DVD VALVES

OPERATION MANUAL

MSV METAL SEATED GATE VALVE

GENERAL SAFETY INSTRUCTIONS

This Operation Manual is created for you to use DVD Metal Seated Gate Valves effectively and to reduce potential risks regarding faulty use of the mentioned valves. With this Manual, potential accidents and damages can be prevented and life time of the valve can be increased.

The product you will be using is designed and manufactured according to highest quality standards and has passed DVD quality procedures 100%. However, Valves hold potential risks and can cause danger in case of faulty use or faulty assembly. Therefore, **everyone, who somehow gets in contact with the valve, is responsible for reading and fully understanding this Operation Manual.**

Unauthorized revision, change or application on the product or any of its parts shall be prevented at all times. In case of incompliance to this Operation Manual, DVD Valves cannot be hold directly or indirectly responsible or liable.

During the use of the Valves, general regulations and standards shall be followed. Some of these regulations are defined in EN Standards. Installation of the Valves shall be done by qualified and experienced technical personnel. For detailed information regarding the Valves, DVD Documentation (Catalogs, if appropriate Special Specifications and Technical Drawings, related DVD Order Confirmation etc.) shall be used and followed.

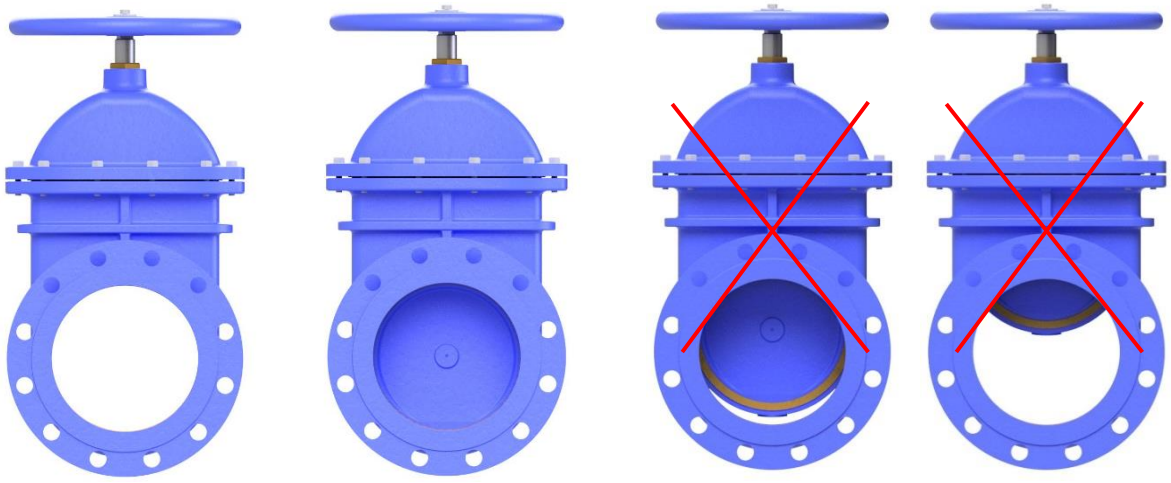
Before disassembling the Valve from the pipeline or any of its parts from the valve, make sure that the pipeline is de-pressurized and necessary safety cautions are taken. **If the line (water or air) is pressurized, any part of the Valve can move unintentionally, without any control.**

After commissioning, consequently the Valves are working under pressure; the Valves shall be monitored at all times and should be inspected regularly. Furthermore; laws, regulations and standards about Occupational Health and Safety should be taken into consideration.

If the Valve is installed as a drainage valve, operation of the valve shall be done with extreme caution. In such an installation, any movement can result in pressurized water discharge. Moreover, since the Valve disc mechanism is reachable, precaution must be taken for trapping or squeezing.

During dismantling of the Valve from the pipeline, medium can flow out from the pipe or the valve in a fast and uncontrolled way. Before dismantling, the pipeline must be emptied to prevent such an incident. Along with the medium; foreign objects (stone, sand, debris etc.) can be flowing out that can cause damage to personnel. Necessary precautions shall be taken to prevent such damage.

DVD Gate Valves are designed to be installed on pipelines as Isolation Valves (On-Off). **DVD Gate Valves should not be used for Regulation purposes.** Regulation purpose use can cause permanent damage to the Valve. Regulation purpose means to operate the Valve in any other position of the Valve Wedge than fully open or fully close positions.



PICTURE 1: Gate Valve Wedge Positions

Operating limits such as Nominal Size, Pressure, Temperature of the Valve can be found in DVD Documentation. Furthermore; Operating Size, Operating Pressure, Valve Body Material and Production Date can be found on the marking of the Valve Body. Any operating condition that is incompliant with these operating limits shall be approved by the Manufacturer in written. Pipeline Operating Pressure can be fluctuating (due to surge, water hammer, air regulation problems etc.). Therefore, such fluctuations should be considered, and the Valve should never be faced with a higher pressure than the defined Nominal Pressure.

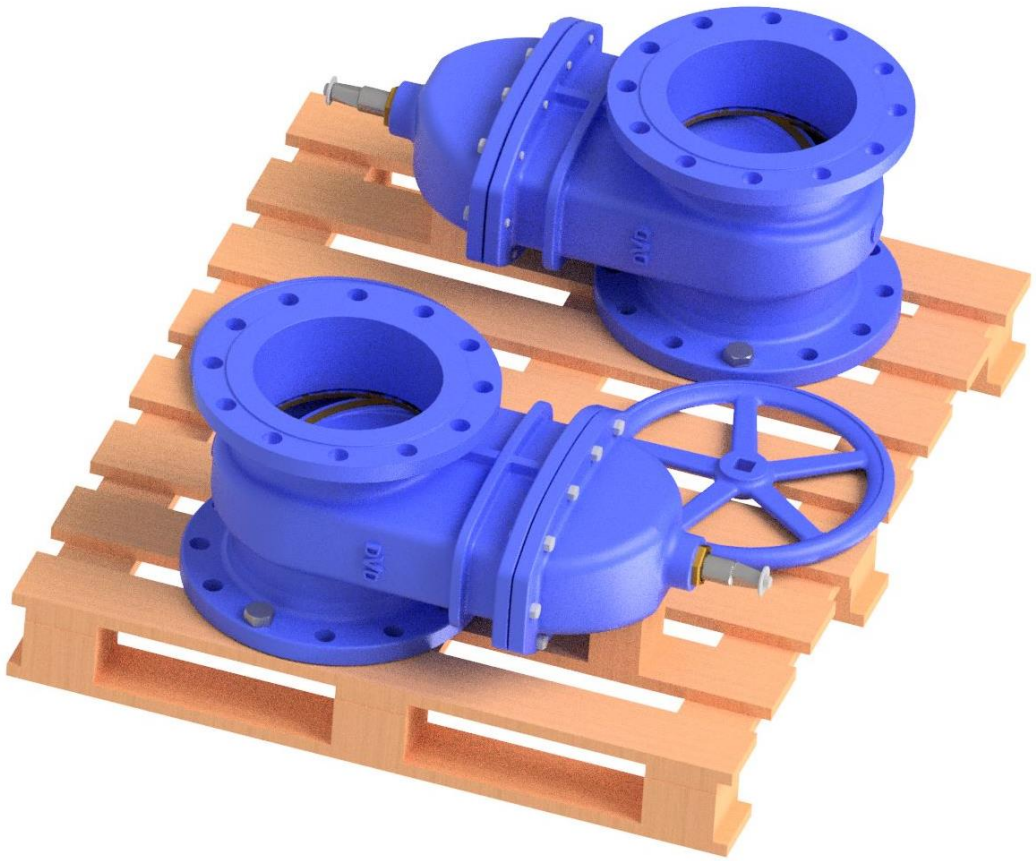
Valves should be projected from frosting at all times. Especially in locations that have high risk, protective measures should be taken such as; burying of pipelines in more depth, protecting the valve chambers by isolation material, or fully draining of pipelines before freezing conditions occur. If no precaution is taken, due to expansion of water, Valve body or other parts of the Valve can be permanently damaged. DVD Valves cannot be held liable from such damages.

TRANSPORTATION AND STORAGE

During transportation and storage, Valves shall be packed with material that can withstand to its size and weight, and should be fully fixed on a pallet. If the Valves are not fully fixed on the pallet, the Valve can move during transportation and can cause severe damage. The Valve should be protected from environmental conditions and physical impacts from outside. Any part of the Valve body should not exceed the pallet dimension and shall be wrapped by protective cover (stretch film, insulation material etc).

Valve coating and Valve accessories shall be protected at all times during transportation and assembly.

Positioning of the Valve on the pallet is done by positioning the Valve on its inlet flange with a support below the cover of the valve. If the Cover is not supported, Valve body can lay down on its handwheel or the shaft. Such a movement should be prevented, since it can damage the Valve or the people around it.



PICTURE 2: Positioning the Valve on the Pallet & Supporting the Cover

Center of Gravity of the Valve can be away from the Valve Center. Therefore, during lifting the Valve, it can swing around. Such incidents can cause damage on the lifting device, the Valve itself, and to personnel around the Valve. **Lifting operation should be done with extreme care and Center of Gravity of the Valve should be determined before lifting operation.**

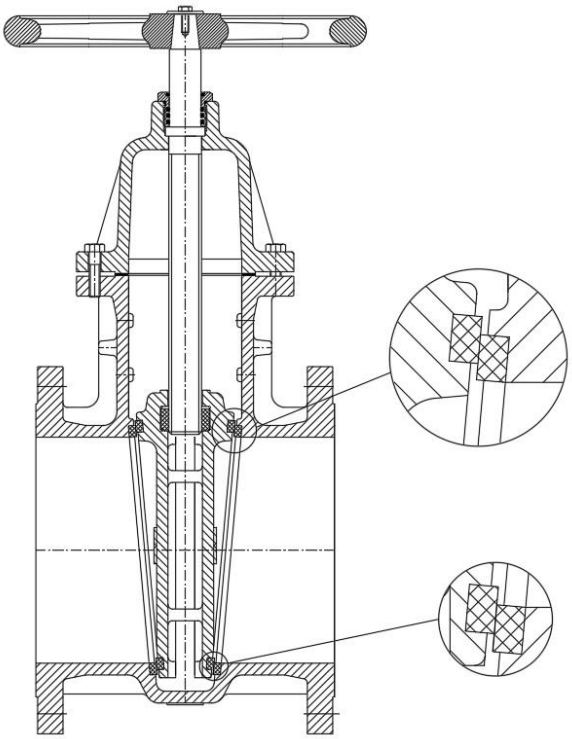
Lifting Belts and Lugs which are according to safety norms shall be used. They have to be suitable for the Valve weight. Valve should be lifted only from the Lifting Bores. **Lifting from the Gearbox, Actuator, Handwheel or the Shaft should not be done at all times.** These parts are not designed to carry the weight of the Valve and lifting from these parts can cause breaking, tumbling or dropping. If a lifting device will be used on small sized valves (DN250>), Flange Connecting Holes can be used as a lifting point.

During Storage and Transportation, Valves should never be faced with direct sunlight. Under direct sunlight; seals or valve coating can get damaged. Valves should be protected and stored in a dry and aerated environment and should be protected from environmental effects. Storage should be done @ -20°C/+50°C temperature range. If the temperature is below 0°C, before assembling the Valve; the Valve should be heated up to 5°C.

DVD Metal Seated Gate Valves are shipped from the factory in semi-open wedge position. Make sure to bring the wedge to either fully open or fully closed position prior to installation. Otherwise, wedge position can be forgotten, and during filling up the pipeline, Valve can start regulating unintentionally and cause cavitation damage.

Valves should never be in direct contact with the ground, and should be protected by a pallet. Valve internal surface and moving parts should be protected from foreign particles, sand, dirt, debris etc. Debris collected on moving parts can cause these parts to get stuck and prevent valve operation. Flange Protection Covers should only be dismantled right before assembly to the pipeline.

Metal Seated Gate Valve rings are extremely sensitive and should be cautiously protected at all times. This cautious protection should be done at all times, including but not limited to storage, transportation, installation and operation stages. In case of a small scratch or debris collection on the rings, the rings can lose their function and the Valve can face leakage problems. In such a situation, the whole Valve should be replaced. DVD Valves cannot be held liable from such ring damages.



PICTURE 3: Location of the Body and Wedge Rings

USE AND APPLICATON

DVD MSV Metal Seated Gate Valves in standard configuration are designed to be used in clean potable water systems. Operation in medium containing gas, oil etc. is only possible with written manufacturer approval and with special material selections suitable to the medium.

In systems that contain foreign particles (dirt, sand, debris etc.), the Valve can be clogged or sealing problems can occur. Gate Valves should not be used in such applications. If the particle level is very low, Strainers should be used in the upstream of the Gate Valves. For special applications other than clean water systems, please get in contact with the manufacturer and request a written approval.

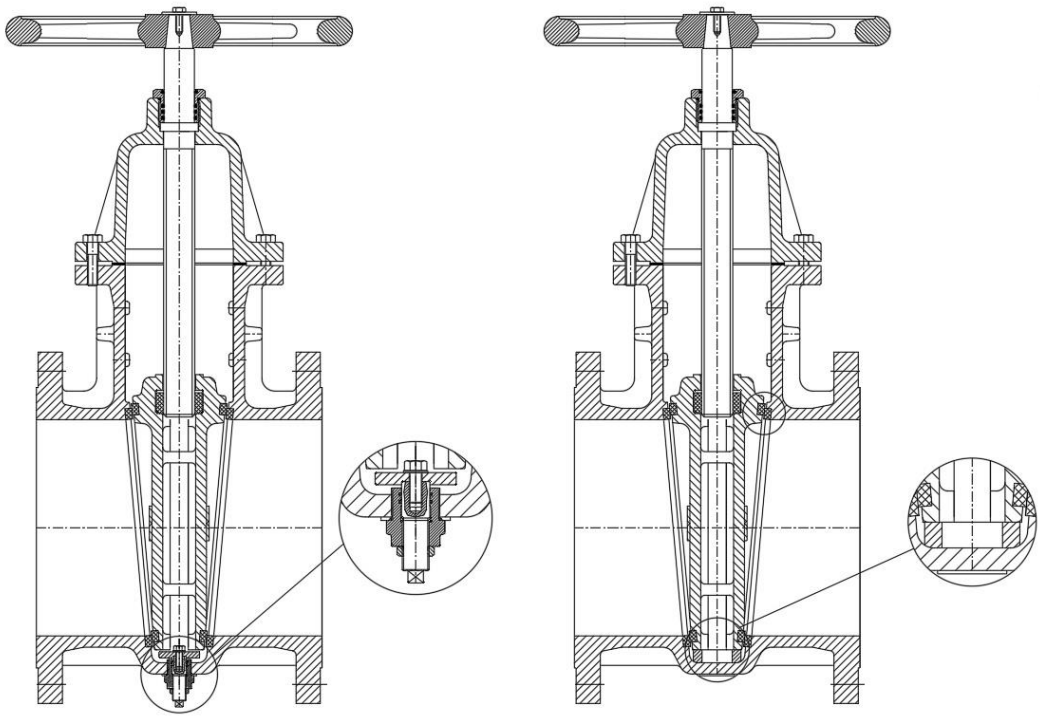
DVD Gate Valves are designed as Isolation Valves (On-Off) and cavitation damage can occur in case of regulation (semi valve wedge opening). If vibration or noise occurs during the operation

of the Valve, please check whether the Valve is either in fully open or fully closed position. If the wedge position is ok but the problem still continues, please check the system operation conditions (flow rate, pressure etc.) in order not to face any cavitation damage.

High Water Velocity can cause damage to the Valve. To prevent such damage, please check the Water Velocity. Maximum operating velocity for DVD Gate Valves is as follows:

Nominal Pressure	Max Water Velocity
10 bar	3 m/s
16 bar	4 m/s
25 bar	5 m/s
40 bar	6 m/s

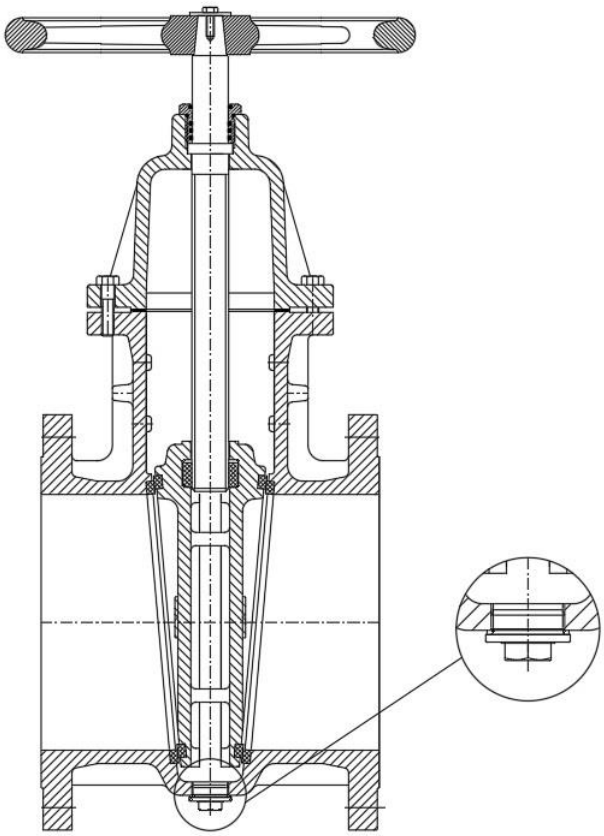
DVD Metal Seated Gate Valves provide sealing by fully matching the surface of body and wedge rings. This matching point can easily be sensed during the operation of the Valve. **Do not force the Valve to close further, if the wedge ring is already matched with the body ring.** Such an action does not better off the sealing performance; on the contrary, due to excessive torque, Valve can be damaged and the wedge can go down to the wedge housing and get stuck. In order to prevent the Wedge from going down to the wedge housing, "Wedge Stop" mechanism is available upon request; and in order to pull off the Wedge from the wedge housing, "Jacking Screw" mechanism is available upon request. If not mentioned on the Order, neither of these mechanisms are provided in the standard configuration. If you think that there is a sealing problem on the valve, do not apply excessive torque on the Valve and get in contact with the manufacturer immediately.



PICTURE 4: Optional Jacking Screw & Wedge Stop Accessories

Due to its design needs, Metal Seated Gate Valves have wedge housing on the body. If water velocity is low or if the medium is not fully clean, residuals can be collected inside this housing.

Such residuals can prevent the wedge to go down and match the sealing rings, causing leakage. Therefore if the valve wedge cannot go down to the housing, do not apply excessive force on the Valve; instead, the Valve should be taken out from the line for flushing. For ease of flushing, optional "Blow-Off Plug" accessory is available upon request. This is an optional accessory where such demand should be mentioned on the order.

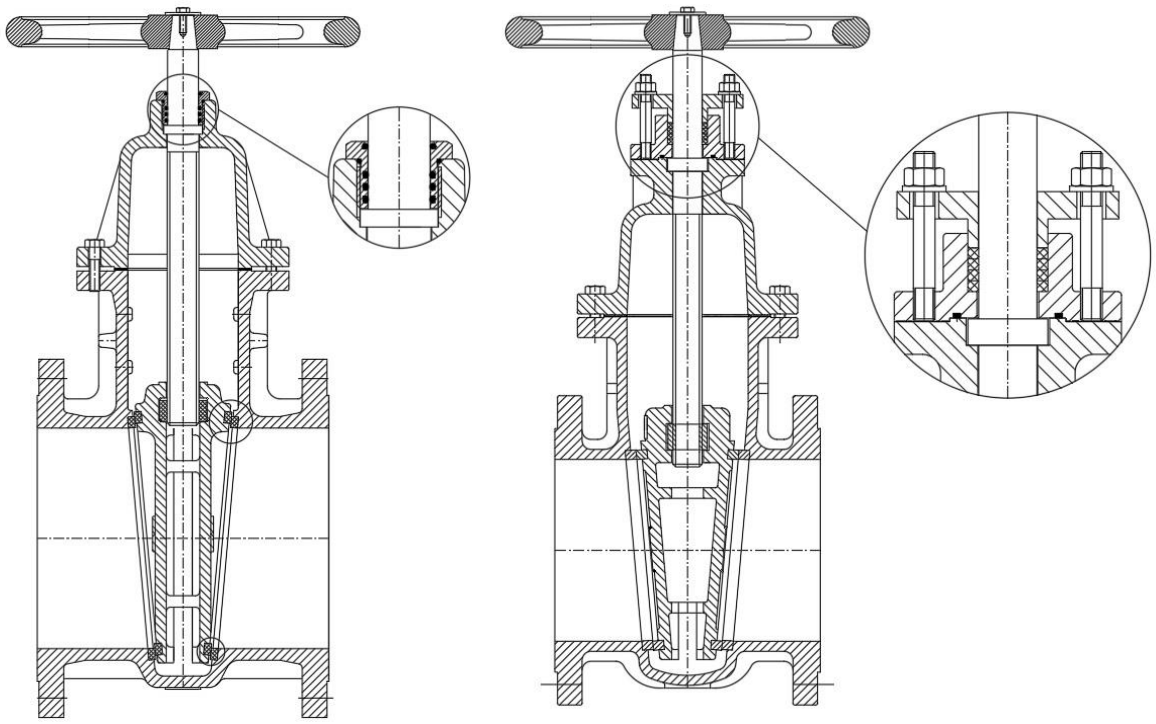


PICTURE 5: Optional Blow-Off Plug Accessory for Ease of Flushing

DVD Butterfly Valves are provided with a Handwheel for manual applications; and with Actuator Handwheel for automation applications. Handwheels are designed to operate the Valve easily and can provide sufficient force on the Valve. **For any reason, do not use a bigger Handwheel or do not use a device (crank, lever etc.) to increase the force acting on the Valve.** If there is a torque problem, please get in contact with the manufacturer.

DVD provides two different Stem Sealing Design Alternatives for MSV Metal Seated Gate Valves. These are, the standard "O-ring Sealing Design" and the optional "Packing Sealing Design". If no alternative is mentioned in the order, the Valve comes with the "O-ring Sealing Design". Therefore for packing option, please get in contact with the manufacturer beforehand and check the detail of the Order Confirmation.

If the Valve is with "Packing Sealing Design", make sure to check the packing for sealing. Especially during transportation and in storage conditions, packing can get loose and cause sealing problems. In such a case, by tightening the studs on the packing, sealing problem can be solved easily. In case of excessive tightening of the studs, opening-closing torque values of the Valve can increase and life time of the packing can decrease. Therefore, do not over-tighten the studs. This process should be inspected and checked in constant time intervals for trouble-free operation.



PICTURE 6: Standard "O-ring Sealing Design" and the Optional "Packing Sealing Design"

If the Valve stays at a constant position (fully open or fully closed) for a long period of time, inspecting the Valve and opening-closing it at least one time per six months is highly advised. Keeping the Valve at a constant position for a long period of time can cause blocking of the Valve.

DVD MSV Metal Seated Gate Valves are designed, manufactured and tested according to EN12266 -1Rate A drip tight sealing. However, for High Pressure (>PN40) or Large Size (>DN800) applications, DVD follows EN1984 and EN12266 -1 Rate B sealing class, which is mentioned on the order.

INSTALLATION TO THE PIPELINE

Pipeline flanges, which the valve will be installed to should be in the same axis and flange surfaces should be parallel to each other. Sealing problems can be seen if this is not obtained, and/or the Valve can face high load forces that can cause failures in long time. Load forces transmitted to the Valve from the pipeline should not go beyond what is defined in EN 1074-2 standard. Not to do so can cause Valve failure.

For Valve installation, enough distance should be provided between two connecting pipeline flanges. Shorter distance than needed can damage the Valve flange or the Valve coating. If there is longer distance than needed, do not try to pull the pipeline flanges and Valve flanges towards each other. During installation, make sure that flange surfaces are clean and smooth.

Valve flange to pipeline flange connection should be done by bolts and nuts; and washers must be used to protect the Valve coating. Opposing bolts should be screwed equally, preventing high load forces, strain and failure. Steel reinforced gaskets should be used between the flanges. Make sure that the gaskets are correctly positioned on the sealing surface of the flanges. Flange bolting should be selected according to EN 1591 Standard requirements. Excessive screwing of the bolts can cause permanent damage on the Valve.

Valve should be protected from outside effects (construction work, coating, concrete work etc.) at all times. Welding work should be concluded before Valve installation, and welding burrs should be cleaned beforehand.

Pipeline should be flushed and cleaned from all foreign particles, before Valve installation. Even though the pipeline can seem to be clean around the Valve installation area, during filling the line, particles from long distances can be carried to the installation area and can cause permanent damage on the Valve. DVD Valves cannot be held liable from damages occurred due to foreign particles such as debris, dirt, stones, wooden sticks etc.

Metal Seated Gate Valves have two double sealing rings (body rings and wedge rings) that are precisely machined to provide metal-metal sealing. **These Valve rings are extremely sensitive and should be cautiously protected at all times.**

If a residual (sand, stone, sticks, leaves etc.) gets in-between the body and wedge rings, the Valve cannot provide sealing. Furthermore, in case of a small scratch on the metal rings, the Valve cannot provide sealing. Residuals in the line, hitting the rings; can damage, wear or take out the ring from its housing. Therefore make sure that there are no residuals on the line. For such incidents, DVD Valves cannot be held liable.

Especially at steel pipeline applications, make sure to have full cathodic protection. In the absence of cathodic protection or non-active protection, Galvanic Corrosion can occur very fast. DVD Valves cannot be held liable from such damages.

Inspect the Valve before installation and make sure that there are no foreign particles inside the Valve. Check the sealing surfaces of the Valve and confirm that they are clean. Open and close the Valve at least one time and check the functionality of the Valve before installation. For Valves that are stored for a long period of time, please check the sealing gasket for any deformation and please contact the manufacturer if you see any problems.

If the Valve needs to be re-coated on site, for maintenance purposes, be sure to protect the sealing surfaces (gaskets, o-rings, stainless steel surfaces etc.) If these surfaces are coated, sealing problems can occur.

VALVE POSITIONING

If the Valve is to be installed underground, installation inside a Valve Chamber is highly recommended. If the Valve is to be buried, optional Extension Spindle and Surface Box accessories are needed. These are optional accessories where such demands should be made on the order.

During installation, take into consideration possible inspection and maintenance circumstances and provide enough space for such intervention. Quick Couplings such as Dismantling Pieces should be used together with large size valves (DN250<) for ease of dismantling the Valve. Dismantling Pieces are recommended to be installed in the upstream of the Valve. Furthermore,

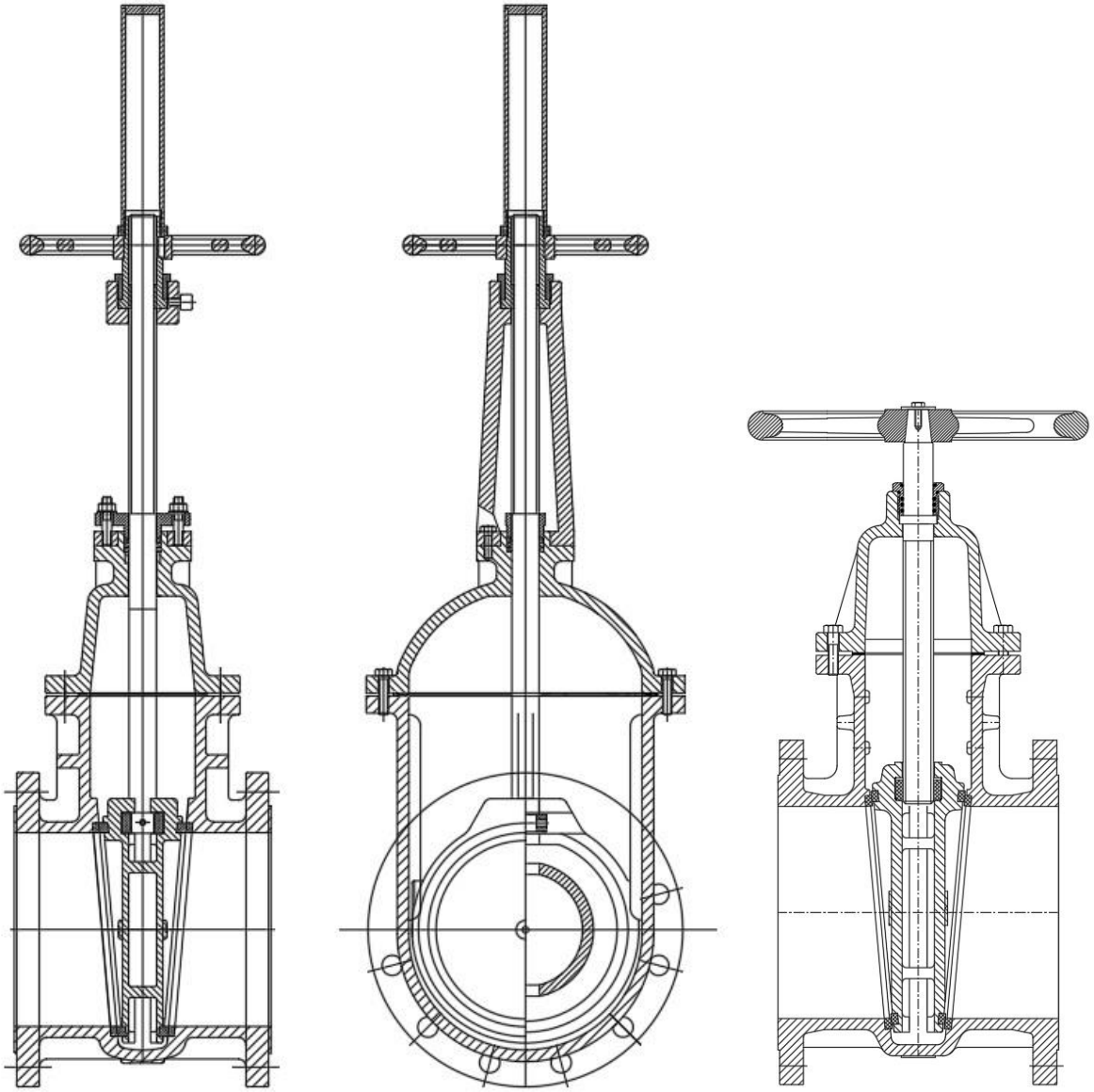
a Lifting Device should be available on the site that is in line with the weight of the Valve. Otherwise, dismantling and re-installing of the Valve for maintenance purposes will not be possible.

PICTURE 7 – Gate Valve + Dismantling Piece Connection

It is recommended to have DN x 3 straight pipeline installation in the upstream and downstream of the Valve. Equipment such as Elbow, T-Connection, Strainer etc. to be installed directly in the upstream of the Valve can cause cavitation and can damage the Valve.

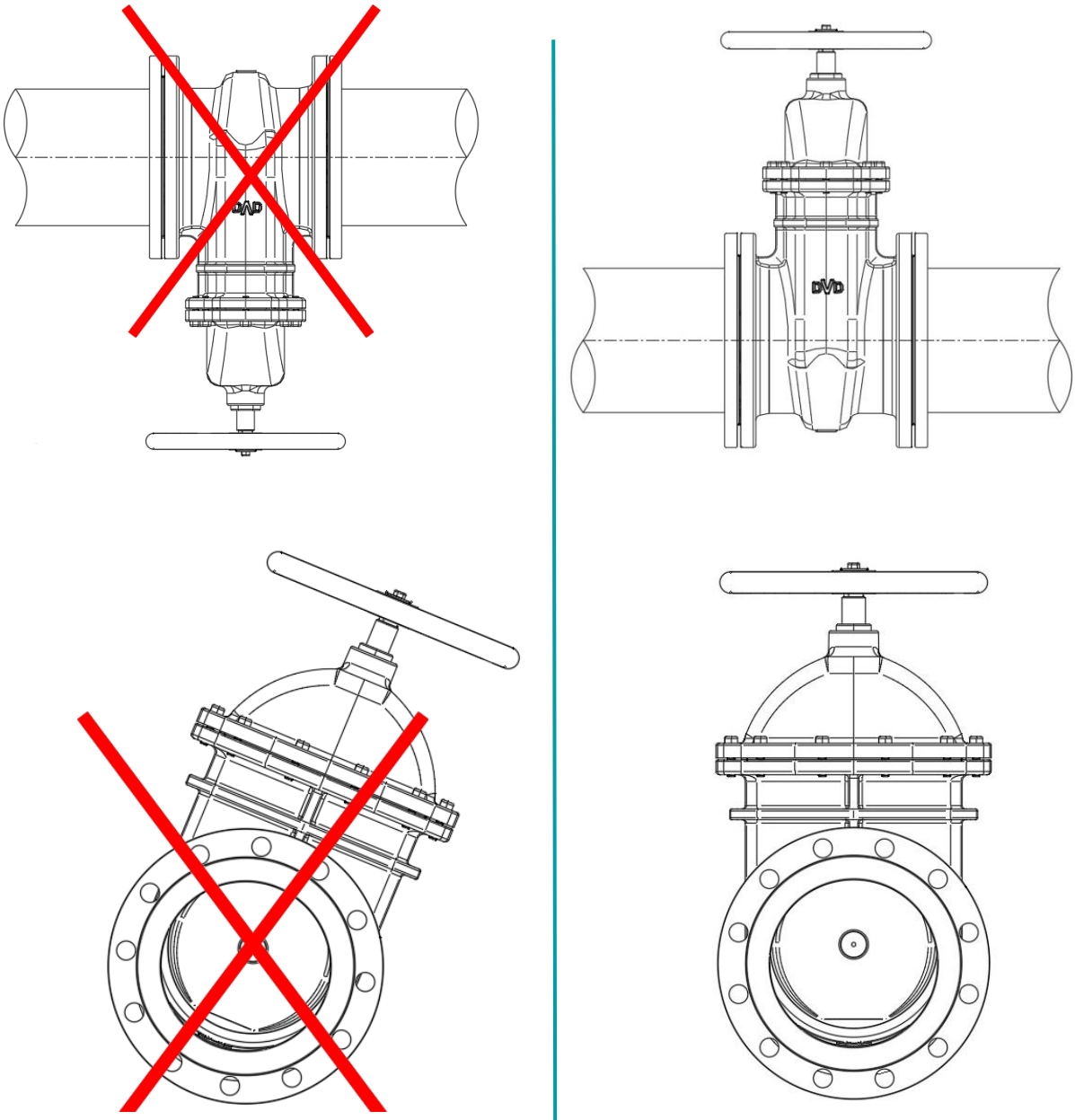
If the Gate Valve is to be installed in the downstream of a Regulating Valve (Hydraulic Control Valve, Plunger Valve etc.) or a Pump, make sure to leave at least DN x 10 gap. Cavitation risk is higher for Regulating Valves and Pumps compared to stationary equipment.

DVD Metal Seated Gate Valves are provided with two different configurations; YSV Rising Stem and MSV Non-Rising Stem Gate Valves. In YSV Rising Stem Gate Valves; Valve Stem and Valve Wedge move up-down together. Therefore, sufficient gap should be provided around the Valve Stem, and it should be made sure that no object restricts the Valve Stem movement.



PICTURE 8: Rising Stem (Stem Movement Area should not be Restricted) and Non-Rising Stem Design

DVD MSV Metal Seated Gate Valves cannot be installed upside-down or installed as tilted. Installing the Valve upside-down or as tilted can cause sealing problems or cause permanent damage on the Valve.

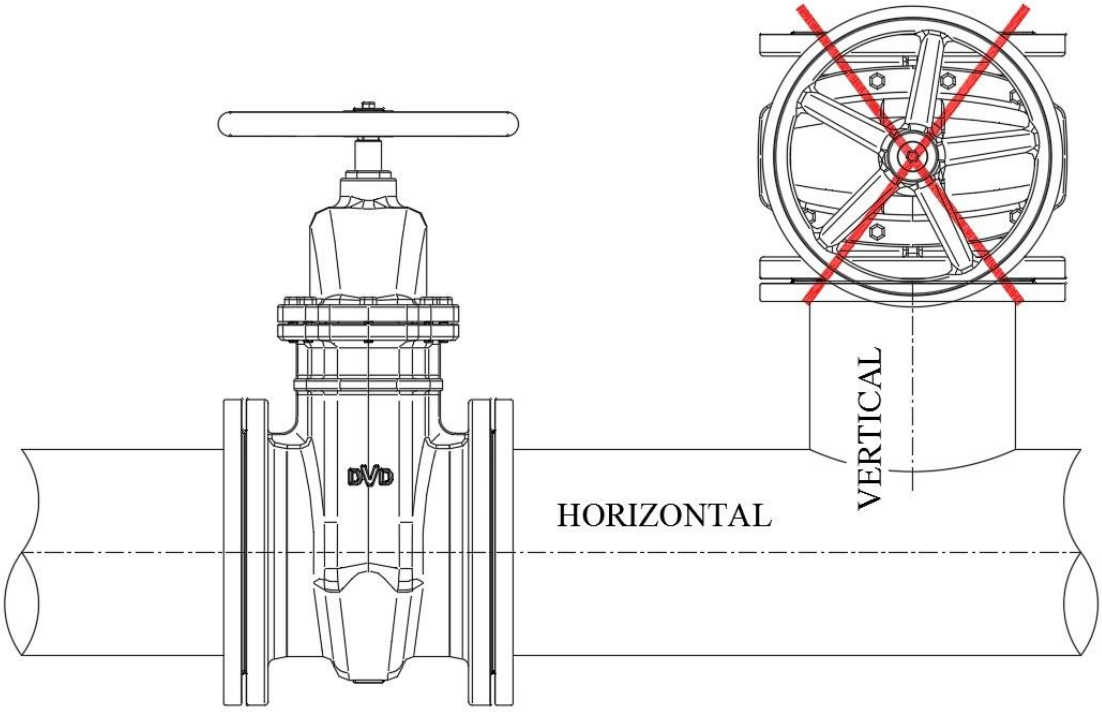


Wrong Installation

Correct Installation

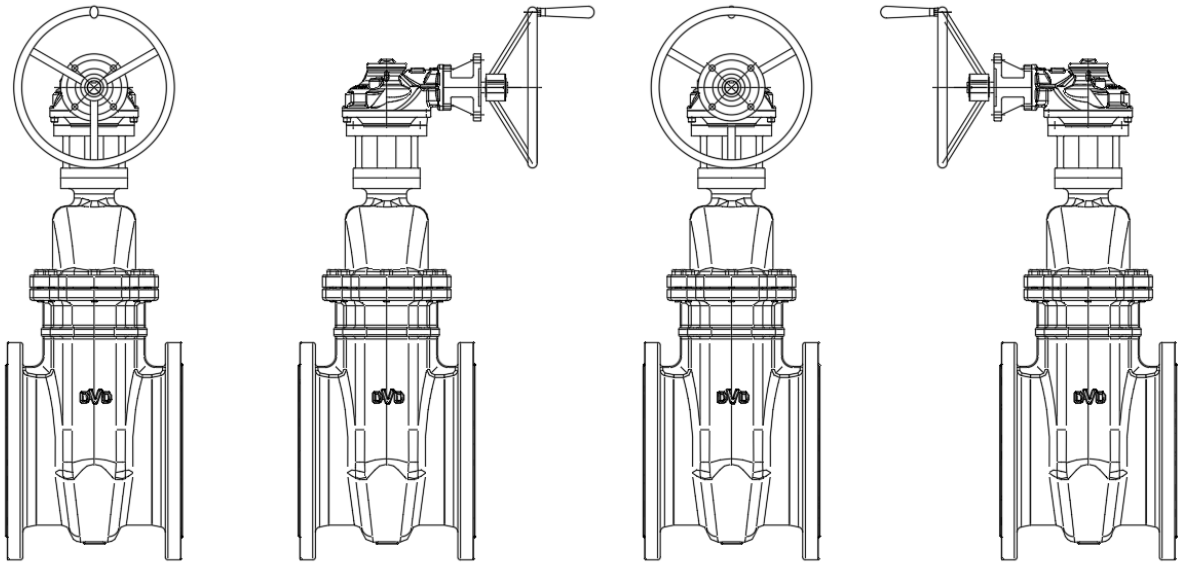
PICTURE 9 – Installation – Valve should not be installed upside-down or as tilted.

DVD Gate Valves can only be installed on horizontal pipelines, following the above requirements. DVD Valves does not take responsibility for vertical pipeline installations. For installations on vertical pipelines, residuals can be collected on the wedge and sediments can occur. Such sediments can cause malfunctioning. Furthermore, especially in large size Valves (DN200<), due to the weight of the wedge, installation on vertical pipelines can cause excessive force on the bottom ring, causing friction and increasing torque values. If installation on a vertical pipeline is necessary, optional "Wedge Guides & Shoes" accessory can decrease friction and increase the life time of the Valve; however, it still can not guarantee trouble-free operation.



PICTURE 10 – Installation on the Pipeline – Correct and Wrong Installation

In large size Gate Valves (>DN300) Gear Box application is highly recommended. If such valves are used without a gearbox, torque values can go up, making it harder to operate the valve. Gearbox is installed in order to decrease the operating torque for ease of operation. If ordered, the gearbox is factory-installed and should be mentioned on the order. If a gearbox is needed to be installed on site to a standard gate valve, some parts should be modified in the factory. Therefore please contact the manufacturer for such a revision. Gearbox on the Valve can be rotated on the shaft in 90 degree intervals. With such rotation, Gearbox Handwheel can be arranged to be with the pipeline axis or to be 90 degrees with the pipeline axis.



PICTURE 11 – Gearbox Positioning on the Valve

DVD MSV Metal Seated Gate Valves are manufactured and tested to have bi-directional sealing. However, for high pressure (>PN40) or large size (>DN800) applications, the Valve is

manufactured to have single sided sealing. This situation can be checked from the arrow direction on the body. If the Valve is single sided, it should be installed on the pipeline taking into consideration the arrow direction.

GENERAL INFORMATION REGARDING ACTUATORS

This section is related to DVD MSV Metal Seated Gate Valves with Actuator. For Manual Gate Valves, please move on to the next section.

For more information, please check the Operation Manual of the Actuator Manufacturer and follow its requirements. If Actuator Brand and Model is unknown, please get in contact with DVD Valves.

DVD Gate Valves are shipped from the factory as Actuators set and tested. Therefore, do not change Actuator Settings and Limits. Such a change can cause excessive force to be applied on the stem and can damage it. If you feel that there is a problem with the settings, please contact DVD Valves and get a written approval for change of setting on site.

DVD MSV Manual Gate Valves are not in Actuator-ready design. If an Actuator installation is to be done on an existing Manual Gate Valve, please contact DVD Valves and receive a written approval for such an installation. Such revision requires a change on the Cover and Stem. If requested, the Valves can be ordered as "Ready for Actuator Assembly with Top Flange" option to prevent such part changes.

For Actuator adaptation, correct Actuator type and model has to be selected. Wrong selection can cause problems regarding with assembly, or can cause permanent Valve damage. **DVD Valves cannot be held liable for damages due to unapproved actuator selection and installation.**

After Actuator installation, Open – Close Limit Settings and Torque Limit Settings should be done. Not to do so can cause excessive force on the Gearbox and can cause permanent damage on the Valve. Please check the Operation Manual of the Actuator Manufacturer for the Settings. DVD Valves cannot be held liable for damages due to not doing the setting, or wrong setting of the Actuator.

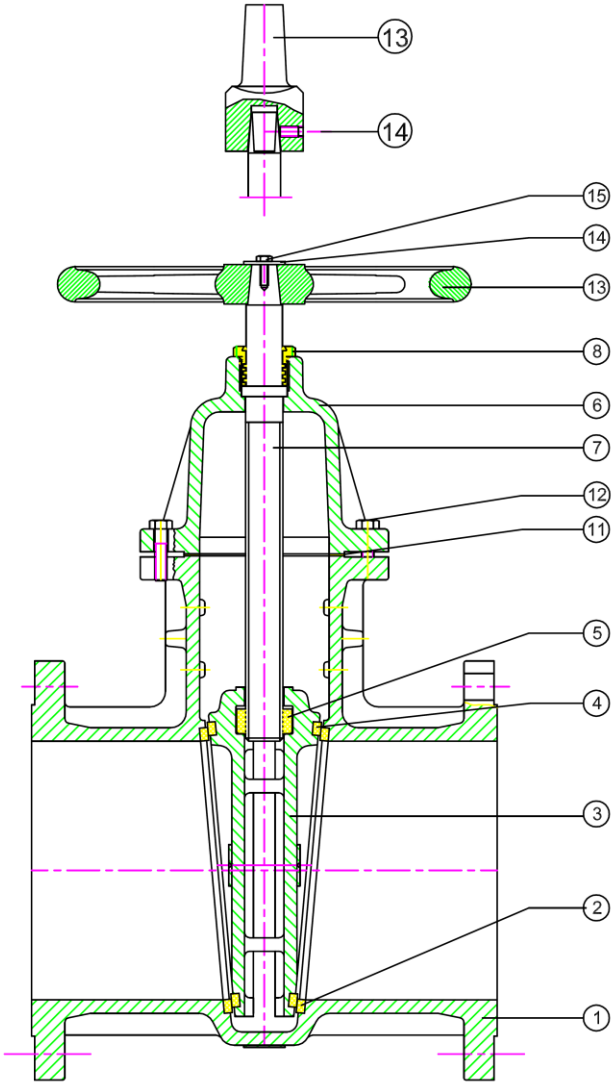
MAINTANANCE

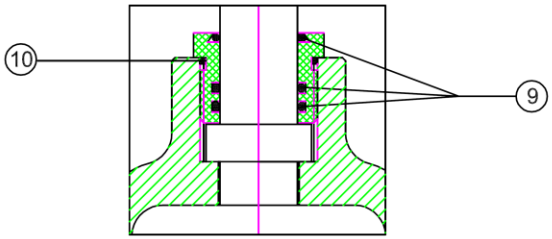
Before starting the maintenance, make sure that the Valve is isolated; upstream and downstream pipelines of the Valve are drained and de-pressurized. In case pipeline is not de-pressurized fully; potential dangers such as sudden disc movement, part movement or pressurized water outflow etc. can occur.

After maintenance is done, please re-install the Valve to the pipeline according to the related section in this Operation Manual.

Maintenance work should be done by experienced and skilled personnel. If there is no such personnel, please get in contact with DVD Valves and request your maintenance need. All personnel who will do the maintenance work should read and fully understand this Operation Manual. Maintenance personnel should follow Occupational Health and Safety requirements and should use the necessary protective accessories (Work shoes, glasses, helmet, gloves etc.).

DVD MSV Metal Seated Gate Valve Spare Part lists and predicted life time of these parts are indicated as below:



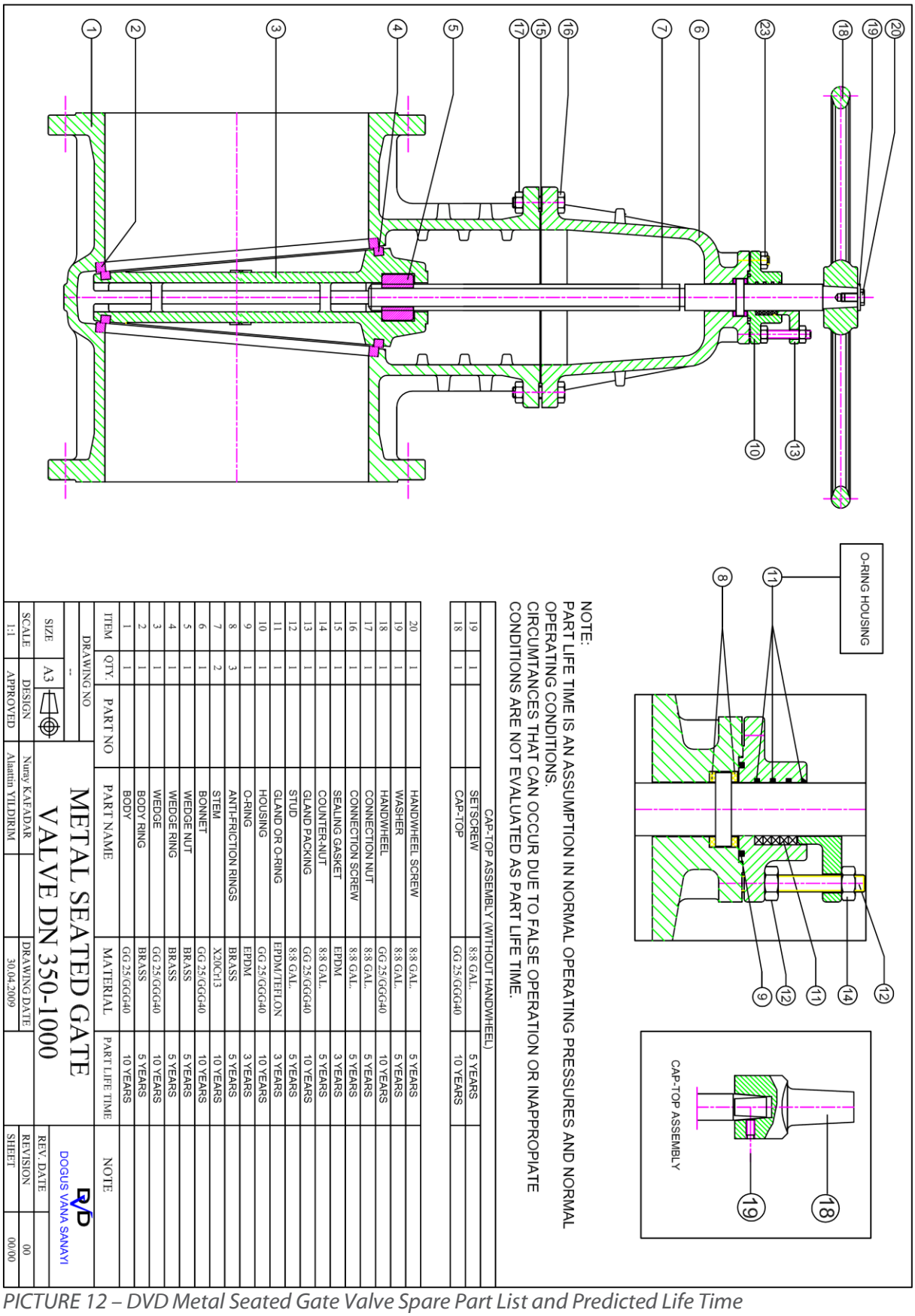


NOTE:
PART LIFE TIME IS AN ASSUMPTION IN NORMAL OPERATING PRESSURES AND NORMAL OPERATING CONDITIONS.
CIRCUMTANCES THAT CAN OCCUR DUE TO FALSE OPERATION OR INAPPROPIATE CONDITIONS ARE NOT EVALUATED AS PART LIFE TIME.

CAP-TOP ASSEMBLY (WITHOUT HANDWHEEL)						
14	1		SETSCREW	8:8 GAL.	5 YEARS	
13	1		CAP-TOP	GG 25/GGG40	10 YEARS	

15	1		SCREW	8:8 GAL.	5 YEARS	
14	1		WASHER	SS 304	5 YEARS	
13	1		HANDWHEEL	GG 25/GGG40	10 YEARS	
12	1		SCREW	8:8 GAL.	5 YEARS	
11	1		SEALING GASKET	EPDM	3 YEARS	
10	1		O-RING	EPDM	3 YEARS	
9	1		O-RING	EPDM	3 YEARS	
8	3		BONNET NUT	BRASS	5 YEARS	
7	2		STEM	X20Cr13	10 YEARS	
6	1		BONNET	GG 25/GGG40	10 YEARS	
5	1		WEDGE NUT	BRASS	5 YEARS	
4	1		WEDGE RING	BRASS	5 YEARS	
3	1		WEDGE	GG 25/GGG40	10 YEARS	
2	1		BODY RING	BRASS	5 YEARS	
1	1		BODY	GG 25/GGG40	10 YEARS	
ITEM	QTY.	PART NO	PART NAME	MATERIAL	PART LIFE TIME	NOTE

DRAWING NO	--	METAL SEATED GATE VALVE DN40-300			DOGUS VANA SANAYI	
SIZE	A3				REV. DATE	
SCALE	DESIGN	Nuray KAFADAR		DRAWING DATE	REVISION	00
1:1	APPROVED	Alaattin YILDIRIM		30.04.2009	SHEET	00/00



PICTURE 12 – DVD Metal Seated Gate Valve Spare Part List and Predicted Life Time

This table is to provide a general idea to users, and life times can vary according to site conditions, application and operational conditions. Sealings should be changed when they are worn out or damaged.

All gasket and o-rings should be lubricated after renewal (w/ de-mineralized lubricant). If the Valve is potable water approved, potable water approved lubricants should be used.

DVD MSV Metal Seated Gate Valve Bonnet Sealing Gasket (11/15) can be removed without removing the body from the pipeline. However, valve body should be fully isolated and de-pressurized before dismantling. **Do not dismantle the bonnet of the valve without de-pressurizing and draining the body fully.**

Please follow the below steps to renew the Bonnet Sealing Gasket (11/15):

1. Isolate the Valve and make sure to de-pressurize and drain the body.
2. Remove the bolts on the Bonnet (6).
3. Remove the Bonnet (6) together with the Stem (7) and Wedge (3). Sitting direction of the Wedge (3) on the Body (1) is extremely important, where it should be installed back to the body in the same direction. Therefore, please mark the Wedge (3) sitting direction beforehand.
4. Make sure not to damage the Body and Wedge Rings (4) and protect them at all times.
5. Remove the Bonnet Sealing Gasket (11/15).
6. Clean the Body (1) gasket channel and Bonnet (6) gasket facing surface.
7. Install the new Bonnet Sealing Gasket (11/15) on the Body (1). Make sure that the gasket is correctly fit to the gasket channel.
8. Install the Bonnet (6) together with the Stem (7) and Wedge (3) on the Sealing Gasket (11/15). Make sure that the gasket is correctly fit with the groove.
9. Screw the Bonnet (6) bolts in opposing order.
10. After installing the Valve, check the Bonnet (6) for good sealing.

Please follow the below steps to renew the Stem (7) O-rings:

1. Remove the Valve from the line, in line with the above mentioned requirements.
2. Bring the Wedge (3) to fully closed position.
3. Remove and take out the Bonnet Nut (8), holding the Stem (7) firm.
4. Renew the o-rings on the Bonnet Nut (8). Make sure that the new O-rings are fit correctly.
5. Clean the O-ring surfaces, O-ring surface on the Valve Bonnet and the Stem.
6. Screw the Bonnet Nut (8) on the bonnet.
7. Check the functionality of the Valve.
8. After installing the Valve, check the body shell for good sealing.

CONTACT INFORMATION

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