OMAL® AUTOMATION

EMPOWERED PERFORMANCE

INSTRUCTION MANUAL

BUTTERFLY VALVES
ITEM 375 - 376 -377 , 385 - 386 - 387

OMAL S.p.A. Società Benefit
Headquarters: Via Ponte Nuovo, 11 - 25050 Rodengo Saiano (BS) Italy · Production Site: Via Brognolo, 12 - 25050 Passirano (BS) Italy
Ph. +39 030 8900145 · Fax +39 030 8900423 · info@omal.it · www.omal.com

INDEX:

		Pag.
1.	**GENERAL FEATURES**	3
2.	**WORKING CONDISTIONS**	3
3.	**OPERATING INFORMATION**	4
4.	**SAFETY INFORMATION**	5
5.	**INSTALLATION INSTRUCTION**	6
6.	**MATERIALIAL AND THEIR DURABILITY**	7
7.	**MAINTENANCE**	7
8.	**SPECIAL VERSIONS**	9
9.	**STORAGE**	9
10.	**TROUBLE SHOOTING**	10
11.	**DISPOSAL OF PRODUCTS AT THE END OF LIFE**	11
12.	**DECLARATION CONFORMITY**	11

Environmentally friendly: under the green leaf icon you can find the instructions for a correct and environmentally friendly handling of the product.

All data and features in this manual may be changed at any time and with no notice for the implementation of technical improvements. Therefore they can not be considered as binding for the delivery.

FOREWORD

The present User's Installation and Maintenance Manual has been edited in conformity with:
-2014/68/EU Directive "Pressure equipment" PED
-2006/42/EC Directive "Machinery" MD
-2014/34/EU Directive "Equipment and protection systems designated to be used in potentially explosive atmospheres" ATEX

The following standards/technical specifications also apply:
-UNI CEN/TS 764-6 Pressure equipment Part 6: Operating instructions structure and contents.
It's up to the reader to find his own product, and the correct operating conditions, possibly referring to the attached drawings.
Below you will find the safety instructions, the minimum information for storage / warehousing, the installation, the commissioning, the maintenance and the instructions for disposal of products at the end of their life.

The company disclaims any liability for damage caused by improper use, even if partial, in respect to the information contained in this manual.

Goods of not European Origin

1. GENERAL FEATURES

OMAL butterfly valves, available in wafer or lug version from DN 40 to DN 600 (lug DN 300), are designed and manufactured to be used in most applications in all industrial fields.

- General requirements in accordance with UNI EN593
- Face to face as per EN 558 series 20
- Tightness at 16 bar or 10 bar according to **EN 12266-1 rate A**
- Integral sealing (with liner vulcanized on hard ring) which avoids any contact between fluid and valve body.
- Sealing design allowing perfect adherence to the valve body and perfect tightness to the flanges, without additional parts.
- Clamping between flanges does not influence the torque of the valve.
- Lapped disc edges that allows better tightness, reduced torque and low wear of the liner.
- Bushes to support the shaft.
- Coupling between stem and disc with two shafts (better Kv) carried out with no additional fittings (e.g. screws, bolts, pins, etc.) to avoid any risk of corrosion and breaking.
- Valve neck with top work as per EN ISO 5211 for easy connections with all different types of actuators.
- All components properly treated against corrosion.

2. WORKING CONDITIONS

2.1 Fluids

Valves are designed and tested to be used with all fluids belonging to Group 1, as per PED/PER Regulations either liquid or gaseous. The operator or the Engineering company in charge of the project will be responsible for the selection of the valve materials chemically and physically compatible with the intercepted fluid. To the best of their abilities OMAL technical staff will be pleased to help customers select the best product for a specific application. However the operator or the Engineering company will be responsible for the final selection.

2.2 Working pressure

The Omal butterfly valves are designed for a continuous use at: PN 16 bar from DN 40 to DN 300, PN 10 bar from DN 350 to DN 600. The Maximum Working pressure must be equal to PN valve.

2.3 Working temperature

The butterfly valves type 375 - 376 - 377 - 385 - 386 - 387 series (A 536 spheroidal cast iron body) are designed and tested for a continuous use keeping the PN value unchanged throughout the whole range of temperatures. Below the maximum and minimum working temperatures for seal material:
NBR: - 23°C + 82°C
EPDM: - 25°C + 135°C
FKM: - 10°C + 190°C

WARNING
Elastomer working temperatures are to be considered as approximate temperatures with inert fluids. A slight chemical sensitivity of the elastomers to the intercepted fluids can dramatically reduce the working temperature range.

2.4 Lubrication

The butterfly valves are factory lubricated for the standard working condition life. During maintenance and reassembling, check that the lubricant to be used is suitable for contact with the seal material, with the fluid intercepted and with the operating conditions.

2.5 External protection

OMAL butterfly valves are suitable for indoor and outdoor installation. The cast-iron body is external protected from corrosion by 160÷200 microns of epoxy painting. The shaft and the disc are in stainless steel or protected by the corrosion
This normally allows to satisfy applications where a protection class C3 is required according to ISO 12944-6

2.6 Marking and classification

The following information are marked on the butterfly valves body and / or with an additional label:
• Manufacturer's brand and name
• Nominal Size
• Nominal pressure
• Heat number

• Address of the manufacturer
• Model / Product Code
• Min./max. Temperature
• Production date
• Materials (body, disc and seal)
• marking according to PED/PER Regulations

3. OPERATING INFORMATION

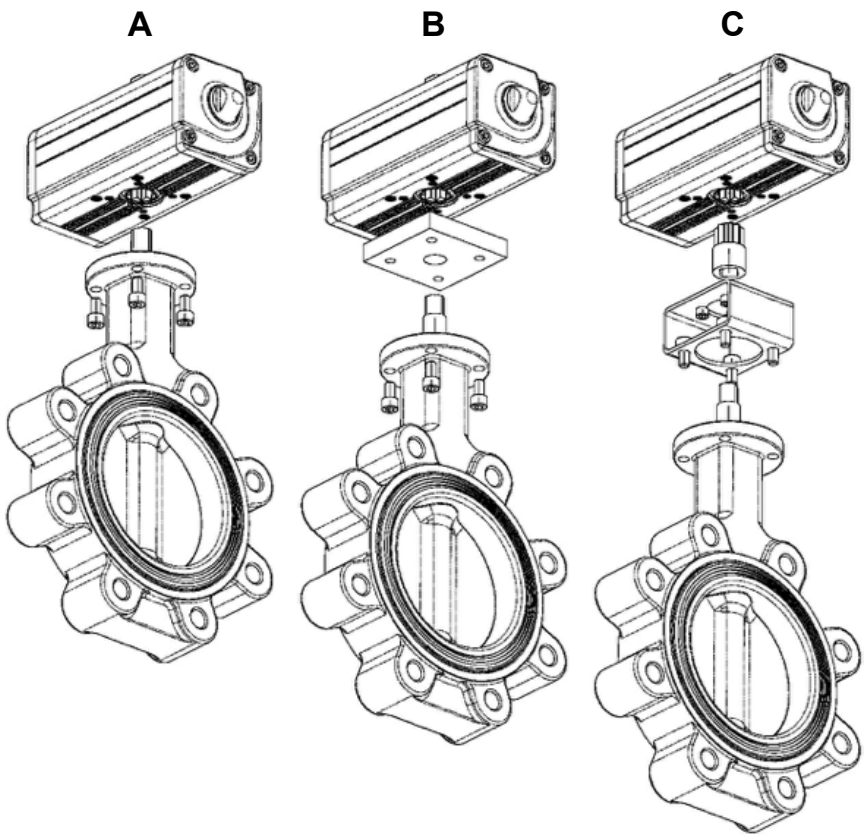
The butterfly valves can be supplied bare shaft, provided with a lever for manual operation or equipped with an electric or pneumatic actuator.

3.1 Handle-operated

If a valve is provided with a handle, the handle will have to be assembled in such a way that, viewed from above, it will have to be turned clockwise to close the valve and counterclockwise to open it. With a closed valve, the handle needs to be in its normal position with respect to the pipeline while with an open valve it needs to be parallel to the pipeline. The handle needs to be stopped (and even locked) in ten different positions angularly equidistant from one another all along the valve stroke.

3.2 Automated valve

The automated valves can be used in a lot of applications where it is necessary also to guarantee full control, efficiency and duration in service. The connection between valve and actuator can be of three types:
A) DIRECT MOUNTING
B) MOUNTING PLATE CONNECTION
C) BRACKET & JOINT CONNECTION



A) DIRECT MOUNTING
Valve actuator direct mounting is the best solution to avoid plays between valve stem and actuator drive shaft. For a direct mounting you should have the same standard flange connection on valve and actuator as well as the valve stem dimensions that fit perfectly with the actuator drive. Before installation please verify that the actuator and valve flange ISO connections are the same size; verify that the valve stem size and shape is suitable for direct mounting, if necessary use a drive reduction. Fit the valve stem into the actuator drive shaft connection, and bolt together the two ISO flanges.

B) MOUNTING PLATE CONNECTION
In case direct mounting is not possible cause of little differences in actuator/valve flanges or drives sizes, mounting plates adapters with suitable flanges dimensions allows an easy connection living a sufficient space for the valve/actuator drive adapter.

C) BRACKET & JOINT CONNECTION
Wherever for technical reason the plant installation requires a distance between actuator and valve, or the valve flange and/or stem are not standard, and in any case, where the valve/actuator connection could not be possible, a bracket and joint is the right answer. The Bracket is a steel bridge that allows to connect the valve with is own flange connection in one side and with the suitable actuator connection into the opposite side, living a space in between for a steel joint connection.

The joint allows a drive connection between the actuator and the valve stem indispensable in case of stem key drive and flat head. Chose the suitable flange bracket and the required joint connections to fix the actuator onto the valve very tight without any plays. OMAL actuator with its draining channels system on the flange connection pattern is especially designed for valve direct mounting. This system allows to drop away any possible flow coming from the valve stem that with valve/actuator direct mounting could damage the actuator.

Coppia di serraggio delle viti

SIZE	TORQUE Nm
M5	5-6
M6	10-11
M8	20-23
M10	45-50
M12	80-85

3.2.1 Cycle time
The cycle time depends on the operating device put on the valve. Please read the instructions about the installed actuator. The interface between valve and actuator complies with ISO 5211

3.2.2 Valve stroke:
The design of the valve (centric actuation) ensures that it is sealed a few degrees before complete closure, depending on the nominal diameter. Actuated valves are not adjusted during installation. To limit the actuator closure to 87°- 88°, an angle that ensures valve sealing at nominal pressures, please refer to the specific documentation available on the website: www.omal.it.
Further increasing the stroke up to 90° will reduce wear on the gaskets and significantly increase product life.

4. SAFETY INFORMATION

- When you receive a product, make sure it is in perfect conditions. Do not install a product which comes in a damaged box especially if it shows signs of damage.

- While the valve is being installed, make sure that the pipeline and the working environment are perfectly clean. The presence of dirt and particles can seriously affect the tightness of the valve. If you use a sealing product, either tape or paste, make sure that it will not end up in the valve body or in the sealing areas.

- If an aggressive or dangerous fluid flows through the valve, make sure the material the valve is made of is compatible with the fluid. If you have any doubt, please contact OMAL technical staff who will carefully evaluate the chemical compatibility of the fluid with the valve.

- A valve is a safe product provided that it is properly installed between flanges on a plant. If you want to test a valve at the bench, especially a pneumatically operated one, make sure there are protections enough to prevent objects and parts of your body to get caught between the butterfly and the valve body. **Please remember that a valve closes in less than a second and with**

enough energy to damage itself and a careless operator.

- Before installing a valve, make sure that the operating temperature and pressure are compatible with the parameters stated by the manufacturer.
- If a valve is used as an END OF LINE valve, please remember that it has not been tested for that specific function. For an END OF LINE application, please note that the valve PN corresponds to 60% of the PN stated for an installation in a pipeline.

- Never try to disassemble a valve or any of its parts when there is fluid in the pipeline regardless of the pressure

- Never remove the valve shafts when there is pressure in the pipeline as the butterfly could be swallowed by the fluid under pressure in the pipeline

5. INSTALLATION

While carrying out the risk assessment for this kind of product as per **PED/PER Regulations** it was impossible to fully evaluate the risks related to traffic, wind, earthquakes etc as every evaluation was strictly related to the type of application and installation.

The owner of the plant will have to carry out this evaluation, where necessary, along with the risk assesment for the plant itself.

OMAL butterfly valves are very easy to install and if you follow some basic installation procedures, the product will perform at its best.

- never try to force a valve between flanges which are not open enough to allow the insertion of the valve as you might seriously damage the sealing areas on the flanges (fig. 1)

- while you insert the valve between the flanges and you subsequently block them, the disc must be kept in an half-open position without exceeding the valve edges (fig. 2)

- support the butterfly by means of two tie-rods which, going through the holes on the flanges and the slots on the valve body, will allow a first generic centering between the flanges. Slightly close the 4 tie-rods (opposite to one another) until the valve is slightly fixed and then center the valve body carefully with respect to the pipeline flanges (a mistake of +- 1mm on a DN 50 and proportionally of +-5mm on a DN 300 is more than acceptable).
Close the 4 tie-rods until the valve is fully blocked, open the butterfly completely (fig 3) and then insert and close all other bolts required by the flanges.

The valve is not particularly sensitive to the torque generated by closing the bolts on the flanges. Please apply the torque stated in the relevant standard also considering the material of bolting.

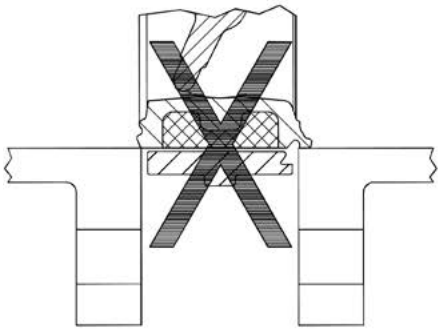


fig. 1

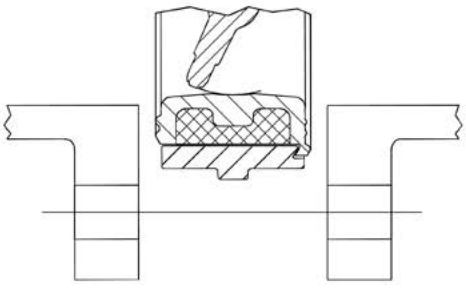


fig. 2

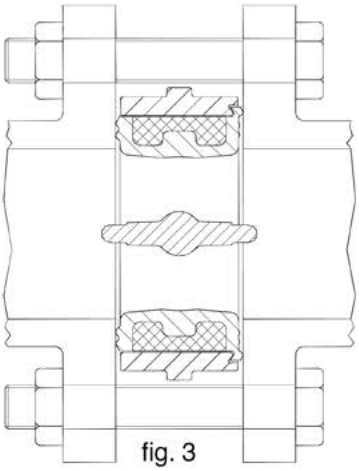


fig. 3

6. MATERIALS AND THEIR DURABILITY

To ensure the full reliability of the valve, it is recommended to carry out at least once a year, a check of the efficiency level of the plant, changing all the worn-out parts promptly where leakage or straining occur, both inside the pipeline and towards the outside of the valve. The life time of the consumable parts can be summarized as follows. Spare parts kits are available for valves maintenance.

DN	40-100	125-300	350-600
Num. of cycles	50.000	30.000	15.000

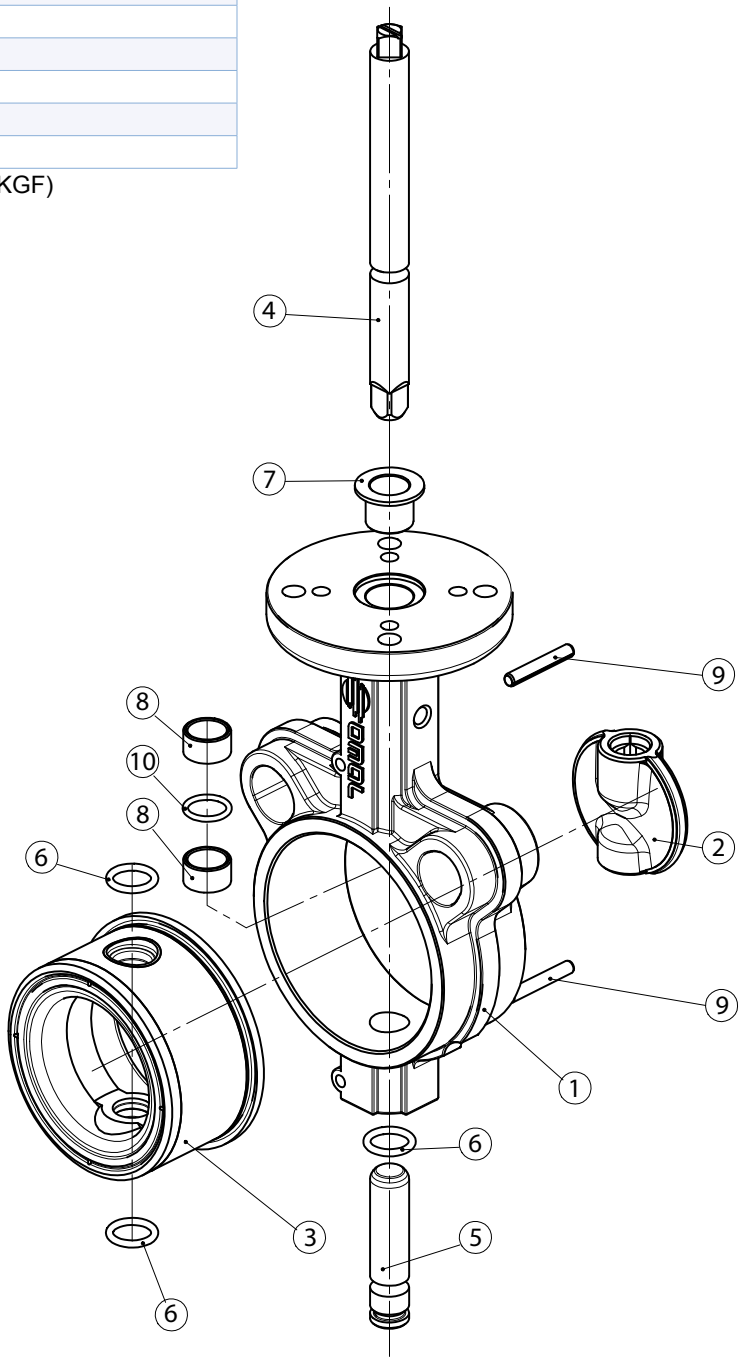
7. MAINTENANCE

The product maintenance must be done by trained and qualified people with proper tools, we recommend checking the correct replacement performing a tightness and functional tested on the valves.

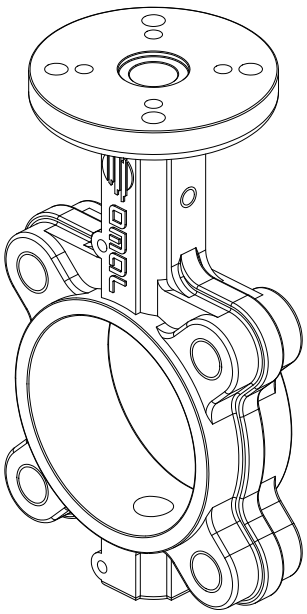
- Remove the spring pins with a punch (9) or the shaft retention flanges, in the case of measures of more than ND 300.
- Remove the upper (4) and lower (5) shafts. For measures of more than ND 300, the lower shaft is not prevalent and can be removed using an M16 bolt.
- Remove the disc (2). The operation is facilitated by rotating the disk 15° from the closed position.
- Remove the main seal (3) noting that in the flange are, it has two different diameters; obviously, it must be extracted by pushing on the smaller diameter. It is recommended to use a hydraulic press with thrust plate diameter of 15 mm more than the valve ND.
- Check that the o-rings (6), also came out with the main seal; if not, remove them from the valve body.
- Remove the upper bushing (7)
- The bushings (8) are not normally replaced during maintenance. Should it be necessary to remove them, contact our technical department for instructions.
- Place the o-rings (6) and (10) in their seats after thorough greasing.
- Insert the main seal (3) into the valve body, aligning the shaft holes as well as possible with the corresponding holes in the body.
- Insert the disc (2), aligning the shaft holes as well as possible with the corresponding holes in the seal. Keep the disc rotated at 15°.
- insert the upper bushing (7)
- Reposition the shafts in their relative seats, until the groove of the rod reaches the same level as the pin hole (up to ND 300 only). During insertion, there may be a slight resistance due to the slight misalignment of the components; use moderate force to insert the shafts; where necessary re-check the alignment of the components. Pay attention to the groove on the head of the upper shaft, which must be exactly in line with the butterfly valve position. Insert the pins or assemble the shaft holder flanges.
- Always run a valve seal test before recommissioning the system.

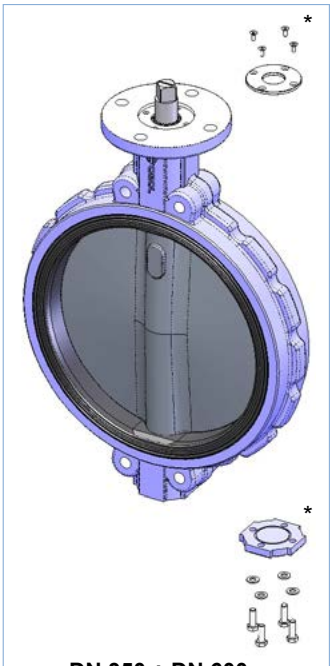
1	Body
2	Disc
3*	Liner
4	Upper shaft
5	Lower shaft
6*	Lower O-ring
7*	Upper bush
8*	Shaft bush
9*	Elastic pin
10*	Shaft O-ring

* Spare parts kit (KGF)



LUG BODY





DN 350 ÷ DN 600

OMAL S.p.A. Società Benefit
Headquarters: Via Ponte Nuovo, 11 - 25050 Rodengo Saiano (BS) Italy · Production Site: Via Brognolo, 12 - 25050 Passirano (BS) Italy
Ph. +39 030 8900145 · Fax +39 030 8900423 · info@omal.it · www.omal.com

WARNING
To make sure there is no pressure in the pipeline, before servicing a valve. If a dangerous or aggressive fluid flows through the pipeline, always wash the pipeline as suggested by the manufacturer. Always wear suitable protections while you open the connections between valve and pipeline.
As products change and evolve in time, please order and use original spare parts only (as per specific instructions accompanying each product). When you place an order, always mention the product code and the production date stamped on the valve and you will get the latest possible version of the spare part you need. If you have any doubt, please contact OMAL technical staff who will help you keep the product as efficient as possible.

8. SPECIAL VERSIONS

The butterfly valves, suitable for use in potentially explosive atmospheres in compliance with the requirements of Directive 2014/34 / EU, is available on request by applying an antistatic device which keeps the valve body, stem and disc in continuity and serves as a grounding point.
The butterfly valves in compliance with the Ex Regulations are suitable for being applied on equipments belonging to GROUP II Category 2, suitable for zones 1 & 2 GAS and 21 & 22 DUST.

9. STORAGE

Choose clean sites for storage, not excessively humid and with temperatures between –10 and +60°C. If the products are to be stored for long periods of time, it is best not to remove them from their protective packaging. Keep the valves in the package during storage.
If the valves are not packaged, must be protected the ends in order to avoid liquid or other to penetrate during storage and thus damage the disc or the seals.

If the valves are to be stored for long periods of time, then they should be inspected periodically: check in particular the possible presence of rust, oxidation, paint nicks or even partial unscrewing of the closures. It is also recommended to perform a complete dry cycle of opening and closing of the valve.
The seals are subject to aging and lose of their characteristics: for this reason, after storage periods of more than two years, it is recommended to check the functionality and the seals before mounting the valve in the line.
Protect the seals from sun light (UV rays cause seal aging).

10. TROUBLE SHOOTING

POTENTIAL EFFECTS OF FAILURE	POTENTIAL FAILURE MODE	SOLUTIONS
Valve leakage	Incomplete closing of the disc	Check the maneuvering system / Contact OMAL
	Liner worn	Replace worn parts as per instruction manual
	Chemical incompatibility with valve construction materials (gasket and / or lens)	Contact OMAL
	Disc worn	Check the chemical compatibility between the media and the construction materials / Contact OMAL
Leakage from Upper or Lower Shaft	Damage on the stem seat or disc liner	Replace worn parts as per instruction manual
		Check the chemical compatibility between the media and the construction materials / Contact OMAL
	Damage on body	Contact OMAL
Valve blocked	Driving system fault	Contact OMAL
	Disc / stem gripping	
	Stem break	
	Actuator- valve connection's break	
Increased maneuvering time / shooting motion	Disc / stem gripping	Contact OMAL
	Liner hardening	Check the chemical incompatibility with valve construction materials. /Contact OMAL
	Partial actuator gripping	Contact OMAL
Inadequate rotation angle	Actuator cannot perform the maneuver	Check actuator dimensioning and verify that actuator fluid pressure is equal to or greater than nominal pressure on plate
	Insufficient air supply to produce the required torque	
	Mechanical stop (if present) not properly adjusted	Adjust the stroke limiters
	Stem gripping	Contact OMAL
	Possible presence of blocked foreign body	Remove the valve and check its operation on the bench
	Incorrect flxing between actuator outlet hole and valve stem	Check for proper connecting kit between valve and actuator

11. DISPOSAL OF PRODUCTS AT THE END OF LIFE

The OMAL butterfly valves are designed so that when they are at the end of their life cycle they can be completely disassembled, separating the different materials for the proper disposal and/or recovery. All materials have been selected to ensure minimal environmental impact, health and safety of personnel during their installation and maintenance, provided that, during use, they are not contaminated by hazardous substances.
The personnel in charge of the product disposal/recovery, must be qualified and equipped with appropriate personal protective equipment (PPE), according to the product size and the type of service for which the device was intended. The management of waste generated during the installation, maintenance or due to the product disposal, is governed by the rules in force in the country where the product is installed, in any case, the following are general guidelines:
- The metal components (cast iron/steel…) can be restored as raw material;
- Seals/sealing elements (NBR, FKM, EPDM...), as contaminated by fluids from other materials and lubrication, must be disposed of.
- The packaging materials that come with the product, should be transferred to the differentiated collection system available in the country.

12. DECLARATION CONFORMITY

OMAL butterfly valves have been designed, manufactured and tested to meet the requirements of the following European standards and are marked, where provided, with the relative CE conformity marking:
- 2014/68/EU Directive “Pressure equipment” PED
- 2006/42/EC Directive “Machinery” MD
- 2014/34/EU Directive “Equipment and protective systems intended for use in potentially explosive atmospheres” ATEX
- Regulation (EC) No 1907/2006 and successive Concerning the Registration, Evaluation, Authorization and Restriction of Chemicals REACH

ADDENDUM TO THE USER'S MANUAL AND OPERATING INSTRUCTIONS FOR UK MARKET

UKCA REGULATIONS COMPLIANCE

The following UK standards are applied to the products for UK market:

U.K. Regulation S.I. 2016 No. 1107	The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016
U.K. Regulation S.I. 2019 No. 696 (Schedule 25)	Amendment of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016
U.K. Regulation 2016 No. 1105	Pressure Equipment (Safety) Regulation 2016 (as amended)
U.K. Regulation S.I. 2008 No. 1597	The Supply of Machinery (Safety) Regulations 2008 (as amended)*

*OMAL S.p.A. declares that the products are in CONFORMITY with the essential safety requirements of the of the above-mentioned Regulations, providing that declared performance and use/installation instructions are observed.