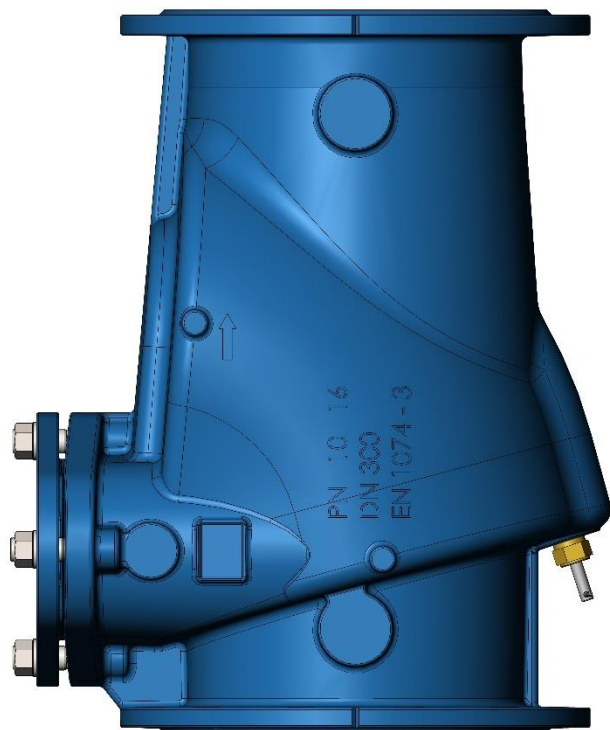


## Operating and maintenance instructions

### **NORVA non-return valve**

Art. 435



## CONTENT

1.	General.....	3	6.3.1	Inspection of the disk.....	8
1.1.	Safety.....	3	6.3.2	Leaking body seals.....	8
1.2.	Proper use.....	3	6.3.3	Leaking bypass valve.....	8
2.	Transport and storage.....	3	6.3.4	Cleaning, lubrication.....	9
2.1.	Transport.....	3	6.3.5	Recommendations for the replacement of parts.....	9
2.2.	Storage.....	3	7.	Trouble-shooting.....	9
3.	Product and function description.....	3	8.	Certifications.....	10
3.1.	Product features and function.....	4	9.	Contacts and after sales support.....	10
3.2.	Fields of application.....	4	10.	Technical drawing & data.....	11
3.3.	Proper and improper mode of operation.....	4			
4.	Installation in the pipeline.....	5			
4.1.	Site requirements.....	5			
4.2.	Place of installation.....	5			
4.2.1.	Stable flow:.....	5			
4.2.2.	Flow velocity.....	6			
4.3.	Installation position.....	6			
4.4.	Mounting instructions, fittings.....	6			
5.	Putting the valve into operation.....	7			
5.1.	Visual inspection.....	7			
5.2.	Function check and pressure test.....	7			
6.	Maintenance and service.....	8			
6.1.	General safety instructions.....	8			
6.2.	Inspection and actuation intervals.....	8			
6.3.	Maintenance and replacement of spare parts.....	8			

## 1. General

### 1.1. Safety

These IMP Armature operating and maintenance instructions must be observed at all times when handling with the IMP NORVA non-return valve. The user must not change or modify this product or the mounting parts/fittings supplied with it. IMP does not assume any warranty or liability for consequential damage arising from non-compliance with these instructions.



For the use of this non-return valve the generally accepted technical rules (EN standards) are in force. The non-return valves must only be installed by qualified, specially trained staff.

For further specifications and information such as dimensions, materials and fields of application, please refer to the related technical data sheet (IMP435 NORVA\_DS).

### 1.2. Proper use

The IMP NORVA non-return valve is a non-return valve designed for installation in pipelines.

The standard model is designed to allow the flow of the medium in pipelines in one direction and to automatically prevent return flow.

The technical application ranges (e.g. working pressure, medium, temperature etc.) are described in the product-related technical data sheet (IMP435 NORVA\_DS).

**For any deviating operating conditions and applications the user must obtain the manufacturer's prior written approval.**

## 2. Transport and storage

### 2.1. Transport

To transport the valve to its installation site, it must be packed in a stable, properly sized container. The packaging also needs to ensure that the valve is protected against weather influences and damage.

When the valve is transported long distance (e.g. overseas) and exposed to special climatic conditions, it needs to be protected by sealing it in plastic wrapping and adding a desiccant.

The IMP NORVA non-return valve must be transported with the disk in closed position. It is advisable to place the valve in its packaging upright on its inlet flange (see Fig. 1).

The factory-applied corrosion protection coating and mountings (e.g. lifting device, bypass) need to be specially protected.

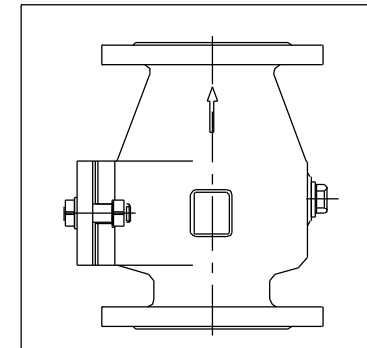


Fig. 1: Position for transport

### 2.2. Storage

The IMP NORVA non-return valve must be stored with the disk in closed position. Preferably the valve should be placed on its inlet flange (see Fig. 1). The elastomer parts (seals) must be protected against UV radiation (direct sunlight etc.) as otherwise their reliable long-term function cannot be ensured.

The valve should be stored in a dry, well-ventilated area. The direct exposure of the non-return valve to radiation heat emitted by radiators should be avoided. The coating-shade can turn pale on long term if exposed to UV radiation (direct sunlight etc.), which does not have influence on function of the valve and can therefore not be a subject for claims.

The components relevant for proper function of the valve, such as the disk, the lifting device must be protected against dust and other kinds of dirt by appropriate covers.

## 3. Product and function description

### 3.1. Product features and function

The IMP NORVA valve is a non-return valve with flanges on both sides and can therefore be installed between two flanges or as an end-of-line valve without counter-flange (in such case the safety must be assured, to avoid eventual injuries because of interference in valve) under full operating pressure. The disk is attached to a rubber joint and opens automatically through the pressure of the medium conveyed. Proper sealing in the other direction is also controlled by the pressure of the medium (resilient seated). For complete sealing, a back-pressure of approx. 5 m water column is needed.

The standard model is supplied with a G  $\frac{3}{4}$  drain plug (Fig. 2). Instead of the plug, a separately available lifting device (also G  $\frac{3}{4}$ ) can be screwed into the opening of the drain plug. It allows forced lifting of the disk to allow the medium to flow back.

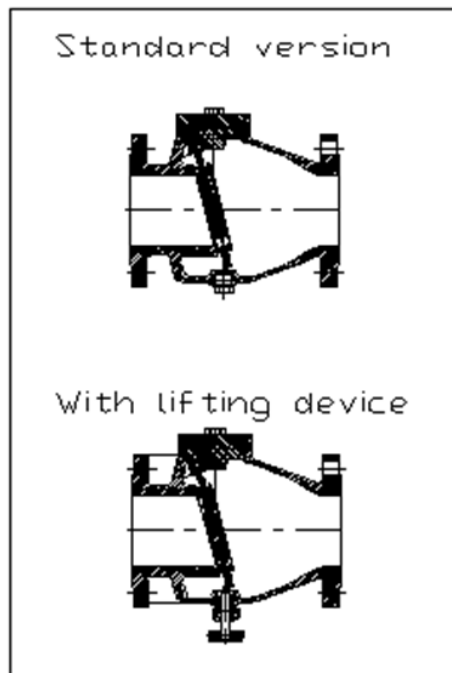


Fig. 2: NORVA Non-Return Valve

### 3.2. Fields of application

- Use EPDM version of NORVA non-return valve for potable water.
- Use NBR version of NORVA non-return valve for waste water.

As different media can have most diverse effects, the user is obligated to proof the possible impact of medium substances and temperatures on the rubber parts and coating of the valve, for every case separately.

**For any deviating operating conditions and applications the user must obtain the manufacturer's prior written approval.**

In the case of media that contain a lot of mechanical impurities, it should be borne in mind that they can cause clogging of the bypass. Consequently, care is required when emptying the pipeline.

### 3.3. Proper and improper mode of operation



The maximum operating temperatures and pressures specified in the technical data sheet (IMP435 NORVA\_DS) must not be exceeded. The closed valve must only be exposed to pressures within the range of its nominal pressure.

The lifting device must only operate up to its maximum specified differential pressure:

- up to nominal diameter DN150 up to 1,5 bar
- nominal diameter DN200 an larger up to 0,7 bar.

The maximum permissible flow velocity (stable flow) is that according to the EN 1074-1 standard:

- Valves with PN 10: 3 m/s
- Valves with PN 16: 4 m/s

Most regular application is in range 0,5 – 2,5 m/s. By flow larger then 2,5 m/s the possibility of water hammer must be considered. The consultation with the producer is obligated.

**In the case of turbulent flow (e.g. when the valve is installed behind elbows, branch, widening etc.), the flow velocity must be reduced accordingly (see**

Sect. 4). Should this be impossible, the maintenance intervals (see Sect. 6) must be shortened.

## 4. Installation in the pipeline

### 4.1. Site requirements

When the valve is installed between pipeline flanges, the flanges must be plane-parallel and in true alignment. Misaligned pipelines must be put into a true alignment position before the valve is installed. Otherwise the body may be exposed to impermissibly high loads and strain during operation which may even cause the body to break.

The installation of the valve must ensure that the valve is not exposed to tensile stress. No loads of the pipeline must be transmitted to the valve.

It needs to be ensured that the space left between the flanges is large enough to prevent damage of the coating of the raised faces of the flanges when the valve is installed. When work is performed in the valve area which may cause dirt (e.g. painting, erection of brick walls or concrete work), the valve must be protected by a suitable cover.

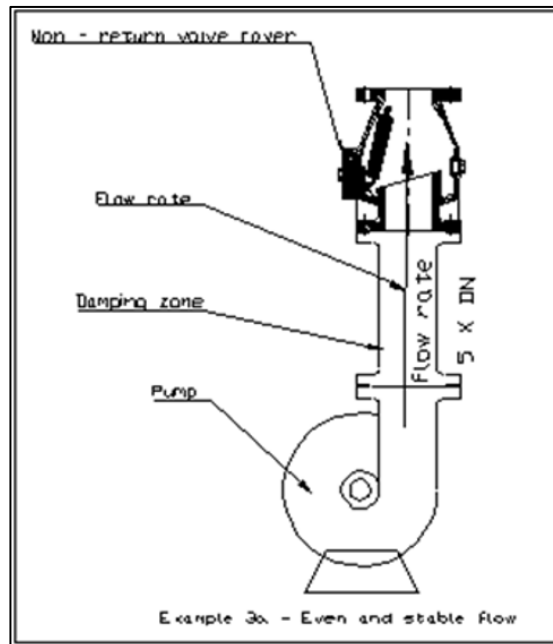


Fig. 3a: Installation of NORVA non-return valve

### 4.2. Place of installation

The place of installation for the valve must be selected in a way that ensures there is enough space to allow proper operation (lifting device, bypass), later function checks and maintenance work (e.g. cleaning of the valve). For open-air installation, the valve must be protected against extreme weather conditions, such as the formation of ice, UV radiation,.. by covering it appropriately.

To ensure proper function and a long service life of the non-return valve, several factors need to be considered for the best place of installation.

#### 4.2.1. Stable flow:

A smooth and even flow ensures the undisturbed position of the disk in the flow even under increased flow velocities (see Section 3.3). To achieve steady and even flow, a straight damping zone of 5x DN should provide upstream of the non-return valve (see Fig. 3a).

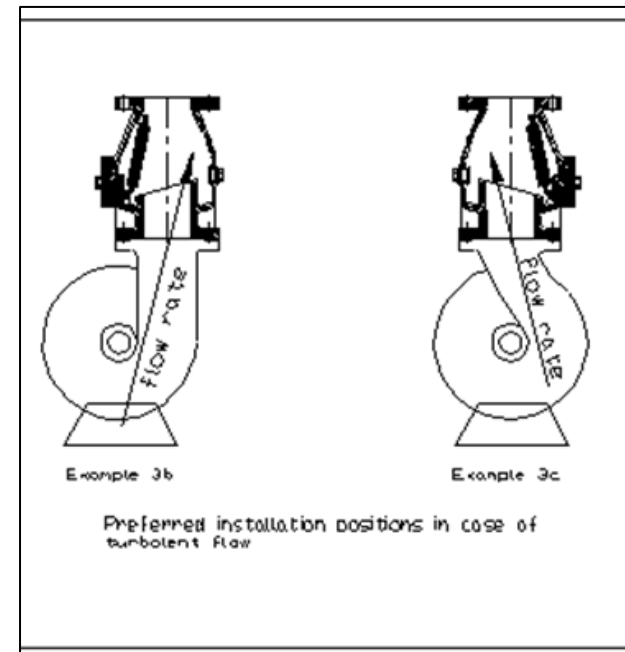


Fig. 3bc: Installation of NORVA non-return valve

If the construction and site conditions do not allow this distance, the preferred installation position should be that shown in Fig. 3b or 3c.



If it is not possible to provide a damping zone according to Fig. 3a, flow turbulences may cause the disk and rubber joint to vibrate and thus shorten their services life. To prevent this, the flow velocity should be reduced to max. 2m/s (e.g. by selecting a larger nominal diameter) and the maintenance intervals should be shortened.

### 4.2.2 Flow velocity

The IMP NORVA non-return valve is suitable for operation at maximum flow velocity according to EN 1074-1 (see section 3.3).

The prerequisite for this kind of operation is the installation of the valve with an upstream damping zone (see Section 4.2.1, Fig. 3a).

If it is impossible to provide a damping zone, the disk and rubber joint will very probably be subject to increased wear and tear. To prevent this, it is advisable to reduce the flow velocity to max. 2 m/s (e.g. by selecting a larger nominal diameter) and to shorten maintenance intervals.



**For operation with waste water containing suspended solids, the flow velocity should be as high as possible within the permissible range as this will prevent the valve from being clogged with deposits.**

### 4.3. Installation position

The IMP NORVA non-return valve can be installed in horizontal or ascending pipelines up to angle of inclination of max. 90° (observe flow arrow on valve body!). The valve will not operate in any other position (Fig. 4).

When used in pipelines conveying waste water containing suspended solids, horizontal installation is advisable as this will prevent the valve from being clogged by deposits.

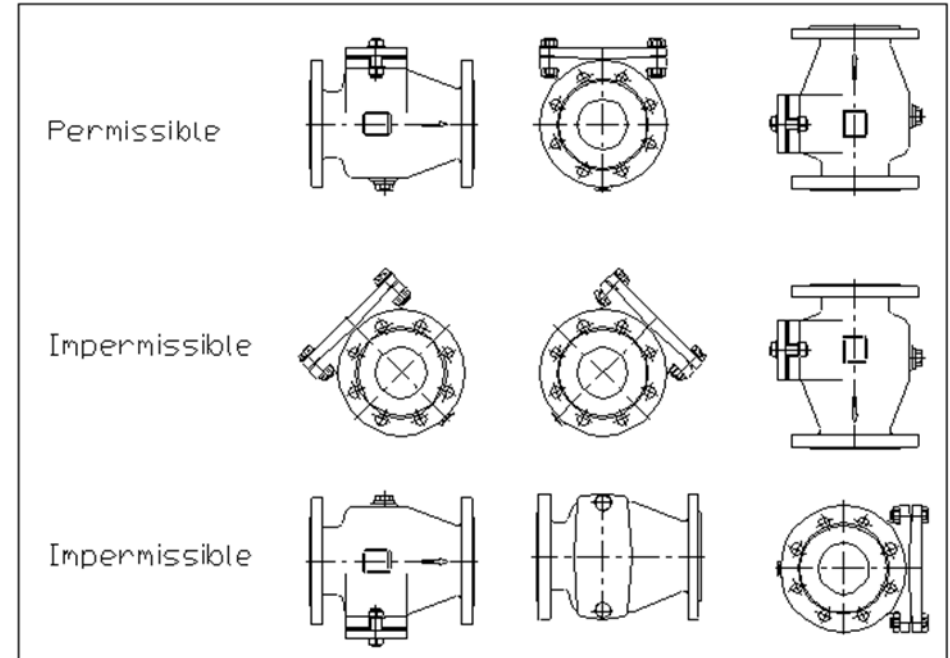


Fig. 4: Permissible and impermissible installation positions

### 4.4. Mounting instructions, fittings

Before the valve is installed, it must be checked for transport or storage damage. While being stored on the construction site before its installation, the valve must be protected against dirt by an appropriate cover. When the valve is being installed, its functional parts (such as the disk, lifting device and the bypass) must be free of dust and dirt. The producer does not assume any liability for consequential damage caused by dirt, grit residues etc.



The proper motion and function of the function parts should be checked before installation. If the valves are painted later on, it must be made sure that the function parts are not painted over.

The lifting device can be screwed into the valve body instead of the plug.

When installing the NORVA non-return valve, it must be made sure that suitable load suspension devices as well as transport equipment and cranes and elevators are available. Suspending the valve using its lifting device or the bypass may damage or even destroy the mounts.

Before installation of the valve the flow has to be stopped or the pipeline has to be empty, and if the temperature of the pipeline is increased, it has to be cooled to the room temperature.

Correct installation of the valve is the condition for its correct operation. The valve is flanged (flange acc. to EN 1092-2) and it is installed between two flanges, installation length according to EN 558-1, series 48.

The pipeline must not be pulled towards the fitting. If the gap between the fitting and flange is too large, this must be compensated by using compensating parts. Pipeline loads must only be transmitted to the valve within the limits specified by EN 1074-3.

For the connection of the valve in to the pipeline, the rubber seals according to EN 1514-1 shape IBC, the hexagonal bolts, nuts and washers are needed. If flared flanges are to be used, these upon recommended seals are mandatory.

During installation in the pipeline system care must be taken to ensure that the connecting flanges of the pipeline getting in contact with the NORVA valve are arranged parallel to each other and are exactly aligned to avoid any tension loads acting upon the valve body.

By joining of the flanges it is necessary to tighten the connecting screws evenly in a cross pattern (see figure 5) to prevent unnecessary tension which may cause cracks or breaks. The screw tightening torques are to be informed by the gasket supplier.

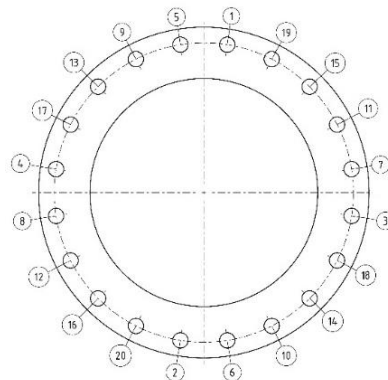


Fig. 5: Tightening of screws in a criss-cross pattern

See Table 1 for screw sizes.

Screw sizes						
DN	Working		Quantity		Screw length	
	PN 10	PN 16	PN	PN	PN10	PN 16
40	M16	M16	4	4		
50	M16	M16	4	4		
65	M16	M16	4	4	M16X65	
80	M16	M16	8	8		
100	M16	M16	8	8		
125	M16	M16	8	8		
150	M20	M20	8	8	M20X70	M20X70
200	M20	M20	8	12	M20X70	M20X70
250	M20	M24	12	12	M20X70	M24X75
300	M20	M24	12	12	M20X75	M24X85
350	M20	M24	16	16	M20X85	M24X90
400	M24	M27	16	16	M24X90	M27X95
500	M24	M30	20	20	M24X100	M30X105
600	M27	M33	20	20	M27X110	M33X115

Table 1: Screw sizes

## 5. Putting the valve into operation

### 5.1. Visual inspection

Before putting the valve and the equipment into operation, all functional parts must be subjected to visual inspection. All screwed connections need to be checked as to whether they are tightly fastened.

### 5.2. Function check and pressure test

Before the installation of the valve, its function parts (disk, lifting device, bypass) should be completely opened and closed at least once and their proper operation should be tested.

For proper function of the non-return valve, the lifting device must afterwards be brought into its basic position (unwind in left till end) and the bypass valve must be put in closed position (unwind in right till end).

### Factory test of the valve to EN 12266-1

DN (mm)	PN	Max operating pressure (bar)	Max operating temperature for neutral liquids (°C)	Test pressure (bar) – with water	
				shell	seat
50-500	16	16	50	24	17,6
200-500	10	10	50	15	11

Table 2: Final test



**CAUTION!** The closed non-return valve must only be exposed to pressures not exceeding its nominal pressure (see table 2). When a pipeline pressure test is performed during which the test pressure exceeds the permissible nominal pressure in the closing direction of the non-return valve, the disk must be opened a little in order not to expose the elastomer parts to excessive loads. To open the valve, the lifting device or the bypass may be used, however the maximum differential pressure must be considered before use of lifting device (see Sect. 3.3).

## 6. Maintenance and service

### 6.1. General safety instructions

Prior to any inspection and maintenance work to be performed the pressurized pipeline must be shut off and the system must be secured against unintentional switching on. Before the inspection the pressure must be relieved.

Depending on the kind and criticality of the medium or fluid conveyed, all the required safety regulations must be complied with!

Upon completion of the maintenance work and prior to resuming operation, all connections, screws, gaskets must be checked for proper fastening and leak-freeness.

The individual steps as stated under Section 5 need to be performed.

### 6.2. Inspection and actuation intervals

The condition of the disk should be checked at least once per year. The proper function of the lifting device and bypass should also be checked at least once per year. In case of extreme operating conditions and heavily polluted media, inspection and actuation should be carried out more frequently depending on the conditions.

When possibility for larger injuries and irreparable damage may be caused in case of operation-lack of the valve, the inspection and actuation intervals must be adequate shortened or adjusted to operation conditions.

### 6.3. Maintenance and replacement of spare parts

The spare parts and wearing parts needed can be found in enclosure and technical data sheet (IMP435 NORVA\_DS).

#### 6.3.1 Inspection of the disk

For inspection according to the recommended intervals the valve must be opened and the disk must be cleaned. In the course of the inspection the sealing parts must be replaced. Should the sealing of the disk be damaged, the disk can be turned over and thus used again (till the DN300). If the rubber joint shows cracks, the disk (spare parts set 1 - look at technical data sheet IMP435 NORVA\_DS) must be replaced.

#### 6.3.2 Leaking body seals

After a longer period of operation, material fatigue may cause the seals of the cover or the plug to leak. Should this be the case, the respective seal must be replaced (spare parts set 2 - look at technical data sheet IMP435 NORVA\_DS).

#### 6.3.3 Leaking bypass valve

Should leaks be detected on the bypass valve, the bypass must be slightly refastened until the valve is tight again. In case of leakiness the respective seal must be replaced.



### 6.3.4 Cleaning, lubrication

To ensure the proper function of the disk, lifting device, bypass, the body of the valve must be cleaned according to the recommended intervals.

It is not necessary to lubricate the disk joint.

In case of sluggish operation, the stem of the lifting device may be slightly greased with a lubricant approved for drinking water.

### 6.3.5 Recommendations for the replacement of parts

For parts list and spare parts see Sect. 10 and technical data sheet (IMP435 NORVA\_DS).

a. Replace disk (spare parts set 1) every 5 years.

b. Replace sealing everytime if cover and nut opened and when necessary (spare parts set 2).



Under extreme operating conditions, the parts mentioned above may have to be replaced more frequently.

## 7. Trouble-shooting



For all maintenance and repair work please observe the general safety instructions under Section 6.1!

Problem	Cause	Remedial action
Disk does not seal properly	Foreign particle(s) jammed in the seat area	Purge valve, dismantle, if necessary and remove foreign particle(s)
	Deposits from the medium have settled on the seat or disk	Dismantle valve and clean seat area and disk
	Back-pressure too low	To achieve the specified leak rate, the back-pressure must be at least 5 m water column
	Unfavourable flow at the valve disk and obstruction of the closing movement	Change installation position (see Section 4)
	Obstruction of the closing movement due to worn bearing (DN350-500)	Replace the bearing
Disks slams	Unfavourable installation position and thus unfavourable flow at the disk (e.g. installed too closely behind the elbow)	Change installation position (see Section 4)
	Flow velocity of the medium too low	Install valve with smaller nominal diameter or increase flow velocity in the system within the permitted range of the valve
Valve soils too fast	Unfavourable installation position (e.g. vertical installation)	Change installation position (see section 4)
	Change installation position (see section 4)	Install valve with a smaller nominal diameter or increase flow velocity in the system observing the permissible application ranges of the valve
Body leaks	Deteriorated seals	Replace seals (see Section 6)
	Packing gland at bypass leaky	Retighten packing gland
Sluggish operation of the lifting device	Counter-pressure too high during lifting	Observe operating ranges of the lifting device (see Sect. 3.3)
	Not enough grease on the stem	Lubricate stem (see Section 6)
Sluggish operation of the bypass valve	Inlet area soiled	Dismantle valve, open cover, if necessary, and clean inlet area
	Not enough grease on the stem	Lubricate stem (see Section 6)

## 8. Certifications

- Rubber parts approved for potable water
- Epoxy coating approved for potable water
- Corrosion protection by GSK
- Process certified by ISO 9001:2015

## 9. Contacts and after sales support

- *Spare parts*

### Spare parts set 1

Contains: EPDM / NBR rubberized DISC, O-ring for cover

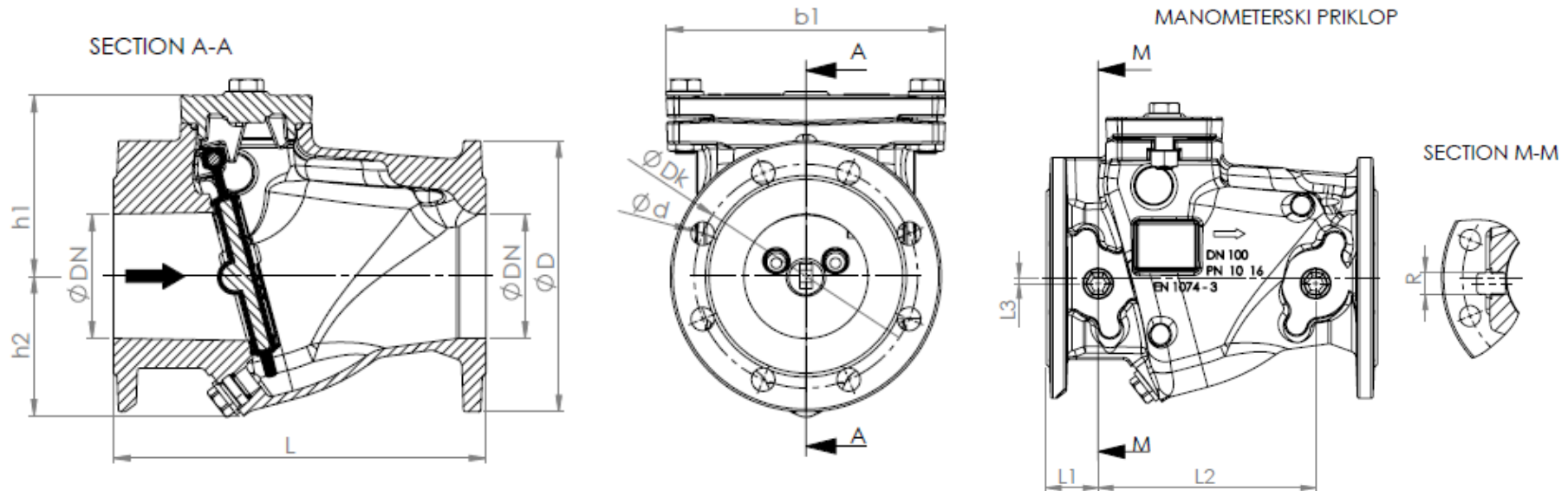
### Spare parts set 2

Contains: EPDM / NBR O-ring for cover, gasket for plug screw

- *Contact*

Additional information & spare parts to be ordered through mail [sales@imp-ta.si](mailto:sales@imp-ta.si).

## 10. Technical drawing & data



DN	D	Dk (PN10/PN16)	d (PN10/PN16)	L	L1	L2	L3	h1	h2	b1	R
50	165	125	19	200	/	/	/	100	90	164	/
65	185	145	19	240	40	158,5	0	120	98	186	1/2"
80	200	160	19	260	/	/	/	130	105	200	/
100	220	180	19	300	47	197	5	145	115	225	1/2"
125	250	210	19	350	46	250	0	165	140	304	1/2"
150	285	240	23	400	/	/	/	251	205	340	/
200	340	295	23	500	80	340	0	255	185	400	1/2"
250	405	350/355	23/28	600	96	408	0	285	230	464	1/2"
300	455	400/410	23/28	700	100,5	499	0	312	255	504	1/2"
350	520	460/470	23/28	800	110	580	0	427	344	585	1/2"
400	580	515/525	28/31	900	120	660	0	461	372	660	1/2"
500	715	620/650	28/34	1100	140	820	0	530	515	770	1/2"