



Technical Support Sheet - Maintenance Manual

Özkan Double Flanged Butterfly Valve

Operation and maintenance manual.

TECHNICAL SUPPORT SHEET: VH6.2MM

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Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hygrade Water product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hygrade Water unless expressly stated in any sale and purchase agreement entered into between Hygrade Water and the user. July 2020

1. GENERAL INFORMATION

This manual must be carefully observed and applied at all times for secure and trouble-free operation of butterfly valves.

It is not allowed to make any modifications or alteration on products that are supplied by ÖZ-KAN. ÖZ-KAN will not assume any liability for consequential damages due to unauthorized modifications or non-compliance with this manual.

1.1 SAFETY

Installation, operation and maintenance of butterfly valves must be made by professional, qualified staff. Although all ÖZ-KAN products are designed and manufactured according to international codes and standards, valves are potentially dangerous items in case they are not operated properly or outside their intended duty.

All workers who will be dealing with storage, assembly, operation, maintenance and disassembly of these products must read and understand this document. All international and local safety standards must be read and understood, and all necessary precautions must be taken before doing any work on valves or pipeline they are installed on.

Pipeline must be depressurized in case any repairs will be made and warning labels should be placed around the area where repairs will take place. Remote control devices such as actuators must be kept in Local or Off position and precautions must be taken to prevent actuators to operate valves with stored energy such as pressurized air or water. Precautions must be taken against flooding in case a discharge valve is to be repaired.

If a valve is to be removed, the pipeline must be emptied. Precautions must be taken because residue fluid will flow freely once the valve is removed.

1.2 PROPER USE

ÖZ-KAN butterfly valves are designed for on/off duty operation. For any other duty, please consult with Hygrade Water.

Max. operation pressure for standard butterfly valves is limited with pressure rating of the valve. Standard waterworks valves can be operated at max. 40°C according to AS4795.2 Max. flow speeds are also in accordance with AS4795.2

In case valves are to be used in different operation conditions and/or applications, details of intended applications must be provided and **written approval of the manufacturer must be obtained**.

Operation & Maintenance Manuals supplied with products contain vital information for safety and long-term troublefree operation so must be observed and applied at all times as well as retained for future reference.

1.3 INSTRUCTIONS FOR SHIPMENT & WAREHOUSING

Adequate packing must be used for shipment and storage depending on shipment type and stocking options. Valve must be protected from atmospheric conditions and external damages at all times. Special packing types may be used for overseas shipments.

Coating applied for corrosion control must be protected against mechanical damage at all times.

Valve disc must be kept slightly open during shipment and storage. Valve must be placed on flanges and preferably with bearing hubs facing upwards.

Some butterfly valves are delivered with electric actuator. If this is the case, make sure actuators are protected from atmospheric conditions and mechanical damages. Pay special attention to the safety of the actuator, while lifting or moving the valve.

Large size butterfly valves do not have their center of gravity in the middle due to their gearbox so may swing sideways during lifting operation. Lifting operations must be made with special care and nobody except the operator must enter the area during lifting operations.

Avoid sudden movements during lifting, moving and lowering the valve. Such sudden motions may damage the valve and/or lifting system.

Lifting cables and belts must only be attached to the body. There are lifting eyes on valve bodies for easy installation of lifting cables and belts. Length, capacity and positioning of cables must be arranged to keep the valve in horizontal position during lifting, moving and lowering.

Make sure the capacity of lifting equipment is adequate to lift the valve you are working with. Make sure general regulation regarding lifting heavy equipment are applied during the lifting process.

Some valves are packed in wooden crates or boxes depending on shipment methods. Make sure the instructions on the crate are applied during off loading and loading. While working with such crates/boxes, center of gravity for the whole crate/box must be taken into consideration.

Valves must be kept in slightly open position during storage in order to protect sealing ring. Sealing rings must be protected from atmospheric affects and direct sunlight. Valves must be kept in dry, clean and well-ventilated areas and they must be kept away from direct sunlight otherwise long term sealing performance cannot be guaranteed.

Valve must be protected from dust and other types of dirt during storage. Special care must be given to protect sealing ring and body seat from mechanical damage.

Try to keep the valve in its factory package until the assembly date. Factory packing will provide some protection to the valve.

This is not a waterproof package but is intended to provide the valve with some protection against the weather and mechanical damage. It is intended to breathe to prevent sweating of the valve in changing conditions so should not be considered watertight.

Valves are suitable for storage from 0° to 40° with adequate protection. If the valve is below 0°C before installation, it must be heated up to minimum $+5^{\circ} - +10^{\circ}$ C before assembly to the pipeline.

All crates should be opened on arrival to ensure that no damage has occurred during transit and the valve has not shifted in its crate. If no issues are found, the crate should be resealed for storage.

If any physical damage is found, it should be examined, reviewed and resolved before any secondary damage can occur.

When storing the palletised/crated valves, they need to be protected from moisture, excess sun light and mechanical harm. They need to be stored under cover of a shelter, rather than wrapped in a tarpaulin.

The coating on the valves and gearboxes is very robust, however the use of metallic tools against the surface such as levers, pry bars, hammers etc. should be avoided. The coating can be chipped or damaged and should this occur, any damaged areas should be repaired prior to installation or back filling.

Rubber seal components must be protected from sunlight, ultra violet, and chemical damage. If the valve is installed in an end of line position on incomplete pipe work, the valve seal area must be protected from the sun and weather.

At all times, no hydrocarbon products such as oils, greases or other chemicals are to make contact with the rubber components.

Do not put fingers or body parts into the area between the seat and seal on disc of the valve. If the valve is operated by another party, loss of limbs or crushing injury may occur.



1.4 Cleaning

If at any time the valves are required to be cleaned, the use of any chemicals is to be avoided.

Clean water only shall be used. All detergents, solvents or other cleaning chemicals are not permitted.

1.5 Standing up your valve

As noted above, your valve should be expected to be enclosed in a crate and lying flat on a flange face. Break down the top and sides of the crate from around the valve leaving the valve sitting on the base pallet only.

Stand so the valve centre shaft lies from left to right rather than away from you. With the gearbox to either your left or right, you can identify the feet of the valve. There are two sets of feet that also double as lifting lugs. These are located on the outside edges of the valve flange at what will now appear to be the top and bottom of the valve.

Note: The primary weight of the valve must be lifted by the lifting lugs only. A secondary strop may be attached to the valve neck to support the gearbox weight if required. There is to be no lifting of the valve through the internal bore area as damage could occur.

When viewing the valve lying on the pallet, note the position of the drive shaft input of the gearbox. This drive shaft will be pointing up when the valve has been stood up. Identify which set of lugs will be the feet and which will be your lifting lugs so that when the valve is standing up, the gearbox input is pointing in the correct direction.

Note: At the standing up stage of lifting the valve, care must be taken not to use loose metallic connections to the valve such as shackles, hooks, chains or the like. Soft round slings shall be used. As the valve stands up, such devices can damage paint coatings as well as break lifting lugs. Forklift forks may not be used to directly to lift the valve for the purpose of standing it up. This method is not secure and presents a danger to the operator and product.

The valve can be lifted using two lugs at the top. Both lugs should be on the same flange side.

Thread the strop through the lifting eyes of the valve. If the lifting eyes of the valve are too small, proper lifting shackles can now be bolted through the valve lifting eyes. These must be properly sized and tightened as any slack that allows the shankle bolt shank to twist in the valve lifting lug hole, could break the valve lifting lug.

Ensure there is appropriate area to stand the valve up a well as allow the base pallet to move. It is likely that due to the angle of lift, that the pallet will push out from under the valve during the lift.

If using a fork hoist, note that a strop over the tip of the forks is not secure so care has to be taken that the strop will not slide off during the lift. A proper lifting eye suited to that machine is recommended.

Once the valve has been lifted, it will be hanging at an angle. Set the valve down while standing the valve up on its feet in one fluid motion.

Depending on the size of the valve and gearbox, the valve may want to tip in the direction of the gearbox. To keep the valve standing on its feet, support the valve gearbox.





A valve has a resilient sealing ring on the periphery of the disc and an integral stainless steel seat on body to provide sealing. The resilient sealing ring is attached to the disc by means of retaining ring. In the closed position this resilient seal is pressed on the cone shaped integral body seat, providing drop-tight sealing in either direction of flow.

Butterfly valves are designed to stop water flow when they are in fully closed position. For any other application, please consult the manufacturer.

The resilient seal on the disc can be easily changed without uninstalling the drive mechanism. On large valves, where it is possible to enter the pipeline, the sealing ring on the disc can be changed without uninstalling the valve from the pipeline.



The valve body has an integral stainless steel welded and micro finished body seat. AISI309LSi, AISI316L and Ni welding is applied depending on project specification in order to prevent corrosion and mechanical damages, especially caused by cavitation.

Butterfly valves are operated by worm or worm and spur gearbox combination in order to reach low torque values and easy operation. Different gearbox combinations are used for different sizes and pressure classes. Gearboxes have a protection class of IP67 as standard. IP68 can be provided upon request.

2. PRODUCT INFORMATION



ÖZ-KAN Double Flanged Resilient Seated Butterfly Valves can be used in well chambers, pumping stations, pipelines and high-level reservoirs. Standard valves are not suitable for wastewater and raw sewage systems.

A butterfly valve controls the flow by 0° - 90° rotating disc. The disc position is vertical in closed position. Disc must be rotated 90° to close or to open the valve. Valves are manufactured as double off-set for easy operation.

2.1 DESIGN LIMITS

Standard ÖZ-KAN butterfly valves are resilient seated. EPDM or NBR sealing rings are used depending on the project specifications. Standard butterfly valves should only be used with mediums that do not have the risk of clogging.

Standard type butterfly valves can be used with following mediums.

- Water
- Raw water (Water coming from wells, rivers, dams etc.)
- Cooling water (With certain limits and as long as adequate corrosion protection is applied.)

ÖZ-KAN products are not suitable for oil and gas applications. Our products are strictly designed for water applications.

Max. allowable temperature for standard type valves is 40°C. ÖZ-KAN range covers valves for higher temperatures with special material configuration and corrosion protection. Please contact Hygrade Water for additional information.

NBR sealing rings should be used for mediums contaminated with metallic oils.

Manufacturer approval is required, in cases where valves are to be used with differing operation conditions.

ÖZ-KAN standard type butterfly valves are designed for isolation duty. For all other applications, please consult Hygrade Water.

Valves should not be operated below 30° open position. If vibration is observed or cracking sounds are heard while the valve is in operation, operation conditions should be checked.

In order to remedy these problems;

- Valve installation position can be changed
- Inlet pressure can be changed
- Valve opening angle can be changed.

Flow speed is critically important for the life expectancy and performance of a butterfly valve. High water velocity will increase the torque value acting on drive shaft. There are limits to the flow speeds for butterfly valves as tabled below.

Flow speeds are limited according to EN 1074 Table 3. ÖZ-KAN KVU type butterfly valves are designed and manufactured according to these limits.

10 3 m/sec	
16 4 m/sec	
25 5 m/sec	
40 6 m/sec	

Operation pressure of a butterfly valve must not exceed

max. allowable pressure of the pressure rating (PN).

ÖZ-KAN valves are equipped with worm gearbox or worm & spur gearbox combinations for easy operation. These gearboxes are travelling nut mechanisms for limiting travel of the disc in open and closed positions. This travelling nut reaches its end position when valve disc reaches full closed position. Forcing the valve after it reaches full closed position will not improve the tightness of the valve.

Long term use of valve in throttling condition will damage the sealing ring and operation mechanism. Valves must not be throttled.

2.2 VALVE MARKING

All valves carry information on their bodies for easy identification. While information on a valve changes according to the project specifications, below information can be found on every valve supplied by ÖZ-KAN

ÖZ-KAN Valve Brand

- DN Nominal Diameter in mm
- PN Nominal Pressure in Bar Valve Body Number Valve Body Material Code

3.ASSEMBLY GUIDE & START UP INSTRUCTIONS

3.1 Pre installation checks

After unpacking and standing the valve, it needs to be checked to ensure correct operation prior to installation in the line.

Before commencing any work on or around the valve that is now standing, ensure that it is properly secured and cannot fall over should it become unbalanced or knocked.

First perform a visual check of the valve. There should be no coating damage to the valve, especially internally and in the flange face area.

Ensure the valve is clean. No dirt or dust should be coating the rubber seal, the flange face area or impinging any bolt holes.

Cycling the valve is a way to check that the valve is traveling through its full range properly. **If cycle testing is required pre installation, note that this can only be done with the valve in the standing position.**

Note: The use of external powered drive devices, either electric or internal combustion is not permitted.

With the valve in the full open position, check the complete circumference of the seal on disc, and the seat in the valve body. There should be no damage to either. Any damage needs to be noted, reported and reviewed prior to installation.

Lubrication of the seal on disc is not required. Should a

lubricant be considered necessary for ease of operation, it must be a water based, food safe lubricant. In New Zealand, this lubricant should be AS/NZS 4020 compliant. Please note that such lubricants will dry out with time..

A successful cycle test will have the valve travel smoothly and consistently and reach both fully open and fully closed positions. Fully open has the disc face at 90 degrees to the flow axis and fully closed has the disc face evenly seated relative to the body seat.

After completing the cycle test, re open the valve to its normal storage position. Open enough to clear the seat while ensuring the disc does not protrude past the flange face.

3.2 ASSEMBLY LOCATION

When installing a butterfly valve in location, make sure pipes are aligned and flanges are parallel. If pipes are not aligned, this problem must be corrected before assembly, otherwise valve body will be loaded with impermissible high loads due to the misalignment. These loads may lead to fracture of the body.

Installation to the pipeline must be tension free as much as possible.

Valves should not be used as structural members or thrust points in a pipeline. The installation needs to be such that there is no mechanical stress on the valve other than being torqued up to its mating pipe flanges, and the normal stress of internal hydraulics.

The weight of the valve must be supported at all times during the process.

To ensure a low stress installation, the weight of the valve should be supported by a plinth and not simply hanging from the pipe. One side of the valve should be attached to the fixed pipe flange, while the other side of the valve should attach to the pipe work via a dismantling joint. This allows for a low stress connection and allows for future maintenance should it be required.

Space left between flanges must be large enough to install the valve without damaging coating on raised faces. Flanges of pipeline must not be pulled towards the valve due an installation gap larger than what is needed. Use of dismantling joints is strongly recommended.

Valve must be protected from nearby construction work with adequate covers. Valve must not be subject to hazardous effects of excavation, painting, concrete works, etc.

Suitable flange gaskets and sealing materials should be used for installation to potable water pipelines.

Pipeline sections both on upstream and downstream sides of the valve should be cleaned before the valve is put into operation.

3.3 INSTALLATION POSITION

There must be sufficient space left in installation position for easy operation, maintenance, dismantling and cleaning of the valve.

If the valve is not located in a valve chamber and installed in the open, it must be protected from extreme atmospheric conditions with adequate covers. (Exposure to sunlight, ice formation, exposure to sand, etc.)

The valve will be equipped with an IP68 gearbox suitable for underground service, if the valve is to be buried.

Valve will be equipped with an IP68 submersible gearbox if the valve may be under water. The rating is IP68 up to 10 meters, up to 72 hours. Such installation may lead to increased operation forces as well as a higher rate of wear and tear of corrosion protection and rotating parts. Such valves should be maintained with shorter intervals..

Pressure acting on the closed valve must not exceed its design pressure.

An appropriate concrete plinth should be made. The valve rests on this plinth to support its weight and therefore the plinth should be poured on top of undisturbed ground in the same way a thrust block. This is to avoid settling that would create stress between the pipe and valve connection. For appropriate methodology, please utilize the appropriate geotechnical engineers.

The valve is lowered into place vertically then presented horizontally to the mating flange.

Before the valve makes contact with its mating flange, the gasket will need to be inserted. (refer to material section for gasket, bolt and stud selection)

It is critically that gaskets are not dragged through the gap such that they can become distorted and that they are properly centered on the pipeline bore.

The gasket material selection will dictate the torques to be used on the bolts/studs and these torques should be provided by the design engineer.

Note: Using the bolts/studs to pull the valve and pipe flange together on any angle must be avoided. The valve must be correctly aligned with the pipe flange before any bolts/studs are applied. Correcting horizontal or vertical alignment by using the bolts/studs to draw the two flanges into alignment can cause damage to both flanges.

Torque wrench calibration

Torque wrench calibration is required. A torque wrench when new is expected to be accurate to the tolerance of the manufacturer. Like all instruments, torque wrenches need periodic calibration to account for wear, normal use and any damage that may be caused by impact. (Reference)

Cross Torque Technique

For correct seal tightness, alignment and no stress installation, it is critical that correct cross torque technique is used. Also referred to as the stare method. Please see

the diagram below.

Uneven torque applied to the flange bolts can break or bend flanges, over stress bolts/suds, and damage the gasket. WSA 109 suggests a four-stage process indicated below however the technique to be used must be detailed by the design engineer.

WAS109 suggests the tightening stages as percentage of torque required. 20%, 50% 75% and then finally 100%. The bolt torques should also then be re torqued after 24 hours.

All bolts are hand tightened. The gap between the flanges should be even.

As per the above example, bolt one is torqued to 20%, the bolt two, then three etc.

The process is repeated by as many steps as determined by the engineer until complete.

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over wrap should be used to provide the best protection. It is highly recommended that a complete wrap system from one supplier is used for both the petrolatum tape and the overwrap. Mixing systems may result in incompatibilities of both product and warranty.

3.4 ITEMS LOCATED AROUND THE VALVE

Suitable filters must be present on the upstream side of the valve, if the medium is contaminated with solid particles or foreign objects. Otherwise such foreign materials may prevent the valve from performing its duty or cause malfunction.

It is not recommended to install a butterfly valve right after an elbow, T-piece or a strainer, because such items will cause turbulence in flow. It is recommended to leave at least $3 \times DN$ distance between such items and the butterfly valve.



On the other side of the valve, the dismantling joint will be installed on the pipe, then the dismantling joint flange is presented to the valve. As per the first flange installation, alignment must be correct and **the use of bolts to "pull" the flanges into alignment is not acceptable.**

As the dismantling joint uses long tie rods to tie the pipe flange to the valve, making the dismantling joint rated for thrust, the pipe flange and the valve flange must be in correct alignment.

When aligning the tie rods, extra care is required. The process of aligning the tie rods may require them to be slid through the bolt holes several times. When doing this care must be taken not to allow the tie rod thread to act as a rasp and remove coating from the inside of the bolt holes as this can cause accelerated corrosion issues.

Flange wrapping

Common practice when burring pipe jointing systems is to wrap the connection in a protective tape system. Using a petrolatum tape wrap followed by a PVC barrier layer provides both physical and corrosion protection by excluding water as well as soil form bolt threads and surfaces.

A proper petrolatum tape system is a petroleumbased product that is non-toxic and free of aromatic hydrocarbons so will not pollute the soil or damage rubber components.

As the petrolatum tape itself is not waterproof, the PVC



If the butterfly valve is to be installed after a control valve (needle valve, plunger valve, etc.) there should be at least 10 x DN distance between the butterfly valve and the control valve.



Butterfly valves should be installed with shafts in horizontal position. Standard butterfly valves are not suitable for installation with shafts in vertical position. However, this can be provided if end user informs manufacturer at order stage.



3.5 VALVE CONFIGURATIONS

Disc opening direction and gearbox side can be arranged according to the four configurations given below. As per AS4795.2, the disc shall open from the bottom with the direction of flow.



Please consult ÖZ-KAN for valve configurations with anti-clockwise closing gearboxes.

3.6 GEARBOX INSTALLATION CONFIGURATIONS

It is possible to install gearboxes in different positions.



3.7 VALVE INSTALLATION POSITIONS

All ÖZ-KAN butterfly valves can be installed in horizontal position.



Standard ÖZ-KAN butterfly valves are not suitable for vertical installation. Please consult Hygrade Water prior to order for such installations.

Valves should not be installed as shown below.



3.8 ASSEMBLY NOTES

Valves should be thoroughly checked before installation to the pipeline. Although all valves are tested and inspected before leaving the manufacturing area, this control should be made to check if valves are damaged due to faulty transport, faulty warehousing or rough handling. Make sure valve is thoroughly cleaned to remove any dirt or foreign materials. Make sure pipeline on both sides of the valve are cleaned to remove foreign materials that might be left in the pipeline during construction stage. ÖZ-KAN does not assume any responsibility for consequential damages caused by dirt or foreign particles that were not removed before operation.

If the valve must be recoated, make sure essential parts such as body seat and sealing ring are not coated. If any section of the valve is sand blasted, these sections should be protected with adequate corrosion protection. Elastomer parts must be protected in case solvent based paint removers are used. Metal plates for identification must not be coated or sand blasted.

Resilient sealing ring on the disc should be controlled before installation. Especially in hot climates and dry storage conditions, EPDM seal ring gets harder in time and does not perform its function. If the seal ring is damaged and there are cracks on it, seal ring should be changed with a new one. Changing method will be described in MAINTENANCE & REPAIRS section. Some lubrication material such as food grade grease or silicone should be applied on resilient seal ring and body seat in order to provide easy operation on a dry pipeline before installation.

Make sure lifting devise of necessary capacity is available at installation site.

The valve should not be completely open during assembly. In the fully open position valve disc protrudes from flange surfaces and installation will not be possible. The valve must never be lifted from its disc. This will damage the valve and its operating parts.

The valve should be installed to the pipeline by hexagonal bolts, nuts and washers in through bolting. Bolts should be tightened crosswise in order to prevent any strain that might damage the valve. Pipeline should not be pulled towards the valve. This will load the valve with tension that might crack the housing in time. The gap between flanges should be filled with thicker seals or by means of adjusting the dismantling joint.

Valves are equipped with lifting eyes for easy lifting. These lifting eyes and flange holes should be used to lift the valves.



There shouldn't be any obstacles on the upstream and downstream sides of the butterfly valve that may prevent the valve disc from reaching its full open position. Extra care should be taken when mating to HDPE Stub flanges due to bore interference with the disc.

ÖZ-KAN recommends use of steel reinforced flange gaskets for easy installation on large sizes.

ÖZ-KAN recommends use of 8.8 quality bolts for installation, however selection of bolting material is left to the end user. Bolt selection must be made according to operation loads and flange gasket selection. Bolt tightening torque should be selected correctly depending on the gasket type that is selected. Bolts should not be over-tightened. This will load the valve with unnecessary tension and bolts may get loose during operation.

Pipeline flanges must be well aligned. All construction and

welding works must be completed before the assembly of the valve. Valve must be protected with adequate covers in case construction and welding work has to be made after installation of the valve. Elastomer sealing element must be protected from the heat and flames generated by welding. All welding and grinding residue must be removed at the end of welding works.

Pipeline must be supported in order to prevent harmful pipeline forces to be transmitted to the valve. Valve must be covered if construction and erection works will continue around the valve.

4. OPERATION

Double Flanged butterfly valves can be operated manually by handwheels or hand levers and electrically by electric actuators.



Double Flanged Butterfly Valve with Electric Actuator.



Double Flanged Butterfly Valve with Handwheel.



Double Flanged Butterfly valve with Handlever.

Operational parts, such as gearbox should be thoroughly checked before installation. Any loose fixings should be tightened before operation. Valve should be opened and closed at least once before the installation. Motion of parts must be checked for any signs of problems.

Valve pressure rating must not be exceeded during site trials or pipeline tests. If the pipeline test pressure exceeds valve pressure rating in closing direction, pressure must be compensated by using a by-pass arrangement.

Valve torque value can be expected to be higher when the valve is operated in dry condition after long term storage

New pipelines must be thoroughly checked and cleaned from foreign objects before they are operated. It must be ensured that any detergents, solvents, etc. that will be used while cleaning the pipeline must not attack materials used for valve construction.

First Operation

After installation, the valve will be in the partially open position.

While a butterfly valve is expected to open against pressure and experience short periods of small opening and high velocities across the seat, the filling process could potentially expose the valve to long durations of high velocity. Butterfly valves are not suitable for fine flow control and this would be equivalent to such a use.

It is also important to flush any potential debris from the line before the first closing of the butterfly valves.

To flush and fill the lines, it is recommended that smaller valve connections, even if temporary are used.

The smaller valve should be of a size that suits the desired flow rate. If it is of a low enough value, it may even be considered sacrificial and could be used to throttle the filing rate.

Once the line is filled, the valve can be opened and closed as required.

4.1 Materials

Gaskets materials

There are multiple gasket materials that can be used. Some solid rubber while others are reinforced rubber or even rubber impregnated fibre.

If the system is deemed to need gaskets that comply with potable water, they will need to be either solid or reinforced EPDM. Standard black insertion rubber gaskets are not approved to AS/NZ4020. Solid rubber gaskets can be used but require additional care when handling as they do not have the same structural strength or pressure rating.

Fibre reinforced gaskets may initially show a small amount of weeping at the edges due to the reinforcing fibres but when properly torqued will not leak. Fibre gaskets impregnated with rubber may also be used. Sometime referred to as CAF or Compressed Aramid Fibre is a gasket that was created to replace asbestos fibre gaskets. The most common brand of aramid fibre is a brand owned by DuPont called Kevlar. The gaskets are very strong but require very high bolt torques to work.

Gasket Structure

Gaskets should be equal to or larger than the bore of flange they are being used to seal and cover the sealing raised face. Bore sizes that are smaller than the flange bore will result in gasket material that is not clamped between the two flanges. This material forms a minor obstruction in the pipe and the excess material will usually break off and travel downstream. These small pieces of rubber will block spray nozzles, pilot valve assemblies of pressure reducing style valves and other downstream equipment.

Excessive bolt torques or over tightening of gaskets will cause the material to physically fail.

Note: Most flange gaskets are single use and therefore should not be re used.

Bolts and Studs

In smaller sizes, bolts are the practical form of flange fastener. The plain shank when properly selected acts as a dowel between the two flanges to help align them. Use of bolts rather than machine screws also helps reduce occurrence of the thread removing the coating from the inside of the hole. This may not seem important however please review galvanic corrosion.

Studs can also be used. Like the bolt, these have a plain shank in the middle but have a thread each end. These can be used when size or space constraints make them practical.

When using threaded rod as in the tie bars of dismantling joints, extreme care must be taken during installation. The absence of a guide shank means that it is very easy for the thread to remove bolt hole coating material, exposing raw metal. This can lead to accelerated corrosion. Zinc coatings such as galvanizing and hot dip coating can have corrosion issues when directly exposed to raw cast irons.

If the risk of accelerated corrosion with zinc coated tie bars is a concern, stainless steel ties bars can take their place.

Sometimes cut threaded rod is offered as studs. These are not studs as they have no shank and should be handle the same as threaded tie rods.

There is also a difference between a bright galvanized bolt and a hot dip zinc coated bolt. Electro galvanizing or bright galv is typically 10-12 micron think while hot dip galvanizing can be 80-100 micron thick. Wet environments with high galvanic index differences will tend to consume the lighter layers of galvanizing much more quickly resulting in premature failure.

Galvanic Corrosion

Galvanic compatibility is a problem that needs careful consideration.

The general practice states that the Anodic index, measured in volts, should not exceed 0.15v. In the case of zinc versus iron, the difference on the galvanic series is 0.4 volts with zinc at 1.25 and iron at 0.85. It is for this reason that care needs to be take when passing galvanized threaded bolts through coated iron or steel flanges, that the coatings are not damage.

5. ACTUATORS

Butterfly valves can be operated with electric, pneumatic or hydraulic actuators depending on the application. These actuators must be selected according to the operational limits described above. In case valves are to be used with deviating conditions, supplier must be informed before valves are put into operation.

Electrical connections for butterfly valves that are going to be operated by electric actuators should be made according to the wiring diagrams that are supplied with the actuators. Limit & torque setting of these actuators must not be altered without informing the manufacturer. These settings should be made while the pipeline is depressurized if the valve is not equipped with a gearbox.

Electrical connections should be made before connecting the valve to the pipeline. Before making the electrical connections, the valve should be opened halfway with the emergency hand wheel. After the completion of electrical connections, valve should be operated to open and the disc motion should be controlled. If the valve disc is closing while the open button is pressed or if the valve disc is opening while the close button is pressed than the phase connection is wrong and it should be corrected. Actuators with reversing contactors will correct the phase connections even if they are connected wrongly.

Actuator must not be transferred between different diameter and different pressure class valves under any circumstances. Torque and limit settings differ from one diameter valve to the other. Transferring of actuators between different size and different pressure class valves can cause serious damage both to the actuator and to the valve.

Catalogues and manuals of actuator suppliers must be consulted in case detailed information is required.

Manual operated valves can be operated by handwheels and for small diameters by levers.



Hand Wheel



Hand Lever

Manual operated valves can be opened by anti-clockwise operation of the hand wheel and can be closed by clockwise operation of the hand wheel. (The opposite applies for valves with anti-clockwise closing gearboxes.)

WARNING: Unlike gate valves, sealing cannot be provided by forcing the hand wheel on butterfly valves. When the valve reaches its full closed position, adjustment nut inside the gearbox reaches its end position. Further force applied on the handwheel will not achieve better sealing and it may damage the gearbox.

Valve disc position can easily be checked from the mechanical position indicator on the valve gearbox. If the valve reaches its full closed position and there is still leakage from valve, then the sealing ring on disc should be checked and replaced if necessary.

There shouldn't be any solid particles in the medium. Solid particles in the medium can cause serious damage to the resilient sealing ring on the disc. Filters must be used, in case there is a risk for foreign material contamination for the medium.

Failure to comply with these regulations may cause serious damage to the valve and nearby equipment and it might lead to personal injury or loss of limbs. Safety instructions regarding operating mechanisms must be thoroughly checked before taking any action with them.

Manufacturer must be consulted for operation torque value and top flange information, in case a manual valve is to be operated with an actuator at a later stage. Settings of this actuator must be made in accordance with actuator suppliers recommendation.

5.1 ELECTRIC ACTUATOR INSTALLATION

All ÖZ-KAN butterfly valves are equipped with ISO top flanges that are suitable for electric actuator installation. Actuator sizing should be made in accordance with max. torque requirements of the butterfly valve. Please consult Hygrade Water NZ for correct actuator selection.

End stop adjustment of the actuator should be made through limit switches. Torque switches should be used for over-torque protection only.

Actuator settings should be made in accordance with the actuator supplier's recommendations. Limit settings of the actuator must be made only after the actuator is installed on the valve. Safety regulations of the actuator must be observed before setting the actuator. Electrical connections of the actuator should only be made by an authorized electrician.

6. MAINTENANCE & REPAIRS

ÖZ-KAN Butterfly Valves are manufactured for minimum maintenance requirements.

Butterfly Valve gearboxes are greased for lifetime and are completely maintenance free. Gearboxes should be handled with care and mechanical position indicators should be controlled while opening and closing the valve. Valve should never be forced after reaching full open or full closed positions. This may seriously damage the gearbox because of high gear ratios.

WARNING: The pipeline must be shut off, depressurized and secured for inadvertent operation before any kind of inspection, maintenance or repair work. Pipeline must be discharged if necessary. All necessary precautions should be taken based on application and fluid conveyed.

Valve gearboxes and covers must never be uninstalled while the pipeline is pressurized.

Maintenance and repair works should only be made by experienced staff, after consulting with Hygrade Water NZ. Necessary precautions must be taken and warning labels should be placed around the working area.

Site management must be informed about planned maintenance and repair works and necessary permissions must be obtained.

All necessary safety devices such as safety boots, helmets, belts, goggles, gloves, insulators, etc. must be used.

6.1 INSPECTION FREQUENCY

Valves should be checked for general appearance, sealing performance and corrosion protection at least once in every year. Number of maintenance inspections must be increased in case valves are being operated in extreme operation conditions.

6.2 REPLACEMENT OF MAIN SEAL & BEARING O-RINGS

If the butterfly valve disc is in full closed position and the valve is not tight, then the sealing ring on valve disc should be changed. If the valve is big enough for a worker to safely work inside, the sealing ring can be changed without removing the valve from the pipeline. If the valve is a smaller sized one, than valve should be removed from the pipeline for sealing ring replacement.

WARNING: Nobody should enter pipeline unless all pumps are stopped and at least two upstream valves are closed securely. Part of the pipeline where the repairs will take place must be discharged completely and should be well ventilated for the workers safety. There shouldn't be pressure on both sides of the valve that is going to be repaired.

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To change the sealing ring the valve should be completely closed. All retaining ring bolts & setscrews should be loosened.





When all retaining ring bolts are loosened the retaining ring can be taken out. After this it is possible to take out the T-Shaped Sealing Ring from its groove.



After removing the old sealing ring, care should be taken to see if any remaining parts of the old sealing ring are left on the sealing ring groove. If there is remaining debris, this should be removed and the sealing ring grooves both on the disc and the retaining ring should be cleaned thoroughly.



After cleaning the sealing ring grooves, the new sealing ring should be carefully installed to the groove on the valve disc. After placing the sealing ring on the valve disc, the retaining ring can be installed back to its place. Care should be taken when re-installing the retaining ring. T-Shaped Sealing Ring should be placed into the groove on the retaining ring.



After placing the retaining ring back into position, the retaining ring bolts can be fastened. The retaining ring bolts should be fastened crosswise.



Sealing rings can be replaced without disassembling the valve disc. A sample disc has been used for taking photos given above for clear shots and easy reference.

In case of leakage from the drive shaft or short shaft area, bearing covers must be removed and 'O'-rings on bearing covers must be replaced with new ones. In order to remove the drive shaft cover, operator must remove the gearbox.

Valve must be de-pressurized for this kind of repair work. In order to proceed with these repairs;

- 1. Bring the valve to full closed position
- 2. Remove gearbox. (If drive shaft bearing is maintained.)
- 3. Unfasten setscrews and bolts on bearing cover.
- 4. Remove bearing cover.
- 5. Remove O-rings on bearing cover.
- 6. Clean O-ring channels on bearing cover. Clean bearing cover slot from foreign materials.
- 7. Place new O-rings in their slots. (Only use correct size & type O-rings.)
- 8. Apply some food grade greased liquid soap on O-rings.
- Place the bearing cover back to its slot. Make sure O-rings are not damaged during installation.
- 10. Tighten hexagonal bolts and setscrews crosswise.

7. SHUT DOWN & DISASSEMBLY

In case the valve should be removed from service, the valve should be fully closed. If the valve is operated by an electric actuator, all electrical connections should be disassembled by a suitably qualified person.

Pump and the valve on the upstream side of the valve that

The valve should be securely connected to a crane or lifting equipment that is strong enough to lift the valve. Flange connection bolts and nuts should be loosened and removed.

If the valve is stuck between the pipeline flanges flange adaptors/dismantling joints on the pipeline should be adjusted to provide enough space to remove the valve from the pipeline.

WARNING: Never lift a valve from hand wheel or gearbox. This may cause serious damage to the valve and it is extremely dangerous for the workers. Always check the weight of the valve and the crane capacity before lifting a valve. Never lift a valve that's weight is over the crane capacity.

Lift and remove the valve from the pipeline. Be sure not to hit the valve to the pipeline.

If the valve is going to be kept in stock for a time, leave the valve disc in a slightly open position. If the valve is left in full closed position, sealing ring will lose its profile under pressure in dry atmosphere. If the valve is left in fully open position, something may strike the disc and damage the valve.

If the valve will be stored lying on its pipe connection flange, make sure that the valve is stored on a wooden pallet. Flange faces should be protected against mechanical damages.

8. SPARE PARTS

All necessary spare parts can be supplied from ÖZ-KAN Head office. We need following information to help you with correct spare parts.

- Valve type (Butterfly valve, check valve, air valve, etc.)
- Valve size and pressure class (DN, PN)
- Valve metal plate information. (Production year, order number, etc.)
- Valve body number (Number that can be seen on the body near name plate)

9. SERVICE STOPS

In case maintenance personnel is required for maintenance and repairs please contact ÖZ-KAN Hygrade Water New Zealand. You will be directed to our nearest service point. Contact details are given below..

Hygrade Water New Zealand

102 Neilson Street, Onehunga, Auckland 1061 PO Box 58142 Botany, Auckland 2163 P: 0800 494 723 www.hygradewater.co.nz

10. CHECKS THAT SHOULD BE MADE BEFORE CALLING SERVICE

Problem	Probable Cause	Corrective Action
Noise coming from the valve	Valve being operated beyond design limits.	Check operation conditions and valve design data. Change operation conditions or replace the valve with correct type.
	Wrong installation position. (Valve too close to a reducer or a flow control valve, etc.)	Change installation position.
Valve fails to operate	Problem with electric actuator	Check actuator power connection Check actuator settings
	Gearbox Blocked	Check short shaft lock, remove it if it in locked position.
	Foreign material jammed inside the valve.	Remove the foreign object by means of flushing the valve or dismantle the valve and remove the object manually.
Valve is not tight.	Valve is not closed completely.	Bring the valve to full closed position by checking position indicator.
	Main seal is worn or damaged.	Replace seal ring.
Leaks though bearing covers.	Bearing O-rings are worn or damaged.	Replace bearing O-rings.
High operation torques	Body seat covered with deposits.	Flush the valve or remove the deposit manually.
	Dry pipeline, dry main seal	Apply a food grade lubricant on valve main seal. Valve will operate easily when sealing ring is wetted.

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Scan for more information

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