

	OPERATING INSTRUCTIONS <i>TRUNNION MOUNTED – BT2</i> <i>ACCORDING TO</i> <i>2014-68-EU DIRECTIVE</i>	MM01BT2
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TRUNNION VALVES IN TWO PIECES (BT2)

WARNING: Before using the valve read carefully everything written in this manual. If the prescriptions here indicated are not observed there could be damages to the equipment, the environment and the people.

5	30.03.16	General revision	M.Conforti	M.Letari
4	28/09/11	General revision	F.Lapini	M.Letari
3	03/10/06	Revision of par. 1 and par. 9	M.Letari	L.Marianetti
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1	22/02/00	General revision	De Luca A.	P.Adami
0	04/10/96	First Issue	P.Adami	L.Melis
Rev.	Date	Description	Issued by	Approved by

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1.0 DESIGN RULES AND STANDARD REFERENCES

Valves are designed, manufactured, inspected and tested in such a way as to ensure its safety when put into service in accordance with the instructions mentioned in this manual. The main rules used in the development of the valves manufactured by Velan ABV are the following:

- PRESSURE RATING: ASME B16.34/ API 6D/ API 6A/ BS EN ISO 17292.
- MINIMUM BODY WALL THICKNESS: ASME B16.34 / ASME VIII / API 6A.
- FACE-TO FACE DIMENSIONS: ASME B16.10 / API 6D / API 6A.
- END CONNECTION: ASME B16.10 / ASME B16.5 / ASME B16.47 / ASME B16.25.
- HYDRAULIC TESTING: API 6D / API6A / API 598.
- FIRE SAFE TEST: API 6FA / API 607 / ISO 10497.
- VALVES ACCORDING TO DIRECTIVE 2014-68-EU (PED).

2.0 TERMS OF EMPLOYMENT AND SAFETY REQUIREMENTS

Valves manufactured by Velan ABV shall respect the following prescriptions:

- Valves manufactured by Velan ABV are designed and manufactured keeping into consideration the expected utilization conditions (pressure, temperature, allowed fluids, etc.); the operative limits are indicated at the end of this manual and on the identification tag placed on each equipment. Any different use is not allowed and can cause a damage both to the equipment and to the people.
- Design and construction criteria were applied to eliminate and/or reduce hazards as far as was reasonably practicable; special measures to reduce the risks at the time of installation of the equipment and/or use, including adequate warning, are indicated in this manual.
- Each modification, rebuilding or replacement of each element or part of the valve can be effected only after the approval of Velan ABV.
- The execution of each operation on above-mentioned equipment must be effected only by personnel properly qualified. If the personnel do not have the necessary knowledge in this field, must be trained. Personnel should wear safety shoes, gloves, helmet, protective glasses and tight-fitting sleeves overalls; avoid fluttering clothes, watches, chains, bracelets or any other piece of clothing that may get entangled. Do not wear loose long hair but put it up.
- If the valve shows any type of leakage, stop immediately its use. Isolate the valve and proceed to its replacement.
- If process fluid is dangerous, do not attempt any intervention on the valve that may result in a release of media to external environment.
- Do not loosen screws or studs when the valve is in pressure.
- A ball valve is basically an on/off valve. Throttling is not allowed as it would result in a rapid wearing of the ball port edges.
- The sense of rotation for opening is counter-clockwise.
- Valves manufactured by Velan ABV cannot be used as end of line valves.

- Take into account that the valve cannot operate in corrosive environment (acid or basic) or during earthquake.
- Valves manufactured by Velan ABV are designed (if not differently specified) for an use in the absence of erosion and corrosion of any type (in absence of corrosion and/or erosion we consider an use which causes a decrease of the thickness of maximum 0,05 mm/year).
- Eventual overpressures that could happen on the valve must be avoided by specific safety accessories on the line.
- Eventual solicitations that can have an effect on the valve must be avoided by specific devices on the pipe.
- It is not possible to use any welding process to fix any type of mechanical support to the valve.
- Valves that have been exposed to harmful and/or dangerous fluids shall be decontaminated before making any operation on them.
- The line supply (if any) and the pressure vessel must be electrically grounded according to the legislation in force).
- Do not touch any valve part during operation, if it is not necessary.
- The existing laws in the country of utilization must be respected; make sure that all operations are not in contrast with the whole of the plant and process safety rules.

3.0 TRANSPORT

The valves are prepared for shipping in boxes in a manner that any possibility of shipping and subsequent damages during the transportation is prevented).

All drawing and documentation delivered with the valves are the property of Manufacturer: they cannot be reproduced, in whole or in part, either text or illustrations, without permission.

Upon receipt of the valve make sure that the valves correspond to the order requirement, verifying the delivery notes and the shipping documents. The Manufacturer shall be immediately informed in case of damage of the packages or missing parts.

The recommended method of handling the valves is to lift them by slings fixed to the lifting lugs (if any) or around the flanged ends.

In any case it is necessary to pay attention during the movement of the equipment to avoid impacts or solicitations to the equipment that could influence the good functioning and the integrity of the valve. Make sure that nobody is near that valve while it is moving.

It is necessary to use ropes, belt and chain whose carrying capacity is higher than the weight of the valve-gear assembly considering a safety margin in accordance to the rules of the plant and the legislation in force. Refer to the dimension drawing for any information related to the weights and to the overall dimensions.

The valve shall be always kept in the open position.

In case an impact occurs, it is necessary to verify the integrity of the equipment before using it.

To avoid the entry of foreign bodies inside the valve, the protections of the flanges must be removed only at the moment of the installation.

In case the equipment is not used immediately, it must be stored in a dry environment at a temperature close to the ambient one (see point 11.0 for further information).

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In case long time storage is foreseen, it is necessary to verify the conditions of the valve before using it.

4.0 INSTALLATION

Actions to be executed are the following:

- Before the installation, inspect the valve to verify the integrity of all components.
- Remove the protections on the line flange.
- Insert the valve to align it to the pipe.
- Proceed to block the valve according to the fixing method adopted (studs/clamp/welding). It is important to notice that:
 - If the line connections are welded, the valve can be fixed without the need of its disassembly but shall be respected certain procedures and precautions. Valve must be in open position and shall remain in that way until we do not return to the initial temperature. Besides, it is necessary to verify that the maximum temperature reached does not harm the properties of materials of gaskets.
 - For bolted junctions, screws the nuts and cross tighten; pay attention that the line flanges are aligned at the time of screwing.
- The blocking value of the line studs shall respect what indicated in “Asme B.1.1 Class 2A”.

Increase the pressure gradually, verifying that no fluid leakages occur. If there is a leakage, eliminate the pressure from the line and replace the valve.

WARNING:

- a. By no means any valve shall be used to support a pipeline or to pull a shorter pipe to allow connection.
- b. The valve shall be installed with the gearbox assembled thereon. The gearbox will be removed and reassembled after valve installation only if strictly necessary.

5.0 USE AND MAINTENANCE

Initially, we recommend to check the equipment periodically, to verify the regular functioning of the valve.

In case some anomalies in the correct functioning of the valve are found, stop its use and effect a verification inspection.

Like any mechanical equipment, the service program depends upon operation frequency and severity of conditions. Valves, which are kept either open or closed for long time, should be operated at least twice a year.

The maintenance program for a normal use of the valve is the following:

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- **MANUAL VALVES:** after an initial period of running in (approximately 100 cycles), it is necessary to effect a verification control (in particular the assembly of the stem). In the majority of the applications a general control every six months is usually sufficient to ensure a regular functioning of the equipment.
- **MOTORIZED VALVES:** after an initial period of running in, it is necessary to effect a verification control. A periodic control (approximately each 1000 cycles or every three months) is generally sufficient to ensure the regular functioning of the equipment.

If the gaskets show to be broken or damaged, must be replaced by others supplied or approved by Velan ABV.

WARNING:

- Before performing any maintenance on the valve, personnel shall ensure that line is removed from service and isolated and no pressure is in the valve body cavity.
- After a major overhaul, if possible test the valve before reassembling it to the line. For testing refer to the relevant procedure. Before pressurizing the valve, check all bolts, nuts, grease nipples etc. for tightness.
- In case the equipment is designed for use with a corrosive media and is or could be subjected to erosion, it is necessary to control the conditions of the valve periodically to verify that the minimum allowed thickness was not exceeded. If the thickness is lower than the allowed one, the valve must be replaced.
- To guarantee the correct functioning of the valve we suggest to operate it at least three times each year.

6.0 REMOVAL FROM THE LINE

The procedure is the following (please refer to the enclosed drawing BT2001 to identify the parts):

1. Shut-off the pressure from the line.
2. Rotate the ball in half-open position (at 45° from the flow line) to allow the media to exit from the valve, then open completely the ball.
3. Remove the bleeder (90) and the drain plug (80), during this operation pay attention to the possible presence of pressure in the valve.
4. Remove the valve from the line.
5. Apply some proper protections to avoid the entry of foreign bodies inside the valve.
6. Keep in a clean and dry place (see point 11.0).

7.0 OPERATOR DISASSEMBLY

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It is necessary to distinguish three cases:

1. Disassembly of the lever:
 - Unscrew the block screws.
 - Remove the lever.

2. Disassembly of the gear unit:
 - Unscrew the connection bolts of the gear unit to the adapter flange (07) of the valve.
 - Remove the gear unit paying attention to avoid any damage to the key (77) connected to the stem (04) of the valve.

3. Disassembly of the actuator:
 - Make reference to the instructions of the actuator to execute this.

8.0 VALVE DISASSEMBLY

The procedure to be followed is:

1. It is recommended to mark up the position of each part before the removal to allow the reassembly of all parts in the same original position).
2. Rotate the ball in closed position.
3. Remove the stem key (77) from the stem (04).
4. Unscrew the screws (44) and remove the adapter flange (07).
5. Unscrew the screws (45) and remove the gland flange (06) contemporary to the stem (04).
6. Separate the stem (04) from the gland flange (06).
7. Remove the gaskets (31 and 33) and replace them if damaged.
8. Remove the o-rings (21 and 23) (and eventually the back-up rings if present) and replace them if damaged.
9. Extract the thrust washer (54) from the stem (04) and replace it if damaged.
10. Extract the bushing (51) from the gland flange (06) and replace it if damaged.
11. Unscrew the screws (43) and remove the trunnion (05).
12. Remove the gaskets (32) from the trunnion and replace them if damaged.
13. Remove the o-rings (22) (and eventually the back-up rings if present) from the trunnion (05) and replace them if damaged.
14. Unscrew the nuts (41) and remove the closure (02) paying attention to avoid any damage to the seats (12+12a).

NOTE: If the valve is metal to metal, the seat does not have the item no. 12a.

15. Remove the gaskets (30) from the closure and replace it if damaged.

16. Remove the o-rings (20) (and eventually the back-up rings if present) from the closure and replace them if damaged.
17. Remove the ball (03) from the body (01).
18. Extract the seats (12+12a) from the relevant places.
19. Inspect the contact surface between seat and ball and in case of damages replace the seat (12+12a).
20. Remove the o-rings (24) (and eventually the back-up rings if present) from the seats and replace them if damaged.
21. Remove the gaskets (34) from the seats and replace them if damaged.
22. Remove the springs (13) from the relevant places.
23. Extract the bushing (50) from the ball and replace it if damaged.
24. Clean all metallic surfaces with a suitable and proper degreaser.
25. Check that all surfaces of the metallic sealing parts are not damaged.
26. Replace, at this point, all damaged parts.

NOTE: for some ratings (CL: 2500 / API 10000) it is present a bushing (51a) also on the adapter flange (07); such part is removed together with the adapter flange. If damaged it must be replaced.

9.0 LUBRICATION

- If not differently specified, lubricate with a proper lubricant all metallic surfaces in contact with the ball during the rotation.
- If not differently specified, lubricate with a proper lubricant all metallic surfaces in contact with o-rings.
- Bushings (50-51) do not need lubrication, being self-lubricated materials.

NOTE:

Use mineral wear-resistant grease for metallic surface.

10.0 ASSEMBLY

Before starting the reassembly of the valve, carry out the following operations:

- Clean all metallic components with a soft cloth saturated with solvent.
- We recommend the replacement of all the gaskets after any disassembly; if the old gaskets will be re-used, clean them with soft cloth, if necessary, wash them with suds and rinse them with clean water; make sure that the o-ring and other gaskets are not slashed, extruded and/or otherwise damaged.
- Check the metallic parts for damages (dents, scoring) along the sealing surface and on moving surfaces.
- Check the surface of bearing, the thrust washers, the gland bushing and all of the seats assembly components.

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- Replace all faulty parts and component.

The procedure to be followed is:

1. During the operation of assembly, keep all elements clean.
2. Insert the o-rings (24) (and the eventual back-up rings present) in the seats (12).
3. Insert the graphite (34) in the seats (12).
4. Insert the springs (13) in the relevant holes of body and closure.
5. Insert the seats (12) in the body (01) and in the closure (02), by exercising a certain pressure for the assembly.
6. Insert the bushing (50) in the ball.
7. Insert the ball (03) in the body, paying attention that the side of the ball with the rectangular cavity is placed on the side of the stem; the ball must be in closed position.
8. Reassemble the gasket (30) and the o-ring (20) (and the eventual back-up rings present) in the closure (02).
9. Reassemble the closure (02), the nuts (41) and screw them uniformly up to having the closure hitting the body, without tightening the nuts.
10. Reassemble the gasket (32) and the o-ring (22) (and the eventual back-up rings present) in the trunnion (05).
11. Reassemble the trunnion (05) on the body and tighten the screws (43) without pressing them.
12. Insert the bushing (51) in the gland flange (06).
13. Insert the o-rings (21) (and the eventual back-up rings present) in the gland flange (06).
14. Insert the thrust washer (54) in the stem (04).
15. Insert the stem (04) in the gland flange (06).
16. Insert the o-ring (23) and the gasket (33) in the gland flange (06).
17. Insert simultaneously the stem (04) and the gland flange (06) in the body (01).
18. Verify the correct positioning of the ball between trunnion and stem.
19. Operate the ball by making a complete turn of 360° in both directions.
20. Screw uniformly the screws of the gland flange (45) and tighten.
21. Tighten uniformly the screws of the trunnion (41).
22. Tighten, at this point, all nuts (40).
23. Position the gasket of the stem (31) in the gland flange (06).
24. Assemble the adapter flange (07), tighten the screws (44).
25. Insert the key (77) in the stem cavity.
26. Reassemble the operator (lever, gear unit or actuator) in the correct position without tighten.
27. Operate the valve repeatedly and verify the alignment of the ball passing with the closures.
28. Tighten the nuts of the operator with the valve.

WARNING:

- When service a ball valve it is very important to adopt all the precautions to avoid damages at the gaskets and seating surface. Always avoid using sharp edges tools where possible; use on-

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ly clean rags to avoid introducing foreign materials into the valve. The grease used for facilitating the assembly shall be absolutely clean.

- It is recommended to test the valve after repair and/or any disassembly and re-assembly of the valve. For testing refer to the relevant procedure. Before pressurizing the valve, check all bolts, nuts, grease nipples etc. for tightness. Check tightness of all joints during the rise of pressure.

11.0 STORAGE

The procedure is the following:

- Lubricate with a suitable grease/anti-corrosive oil all internal metallic surfaces.
- The sealing extremities of the line flanges (RF, BW, TTJ) shall be protected by proper caps.
- Store the valve with the ball aligned to the sense of fluid and not in position of half-open to avoid damages on the seat inserts.
- Do not put any load to each single valve part.

Make sure that the valve is maintained in a clean conditions during its storing; exposure to abnormal humid conditions should be avoided. In the case of storage in dusty environment, take care to cover the valve with a plastic sheet.

12.0 TROUBLESHOOTING

Please find below the main types of problems and the procedure to follow for their solutions:

- A. LEAKAGE FROM THE STEM: When an immediate stop of leakage is necessary, if the valve has an emergency stem sealing, inject some sealing fluid to stop the leakage. This solution is temporary and serves only to stop the leakage at the moment. Then proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (44-45); if such operation does not solve the problem, proceed to the replacement of the stem sealings (21 – 31).
- B. LEAKAGE FROM THE COUPLING TO THE LINE FLANGE: tighten the coupling nuts according to the table “Asme B1.1 Class 2A”. If the leakage continues, the problem could be caused by a damage of the surfaces or by an offset of the two connections, remove the valve and make a control.
- C. LEAKAGE FROM THE GLAND FLANGE: proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (44-45); if such operation does not solve the problem, replace the sealings of the gland flange (23-33).
- D. LEAKAGE FROM THE TRUNNION: proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence

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of pressure inside the body cavity), to tighten the block screws (43); if after such operation the problem is not solved, replace the sealings of the trunnion (22-32).

- E. **LEAKAGE FROM SEATS:** When an immediate stop of leakage is necessary, if the valve has an emergency seat sealing, inject some sealing fluid to stop the leakage. This solution is temporary and serves only to stop the leakage at the moment. Remove the valve from the line and make an inspection.
- F. **BLOCKED VALVE:** if the emergency seals are present, proceed to the injection of a lubricating fluid, then try to operate again. If the problem continues, it is necessary to control the group stem-gland flange and/or seat/ball (it could be necessary to replace the seals and/or to eliminate possible obstructions deposited).

NOTE: many of above described problems can be due to an improper use of the valve.

Check that:

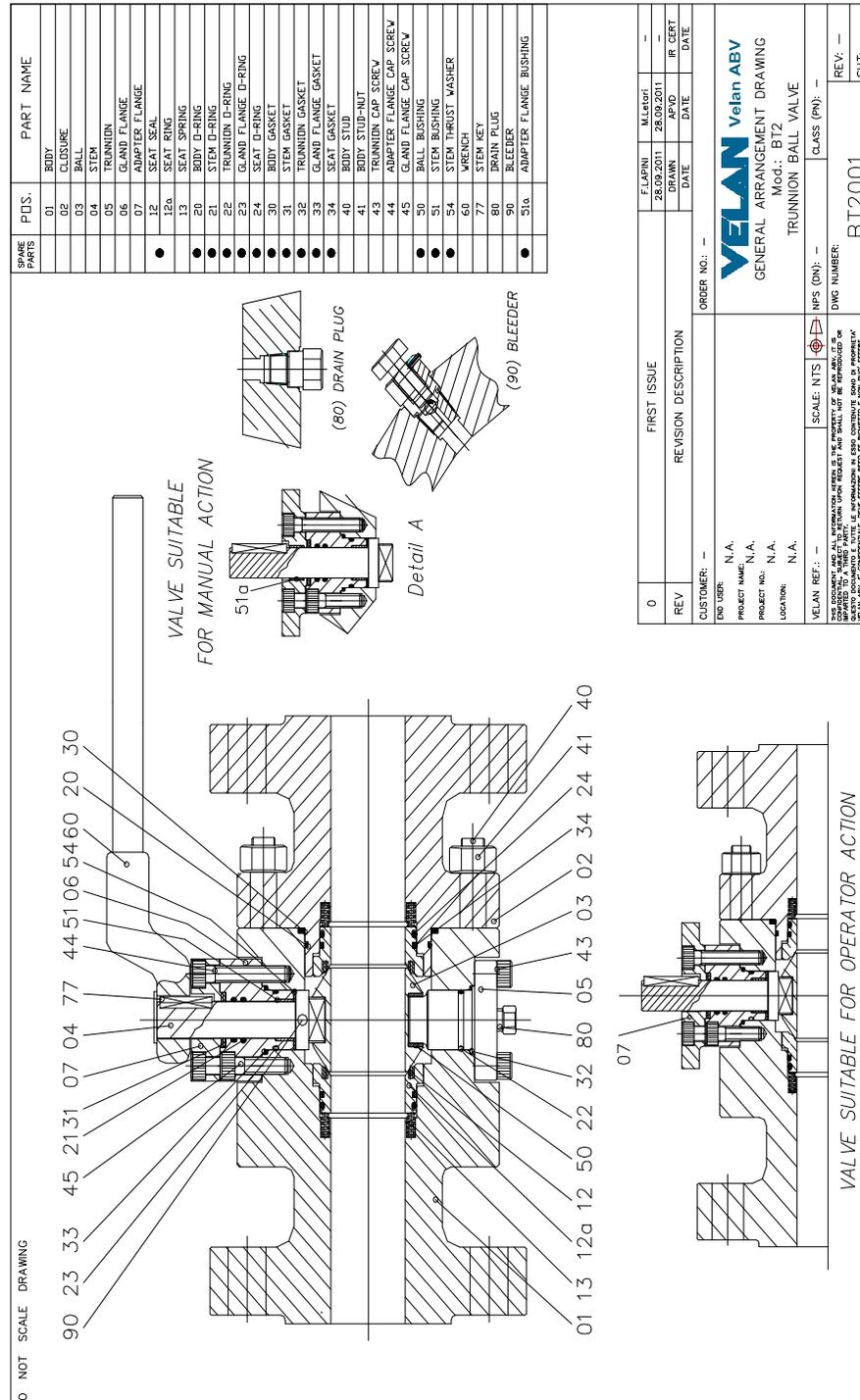
- The equipment is assembled correctly.
- The operating limits are respected.
- The use conditions are equal to the allowed ones.

13.0 **DISPOSAL**

When dismantling the unit and/or its part at the end of the valve life, address the component authority. Do not throw the package or any other part of the valve in the environment.

14.0 ASSEMBLY DRAWING.

DO NOT SCALE DRAWING



SPARE PARTS	POS.	PART NAME
	01	BODY
	02	CLOSURE
	03	BALL
	04	STEM
	05	TRUNNION
	06	GLAND FLANGE
	07	ADAPTER FLANGE
●	12	SEAT SEAL
	12a	SEAT RING
	13	SEAT SPRING
●	20	BODY O-RING
●	21	TRUNNION O-RING
●	22	TRUNNION O-RING
●	23	TRUNNION O-RING
●	24	GLAND FLANGE O-RING
●	24a	GLAND FLANGE O-RING
●	30	BODY GASKET
●	31	STEM GASKET
●	32	TRUNNION GASKET
●	33	GLAND FLANGE GASKET
●	34	SEAT GASKET
●	40	BODY STUD
●	41	BODY STUD-NUT
●	43	TRUNNION CAP SCREW
●	44	ADAPTER FLANGE CAP SCREW
●	45	GLAND FLANGE CAP SCREW
●	50	BALL BUSHING
●	51	STEM BUSHING
●	54	STEM THRUST WASHER
	60	WRENCH
	77	STEM KEY
	80	DRAIN PLUG
	90	BLEEDER
●	90a	ADAPTER FLANGE BUSHING

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ORDER NO.: —
 CUSTOMER: —
 END USER: N.A.
 PROJECT NAME: N.A.
 PROJECT NO.: N.A.
 LOCATION: N.A.
 SCALE: NTS
 NPS (DN): —
 DWG NUMBER: BT2001
 CLASS (PN): —
 REV: —
 SHT: —

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TRUNNION VALVES IN THREE PIECES (BT3)

WARNING: Before using the valve read carefully everything written in this manual. If the prescriptions here indicated are not observed there could be damages to the equipment, the environment and the people.

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1.0 DESIGN RULES AND STANDARD REFERENCES

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- Design and construction criteria were applied to eliminate and/or reduce hazards as far as was reasonably practicable; special measures to reduce the risks at the time of installation of the equipment and/or use, including adequate warning, are indicated in this manual.
- Each modification, rebuilding or replacement of each element or part of the valve can be effected only after the approval of Velan ABV.
- The execution of each operation on above-mentioned equipment must be effected only by personnel properly qualified. If the personnel do not have the necessary knowledge in this field, must be trained. Personnel should wear safety shoes, gloves, helmet, protective glasses and tight-fitting sleeves overalls; avoid fluttering clothes, watches, chains, bracelets or any other piece of clothing that may get entangled. Do not wear loose long hair but put it up.
- If the valve shows any type of leakage, stop immediately its use. Isolate the valve and proceed to its replacement.
- If process fluid is dangerous, do not attempt any intervention on the valve that may result in a release of media to external environment.
- Do not loosen screws or studs when the valve is in pressure.
- A ball valve is basically an on/off valve. Throttling is not allowed as it would result in a rapid wearing of the ball port edges.
- The sense of rotation for opening is counter-clockwise.

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- Valves manufactured by Velan ABV cannot be used as end of line valves.
- Take into account that the valve cannot operate in corrosive environment (acid or basic) or during earthquake.
- Valves manufactured by Velan ABV are designed (if not differently specified) for a use in the absence of erosion and corrosion of any type (in absence of corrosion and/or erosion we consider an use which causes a decrease of the thickness of maximum 0,05 mm/year).
- Eventual overpressures that could happen on the valve must be avoided by specific safety accessories on the line.
- Eventual solicitations that can have an effect on the valve must be avoided by specific devices on the pipe.
- It is not possible to use any welding process to fix any type of mechanical support to the valve.
- Valves that have been exposed to harmful and/or dangerous fluids shall be decontaminated before making any operation on them.
- The line supply (if any) and the pressure vessel must be electrically grounded according to the legislation in force).
- Do not touch any valve part during operation, if it is not necessary.
- The existing laws in the country of utilization must be respected; make sure that all operations are not in contrast with the whole of the plant and process safety rules.

3.0 TRANSPORT

The valves are prepared for shipping in boxes in a manner that any possibility of shipping and subsequent damages during the transportation is prevented.

All drawing and documentation delivered with the valves are the property of Manufacturer: they cannot be reproduced, in whole or in part, either text or illustrations, without permission.

Upon receipt of the valve make sure that the valves correspond to the order requirement, verifying the delivery notes and the shipping documents. The Manufacturer shall be immediately informed in case of damage of the packages or missing parts.

The recommended method of handling the valves is to lift them by slings fixed to the lifting lugs (if any) or around the flanged ends.

In any case it is necessary to pay attention during the movement of the equipment to avoid impacts or solicitations to the equipment that could influence the good functioning and the integrity of the valve. Make sure that nobody is near that valve while it is moving.

It is necessary to use ropes, belt and chain whose carrying capacity is higher than the weight of the valve-gear assembly considering a safety margin in accordance to the rules of the plant and the legislation in force. Refer to the dimension drawing for any information related to the weights and to the overall dimensions.

The valve shall be always kept in the open position.

In case an impact occurs, it is necessary to verify the integrity of the equipment before using it.

To avoid the entry of foreign bodies inside the valve, the protections of the flanges must be removed only at the moment of the installation.

In case the equipment is not used immediately, it must be stored in a dry environment at a temperature close to the ambient one (see point 11.0 for further information).

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In case long time storage is foreseen, it is necessary to verify the conditions of the valve before using it.

4.0 INSTALLATION

Actions to be executed are the following:

- Before the installation, inspect the valve to verify the integrity of all components.
- Remove the protections on the line flange.
- Insert the valve to align it to the pipe.
- Proceed to block the valve according to the fixing method adopted (studs/clamp/welding). It is important to notice that:
 - If the line connections are welded, the valve can be fixed without the need of its disassembly but shall be respected certain procedures and precautions. Valve must be in open position and shall remain in that way until we do not return to the initial temperature. Besides, it is necessary to verify that the maximum temperature reached does not harm the properties of materials of gaskets.
 - For bolted junctions, screws the nuts and cross tighten; pay attention that the line flanges are aligned at the time of screwing.
- The blocking value of the line studs shall respect what indicated in “Asme B.1.1 Class 2A”.

Increase the pressure gradually, verifying that no fluid leakages occur. If there is a leakage, eliminate the pressure from the line and replace the valve.

WARNING:

- a. By no means any valve shall be used to support a pipeline or to pull a shorter pipe to allow connection.
- b. The valve shall be installed with the gearbox assembled thereon. The gearbox will be removed and reassembled after valve installation only if strictly necessary.

5.0 USE AND MAINTENANCE

Initially, we recommend to check the equipment periodically, to verify the regular functioning of the valve.

In case some anomalies in the correct functioning of the valve are found, stop its use and effect a verification inspection.

Like any mechanical equipment, the service program depends upon operation frequency and severity of conditions. Valves, which are kept either open or closed for long time, should be operated at least twice a year.

The maintenance program for a normal use of the valve is the following:

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- **MANUAL VALVES:** after an initial period of running in (approximately 100 cycles), it is necessary to effect a verification control (in particular the assembly of the stem). In the majority of the applications a general control every six months is usually sufficient to ensure a regular functioning of the equipment.
- **MOTORIZED VALVES:** after an initial period of running in, it is necessary to effect a verification control. A periodic control (approximately each 1000 cycles or every three months) is generally sufficient to ensure the regular functioning of the equipment.

If the gaskets show to be broken or damaged, must be replaced by others supplied or approved by Velan ABV.

WARNING:

- Before performing any maintenance on the valve, personnel shall ensure that line is removed from service and isolated and no pressure is in the valve body cavity.
- After a major overhaul, if possible test the valve before reassembling it to the line. For testing refer to the relevant procedure. Before pressurizing the valve, check all bolts, nuts, grease nipples etc. for tightness.
- In case the equipment is designed for use with a corrosive media and is or could be subjected to erosion, it is necessary to control the conditions of the valve periodically to verify that the minimum allowed thickness was not exceeded. If the thickness is lower than the allowed one, the valve must be replaced.
- To guarantee the correct functioning of the valve we suggest to operate it at least three times each year.

6.0 REMOVAL FROM THE LINE

The procedure is the following (please refer to the enclosed drawing BT3001 to identify the parts):

1. Shut-off the pressure from the line.
2. Rotate the ball in half-open position (at 45° from the flow line) to allow the media to exit from the valve, then open completely the ball.
3. Remove the bleeder (90) and the drain plug (80), during this operation pay attention to the possible presence of pressure in the valve.
4. Remove the valve from the line.
5. Apply some proper protections to avoid the entry of foreign bodies inside the valve.
6. Keep in a clean and dry place (see point 11.0).

7.0 OPERATOR DISASSEMBLY

It is necessary to distinguish three cases:

1. Disassembly of the lever:

- Unscrew the block screws.
 - Remove the lever.
2. Disassembly of the gear unit:
- Unscrew the connection bolts of the gear unit to the adapter flange (07) of the valve.
 - Remove the gear unit paying attention to avoid any damage to the key (77) connected to the stem (04) of the valve.
3. Disassembly of the actuator:
- Make reference to the instructions of the actuator to execute this.

8.0 VALVE DISASSEMBLY

The procedure to be followed is:

1. It is recommended to mark up the position of each part before the removal to allow the reassembly of all parts in the same original position).
2. Rotate the ball in closed position.
3. Remove the stem key (77) from the stem (04).
4. Unscrew the screws (45) and remove the adapter flange (07).
5. Unscrew the screws (44) and remove the gland flange (06) contemporary to the stem (04).
6. Separate the stem (04) from the gland flange (06).
7. Remove the gaskets (31 and 33) and replace them if damaged.
8. Remove the o-rings (21 and 23) (and eventually the back-up rings if present) and replace them if damaged.
9. Extract the thrust washer (54) from the stem (04) and replace it if damaged.
10. Unscrew the screws (43) and remove the trunnion (05).
11. Remove the gaskets (32) from the trunnion and replace them if damaged.
12. Remove the o-rings (22) (and eventually the back-up rings if present) from the trunnion (05) and replace them if damaged.
13. Place the valve with the axis of flow in vertical position.
14. Unscrew the superior nuts (41) and remove the upper closure (02) paying attention to avoid any damage to the seats (12+12a).

NOTE: If the valve is metal to metal, the seat does not have the item no. 12a.

15. Remove the gaskets (30) from the closure and replace it if damaged.
16. Remove the o-rings (20) (and eventually the back-up rings if present) from the closure and replace them if damaged.
17. Lift the ball (03) from the body (01).
18. Unscrew the inferior nuts (41) and remove the body (01).

19. Extract the seats (12+12a) from the relevant place.
20. Inspect the contact surface between seat and ball and in case of damages replace the seat (12+12a).
21. Remove the o-rings (24) (and eventually the back-up rings if present) from the seats and replace them if damaged.
22. Remove the gaskets (34) from the seats and replace them if damaged.
23. Remove the springs (13) from the relevant place.
24. Extract the bushings (50) from the ball (03) and replace them if damaged.
25. Clean all metallic surfaces with a suitable and proper degreaser.
26. Check that all surfaces of the metallic sealing parts are not damaged.
27. Replace, at this point, all damaged parts.

9.0 LUBRICATION

- If not differently specified, lubricate with a proper lubricant all metallic surfaces in contact with the ball during the rotation.
- If not differently specified, lubricate with a proper lubricant all metallic surfaces in contact with o-rings.
- Bushings (50-51) do not need lubrication, being self-lubricated materials.

10.0 ASSEMBLY

Before starting the reassembly of the valve, carry out the following operations:

- Clean all metallic components with a soft cloth saturated with solvent.
- We recommend the replacement of all the gaskets after any disassembly; if the old gaskets will be re-used, clean them with soft cloth, if necessary, wash them with suds and rinse them with clean water; make sure that the o-ring and other gaskets are not slashed, extruded and/or otherwise damaged.
- Check the metallic parts for damages (dents, scoring) along the sealing surface and on moving surfaces.
- Check the surface of bearing, the thrust washers, the gland bushing and all of the seats assembly components.
- Replace all faulty parts and component.

The procedure to be followed is:

1. During the operation of assembly, keep all elements clean.
2. Insert the o-rings (24) (and the eventual back-up rings present) in the seats (12).
3. Insert the graphite (34) in the seats (12).
4. Put some heavy grease inside the holes of the closure (02), insert the springs (13) inside relevant holes.

5. Insert the seats (12+12a) in the closure (02) and in the body (01), by exercising a certain pressure for the assembly.
6. Reassemble the gaskets (30) and the o-rings (20) (and the eventual back-up rings if present) in the closures (02).
7. Insert the bushing (50) in the ball.
8. Place a closure (02) with the axis of fluid in vertical.
9. Insert the body (01) in the closure (02); insert the inferior nuts (40) without tighten them.
10. Insert the ball (03) in the body (01). The ball must be in closed position. Being careful that the side of the ball with the rectangular cavity must be placed on side of the stem.
11. Assemble the second closure (02), the nuts (41) and screw uniformly without tighten.
12. Insert the o-rings (21) (and the eventual back-up rings if present) in the gland flange (06).
13. Assemble the thrust washer (54) on the stem (04).
14. Insert the stem (04) on the gland flange (06).
15. Insert the o-rings (23) (and the eventual back up rings if present) in the gland flange (06).
16. Assemble the graphite (33) in the gland flange (04)
17. Insert simultaneously the stem (04) and the gland flange (06) in the body (01).
18. Reassembly the gaskets (32) and the o-rings (22) (and the eventual back-up rings present) in the trunnion.
19. Insert the trunnion on the body (01) and tighten the screws (43) without tighten them.
20. Verify the correct positioning of the ball.
21. Operate the ball by making a complete turn of 360° in both directions.
22. Tighten, at this point, all nuts (41).
23. Screw uniformly the screws of the gland flange (45) and tighten.
24. Screw uniformly the screws of the trunnion (43) and tighten.
25. Place the stem gasket (31) in the gland flange (06).
26. Assemble the adapter flange (07), put the screws (44) and tighten.
27. Insert the key (77) on the stem (04).
28. Reassemble the operator (lever, gear unit or actuator) in the correct position and tighten the connection nuts with the adapter flange.
29. Operate the valve repeatedly and verify the alignment of the ball passing with the closure.
30. Tighten the nuts of the operator with the valve.

WARNING:

- When service a ball valve it is very important to adopt all the precautions to avoid damages at the gaskets and seating surface. Always avoid using sharp edges tools where possible; use only clean rags to avoid introducing foreign materials into the valve. The grease used for facilitating the assembly shall be absolutely clean.
- It is recommended to test the valve after repair and/or any disassembly and re-assembly of the valve. For testing refer to the relevant procedure. Before pressurizing the valve, check all bolts, nuts, grease nipples etc. for tightness. Check tightness of all joints during the rise of pressure.

11.0 STORAGE

The procedure is the following:

- Lubricate with a suitable grease/anti-corrosive oil all internal metallic surfaces.
- The sealing extremities of the line flanges (RF, BW, RTJ) shall be protected by proper caps.
- Store the valve with the ball aligned to the sense of fluid and not in position of half-open to avoid damages on the seat inserts.
- Do not put any load to each single valve part.

Make sure that the valve is maintained in a clean conditions during its storing; exposure to abnormal humid conditions should be avoided. In the case of storage in dusty environment, take care to cover the valve with a plastic sheet.

12.0 TROUBLESHOOTING

Please find below the main types of problems and the procedure to follow for their solutions:

- A. LEAKAGE FROM THE STEM: When an immediate stop of the leakage is necessary, if the valve has an emergency stem sealing, inject some sealing fluid to stop the leakage. This solution is temporary and serves only to stop the leakage at the moment. Then proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (44-45); if such operation does not solve the problem, proceed to the replacement of the stem sealings (21 – 31).
- B. LEAKAGE FROM THE COUPLING TO THE LINE FLANGE: tighten the coupling nuts according to the table “Asme B1.1 Class 2A”. If the leakage continues, the problem could be caused by a damage of the surfaces or by an offset of the two connections, remove the valve and make a control.
- C. LEAKAGE FROM THE GLAND FLANGE: proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (44-45); if such operation the problem is not solved, replace the sealings of the gland flange (23-33).
- D. LEAKAGE FROM THE TRUNNION: proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (43); if after such operation the problem is not solved, replace the sealings of the trunnion (22-32).
- E. LEAKAGE FROM SEATS: When an immediate stop of the leakage is necessary, if the valve has an emergency seat sealing, inject some sealing fluid to stop the leakage. This solution is temporary and serves only to stop the leakage at the moment. Remove the valve from the line and make an inspection.

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- F. **BLOCKED VALVE:** if the emergency seals are present, proceed to the injection of a lubricating fluid, then try to operate again. If the problem continues, it is necessary to control the group stem-gland flange and/or seat/ball (it could be necessary to replace the seals and/or to eliminate possible obstructions deposited).

NOTE: many of above described problems can be due to an improper use of the valve.

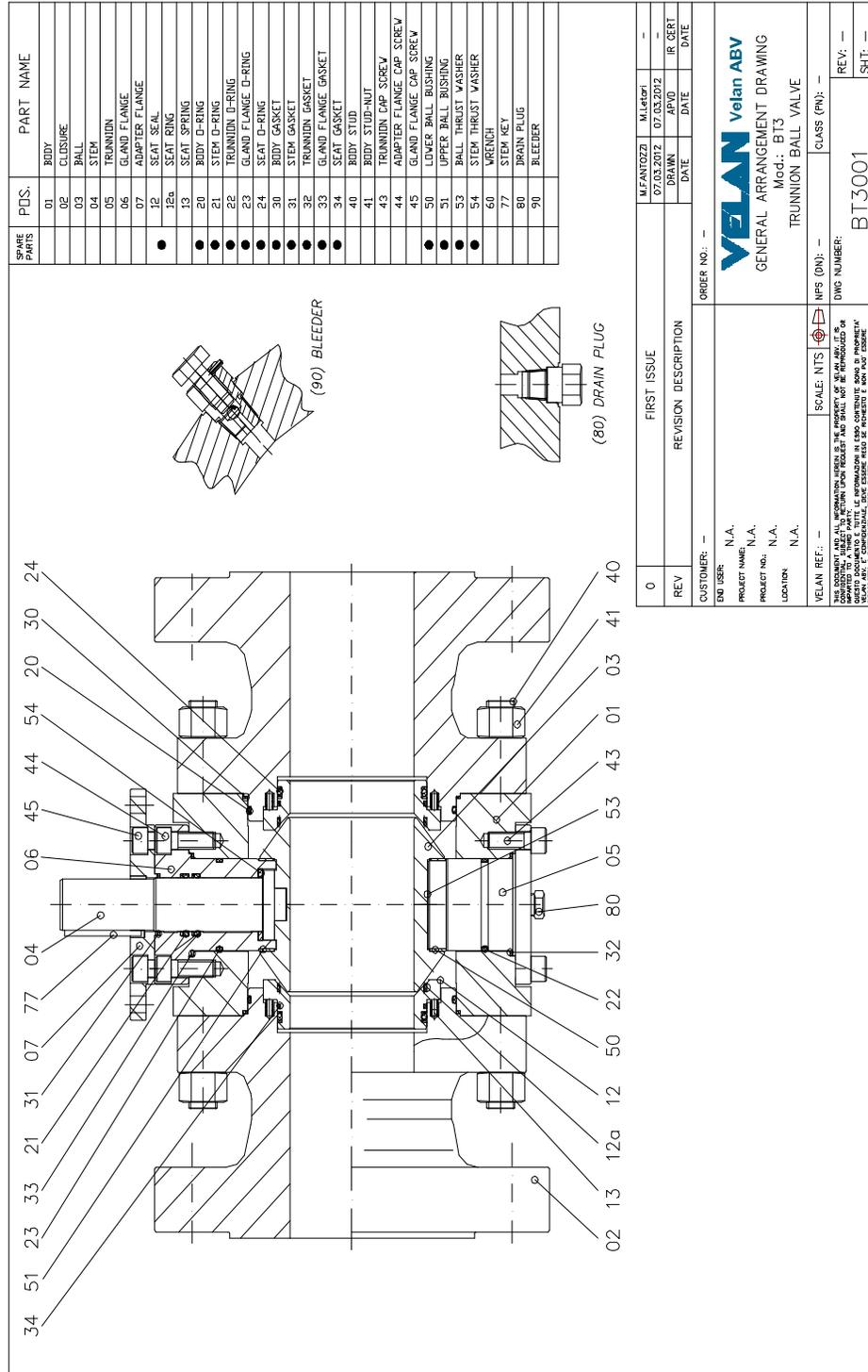
Check that:

- The equipment is assembled correctly.
- The operating limits are respected.
- The use conditions are equal to the allowed ones.

13.0 **DISPOSAL**

When dismantling the unit and/or its part at the end of the valve life, address the component authority. Do not throw the package or any other part of the valve in the environment.

14.0 ASSEMBLY DRAWING.



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TRUNNION VALVES IN THREE PIECES (BT3)

WARNING: Before using the valve read carefully everything written in this manual. If the prescriptions here indicated are not observed there could be damages to the equipment, the environment and the people.

2	30.03.16	General revision	M.Conforti	M.Letari
1	07/03/12	General revision	M.Fantozzi	M.Letari
0	16/04/02	First issue	M. Letari	L.Marianetti
Rev.	Date	Description	Issued by	Approved by

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- 6.0 REMOVAL FROM THE LINE.**
- 7.0 OPERATOR DISASSEMBLY.**
- 8.0 VALVE DISASSEMBLY.**
- 9.0 LUBRIFICATION.**
- 10.0 ASSEMBLY.**
- 11.0 STORAGE.**
- 12.0 TROUBLESHOOTING.**
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- 14.0 ASSEMBLY DRAWING.**
- 15.0 ATTACHMENT “A”: OPERATING LIMITS.**

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1.0 DESIGN RULES AND STANDARD REFERENCES

Valves are designed, manufactured, inspected and tested in such a way as to ensure its safety when put into service in accordance with the instructions mentioned in this manual. The main rules used in the development of the valves manufactured by Velan ABV are the following:

- PRESSURE RATING: ASME B16.34/ API 6D/ API 6A/ BS EN ISO 17292.
- MINIMUM BODY WALL THICKNESS: ASME B16.34 / ASME VIII / API 6A.
- FACE-TO FACE DIMENSIONS: ASME B16.10 / API 6D / API 6A.
- END CONNECTION: ASME B16.10 / ASME B16.5 / ASME B16.47 / ASME B16.25.
- HYDRAULIC TESTING: API 6D / API6A / API 598.
- FIRE SAFE TEST: API 6FA / API 607 / ISO 10497.
- VALVES ACCORDING TO DIRECTIVE 2014-68-EU (PED).

2.0 TERMS OF EMPLOYMENT AND SAFETY REQUIREMENTS

Valves manufactured by Velan ABV shall respect the following prescriptions:

- Valves manufactured by Velan ABV are designed and manufactured keeping into consideration the expected utilization conditions (pressure, temperature, allowed fluids, etc.); the operative limits are indicated at the end of this manual and on the identification tag placed on each equipment. Any different use is not allowed and can cause a damage both to the equipment and to the people.
- Design and construction criteria were applied to eliminate and/or reduce hazards as far as was reasonably practicable; special measures to reduce the risks at the time of installation of the equipment and/or use, including adequate warning, are indicated in this manual.
- Each modification, rebuilding or replacement of each element or part of the valve can be effected only after the approval of Velan ABV.
- The execution of each operation on above-mentioned equipment must be effected only by personnel properly qualified. If the personnel do not have the necessary knowledge in this field, must be trained. Personnel should wear safety shoes, gloves, helmet, protective glasses and tight-fitting sleeves overalls; avoid fluttering clothes, watches, chains, bracelets or any other piece of clothing that may get entangled. Do not wear loose long hair but put it up.
- If the valve shows any type of leakage, stop immediately its use. Isolate the valve and proceed to its replacement.
- If process fluid is dangerous, do not attempt any intervention on the valve that may result in a release of media to external environment.
- Do not loosen screws or studs when the valve is in pressure.
- A ball valve is basically an on/off valve. Throttling is not allowed as it would result in a rapid wearing of the ball port edges.
- The sense of rotation for opening is counter-clockwise.

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- Valves manufactured by Velan ABV cannot be used as end of line valves.
- Take into account that the valve cannot operate in corrosive environment (acid or basic) or during earthquake.
- Valves manufactured by Velan ABV are designed (if not differently specified) for a use in the absence of erosion and corrosion of any type (in absence of corrosion and/or erosion we consider an use which causes a decrease of the thickness of maximum 0,05 mm/year).
- Eventual overpressures that could happen on the valve must be avoided by specific safety accessories on the line.
- Eventual solicitations that can have an effect on the valve must be avoided by specific devices on the pipe.
- It is not possible to use any welding process to fix any type of mechanical support to the valve.
- Valves that have been exposed to harmful and/or dangerous fluids shall be decontaminated before making any operation on them.
- The line supply (if any) and the pressure vessel must be electrically grounded according to the legislation in force).
- Do not touch any valve part during operation, if it is not necessary.
- The existing laws in the country of utilization must be respected; make sure that all operations are not in contrast with the whole of the plant and process safety rules.

3.0 TRANSPORT

The valves are prepared for shipping in boxes in a manner that any possibility of shipping and subsequent damages during the transportation is prevented).

All drawing and documentation delivered with the valves are the property of Manufacturer: they cannot be reproduced, in whole or in part, either text or illustrations, without permission.

Upon receipt of the valve make sure that the valves correspond to the order requirement, verifying the delivery notes and the shipping documents. The Manufacturer shall be immediately informed in case of damage of the packages or missing parts.

The recommended method of handling the valves is to lift them by slings fixed to the lifting lugs (if any) or around the flanged ends.

In any case it is necessary to pay attention during the movement of the equipment to avoid impacts or solicitations to the equipment that could influence the good functioning and the integrity of the valve. Make sure that nobody is near that valve while it is moving.

It is necessary to use ropes, belt and chain whose carrying capacity is higher than the weight of the valve-gear assembly considering a safety margin in accordance to the rules of the plant and the legislation in force. Refer to the dimension drawing for any information related to the weights and to the overall dimensions.

The valve shall be always kept in the open position.

In case an impact occurs, it is necessary to verify the integrity of the equipment before using it.

To avoid the entry of foreign bodies inside the valve, the protections of the flanges must be removed only at the moment of the installation.

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In case the equipment is not used immediately, it must be stored in a dry environment at a temperature close to the ambient one (see point 11.0 for further information).

In case long time storage is foreseen, it is necessary to verify the conditions of the valve before using it.

4.0 INSTALLATION

Actions to be executed are the following:

- Before the installation, inspect the valve to verify the integrity of all components.
- Remove the protections on the line flange.
- Insert the valve to align it to the pipe.
- Proceed to block the valve according to the fixing method adopted (studs/clamp/welding). It is important to notice that:
 - If the line connections are welded, the valve can be fixed without the need of its disassembly but shall be respected certain procedures and precautions. Valve must be in open position and shall remain in that way until we do not return to the initial temperature. Besides, it is necessary to verify that the maximum temperature reached does not harm the properties of materials of gaskets.
 - For bolted junctions, screws the nuts and cross tighten; pay attention that the line flanges are aligned at the time of screwing.
- The blocking value of the line studs shall respect what indicated in “Asme B.1.1 Class 2A”.

Increase the pressure gradually, verifying that no fluid leakages occur. If there is a leakage, eliminate the pressure from the line and replace the valve.

WARNING:

- a. By no means any valve shall be used to support a pipeline or to pull a shorter pipe to allow connection.
- b. The valve shall be installed with the gearbox assembled thereon. The gearbox will be removed and reassembled after valve installation only if strictly necessary.

5.0 USE AND MAINTENANCE

Initially, we recommend to check the equipment periodically, to verify the regular functioning of the valve.

In case some anomalies in the correct functioning of the valve are found, stop its use and effect a verification inspection.

Like any mechanical equipment, the service program depends upon operation frequency and severity of conditions. Valves, which are kept either open or closed for long time, should be operated at least twice a year.

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The maintenance program for a normal use of the valve is the following:

- **MANUAL VALVES:** after an initial period of running in (approximately 100 cycles), it is necessary to effect a verification control (in particular the assembly of the stem). In the majority of the applications a general control every six months is usually sufficient to ensure a regular functioning of the equipment.
- **MOTORIZED VALVES:** after an initial period of running in, it is necessary to effect a verification control. A periodic control (approximately each 1000 cycles or every three months) is generally sufficient to ensure the regular functioning of the equipment.

If the gaskets show to be broken or damaged, must be replaced by others supplied or approved by Velan ABV.

WARNING:

- Before performing any maintenance on the valve, personnel shall ensure that line is removed from service and isolated and no pressure is in the valve body cavity.
- After a major overhaul, if possible test the valve before reassembling it to the line. For testing refer to the relevant procedure. Before pressurizing the valve, check all bolts, nuts, grease nipples etc. for tightness.
- In case the equipment is designed for use with a corrosive media and is or could be subjected to erosion, it is necessary to control the conditions of the valve periodically to verify that the minimum allowed thickness was not exceeded. If the thickness is lower than the allowed one, the valve must be replaced.
- To guarantee the correct functioning of the valve we suggest to operate it at least three times each year.

6.0 REMOVAL FROM THE LINE

The procedure is the following (please refer to the enclosed drawing BT3002 to identify the parts):

1. Shut-off the pressure from the line.
2. Rotate the ball in half-open position (at 45° from the flow line) to allow the media to exit from the valve, then open completely the ball.
3. Remove the bleeder (90) and the drain plug (80), during this operation pay attention to the possible presence of pressure in the valve.
4. Remove the valve from the line.
5. Apply some proper protections to avoid the entry of foreign bodies inside the valve.
6. Keep in a clean and dry place (see point 11.0).

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7.0 OPERATOR DISASSEMBLY

It is necessary to distinguish three cases:

1. Disassembly of the lever:
 - Unscrew the block screws.
 - Remove the lever.
2. Disassembly of the gear unit:
 - Unscrew the connection bolts of the gear unit to the adapter flange (07) of the valve.
 - Remove the gear unit paying attention to avoid any damage to the key (77) connected to the stem (04) of the valve.
3. Disassembly of the actuator:
 - Make reference to the instructions of the actuator to execute this.

8.0 VALVE DISASSEMBLY

The procedure to be followed is:

1. It is recommended to mark up the position of each part before the removal to allow the reassembly of all parts in the same original position).
2. Rotate the ball in closed position.
3. Remove the stem key (77) from the stem (04).
4. Unscrew the screws (44) and remove the adapter flange (07).
5. Unscrew the screws (45) and remove the gland flange (06) contemporary to the stem (04).
6. Separate the stem (04) from the gland flange (06).
7. Remove the gaskets (31 and 33) and replace them if damaged.
8. Remove the o-rings (21 and 23) (and eventually the back-up rings if present) and replace them if damaged.
9. Extract the thrust washer (54) from the stem (04) and replace it if damaged.
10. Place the valve with the axis of flow in vertical position.
11. Unscrew the nuts (41) and remove the closure (02) paying attention to avoid any damage to the seats (12+12a).

NOTE: If the valve is metal to metal, the seat does not have the item no. 12a.

12. Remove the gaskets (30) from the closure and replace it if damaged.
13. Remove the o-rings (20) (and eventually the back-up rings if present) from the closure and replace them if damaged.

14. Lift the ball (03) from the body (01) contemporary to the support plates (05a).
15. Extract the seats (12+12a) from the relevant places.
16. Inspect the contact surface between seat and ball and in case of damages replace the seat (12+12a).
17. Remove the o-rings (24) (and eventually the back-up rings if present) from the seats and replace them if damaged.
18. Remove the gaskets (34) from the seats and replace them if damaged.
19. Remove the springs (13) from the relevant places.
20. Separate the support plates (05a) from the ball (03).
21. Extract the bushings (50) from the support plate (05a) and replace them if damaged.
22. Unscrew the nuts (41) from the opposite side and remove the second closure (02).
23. Remove the gaskets (30) from the second closure (02) and replace them if damaged.
24. Remove the o-rings (20) (and the eventual back-up rings if present) from the second closure (02) and replace them if damaged.
25. Clean all metallic surfaces with a suitable and proper degreaser.
26. Check that all surfaces of the metallic sealing parts are not damaged.
27. Replace, at this point, all damaged parts.

9.0 LUBRICATION

- If not differently specified, lubricate with a proper lubricant all metallic surfaces in contact with the ball during the rotation.
- If not differently specified, lubricate with a proper lubricant all metallic surfaces in contact with o-rings.
- Bushings (50-51) do not need lubrication, being self-lubricated materials.

10.0 ASSEMBLY

Before starting the reassembly of the valve, carry out the following operations:

- Clean all metallic components with a soft cloth saturated with solvent.
- We recommend the replacement of all the gaskets after any disassembly; if the old gaskets will be re-used, clean them with soft cloth, if necessary, wash them with suds and rinse them with clean water; make sure that the o-ring and other gaskets are not slashed, extruded and/or otherwise damaged.
- Check the metallic parts for damages (dents, scoring) along the sealing surface and on moving surfaces.
- Check the surface of bearing, the thrust washers, the gland bushing and all of the seats assembly components.
- Replace all faulty parts and component.

The procedure to be followed is:

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1. During the operation of assembly, keep all elements clean.
2. Insert the o-rings (24) (and the eventual back-up rings present) in the seats (12).
3. Insert the graphite (34) in the seats (12).
4. Put some heavy grease inside the holes of the closure (02), insert the springs (13) inside relevant holes.
5. Insert the seats (12+12a) in the closure (02), by exercising a certain pressure for the assembly.
6. Reassemble the gaskets (30) and the o-rings (20) (and the eventual back-up rings if present) in the closure.
7. Insert the bushing (50) in the ball.
8. Assemble the support plates (05a) on the ball (03).
9. Place one closure (02) with the axis of fluid in vertical.
10. Insert the ball (03) contemporary to the plates (05a) in the closure (02). During such operation verify the insert of the pins (71) in the relevant places.
11. Place slowly the body (01) on the lower closure (02), being careful that the side of the ball with the rectangular cavity must be placed on side of the stem. The ball must be in closed position.
12. Install the lower nuts (41) and screw them uniformly without tightening.
13. Assemble the second closure (02), the nuts (41) and screw uniformly without tighten.
14. Insert the o-rings (21) (and the eventual back-up rings if present) in the gland flange (06).
15. Assemble the thrust washer (54) on the stem (04).
16. Insert the stem (04) on the gland flange (06).
17. Insert the o-rings (23) (and the eventual back up rings if present) in the gland flange (06).
18. Assemble the graphite (23) in the gland flange (04)
19. Insert simultaneously the stem (04) and the gland flange (06) in the body (01).
20. Verify the correct positioning of the ball.
21. Operate the ball by making a complete turn of 360° in both directions.
22. Tighten, at this point, all nuts (40).
23. Screw uniformly the screws of the gland flange (45) and tighten.
24. Place the stem gasket (31) in the gland flange (06).
25. Assemble the adapter flange (07), put the screws (44) and tighten.
26. Insert the key (77) on the stem (04).
27. Reassemble the operator (lever, gear unit or actuator) in the correct position and tighten the connection nuts with the adapter flange.
28. Operate the valve repeatedly and verify the alignment of the ball passing with the closure.
29. Tighten the nuts of the operator with the valve.

WARNING:

- When service a ball valve it is very important to adopt all the precautions to avoid damages at the gaskets and seating surface. Always avoid using sharp edges tools where possible; use only clean rags to avoid introducing foreign materials into the valve. The grease used for facilitating the assembly shall be absolutely clean.
- It is recommended to test the valve after repair and/or any disassembly and re-assembly of the valve. For testing refer to the relevant procedure. Before pressurizing the valve, check all

bolts, nuts, grease nipples etc. for tightness. Check tightness of all joints during the rise of pressure.

11.0 STORAGE

The procedure is the following:

- Lubricate with a suitable grease/anti-corrosive oil all internal metallic surfaces.
- The sealing extremities of the line flanges (RF, BW, TTJ) shall be protected by proper caps.
- Store the valve with the ball aligned to the sense of fluid and not in position of half-open to avoid damages on the seat inserts.
- Do not put any load to each single valve part.

Make sure that the valve is maintained in a clean conditions during its storing; exposure to abnormal humid conditions should be avoided. In the case of storage in dusty environment, take care to cover the valve with a plastic sheet.

12.0 TROUBLESHOOTING

Please find below the main types of problems and the procedure to follow for their solutions:

- LEAKAGE FROM THE STEM:** When an immediate stop of the leakage is necessary, if the valve has an emergency stem sealing, inject some sealing fluid to stop the leakage. This solution is temporary and serves only to stop the leakage at the moment. Then proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (44-45); if such operation does not solve the problem, proceed to the replacement of the stem sealings (21 – 31).
- LEAKAGE FROM THE COUPLING TO THE LINE FLANGE:** tighten the coupling nuts according to the table “Asme B1.1 Class 2A”. If the leakage continues, the problem could be caused by a damage of the surfaces or by an offset of the two connections, remove the valve and make a control.
- LEAKAGE FROM THE GLAND FLANGE:** proceed, after having eliminated the pressure from the line and having opened the bleeder (be careful during this operation for the possible presence of pressure inside the body cavity), to tighten the block screws (44-45); if such operation does not solve the problem, replace the sealings of the gland flange (23-33).
- LEAKAGE FROM SEATS:** When an immediate stop of the leakage is necessary, if the valve has an emergency seat sealing, inject some sealing fluid to stop the leakage. This solution is temporary and serves only to stop the leakage at the moment. Remove the valve from the line and make an inspection.
- BLOCKED VALVE:** if the emergency seals are present, proceed to the injection of a lubricating fluid, then try to operate again. If the problem continues, it is necessary to control the

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group stem-gland flange and/or seat/ball (it could be necessary to replace the seals and/or to eliminate possible obstructions deposited).

NOTE: many of above described problems can be due to an improper use of the valve.

Check that:

- The equipment is assembled correctly.
- The operating limits are respected.
- The use conditions are equal to the allowed ones.

13.0 **DISPOSAL**

When dismantling the unit and/or its part at the end of the valve life, address the component authority. Do not throw the package or any other part of the valve in the environment.

14.0 ASSEMBLY DRAWING.

