

# OPERATING AND INSTALLATION MANUAL

## ROFI® Standard Valves

Content	Page
<b>1 Introduction</b> .....	3
<b>2 General Information</b> .....	4
2-1 Marking.....	5
2-2 Notes on possible dangers.....	5
2-2-1 Significance symbols and explanatory notes on safety information.....	5
2-2-2 Qualified Personnel.....	6
2-2-3 Notes to safe use as directed.....	6
2-2-4 Notes to safe operation.....	6
2-2-5 Notes to dangerous operation.....	6
<b>3 Notes to safe transport and storage</b> .....	7
3-1 Transport.....	7
3-2 Storage.....	7
<b>4 Details on safe installation</b> .....	7
4-1 Planning and installation.....	8
4-1-1 Installing position.....	9
4-1-2 Spindle operated Valves.....	9
4-1-3 Non-return Valves.....	9
4-1-4 Strainers.....	9
4-2 Differential pressure.....	9
4-3 Temperature changes.....	10
4-4 Additional instructions for installation.....	10
4-4-1 Flanged Valves.....	10
4-4-2 Valve with butt-weld or socket-weld ends.....	10
4-4-3 Gear operated and actuated Valves.....	11
4-4-4 Insulation.....	11
4-4-5 External moving parts.....	11
<b>5 Valve operation</b> .....	11
5-1 Bolt torques, shutting and opening torques.....	11
5-2 Cleaning (Pickling).....	11
5-3 Venting.....	12
5-4 Heating and cooling rates.....	12
5-5 Additional operating rules.....	12
5-6 Function testing.....	12

Content	Page
5-7 Checking during and after first operation .....	12
<b>6 Maintenance</b> .....	13
6-1 Gland packing, Bonnet-flange-seals and Replacement .....	13
6-2 Recommended lubricants .....	14
6-3 Lubricant of spindle thread .....	14
<b>7 Troubleshooting table</b> .....	15
<b>8 Spare parts</b> .....	16
<b>9 Guarantee / Warranty</b> .....	16

## 1. Introduction

Industrial valves made by company ROFI® S.A.R.L. are designed according to International norms such as DIN-Standards, EN-Standards and according to the Technical Rules like AD and the European Pressure Vessel Guideline 97/23/EG, etc.. Design, manufacture and testing of these valves was carried out on condition that the valves are operated under normal operating conditions. Normal operating conditions contain for example the following:

- operation with liquid or gaseous media, without special corrosive, chemical or abrasive influences.
- frequency of temperature-change of app. 3°C – 6°C per minute
- usual flow rates, depending on the kind of medium and the range of application of the valve.
- operation without additional outer influences like pipeline-forces, vibrations, wind load stressing, earthquake, corrosive environment, fire, operation load stressing, disintegration pressure of unstable fluorides, etc.

If the purchaser expects stresses deviating from the normal operating conditions he has to indicate these requirements unambiguously and completely in the enquiry as well as in the order. This would allow us, as the valve manufacturer, to work out corresponding measures and to suggest them to the customer. These measures could be for example:

- special choose of the body material.
- higher wall-thickness.
- protection of areas which are endangered by wear.
- special gaskets and bolt connections.
- special operation instructions depending on the medium and the kind of operation.
- special coatings
- additional equipment to avoid excessive overpressure.
- special design for control operation,
- etc.

During planning and installation of the pipeline the customer should take measures which minimize additional dangers and pressures on the valves, on the piping system and on the environment, for example by:

- installation of vibration dampers
- consideration of a security final position in case of breakdown of energy
- taking measures to ensure the safe drainage of dangerous media in case of leakage,
- etc.

The guidance for installation, operation and maintenance of ROFI® Valves contained in this manual, is intended for use with our standard products. It may also be used with special valves provided the special additional instructions are observed. These are available on request. These instructions should ensure trouble-free fitting and safe operation of our valves, and form also the basis for any guarantee claims that might arise.

### **Attention !**



**In terms of their hazard potential, valves and associated fittings should be treated on a par with pressure vessels. Their design, installation and maintenance should therefore be based not just on these instructions but also on the relevant Accident Prevention Regulations, Codes of Practice and specialist literature. The handling and use of valves and fittings should only be entrusted to properly trained personnel.**

## **2. General Information**

The design of the valve depends upon the use and is beneath the responsibility of the buyer. With the application for mediums and temperatures which differ from the type description, it has to be consulted with the manufacturer or the distributor respectively. The operating instruction is made for valves - gate valves, globe valves, ball valves, swing check valves, strainers. It refers to valid standards and rules and regulates order, fitting and operation. The instructions cannot replace qualified personnel. Technical changes at the valves as well as changes of this description are in the responsibility of the manufacturer.

All valves are provided according to DIN EN 19 with sprinkled or rather stamped signs for the nominal pressure (PN), nominal diameter (DN), construction materials, manufacturer's mark, and as far as necessary with a directional marker. Before leaving the factory they are tested according to DIN 3230 (or corresponding special agreements) with 1,5 fold nominal pressure for safety and tightness of the body by internal pressure test. The seal is tested in any case, if nothing else has been agreed, with 1-fold nominal pressure.

## 2.1. Marking

Additional to the marking according to EN 19, the nameplate on the product is containing the following information:

- Name of manufacturer
- Type
- Epsilon in hexagon
- II 2G c X T <sup>2)</sup>
- CE-Mark

<sup>2)</sup> The highest surface temperature of the valve is given by the fluid and by the existing ambient temperature and has to be defined by the end-user.

Letter X:

The end-user has to mention the highest surface temperature of the unit in relation to the highest temperature of the fluid clearly on the valve's nameplate.

By marking the product with the CE-mark we declare the conformity with the European Pressure Equipment Directive 97/23/EG.

By marking these products of group II - belonging to the product-category 2G referring to chapter II article 8 according to Directive 94/9/EG - with the EX mark, we declare the conformity with the ATEX Directive 94/9 EG for the use in hazardous areas.

## 2.2. Notes on possible dangers

### 2.2.1. Significance symbols and explanatory notes on safety information

In these Operating and Installation Instructions dangers, risks and items of safety information are highlighted to attract special attention. Information marked with the above symbol and **“ATTENTION!”** describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance. All other information not specifically emphasised such as transport, installation, operating and maintenance instructions as well as technical data (in the operating instructions, product documentation and on the device itself) must also be complied with to the fullest extent in order to avoid faults which in turn can cause serious injury to persons or damage to property.



Warning of general danger

### 2.2.2. Qualified Personnel

Are persons who are familiar with installation, assembly, start-up and operation of the product and have the qualifications corresponding to their responsibilities.

### 2.2.3. Notes to safe use as directed

The valves are mainly used to shut-off, to control, to prevent back-flow and to filter diverse fluids in piping systems and are only allowed to use in-between the frame of their technical data.

Swing Check Valves and Check Valves can only be used with fluids which doesn't cause any explosive mixture or atmosphere in the interior.

### **Attention !**



- **Refer to the data sheet for applications, limits on use and possibilities.**
- **Certain media require or preclude the use of special materials.**
- **The valves are designed for standard operating conditions. If conditions exceed these requirements, e.g. aggressive or abrasive media, the operator should state the higher requirements when ordering.**

### 2.2.4. Notes to safe operation

According to Category 2, ROFI® Valves can be used in hazardous areas of zone 1 or 2. These are areas where an explosive atmosphere of gases, steams and fogs occur from time to time

### 2.2.5. Notes to dangerous operation

Electrostatic insulating fluids can cause different charges in the fluid when flowing through the valve.

### 3. Notes to safe transport and storage

#### 3.1. Transport

When loading or unloading ensure that the valves are not thrown or subjected to sudden knocks. Large valves should be handled with hemp or synthetic ropes slung to the yoke arms or the bonnet flange. Valves with actuators should be slung using a three-point suspension at the main connection nozzle and the yoke arms or yoke head (note centre of gravity). Special eyebolts must be used when supplied with heavy valves.

To avoid damages at the sealing areas during transport and storage the valves are supplied in closed position – except of Ball Valves and Swing Check Valves. Locking caps defend the flange openings from pollution. The valves may not be damaged upon transport and storage. For this reason they are coated against corrosion with a primer coat. For further protection the valve has to be adapted in the plant according to the operating conditions.

#### 3.2. Storage

On site the valves must be stored so as to be protected against mechanical damage and/or corrosion. The preferable storage condition is in closed rooms with ambient temperature. Flanges or weld ends can be sealed using plugs, lids, plastic caps or oil paper. Internal surfaces can be treated with preservatives or moisture absorbers. The protective packaging we provide must be left intact during storage and removed prior to installation or operation respectively.

### 4. Details on safe installation

During installation and operating, the corresponding valve manuals have to be taken into consideration.

An electro-static conductive connection from the valve to the earthing-potential must be given.

During installation of electrical valves, EN 60079-14 has to be taken into consideration.

Special requirements of the type testing certificates for the installed valves, e.g. electric actuators have to be taken into consideration.

The valve-actuators has to be conform to the European Directive 94/9/EG (ATEX).

In explosive areas, the electrical equipment installed must be in accordance with the corresponding category (2 / 3) – EN 50014.

The installation of the electrical device must be in accordance with DIN VDE 0100 and EN 60079.

#### 4.1. Planning and installation

The designer, contractor and/or end user are basically responsible for positioning, installing and operating the valves in the piping system. Here are some notes for guidance:

##### **Attention !**



**Planning and installation errors can affect the proper operation of valves and may even constitute a major hazard potential (e.g. incorrect positioning of check valves, wrong direction of flow in gate valves with relief port, etc.)**

A number of possible causes of damage are described below in chapter 7, but the list does not require to be complete due to the great many possible planning, installation and maintenance errors. If in doubt, ask us. Permitted operating limits for valves are shown in the relevant pressure-temperature tables.

Before fitting the transport securing and locking caps at the flange openings have to be removed and the valves have to be cleaned - especially the sealing areas. Upon mounting it has to be paid attention to the fact that all sealings are centred at the joining flanges. The pipe relaying is to be done in such a way that harmful thrusts and bending stresses will be kept away from the body. While coating the plant, gland bolt nuts and stems are not allowed to be painted. If construction work is still done near or above the valve, this is to be covered from dust, sand, or part of building materials (e.g. with a plastic wrap).

**Gate valves, Ball valves and Globe valves** are fitted with vertical stem, because thereby the abrasion appearing with movement and due to possible bending of stem (by the weight of wedge, sealing discs, plugs, or the flow power) is reduced or the possibility of seizing is largely diminished. The fitting of globe valves is done with entering of the through flow medium under the plug, only with globe valves with pressure relief plug the entry has to be done over the plug (see marker). With gate valves it is irrelevant in which direction the through flow is done.

**Check valves** in straightway form can only be fitted in horizontal pipelines.

**Swing check valves** and swing check valves with lever and weight can be fitted in horizontal or vertical pipelines (medium from below).

**Strainers** must be fitted that way that the screen shows down. Upon fitting the flow direction has to be considered (directional marker).



#### 4.1.1. Installing position

#### 4.1.2. Spindle operated Valves

All spindle-operated valves are designed to "shut" when the hand-wheel is turned clockwise and "open" when the hand-wheel is turned counter-clockwise. When the valve is fitted into a horizontal pipe-spool it should be positioned with the spindle vertical or the bonnet flange horizontal so far as possible. When spindle-operated valves (globe valves, gate valves etc.) are fitted with their spindle on the skew or pointing vertically down, dirt particles can be collected inside the body where the spindle passes through to the packing gland. These particles can cause damage to the spindle, back seal or gland packing and this type of position should therefore be avoided wherever possible. Bellows sealed valves should be fitted vertically if possible. Any other position can cause deposits in the folds of the bellows, and hence premature wear.

#### 4.1.3. Non-return Valves

Non-return valves can be fitted in pipe systems horizontally, vertically or at an oblique angle. For vertical or oblique fitting the valve will only operate properly when the direction of flow is from bottom to top. For horizontal or oblique positions the bonnet flange must be in a horizontal position in relation to the pipe direction. In case of check valves with lever and weight or spring to close or damping device which are fitted in a non horizontal piping it should be assured by reconstruction that the closing or damping device action is not disturbed. Swing check valves with outside control mechanism, equipped with hinge and counterweight, shock absorber or spring should be positioned in such way that the shut-off functions of these extra devices are always secured.

#### 4.1.4. Strainers

Before installing a strainer take into consideration about grade of filtering. Leave sufficient space to remove the screen basket during installation in pipelines. Make sure that the trap is installed to suit the direction of flow. The screen basket should never be at top, otherwise dirt will fall back into pipe. If water hammer is possible due to condensation in steam lines, never install the trap with the screen basket at the bottom, but install it in a horizontal way.

### 4.2. Differential pressures

As a rule globe valves are installed such that the shut-off pressure is under the disc. When using our standard globe valves up to PN 160, ensure that the maximum allowable shut-off differential pressure (pressure under the disc) corresponds to DIN 3356 Part 3. For greater shut-off differential pressures these valves must be fitted with pre-lift disc and installed such that the pressure is above the disc. Opening of the pre-lift disc pressurizes the connected system. Once the pressure is balanced, the valve's main shut-off disc can be opened. In order to avoid undesirable pressure surges when opening large valves with high differential pressures, or to warm up gradually the connected pipelines, suitable bypasses opened before the main valve should be provided.

### 4.3. Temperature changes

To prevent damage and leakage due to rapid heating, the valves should be provided with properly designed bypasses or drains that open at the right time. The usual temperature rise rates in power station duties for example are of the order of 3-6 degrees C per minute. If more rapid warming rates are anticipated, we should be consulted regarding the appropriate measures to be taken. Frequent operation through broad temperature ranges at high rates of temperature change can lead to premature fatigue (relaxation) of the bonnet flange bolts among other components. If in doubt, ask our advice.

### 4.4. Additional instructions for installation

As a general rule the direction of flow is marked by arrows in accordance with DIN EN 19. In case of doubt, refer to the relevant sectional drawings. Always allow for adequate access clearance in the planning and installation phase for easy assembly and disassembly of internal valve parts. Valves should never be taken as fixed reference points within pipe systems, and substantial pipe loadings on valves should therefore be avoided. Exceptions to this rule are subject to our specific approval for each individual case. It has to be on a case-by-case basis because the forces resulting, for example, from shear, bending and torsional stresses as well as temperature gradients vary according to duty and installation, and occur in a variety of combinations. We are therefore not able to make any generalizations. Before fitting the valve in position, remove the flange- or butt weld end protectors and moisture absorbers, if provided. The valve must be free from foreign matter of any nature. Cleanliness is the cardinal rule when fitting valves. If the pipe ends require machining, chips and other foreign matter must be carefully removed. The pipe ends must be properly aligned so as to prevent the valve being subjected to unnecessary strain. Bricklaying or painting should not be carried out in the vicinity of installed valves until stuffing boxes, spindles and valve position indicators (if fitted) have been properly protected against soiling. Valves are despatched from our works with a high shut-seal property. This is a quality feature that can only be maintained if care is taken during installation and subsequent operation to prevent the ingress of foreign matter into the valve and hence damage to seats and other areas.

#### 4.4.1. Flanged Valves

The sealing faces of flanged valves must be clean and in good condition. Before bolting-down, flanges must be correctly aligned. When bolting-down, all flange boreholes must be used at all times. For initial fitting, threads can be smeared with graphite or molybdenum-di-sulphide to stop seizure - do not use oils or greases. Never use damaged parts such as bolts, nuts or washers. Make sure that materials are suitable and correct for the job. Tighten bolts evenly and in cross-sequence using the correct tools to the correct torques (see chapter 5.1).

#### 4.4.2. Valve with butt-weld or socket-weld ends

The piping contractor is responsible for welding the valves into the pipeline and any necessary heat treatment. Gate and Globe valves should be lightly closed to prevent damage to the seating surfaces and stem caused by thermal expansion during the socket welding process. Never attach the welding cable (opposite pole) to the bonnet, spindle or any other places on the valve assembly! This could cause spots of arcing on the spindle or seat faces. The weld cable should be attached to a bright area on the valve body or, even better, to the pipe itself. For valves with socket weld ends, the socket depth of the pipe ends should be selected in accordance with codes of practice, and unacceptable weld-seam stresses prevented by leaving a gap between pipe end and socket seat.

**Weld the connection as follows:**

- 1) Remove all grease, oil or paint from the pipe that is to be welded into the valve and from the valve end connections.
- 2) Insert the pipe into the valve end connection until it bottoms out in the socket weld bore.
- 3) Withdraw the pipe 1/16" so that a gap remains between the pipe and the bottom of the socket weld bore to prevent cracks (ASME B16.11). Tack the pipe into the valve and complete the fillet weld.

**NOTES:**

**A minimum of two layers should be used for all socket welds. This will decrease the chance of leaking even if one pass contains a weld defect.**

- Where possible, welding should be done in the flat or horizontal position. Where vertical welding is necessary, progression should be upward (vertical down welding is prone lack-of-fusion).

**4.4.3. Gear operated and actuated Valves**

These valves must be fitted with their spindles vertical, otherwise the drive must be additionally supported in such a way that it is able to follow any changes in position of the valve during operation (caused by the piping system). If no extra support or suspension is desired, this must have our specific approval for the case in question. The direction of rotation: clockwise = shut; counter clockwise = open, also applies for back gear hand wheels and the manual emergency operation of electric actuators. The specific torques of electric actuators normally are set in the factory. The closing of ROFI<sup>®</sup> valves is controlled by torque switches, eventually additionally secured by limit switches. Opening of the valve is generally controlled by limit switches only. Wiring diagrams for the actuators are present in their connection boxes. The guidelines of the actuator manufacturer always have to be respected. In case of gate valves with pressure sealed bonnets an end stop installed on the stem will prevent the wedging of the discs in case of a too high closing torque of the actuator. The shut-off action of the electric actuator in the closing direction is controlled by travel limitation; - the torque switch gives additional security.

**4.4.4. Insulation**

If valves are insulated, care must be taken to ensure that the stuffing box area and pressure relief devices remains accessible for checks during operation.

**4.4.5. External moving parts**

Valves with external moving parts e.g. swing check valves with lever and counterweight, always have to be secured by means of protective caps.

**5. Valve operation**

**5.1. Bolt torques, shutting and opening torques**

If required, we will give advice on the bolt tightening torques as well as the opening and closing forces of valves depending on type and duty (pressure-temperature).

**5.2. Cleaning (Pickling)**

Owing to the wide variety of pickling processes it is not possible to make any generalization on this point. Suffice it to say that the process must be selected in accordance with the materials to be pickled. The pickling contractor will be responsible for the pickling medium and process. The valve should be fully

opened during pickling to prevent the pickling medium penetrating the packing area. Flushing should be done with the valve half-shut to facilitate thorough flushing of the internal surfaces.

### 5.3. Venting

In accordance with the relevant Accident Prevention Regulations (UVV) valves and fittings should be vented by means of specially fitted vent pipes or stuffing box connections. Venting by slackening off the bonnet flange or the stuffing box gland is not permitted and can cause danger. If vents are required as non standard extra, we recommend that these be fitted in our works.

### 5.4. Heating and cooling rates

To avoid damaging the valve body material or flange connections the normal plant-related heating and cooling rates must be observed. If in doubt, consult us (see chapter 4.3)

### 5.5. Additional operating rules

Manual shut-off valves are right-hand or clockwise shutting. Back gears and remote drives are designed to retain this direction of rotation. Because valves are frequently subjected to high temperatures and develop surface and radiated heat as a result, protective clothing (especially gloves) should be worn. This is also recommended when operating valves where leaks can allow hazardous media (e.g. steam, acids) to escape. Hand wheels of electric actuators are for emergency operation only; they are disengaged during normal operations and can be engaged when required.

### **Attention !**



**Valves with hand wheel must only ever be manually operated. The use of bars or pipes to increase leverage can damage the unit and cause an accident through slippage or failure, and is not permitted.**

Where bypasses or drain valves are fitted to prevent temperature shocks to piping downstream or for other reasons, these secondary fittings must be operated before the main valve. For setting, maintenance and operation of actuators, refer to the manufacturer's instruction manual.

### 5.6. Function testing

After installation, the valve must be function tested prior to initial operation. The valve, whether manually operated or driven, should be opened and shut at least once.

### 5.7. Checking during and after first operation

During operation the tightness of the stuffing box and bonnet flange as well as the pipe connection flanges must be monitored. If necessary bolts should be further tightened (see points 3.7 and 4.1). Left unattended, leaks can cause erosion of the seal faces and seals and hence lead to permanent leakage. Seal tightness should be checked after a while since seals and bolts etc. are apt to settle during initial operation, especially at high temperatures.

### **Attention !**



**Bolted connections must never be slackened on valves under pressure and only tightened in case of emergency (e.g. leakage) in accordance with Accident Preventions Regulations (UVV), permitted torque and under expert supervision using the proper tools.**

Spring loaded stuffing boxes must also be checked for tightness during operation, and tightened as necessary (see point 4.1). It should be noted that the stuffing box must seal without a major increase of friction at the spindle. We recommend that regular checks be carried out during operation.

## **6. Maintenance**

Because of their hazard potential valves are comparable with other pressure vessels and as such are governed by the relevant Accident Prevention Regulations (UVV). Before undertaking maintenance and assembly work, make sure that the valve is not under pressure or temperature and that the system before and after the valve is completely blocked off. Valves must be regularly serviced to ensure trouble free operation. Typical maintenance points include checking glands, lubricating spindles, function checks. At less frequent intervals valves should be closely inspected for wear and shut down to change lubricants and gland packing. It is not feasible to recommend specific intervals owing to the wide variety of unknown factors involved, such as the position of the valve within the plant configuration, the medium, operating cycle, temperature change loadings and so forth. The user should call upon his experience as plant operator to specify inspection and maintenance intervals.

### **6.1. Gland packing, Bonnet-flange-seals and Replacement**

The gland seals the gap between body and spindles against loss of medium. The packing materials are selected to suit the particular requirements - as far as known to us -and long life can normally be anticipated. If packing does require replacement however, proceed as follows: The packing cavity must be opened in accordance with the Accident Prevention Regulations (UVV) with the valve at ambient temperature and not under pressure. The old packing must be removed completely before the new one is fitted. The empty cavity and gland contact faces must be thoroughly cleaned. Ensure that the turndown bolts on the gland ring are eased. If using slotted packing rings, the ring gaps must be offset by 120-180 degrees to one another. Once repacking is complete, operate the valve several times and if necessary the gland bolts further tightened down (see point 4.1). The gland must be checked for tightness during operation. If required it should be re-tightened since a leaking packing can be quickly destroyed by erosion.

### **Attention !**



**It is not allowed to repack a valve when the valve is under pressure. Even when the valve has a backseat device. Since the sealing effect of this back seat can be greatly reduced after a short time of operation through dirt, wear or corrosion, however with an attendant hazard for fitters when slacking off the gland screws.**



## 6.2. Recommended lubricants

We recommend standard lubricants to DIN 51825. Never use mineral oils as lubricants. In cases where stem nuts are equipped with ball- or needle bearings the use of lubricants containing solids (graphite, copper etc..) is not allowed. The solid particles can damage the bearings. For lubrication of actuators, we refer to the manufacturer's instructions.

## 6.3. Lubricant of spindle thread

The frequency of spindle lubrication will depend on the valve operation cycle, its ambient conditions (pollution, temperature) and the influence of the valve heat on the grease point. The spindle thread should first be cleaned if heavily soiled, and the gland area protected accordingly. For hand operated valves, the spindle thread should be brush-greased beneath the yoke head (valve shut) and above the hand wheel (valve open). For valves with back gear or electric actuator, the foregoing lubrication is carried out through the hollow shaft of the actuator. After spindle lubrication, manual and electric operated valves should be operated a number of times, and lubrication repeated if necessary. It is for the valve operator to specify the intervals for lubrication of the spindle thread and of the thread bushing (depending on the operating conditions of the valve).

## 7. Troubleshooting table

Fault	Possible cause	Corrective measures
No flow	Flange covers have not been removed	Remove flange covers
Flow too low	Piping clogged	Check piping system
Flange broken between unit and piping	Bolts tighten unevenly Mating flanges not properly aligned	 Re-align piping and fit new valve. <b>Relief the pressure in the system first !</b>
Leaks across the gate	Solid particles in the medium  Deformation of the seat faces due to excessive tightening of the valve or due to thermal stress  Erosion or corrosion caused for instance by incorrect selection of valve size or material	 Re-grind seats, use spare parts <b>only by qualified personnel !</b>
Leaks through Bonnet and Flange	Extreme temperature fluctuation or vibration  Excessive pressure stresses on the Bonnet Flange bolting  Inadequate maintenance  External influences  Failure of seal as result of insufficient resistance to temperature or medium	Re-tightening of connection bolts  Replacement of the seal
Leaks through gland	Inadequate maintenance  Wear of packing material  Failure of gland caused by the use of a packing material without sufficient resistance to temperature of the medium.	Retighten, repack or replace packing
Failure of actuators	Please see and check the manual of the manufacturer	For causes of trouble and remedial action, refer to the manual supplied by the actuator manufacturer. We strongly recommend that limit switches or torque limiters are reset by properly skilled personnel only.

## 8. Spare parts

With their sturdy construction and use of high-quality materials, ROFI® Valves have a long service life. Nevertheless certain components can wear or fail because of:

- extremely frequent operation,
- excessive vibration in the piping system,
- excessive external stress on the valve, or
- inadequate maintenance.

Spare parts for components which the Client is able to fit himself using standard tooling are available from ROFI S.A.R.L.. For storage and fitting we recommend close attention to the catalogue documents and drawings. In terms of storage, it must be remembered that soft seals, certain plastics and lubricants can deteriorate over long storage periods and will not function as required. For best results, store these products in dry rooms at a temperature of approx. 20°C to achieve a storage life of 4 to 5 years. When ordering spare parts, you should specify:

Type of valve, diameter nominal, pressure rating, material, drawing number and- where possible - the Purchase Order Number under which the valve was first supplied.

## 9. Guarantee / Warranty

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of ROFI® S.A.R.L." valid at the time of delivery or, by way of departure, in the contract of sale itself. We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application. No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, datasheets and relevant regulations. This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements. Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us. No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded. The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear. Any damage incurred during transport should not be reported to us but rather to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.