	27.8	136	110	-	32	M12	M10	31	12	0	47
200	8	152	108	380	220	25	381	323	9.5	58	35	39.1	168	130	-	32	M12	M12	29	14	0	71
250	10	165	117	445	260	29	442	374	9.5	68	40	44.2	188	160	-	40	M16	M12	31	18	0	108
300	12	178	124	520	305	32	535	445	12.7	90	50	55.5	230	160	-	55	M20	M16	30	28	0	169
350	14	190	129	585	340	32	625	535	12.7	90	55	60.6	270	230	-	90	M24	M16	25	53	0	254
400	16	216	146	650	385	35	699	580	19.1	119	70	78.2	299	230	-	90	M24	M16	29	53	0	350
450	18	222	147	710	410	35	724	605	19.1	119	70	78.2	299	230	-	90	M24	M16	40	20	1	410
500	20	229	145	775	450	35	836	690	22.2	146	85	94.6	366	-	330	120	M30	M16	17	84	1	554
600	24	267	172	915	525	41	926	770	22.2	156	95	104.8	376	-	330	120	M30	M16	31	69	1	843

L64 (PN25)

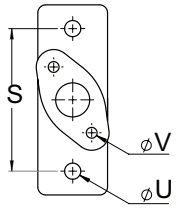
DN	NPS	Dimensions (mm)																	Center of gravity (mm)			Weight (kg)
		A (API/ Series 13)	A1	ØB	C	ØD	E	K	M	N	O	P	R	S	ØS	T	U	V	X	Y	Z	
80	3	114	86	200	115	18	226	201	4.8	25	15	17.0	105	70	-	-	M10	M8	24	11	0	13
100	4	127	95	235	135	22	258	223	4.8	35	20	22.2	125	90	-	-	M12	M8	26	11	0	20
150	6	140	104	300	185	26	321	275	6.4	46	25	27.8	136	110	-	32	M12	M10	27	17	0	35
200	8	152	108	360	220	26	381	323	9.5	58	35	39.1	168	130	-	32	M12	M12	26	19	0	53
250	10	165	117	425	260	30	442	374	9.5	68	40	44.2	188	160	-	40	M16	M12	27	24	0	80
300	12	178	124	485	305	30	535	445	12.7	90	50	55.5	230	160	-	55	M20	M16	28	39	0	118

L64 (PN40)

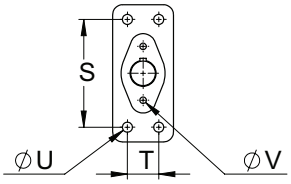
DN	NPS	Dimensions (mm)																	Center of gravity (mm)			Weight (kg)
		A (API/ Series 13)	A1	ØB	C	ØD	E	K	M	N	O	P	R	S	ØS	T	U	V	X	Y	Z	
80	3	114	86	200	115	18	226	201	4.8	25	15	17.0	105	70	-	-	M10	M8	24	11	0	13
100	4	127	95	235	135	22	258	223	4.8	35	20	22.2	125	90	-	-	M12	M8	26	11	0	20
150	6	140	104	300	185	26	321	275	6.4	46	25	27.8	136	110	-	32	M12	M10	27	17	0	37
200	8	152	108	375	220	30	381	323	9.5	58	35	39.1	168	130	-	32	M12	M12	27	16	0	63
250	10	165	117	450	260	33	442	374	9.5	68	40	44.2	188	160	-	40	M16	M12	29	19	0	101
300	12	178	124	515	305	33	535	445	12.7	90	50	55.5	230	160	-	55	M20	M16	30	31	0	155

LW Wafer design

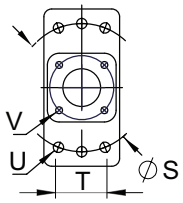
3" & 4"
(DN 80 & 100)

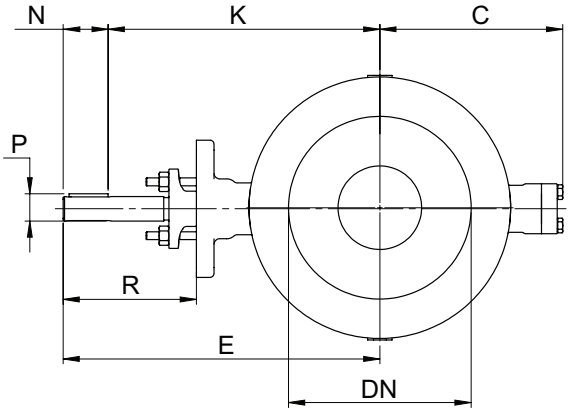


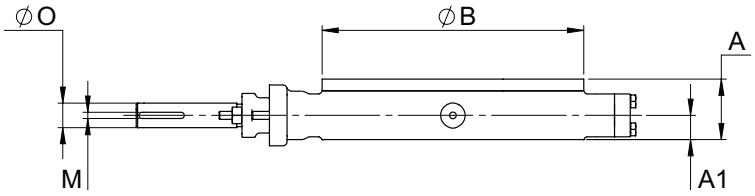
6"–24"
(DN 150–600)



20" & 24"
(DN 500 & 600)
in pressure class
ASME 300 & PN 25–40





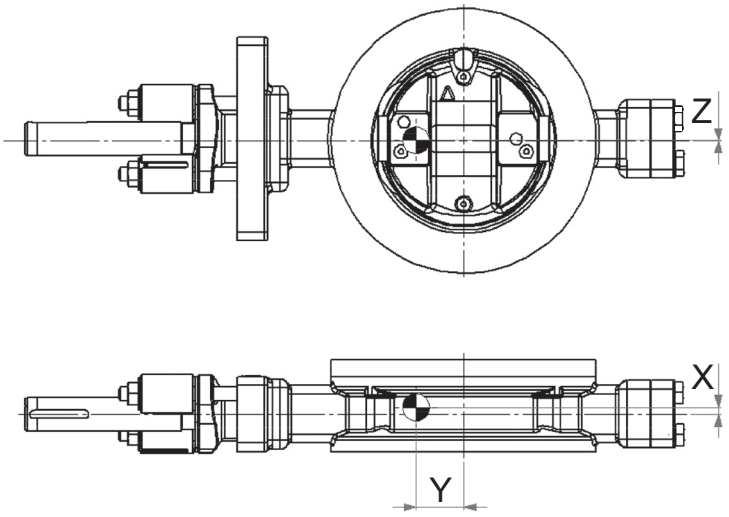


NOTE:

Weight and center of mass dimensions X, Y & Z are given for bareshaft valve without bracket, valve in closed position.

Values are approximate based on 3D-models. Please be aware the actual values may vary due to manufacturing tolerances.

Wafer design can have threaded blind holes on the body, depending on valve size and pressure class.



LW6, LW7 & LW8 (ASME 150, PN 10–16)

DN	NPS	Dimensions (mm)																		Center of gravity (mm)			Weight (kg)
		LW6 A (API)	LW6 A (Series 20)	LW7 A (Series 25)	LW8 A (Series 16)	A1	ØB	C	E	K	M	N	O	P	R	S	T	U	V	X	Y	Z	
80	3	48	46	49	64	20	131	115	226	201	4.8	25	15	17.0	105	70	-	M10	M8	3	28	0	6
100	4	54	52	56	64	22	156	135	258	223	4.8	35	20	22.2	125	90	-	M12	M8	3	28	0	9
150	6	57	56	70	76	24	217	165	277	242	4.8	35	20	22.2	125	110	32	M12	M8	3	23	0	16
200	8	64	60	71	89	25	267	195	323	277	6.4	46	25	27.8	136	110	32	M12	M10	5	27	0	26
250	10	71	68	76	114	30	328	230	393	342	6.4	51	30	32.9	161	130	32	M12	M12	4	30	0	46
300	12	81	78	83	114	37	375	265	428	370	9.5	58	35	39.1	168	130	32	M12	M12	3	31	0	59
350	14	92	92	92	127	42	438	310	508	440	9.5	68	40	44.2	188	160	40	M16	M12	3	52	0	107
400	16	102	102	102	140	47	483	345	570	490	12.7	80	45	50.4	220	160	55	M20	M16	3	66	1	135
450	18	114	114	114	152	55	538	375	610	520	12.7	90	50	55.5	230	160	55	M20	M16	1	70	1	173
500	20	127	127	127	152	62	593	415	680	590	12.7	90	55	60.6	270	230	90	M24	M16	1	87	1	219
600	24	154	154	154	178	79	695	480	769	650	19.1	119	70	78.2	299	230	90	M24	M16	-1	85	1	338

LW5 & LW8 (ASME 300, PN 25–40)

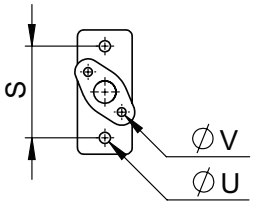
DN	NPS	Dimensions (mm)																	Center of gravity (mm)			Weight (kg)
		LW5 A (API)	LW8 A (Series 16)	A1	ØB	C	E	K	M	N	O	P	R	S	ØS	T	U	V	X	Y	Z	
80	3	48	64	20	131	115	226	201	4.8	25	15	17.0	105	70	-	-	M10	M8	3	28	0	6
100	4	54	64	22	156	135	258	223	4.8	35	20	22.2	125	90	-	-	M12	M8	3	28	0	8
150	6	59	76	25	217	185	321	275	6.4	46	25	27.8	136	110	-	32	M12	M10	3	35	0	19
200	8	73	89	32	280	220	381	323	9.5	58	35	39.1	168	130	-	32	M12	M12	3	32	0	37
250	10	83	114	38	340	260	442	374	9.5	68	40	44.2	188	160	-	40	M16	M12	2	38	0	64
300	12	92	114	41	400	305	535	445	12.7	90	50	55.5	230	160	-	55	M20	M16	3	59	0	94
350	14	117	127	56	447	340	625	535	12.7	90	55	60.6	270	230	-	90	M24	M16	1	95	1	142
400	16	133	140	63	507	385	699	580	19.1	119	70	78.2	299	230	-	90	M24	M16	2	99	1	207
450	18	149	152	75	564	410	724	605	19.1	119	70	78.2	299	230	-	90	M24	M16	0	90	1	245
500	20	159	152	71	624	450	836	690	22.2	146	85	94.6	366	-	330	120	M30	M16	5	125	1	347
600	24	181	178	85	731	525	926	770	22.2	156	95	104.8	376	-	330	120	M30	M16	4	126	1	510

LW7 (PN25, PN 25 / ASME 150)

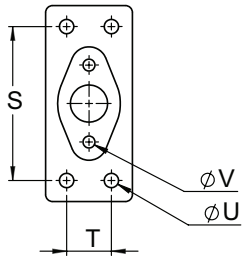
DN	NPS	Dimensions (mm)															Weight (kg)
		A	A1	ØB	C	E	K	M	N	O	P	R	S	T	U	V	
80	3	49	20	131	115	226	201	4.8	25	15	17	105	70	0	M10	M8	5
100	4	56	22	156	135	258	223	4.8	35	20	22.2	125	90	0	M12	M8	8
150	6	70	25	217	185	321	275	6.4	46	25	27.8	136	110	32	M12	M10	18
200	8	71	25	267	195	323	277	6.4	46	25	27.8	136	110	32	M12	M10	22
250	10	76	30	328	230	393	342	6.4	51	30	32.9	161	130	32	M12	M12	35
300	12	83	37	375	265	428	370	9.5	58	35	39.1	168	130	32	M12	M12	49
350	14	92	42	438	310	508	440	9.5	68	40	44.2	188	160	40	M16	M12	88
400	16	102	47	483	345	570	490	12.7	80	45	50.4	220	160	55	M20	M16	112
450	18	114	55	538	375	610	520	12.7	90	50	55.5	230	160	55	M20	M16	146
500	20	127	62	593	415	680	590	12.7	90	55	60.6	270	230	90	M24	M16	198
600	24	154	79	695	480	769	650	19.1	119	70	78.2	299	230	90	M24	M16	312

LG Lug design

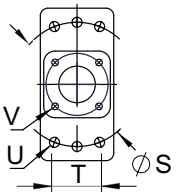
3" & 4"
(DN 80 & 100)

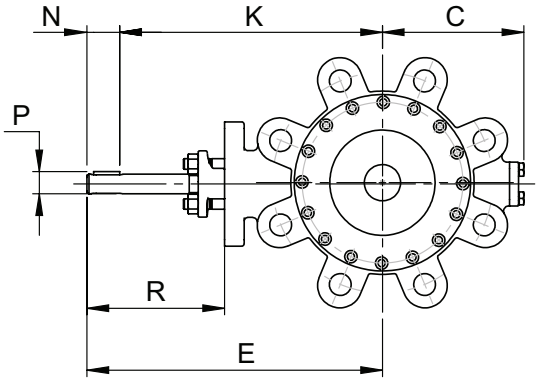


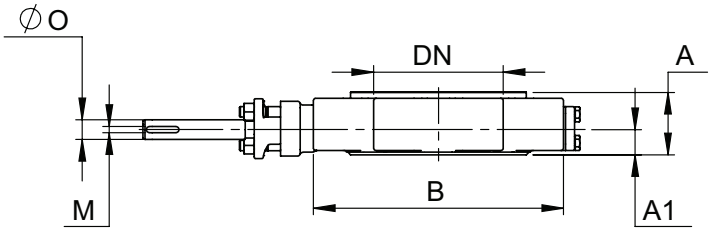
6"–24"
(DN 150–600)



20" & 24"
(DN 500 & 600)
in pressure class
ASME 300 & PN 25–40



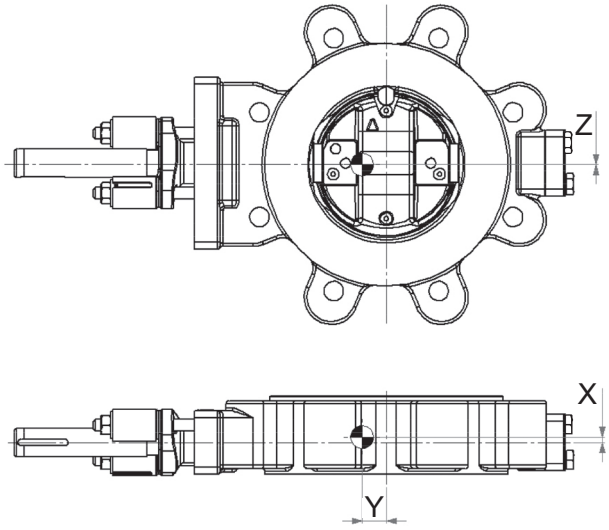




NOTE:

Weight and center of mass dimensions X, Y & Z are given for bareshaft valve without bracket, valve in closed position.

Values are approximate based on 3D-models. Please be aware the actual values may vary due to manufacturing tolerances.



LG6, LG7 & LG8 (ASME 150, PN 10–16)

DN	NPS	Dimensions (mm)																		Center of gravity (mm)			Weight (kg)
		LG6 A (API)	LG6 A (Series 20)	LG7 A (Series 25)	LG8 A (Series 16)	A1	ØB	C	E	K	M	N	O	P	R	S	T	U	V	X	Y	Z	
80	3	48	46	49	64	20	205*	115	226	201	4.8	25	15	17.0	105	70	-	M10	M8	2	25	0	10
100	4	54	52	56	64	22	240	135	258	223	4.8	35	20	22.2	125	90	-	M12	M8	4	18	0	14
150	6	57	56	70	76	24	280	165	277	242	4.8	35	20	22.2	125	110	32	M12	M8	3	21	0	19
200	8	64	60	71	89	25	335	195	323	277	6.4	46	25	27.8	136	110	32	M12	M10	5	25	0	34
250	10	71	68	76	114	30	405	230	393	342	6.4	51	30	32.9	161	130	32	M12	M12	3	26	0	53
300	12	81	78	83	114	37	475	265	428	370	9.5	58	35	39.1	168	130	32	M12	M12	2	25	0	70
350	14	92	92	92	127	42	520	310	508	440	9.5	68	40	44.2	188	160	40	M16	M12	5	41	0	125
400	16	102	102	102	140	47	590	345	570	490	12.7	80	45	50.4	220	160	55	M20	M16	7	47	0	172
450	18	114	114	114	152	54	635	375	610	520	12.7	90	50	55.5	230	160	55	M20	M16	5	50	0	216
500	20	127	127	127	152	59	705	415	680	590	12.7	90	55	60.6	270	230	90	M24	M16	7	65	1	279
600	24	154	154	154	178	77	830	480	769	650	19.1	119	70	78.2	299	230	90	M24	M16	4	60	0	440

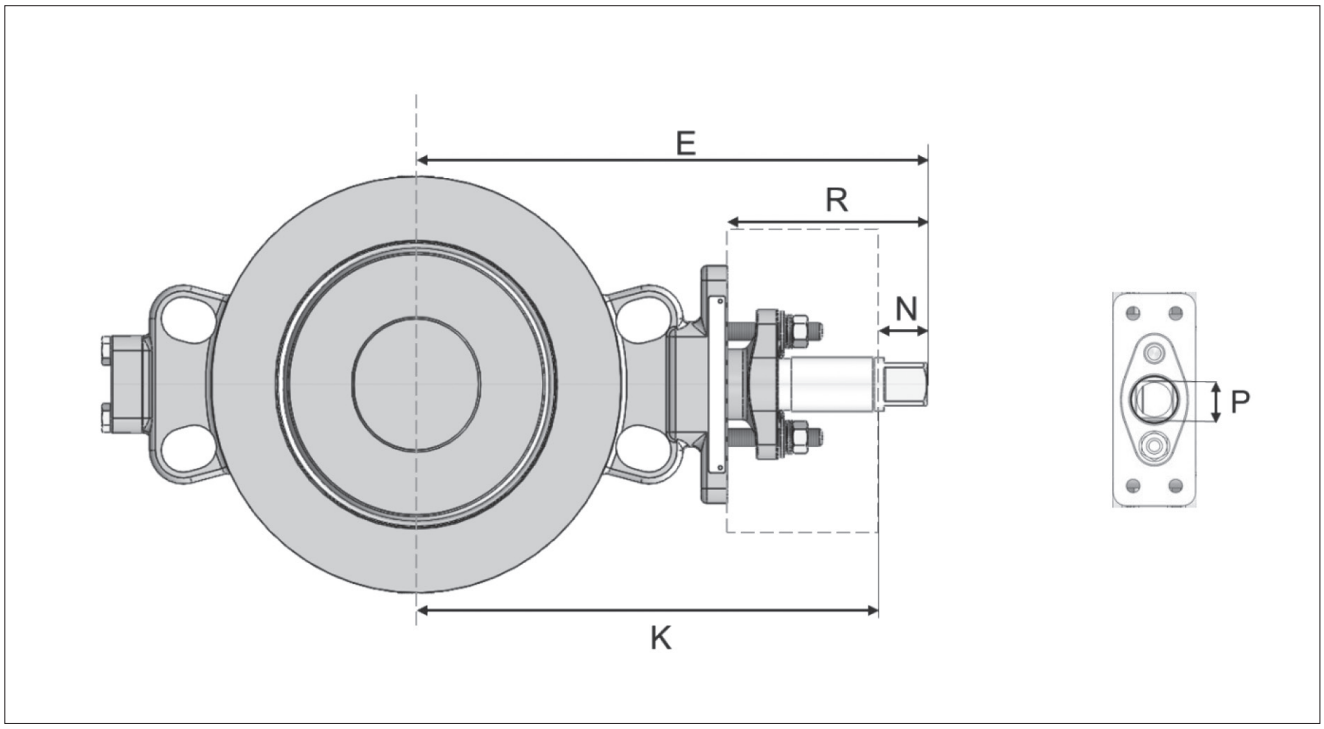
*ASME 150: 180

LG5 & LG8 (ASME 300, PN 25–40)

DN	NPS	Dimensions (mm)																	Center of gravity (mm)			Weight (kg)
		LG5 A (API)	LG8 A (Series 16)	A1	ØB	C	E	K	M	N	O	P	R	S	ØS	T	U	V	X	Y	Z	
80	3	48	64	20	205	115	226	201	4.8	25	15	17.0	105	70	-	-	M10	M8	3	19	0	10
100	4	54	64	22	240	135	258	223	4.8	35	20	22.2	125	90	-	-	M12	M8	4	18	0	14
150	6	59	76	25	320	185	321	275	6.4	46	25	27.8	136	110	-	32	M12	M10	3	23	0	31
200	8	73	89	31	380	220	381	323	9.5	58	35	39.1	168	130	-	32	M12	M12	3	25	0	46
250	10	83	114	37	445	260	442	374	9.5	68	40	44.2	188	160	-	40	M16	M12	2	30	0	84
300	12	92	114	40	505	305	535	445	12.7	90	50	55.5	230	160	-	55	M20	M16	4	49	0	113
350	14	117	127	56	575	340	625	535	12.7	90	55	60.6	270	230	-	90	M24	M16	6	69	0	196
400	16	133	140	63	650	385	699	580	19.1	119	70	78.2	299	230	-	90	M24	M16	8	71	0	281
450	18	149	152	75	690	410	724	605	19.1	119	70	78.2	299	230	-	90	M24	M16	8	70	0	323
500	20	159	152	75	755	450	836	690	22.2	146	85	94.6	366	-	330	120	M30	M16	12	103	1	447
600	24	181	178	85	890	525	926	770	22.2	156	95	104.8	376	-	330	120	M30	M16	14	97	1	670

Dimensions for valves with square shaft connection

Same dimensions apply for all body types. Other dimensions as in above tables



ASME 150, PN 10–16

Size		E	K	N	P	R
DN	NPS					
80	3	211	201	10	11	90
100	4	237	223	14	14	104
150	6	256	242	14	14	104
200	8	296	277	19	19	109
250	10	364	342	22	22	132
300	12	397	370	27	27	136

ASME 300, PN 25–40

Size		E	K	N	P	R
DN	NPS					
80	3	211	201	10	11	90
100	4	237	223	14	14	104
150	6	294	275	19	19	109
200	8	349	323	26	27	137
250	10	404	374	30	30	150
300	12	480	445	35	36	175

12. EU DECLARATION OF CONFORMITY FOR ATEX APPROVED VALVES

EU DECLARATION OF CONFORMITY

for ATEX approved valves

Manufacturer:
Valmet Flow Control Oy
01380 Vantaa, Finland
*Valmet Flow Control (Jiaxing) Co., Ltd.
Jiaxing, China
*) Also manufactures certain series

EU Authorised Representative: Valmet Flow Control Oy, Vanha Porvoontie 229, 01380 Vantaa, Finland. Contact details: +358 10 417 5000

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product:	Neles Butterfly Valves
Type:	L-series (L1, L2, L4, L5, L6, L12, LG, LW),
ATEX group and category:	II 2 GD, II 3 GD
Ex GAS:	Ex h IIC 85°C…Tmax Gb
Ex DUST:	Ex h IIIC T85°C…T(Tmax) Db
	Tmax= valve max. temperature in name plate

Manufacturer's certificates:

Standard / Directive	Notified Body and NoBo number	Certificate No.
ISO 9001:2015	LRQA (Certification body)	10531829
PED 2014/68/EU Module H	DNV Business Assurance Italy S.r.l. 0496	142306-2013-CE-FIN-ACCREDIA
ATEX 2014/34/EU Annex IV	DNV Product Assurance AS Norway 2460	Presafe 18 ATEX 91983Q Issue 6

ATEX 2014/34/EU Annex VIII technical files are archived by Notified Body number 0537

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

PED 2014/68/EU	Valve
ATEX 2014/34/EU	Non-electrical equipment

Main components:

Valve:
The valve is suitable for service up to PED Cat III
Valve design standard: ASME B16.34

Installation, Maintenance and Operating instructions manual (IMO) must be followed before installation in order to ensure proper and safe mounting and usage of equipment.

The product above is manufactured in compliance with the applicable European directives and technical specifications/standards (EN10204). The product is in conformity with the customer order.

Instrumentation and accessories having equal protection concept, level and performance specification with the original can be presumed to be in conformity with this Declaration of Conformity.

Protection from e.g. static electricity caused by the process or connected equipment must be considered by the user (EN 60079-14 § 6). EN 60079-19 applies for modifications.

Non-electrical equipment is according EN 80079-37:2016 and EN 80079-36:2016. The actual surface temperature of non-electrical equipment is depended on the process and ambient conditions (EN 80079-36:2016 § 6.2.5 and 6.2.7). The protection from high or low temperature must be considered by the end user before put into service.

The product does not possess any residual risk according to hazard analysis conducted under the applicable directives providing that the procedures stated by the IMO are followed and the product is used under conditions mentioned in the technical specifications.

Documents with digital and/or e-signature conveyed by Valmet Flow Control conform to the Regulation (EU) No 910/2014 as well as the national code on e-signatures. In order to secure the integrity of the document, the authenticity of the sender, and indisputableness of the dispatch the identification is covered by individual ID codes, passwords, and by regularly changing passwords. The authorization to sign documents is based on organizational position and/or is task related. The impartial third party in the company bestows the access right with predefined authorities to particular databases.

Vantaa 10.9.2024

Juha Virolainen, Global Quality Director

13. TYPE CODE

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13		14.
-	LW	6	K	B	A	200	A	A	A	A	T	D	/	-

1. sign	FLOW BALANCING CONSTRUCTION
-	Standard construction
Q-	Flow balancing trim, Q-disc (available up to 12" / DN 300)

2. sign	PRODUCT SERIES / DESIGN
LW	Wafer type, metal seated triple eccentric butterfly valve
LG	Lug type, metal seated triple eccentric butterfly valve
L6	Double flange type, metal seated triple eccentric butterfly valve

3. sign	FACE TO FACE
LW & LG	
6	EN 558-part 1, table 5 / basic series 20 (DIN 3202-K1) (with PN 10–16) API 609 category B class 150 (with ASME 150)
7	EN 558-part 1, table 5 / basic series 25 (DIN 3202-K2) (with PN 10–16 and ASME 150)
8	EN 558-part 1, table 5 / basic series 16 (DIN 3202-K3)
5	API 609 category B class 300 (with PN 25–40 and ASME 300)
L6	
4	API 609 category B, Double-flanged (short pattern) (with all pressure classes), equivalent to ISO5752 / EN558 basic series 13

4. sign	PRESSURE RATING & DRILLING
C	ASME 150
D	ASME 300
J	PN10 (above 12" / DN 300 only with LW)
K	PN16 (above 12" / DN 300 only with LW)
L	PN 25 (above 12" / DN 300 only with LW)
L/C	PN 25 rated body / ASME 150 rated internal components (only with LW)
M	PN 40 (above 12" / DN 300 only with LW)

5. sign	VALVE-ACTUATOR CONNECTION AND SHAFT CONSTRUCTION
B	Drive shaft + trunnion with two keyways / bracket according to manufacturer standard (keyways' orientation according to ISO 5211)
A	Through shaft with two keyways / bracket according to manufacturer standard (keyways' orientation according to ISO 5211)
D	Drive shaft + trunnion with square drive / bracket according to manufacturer standard (up to 12" / DN 300)

6. sign	CONSTRUCTION
A	**STANDARD (max. +260 °C / +500 °F)** • Bearings 316 + PTFE-based coating • Body and blind flange gaskets graphite • "A" construction fulfills NACE MR0175 for LW • Anti-static device with PTFE packing: ATEX II 3 G c with graphite packing: ATEX II 2 G c
N/1N	**EXTENDED SERVICE (max. +425 °C / +797 °F)** • Bearings Inconel 625 + PVDC coating • Body and blind flange gaskets graphite • "N" construction fulfills NACE MR0175 for LW with "A" seat • "1N" construction fulfills NACE MR0175 for L6 and LG with "A" seat NACE compliant clamp ring bolting • Anti-static device with PTFE packing: ATEX II 3 G c with graphite packing: ATEX II 2 G c
H/1H	**HIGH TEMPERATURE SERVICE (max. +600 °C / +1112 °F)** • Cobalt based alloy bearings • Shaft cobalt-based material coated • Body and blind flange gaskets graphite • "N" construction fulfills NACE MR0175 for LW with "A" seat • "1H" construction fulfills NACE MR0175 for L6 and LG with A seat NACE compliant clamp ring bolting • Anti-static device: ATEX II 2 G c
B	**BEARING PROTECTION** **(Temp range -15 °C ... +220 °C / +5 °F ... +428 °F)** • PTFE bearing protection • Back space of seat filled to prevent accumulation of process fluid • Otherwise as "A" construction
1B	**BEARING PROTECTION FOR EXTENDED SERVICE** **(max. +425 °C / +797 °F)** • Graphite bearing protection • Otherwise as "N" construction
Z	**OXYGEN SERVICE** • BAM/WHA approved soft parts • Temperature range with CF8M, T= -30 °C ... +140 °C (-22 °F ... +284 °F) • Temperature range with Monel, T= -50 °C ... +200 °C (-58 °F ... +392 °F) • Max. pressure with CF8M = 26 bar (377 psi) • Max. pressure with Monel = 41.4 bar (600 psi) • Flow direction limited to flow-to-close • Oxygen cleaning acc. to Valmet internal procedure FC-M-1360-En **Note!** No carbon steel body material allowed. **Note!** Only "Z" construction available for oxygen flow media. Not to be used with other flow medias.
1A	**GRAPHITE FREE (PTFE SOFT PARTS)** **(max. +260 °C / 500 °F)** • Body and blind flange gaskets PTFE • Otherwise as "A" construction
C	**CRYOGENIC (Standard Cryo extension)** • Extended bonnet and drive shaft (Cryo extension for T = -200 °C ... +260 °C / -328 °F ... +500 °F) • Additional gaskets and bearings • Otherwise as "A" construction Only with "G1" packing

7. sign	SIZE (inches / mm)
ASME	03, 04, 06, 08, 10, 12, 14, 16, 18, 20, 24
PN	080, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600

8. sign	BODY	9. sign	DISC	10. sign	SHAFT & PINS
Note: Material coding specifies only the type of material not grade (cast, wrought, bar, forged...) which can change based on size or type. Below material combinations are not fixed by each row.					
A	CF8M / 1.4408	A	CF8M / F316	A	AISI 316 (strain hardened) Not suitable with ASME 300 (sign 4 “D”)
P	WCB / 1.0619		-	C	Gr. 630 (17-4PH) Not suitable for “C” construction
A1	ASTM A351 gr. CF8 / AISI 304	A1	ASTM A351 gr. CF8 / AISI 304	N	XM-19 (Nitronic 50)
A2	ASTM A351 gr. CF3M / AISI 316L	A2	ASTM A351 gr. CF3M / AISI 316L	H	Nimonic 80A
A3	ASTM A351 gr. CF3 / AISI 304L	A3	ASTM A351 gr. CF3 / AISI 304L	-	-
A4	ASTM A351 gr. CF8C / AISI 347	A4	ASTM A351 gr. CF8C / AISI 347	-	-
F	ASTM A352 gr. LCC	B	CF8M / F316 + cobalt based alloy on disc edge	-	-
F1	ASTM A352 gr. LCB	-	-	-	-
C	ASTM A351 gr. CG8M / AISI 317	C	ASTM A351 gr. CG8M / AISI 317	-	-
C1	ASTM A351 gr. CG3M	C1	ASTM A351 gr. CG3M		
P1	ASTM A216 gr. WCC	-	-	-	-
M	ASTM A494 gr. M-35-1 (Monel K400)	M	ASTM A494 gr. M-35-1 (Monel K400)	M	Monel K500
U2	ASTM A995 gr. 4A / EN 10213 - 1.4570	U2	ASTM A995 gr. 4A / EN 10213 - 1.4570		
U3	ASTM A995 gr. 5A / EN10213 - 1.4469	U3	ASTM A995 gr. 5A / EN10213 - 1.4469	U3	UNS 32750

11. sign	STANDARD SEAT
A	Incoloy 825 (UNS N08825), hard chrome plated T = -200 °C ... +500 °C (-328 °F ... +932 °F), (Nace MR 0103/MR0175)
H	Nimonic 80A (UNS N07080), hard chrome plated T = -200 °C ... +650 °C (-328 °F ... +1202 °F), (Not Nace)
K	W. No. 2.4681, UNS R31233 (ULTIMET) T = -200 °C ... +600 °C (-328 °F ... +1112 °F), (Nace MR 0103)

12. sign	SHAFT SEAL OPTIONS
T	Standard live loaded PTFE V-ring packing (ISO15848-1 certified)
G	Standard live loaded graphite packing (Fire safe and ISO15848-1 certified)
T1	High performance live loaded PTFE V-ring packing (ISO15848-1 certified)
G1	High performance live loaded graphite packing (Fire safe and ISO15848-1 certified)

13. sign	
D	Mod D, modular butterfly valve platform

14. sign	STANDARD FLANGE FINISHING Special flange finish shall always be marked in type code.
-	Ra 3.2–6.3, standard, without sign cover: EN 1092-1 Type B1 (Ra 3.2–12.5) ASME B16.5, Ra 3.2–6.3 (125–250 µin) DIN 2526 Form E (Ra 4)
05	Ring joint
12	ASME B16.5 Large Male (Ra 10–12.5)
13	ASME B16.5 Large Female
16	ASME B16.5 Large Tongue
17	ASME B16.5 Large Groove
18	ASME B16.5 Small Tongue
19	ASME B16.5 Small Groove
20	ASME B16.5 Flat face
24	EN1092-1 Type D Groove
25	EN1092-1 Type E Spigot

14. GENERAL SAFETY WARNINGS AND DISCLAIMERS

General safety warnings (Only for Neles Neldisc™ L-series)

Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
2. Valves may be equipped with lifting threads on the body or on the flanges. These are intended to be used with the lifting plan.
3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
5. Workers must be trained for lifting and handling valves.
6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.

Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.
7. Beware of Trim (Disc, Ball or Plug) movement even when the valve is disassembled. Trim may move simply due to the weight of the part or change in position of the valve. Keep hands or other body parts away from locations where they may be injured by movement of the trim. Do not leave objects near or in the valve port which may fall in and need to be retrieved.

General disclaimers

Receiving, handling and unpacking.

1. Respect the safety warnings above!
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
3. Store valves and equipment in a dry and protected area until the equipment is installed.
4. Do not exceed the maximum storage temperatures given in the IMO (installation, maintenance, and operating instructions).
5. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
6. Remove the valve endcaps just before mounting into the pipeline.
7. FOR YOUR SAFETY IT IS IMPORTANT TO FOLLOW THESE PRECAUTIONS BEFORE REMOVAL OF THE VALVE FROM THE PIPELINE OR ANY DISASSEMBLY:
   - Be sure you know what flow medium is in the pipeline. If there is any doubt, confirm with the proper supervisor.
   - Wear any personal protective equipment (PPE) required for working with the flow medium involved in addition to any other PPE normally required.
   - Depressurize the pipeline, bring to ambient temperature, and drain the pipeline flow medium.
   - Cycle the valve to relieve any residual pressure in the body cavity.
   - After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
   - The valves with offset shaft (Butterfly, eccentric rotary plug) have greater trim area on one side of the shaft. This will cause the valve to open when pressurized from the FTO direction.
   - WARNING: DO NOT PRESSURIZE THE ECCENTRIC VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!
   - WARNING: DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM AN ECCENTRIC VALVE WHILE PRESSURIZED!
   - Before installing the eccentric valve in or remove it from the pipeline, cycle the valve closed. Eccentric valves must be in the closed position to bring the trim within the face to face of the valve. Failure to follow these instructions will cause damage to the valve and may result in personal injury.

Operating

8. The identification plate (ID-plate, type plate, nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
9. (For soft seats) The practical and safe use of this product is determined by both the temperature and pressure ratings of the seat and body. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some seat materials have pressure ratings that are lower than the body ratings. All body and seat ratings are dependent on the valve type, size and material of the body and seat. Never exceed the marked rating.
10. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process medium. Damage or personal injury may result.
11. The operating torque of the valve may rise over time due to wear, particles or other damage of the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.
12. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.

13. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
14. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
15. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
16. As the use of the valve is application specific, several factors should be considered when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
17. It is the end user's responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
18. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
19. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
20. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.

Maintenance

21. Respect the safety warnings above!
22. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.
23. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.
24. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
25. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
    - See IMO for the correct stem position.
    - Consider that the positioner may give the wrong signals.
26. Sealing materials (soft sealing parts) should be changed when the valve is in maintenance. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
27. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
28. Valve pressure retaining parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure retaining parts. Damaged pressure retaining parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warranty.
29. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
30. Check the condition of sealing surfaces on the seats, trim (disc, ball, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
31. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
32. Do not weld on pressure retaining parts without an ASME and PED qualified procedure and personnel.
33. Pressure retaining parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
34. Make sure that the valve is positioned in the correct flow direction into the pipeline.
35. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
36. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
37. Never store a valve in maintenance without flow port protection.
38. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut-off pressure marked on the valve identification plate.
39. Actuator mounting and unmounting:
    - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
    - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
    - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories either as is or with additional actuator support. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.
40. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.
41. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
    - Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
    - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
    - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test medium during the test.
    - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.

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