OPERATING INSTRUCTIONS

GATE VALVES APPLICATION

&

MAINTENANCE

Read and follow instructions carefully. Proper training and periodic review regarding the use of this equipment is essential to prevent possible serious injury and/or property damage. Shown products are according the current production. Dikkan reserves to modify product characteristics according technical evolution or customer special request. Verify if manual comply with used product.

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CONTENTS

1. SAFETY TERMS

The signal terms DANGER, CAUTION and NOTICE are used in this operating manual in the event of notices related special dangers, or for unusual information, requiring a special marking.

Danger infers that there is the danger of life and considerable damage in the event of non-compliance.

Caution infers that there is the danger of injuries and damage in the event of non-compliance.

Notice infers that attention is drawn to technical correlations/connections.

2. TECHNICAL FEATURES

Standard:	EN 1171
Face to Face:	EN558 Series 14 (DIN 3202 F4) – EN558 Series 15 (DIN 3202 F5)
Flange Dimension:	EN 1092-2/B, EN 1092-3/A, EN 1092-3/B
Material:	Cast Iron, Ductile Iron, Cast Steel, Stainless Steel, Bronze
Type:	Rising-stem, Non-rising stem, Screwed bonnet, Screwed ends
Application:	Cold and hot water, fresh water, seawater, lubricating oil and neutral media
Operation:	Manual by handwheel (Option: Electric, Pneumatic, Hydraulic Actuator, Gear Box)

Pressure & Temperature Ranges

Cast Iron, Ductile Iron, Bronze	Working Pressure [bar]	
Bore	120 ℃	180 ℃
DN15-DN200	16	10
DN250	10	6
DN300-DN350	6	4
DN400-DN600	4	2

Cast Steel, Stainless Steel	Working Pressure [bar]
Bore	120 ℃
DN15-DN150	40
DN175-200	16
DN250-DN300	10
DN350	6
DN400-DN600	4

Standard:	API 600
Face to Face:	ASME B16.10
Flange Dimension:	ASME B16.5
Material:	Cast Iron, Ductile Iron, Cast Steel, Stainless Steel, Bronze
Type:	Rising stem
Application:	Petroleum and Natural Gas
Operation:	Manual by handwheel (Option: Electric, Pneumatic, Hydraulic Actuator, Gear Box)

Ratings for Group 1.1 Materials

Pressure & temperature ranges

Bore	Pressure rating	Temperature [°C]	Working pressure [bar]
DN 50 - DN 600	Class 150	−29 to 38	19,6
	Class 150	50	19,2
	Class 150	100	17,7
	Class 150	150	15,8
	Class 150	200	13,8
	Class 150	250	12,1
	Class 150	300	10,2
	Class 150	325	9,3
	Class 150	350	8,4
	Class 150	375	7,4
	Class 150	400	6,5
	Class 150	425	5,5

⚠ **Valves must not be used at higher “pressure & temperature” than defined “working pressure & temperature”.**

3. DESCRIPTION.

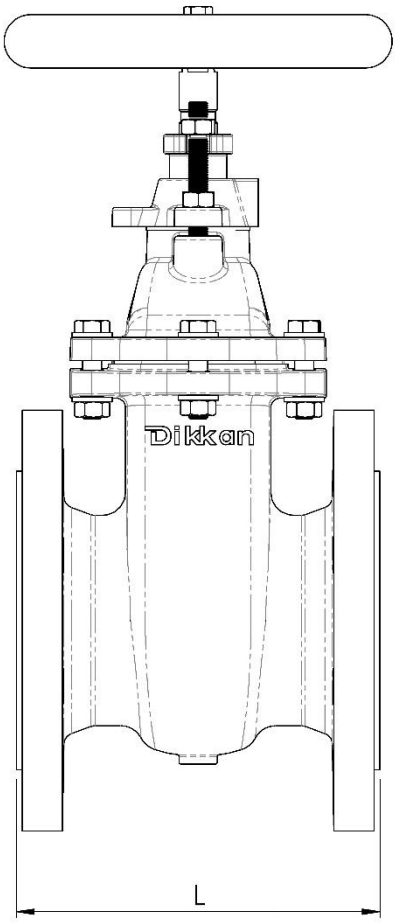
A Gate valves make a linear motion and are designed to close off, open up the flow in a pipeline. Gate valve has two types which are rising stem and non-rising stem. The wedge is designed to stop flow and a tight seal with pressure side the wedge.

Gate valves are operated by handwheel manually. If required, valves can be produced suitable for gearbox, electrical, pneumatic or hydraulic actuator installation. General features of the gate valves are as follows;

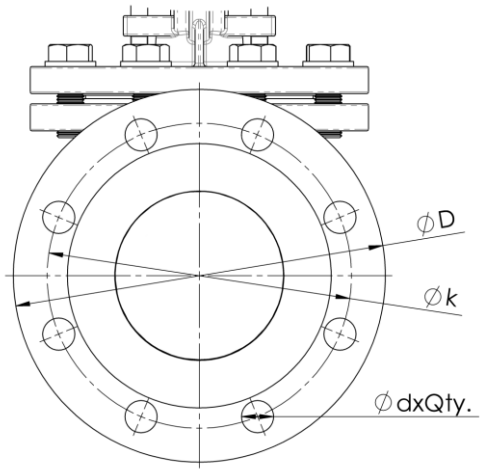
- Bolted bonnet & Screwed Bonnet & Secured Bonnet
- Rising stem & Non-rising stem
- Metallic or soft seating surfaces
- Special trims available
- Flanged & Threaded Ends
- Backseat

4. HOW TO MEASURE VALVES

It is very important to supply dimensions as described below as well as pressure, temperature and medium information, to request or purchase the exact valve as per your needs.

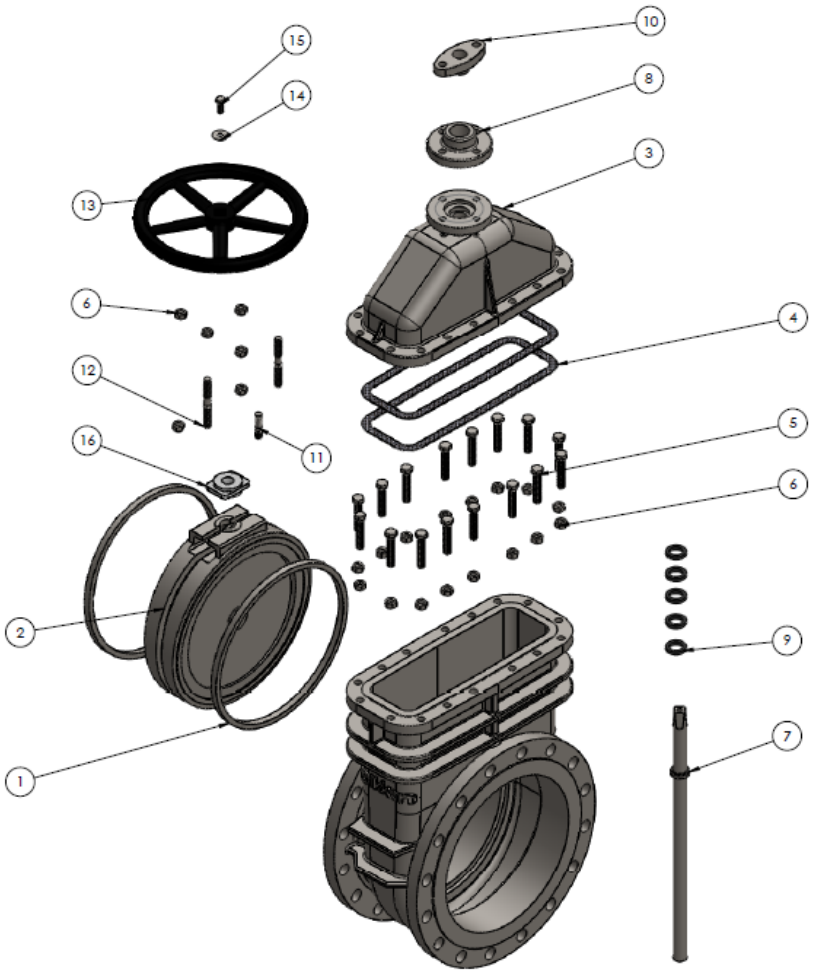


L: Face to Face Length



ØD: Outside Flange Diameter
Øk: Hole Circle Diameter
ØdxQty.: Diameter of Bolt Holes x Number of Bolt Holes

5. GATE VALVE TYPICAL PART LIST



PART NO	DESCRIPTION
1	SEALING RING
2	DISC
3	BONNET
4	GASKET
5	BOLT
6	NUT
7	STEM
8	BONNET FLANGE
9	GLAND
10	BUSHING
11	BOLT
12	BOLT
13	HANDWHEEL
14	WASHER
15	BOLT
16	BEARING BUSH

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6. PROTECTION DURING STORAGE AND TRANSPORT

- Valves should be stored in a closed place where will not be exposed to direct to sunlight.
- Valves shall be kept on pallets, avoiding any direct contact with the ground.
- Valves shall be protected from any external effects and mechanical damages in the storage place.
- Valves shall be protected from dust and dirt.
- Valves, keep the packaging until the moment of installation. (In valve packaging to prevent sweating, you are not allowed to sudden changes in temperature in the storage area)
- Keep the valve in the storage space heat and flame sources.
- Protect the valve from excessive vibration during transportation.
- Optimum storage temperature is 5°C to 40°C.
- During the storage, it should be assured that the wedges of the valves are in closed position. (except for soft seal valves)
- Unload all valves from wooden pallets carefully to the ground without dropping. When lifting, the valve should be secured by the body and never lifted by the trim.
- Good condition of stored products must be periodically verified.

7. INSTALLATION

- Pipelines and pipeline systems have to be installed in such way that no tensions from thermal expansion (or other) of the pipeline may have impact on the valves. This can theoretically even lead to breaks in the valves, causing danger from medium spills. DIKKAN offers suitable expansion joints for this purpose.
- Before installation, the pipeline must be cleaned off all dirt such as sand, dust, welding residues etc. Use strainers, in suitable sections of the pipeline, for future protection of the valve from dirt and foreign substances.
- Verify that the valve is suitable for the operating specifications of the medium (installation); such as maximum operating pressure, maximum operating temperature, corrosiveness and abrasiveness, etc.
- Verify that the distance between the flanges, where the valve will be connected, is equal to the length of the valve body.
- All protection devices for transport and storage have to be removed before installation.
- The arrow on the valve body must be in the same direction of the liquid flow. Valves without on the arrow mark can be installed with bidirectional piping.
- Valves shall be assembled to the pipeline in fully closed position.
- Use gaskets between the valve flanges and the counter flanges. The gasket should be suitable for operation conditions or maximum pressure/temperature ratings.
- The flanges which the valve will be assembled should be in the same axis and the flange surfaces should be parallel to each other.

- The bolting must be checked for correct size, length, material and that all connection flange bolt holes are utilized. Tighten the bolts and nuts in the crossover method shown in Fig. 1, to load the pipe and valve evenly and prevent stress on the joints. Finally tighten bolts to correct torque levels as recommended in Table. Do not overtighten.
- To avoid effects of weight and stress of the piping system to the valves, all piping systems should contain independent support mechanisms.
- After the installation process is completed, check the connections for leaks with water. Do not use the valve if it is leaking.
- During installation prevent to damage the paint of the valve.

	Hex Head Bolt Max.Tightening Torque													
Metric	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M45	M52	M56	M64
(Grade 6.8, Steel) Torque (Nm)	37	64	158	310	535	787	1071	1455	1872	2431	3780	5850	7236	10852
(Grade 8.8, Steel) Torque (Nm)	50	87	210	412	711	1048	1422	1932	2481	3226	4992	7747	9650	14416
(Grade 70, Stainless Steel) Torque (Nm)	33	56	137	269	462	673	918	1237	1595	2057	3170	4913	6120	9130
(Grade 80, Stainless Steel) Torque (Nm)	43.5	75	183	359	617	897	1224	1648	2126	2743	4227	6550	8160	12174

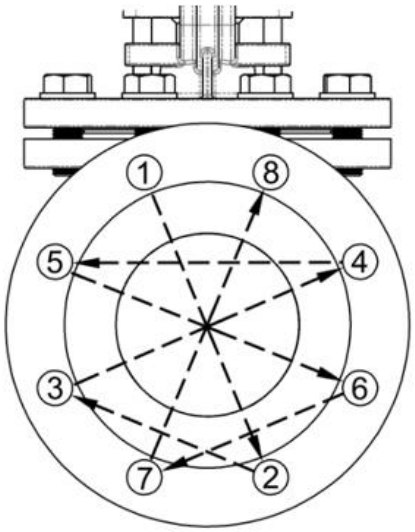
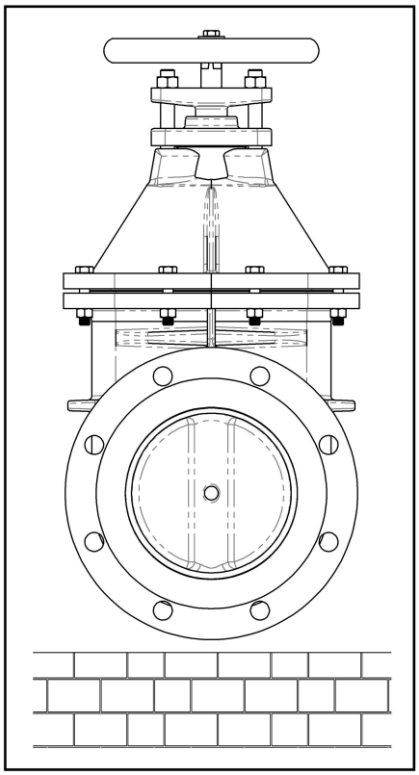
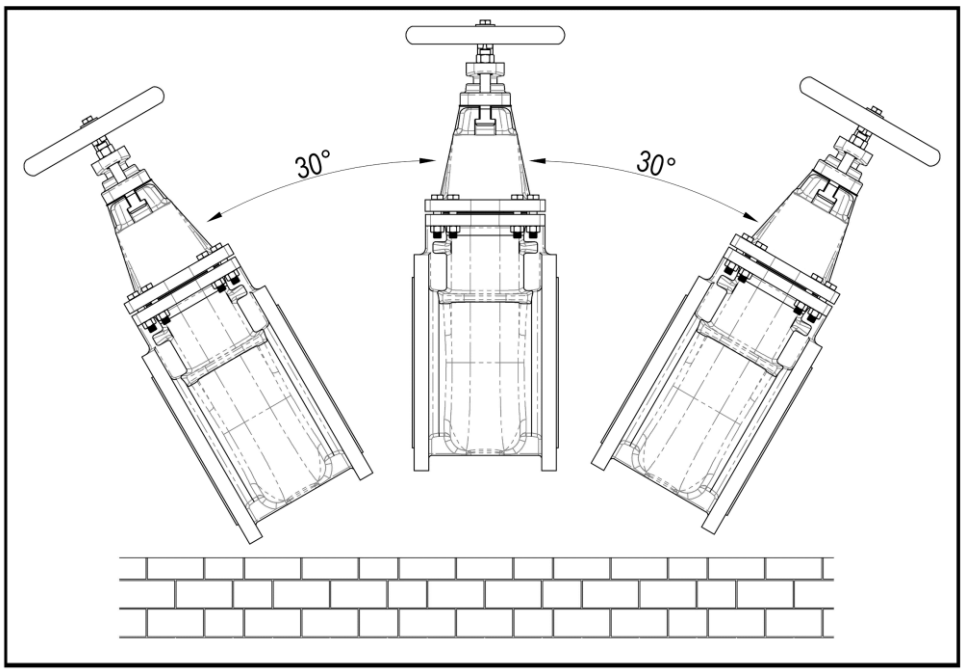
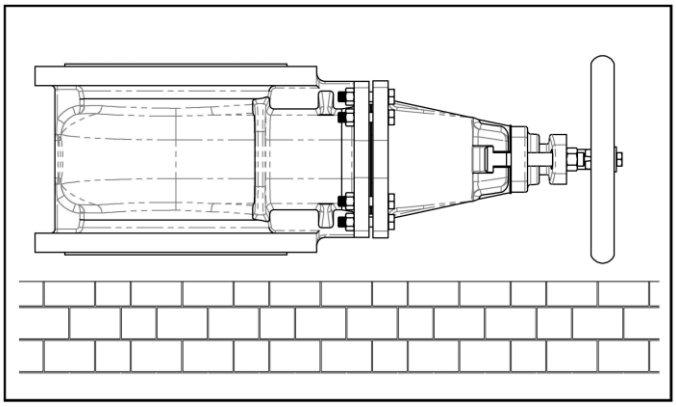


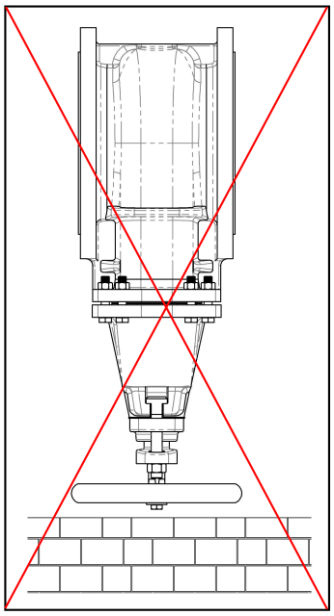
Fig.1

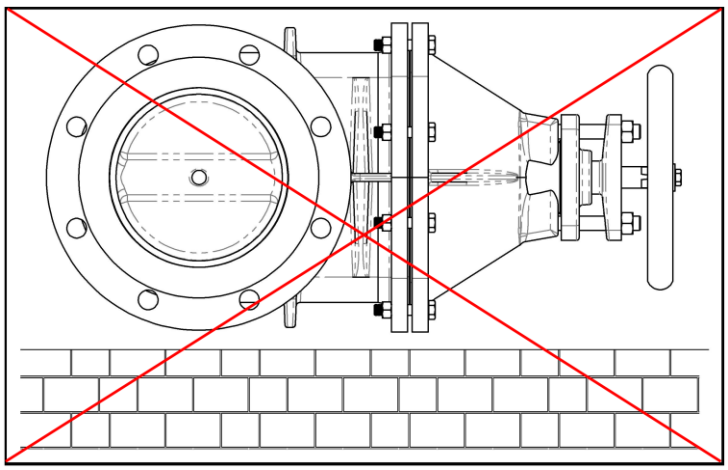
7.1 Installation Position











8. MAINTENANCE

Dikkan gate valves are designed to have minimum maintenance. But if you carry out the following maintenance, they will increase the longevity and reliability of the valve.

Valves shall be dismounted from pipeline before maintenance and shall be cleaned from medium.

Maintenance work must be performed by qualified, trained and skilled people according to maintenance instructions Welding is not accepted on valves repairing.

- In very seldom used places, valves should be performed open-close every 3-4 months.
- The stem threads that are exposed to atmosphere should be periodically lubricated, with quality grease.
- Bonnet bolt tension should be checked periodically when valves are used in high temperature applications where loosening may occur. Although leaks through ring joints are rare, erosion or corrosion could cause rings to fail. In these cases, a new ring gasket is required.
- The valve gland packing should be inspected at least monthly. If the gland packing shows signs of leakage, simply tighten the adjusting nuts *(P.No6)* to compress the packing. Do not over-tighten the adjusting nuts as this will make operation of the valve more difficult. If, after tightening the adjusting nuts to their fullest extent, the leakage does not stop, it is then necessary to replace the gland packing.

8.1 Replace the Gland Packing

At any circumstances, packing replacement is dangerous and not recommended for the valves under pressure. Even the valve is back seated; it is not possible to make sure that any particle is avoiding backseat to be at full closed position.

Backseat function shall only be used for avoiding or minimizing leakage of medium left in the line after shutting down the line and taking away the line pressure. Rather than attempting to repack under pressure, it is preferable to use the backseat to control the stem leakage until a shutdown provides safe repacking conditions.

Valves shall not be retained fully back seated during usage. This may yield packing to dry and cause the valve leakage. After the valve has been opened fully, rotate the hand wheel quarter turn towards the close position.

Unscrew nuts (P.No6) and raise gland (P.No9). Remove all of the old gland packing with packing hook. Clean the stuffing box and stem.

Cut packing by using a spare stem, a mandrel with the same diameter as the stem (Fig.2). Hold the packing tightly on the mandrel, but do not stretch excessively. Always cut the packing into individual rings. Rings should be cut with a butt joint (Fig.3). Cut the ring (Fig.4). Install one ring at a time. Seat each ring firmly; making sure it is fully seated before the next ring is installed.

Do not use a pointed tool to push the rings into position. When inserting the packing rings, the butt joints offset 180° from each other (Fig.5). When enough rings have been individually seated so that the nose of the gland will reach them, individual tamping of the rings should be supplemented by the gland. Bring down the gland and tighten nuts balanced (P.No15), sufficiently while allowing the stem to operate smoothly.

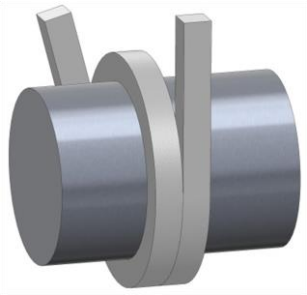


Fig.2

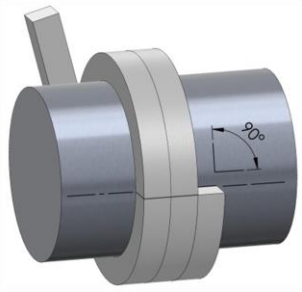


Fig.3

Fig.4

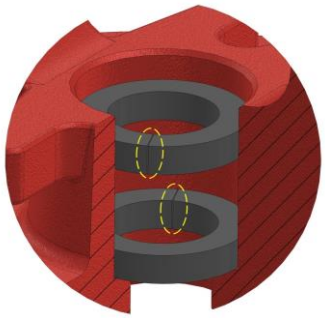


Fig.5

8.2 Replace the Gasket

Depressurize the system and remove the valve from pipeline before bonnet disassembly.

Disassembly the valve will become out of warranty. Please consult Dikkan before disassembling if the valve is under warranty.

- ***Bonnet Disassembly***

a) Operate the valve until it becomes full open position.
b) Remove bonnet bolts (P.No5) by using crossover method.
c) Lift up the bonnet assembly, taking care not to damage the wedge.

- ***Gasket Replacement***

a) Discard the old gasket. (P.No4)
b) Inspect the gasket seating surface of the body for wear, damage or deterioration.
c) Polish gasket seating surface with sandpaper to clean rust, dirt and remnant of gasket.
d) Clean the surface to remove all polishing residue.
e) Install a new gasket.

- ***Body-Bonnet Assembly***

a) Inspect the bonnet bolts to ensure that it is not damaged. Any damaged bolts should be replaced.
b) Place the entire bonnet assembly onto the valve body, taking care not to damage the wedge.
c) Tighten the bolts in the crossover method like a shown in Fig. 1.
d) Test the valve as required, and place the valve back into service.

8.3 Metal to Metal Sealing

If the seat examination shows only small defects, it is possible to renew seat sealing surface lapping the seat with the special tool and immediate action is necessary.

To repair the wedge seat or body seat, the valve must be removed from pipeline, then use the following procedure:

a) Using a thick polishing paste, alternately turn clockwise and counterclockwise about 90°, softly pressing. Lift up often and turn the tool, changing its contact position with seat. Go on with lapping until any defect disappears, adding, polishing paste if necessary. And then clean the seat and repeat treatment using a thinner polishing paste.
b) Remove lapping tool and clean carefully the seat, using a washing agent.
c) After lapping, it is recommended that the surface of the seat and wedge be checked for proper contact using marking blue. Coat the body seats with marking blue, and tightly press the wedge into the body seats by hand. Remove the wedge and examine to make sure there is continuous contact between the sealing surfaces of the wedge and body seat.
d) If such contact is not homogen, repeat steps a, b and c until excellent contact is obtained. If disk defect is greater, a trial to repair it can be performed metal cutting the sealing surface of disk on a lathe. After metal cutting perform lapping as indicated above.

9. OPERATION

- Gate valves are operated manually by handwheel. The handwheels are designed such that reasonable effort exerted by the operators is sufficient to operate the valve. All Dikkan gate valves have open and closed marked on the hand wheels along with directional arrow. To open, turn the handle in a counterclockwise direction. To close, turn the handle in a clockwise direction. Whenever possible, open and close the valve slowly. This is particularly important in piping systems containing liquids where quick valve closure (with other factors) could lead to the possibility of an undesirable pressure surge (water hammer) in the piping system.
- Level indicator models, you can follow the valve open- close rates on the level indicator.
- If the hand wheel is difficult to turn, loosen packing nut ¼ to ½ turn. Retighten packing nut after open-close operation is completed.

10. RECYCLING

Product can be recycled. If suitable procedure has been respected, no environment pollution risk occurs. When the recycling of the product is made, the country's laws, rules and regulations must be observed.

11. PRESSURE EQUIPMENT DIRECTIVE (2014/68/EU) AND CE MARKING

Dikkan gate valves comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Valves are categorized in accordance with the maximum working pressure, size and ascending level of hazard, which is dependent on the fluid being transported. Fluids are classified as Group 1, dangerous fluids or Group 2, all other fluids including steam. Categories are SEP (sound engineering practice) and for ascending levels of hazard, I, II, III or IV. All valves designated as SEP do not bear the CE mark nor require a Declaration of Conformity. Dikkan valves with a CE marking have a declaration of conformity which includes information about the applied conformity assessment procedure. It has been confirmed that the quality assurance in design control, manufacture and the manufacturer's final acceptance of Dikkan Gate Valve by notified body.

Risk Analysis List

Hazard	Hazard Cause	Possible Results)	Probability	Severity	Risk	Actual Condition	Probability	Severity	Risk
Explosion	Material Selection for low endurance of pressure impact. Internal leakage	Slightly Injury, Damage	2	2	4	Using high endurance of pressure impact.(The samples are controlled by toughness and tensile strenght test according to DIN EN ISO 10873)	1	2	2
Corrosion	Wrong material and paint selection	Denudation	3	2	6	Selection of the material and paint which stands up to the corrosive enviroment. Add the corrosion factor to the design calculation	1	2	2
Fire	Sealing surface corrosion and gland leakage. Lack of enough durability	Slightly Injury	3	2	6	Selection of the proper gland and gasket materials. controlling the sample by Leakage and Body Strength Test according to EN 12266-1 and EN 12266-2	1	2	2
Steam	Sealing surface corrosion and gland leakage.	Slightly Injury, Damage	2	2	4	Selection of the proper gland and gasket materials. controlling the sample by Leakage and Body Strength Test according to EN 12266-1 and EN 12266-2	1	2	2
Energy Loss	Used of high pressure drop valves. Having an extensive valve surface	Energy Loss	3	2	6	Remarking the operation pressure on the valve	1	2	2

12. SAFETY REMARKS

- The operating instruction has to be observed in an obligatory way. In the event of mismatch, all warrants and liabilities are reserved.
- Sharp edges and burrs can cause injuries.
- The valves must be mounted, started up or serviced by fully trained and qualified personnel only
- Maintenance staff must be elucidated about the dangers pertaining to disassembling and mounting of valves as well as electric and machinery installations
- Safety goggles and other appropriate protective gear should be used. Failure to do so could result in serious injury.
- At all work at a valve installed in a pipeline it has to be made sure that the plant is not under pressure and not medium can leak from the pipeline.
- Be sure that any dangerous or combustible or detonating gas or fluid has been depressurized from product and connected piping, to avoid any danger to maintenance people due to contact or inhalation.
- Preserve valve specific maintenance manual in conjunction with this manual and let them reachable by maintenance staff. Be sure that maintenance staff read any part of those manuals before any use or maintenance operation.

13. TROUBLESHOOTING

⚠ **Be sure to observe the safety instructions during troubleshooting.**

Fault	Possible Cause	Corrective Action
Valve leaking around stem and gland	T-Bolts loose	Tighten T-Bolts
	Damaged or worn gland packing	Refer to the "8.1 Replace the Gland Packing" sections of this manual
	Damaged stem	Replace stem
Valve leaking around bonnet	Body-Bonnet bolts loose	Tighten body-bonnet bolts
	Damaged bonnet gasket	Refer to the "8.2 Replace the Gasket" sections of this manual
Valve leaking around pipe connections	Flange bolts loose	Tighten flange bolts
	Damaged flange gasket	Replace flange gasket
Valve hard operate	T-Bolts too tight or tightened unevenly	Loosen T-Bolts, re-tighten T-Bolts evenly
	If the valve has not been operated over for a long time, may stem is stuck	Lubricate stem threads with grease
Valve does not pass flow	Check flow arrow direction on valve body	The arrow on the valve body must be in the same direction of the liquid flow
	Flange covers not removed	Remove flange covers
	The valves and pipeline must be protected against freezing media	Warm up pipeline system and use valve jacket
Valve seat leaking	Dirt or debris between sealing surfaces	Open valve to flush or clean sealing surfaces
	Damaged wedge seat or body seat	Refer to the "8.3 Metal to Metal Sealing" sections of this manual
Low flow rate	Blockage in the pipeline system	Check pipeline system
Breaking the valve parts	Damage to the parts bearing pressure because of water hammer	To avoid water hammer, where necessary in the pipeline system, place water hammer protective equipment

14. Warranty

Warranty Period: 18 Months

The warranty shall not cover maintenance work, installation of external parts. When unoriginal parts are used for replacement, warrants and liabilities become invalid.

15. NOTES

NDFT is 120 microns unless otherwise specified by the purchaser. (for coated valves)

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