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API 6D FABRICATED THROUGH CONDUIT GATE VALVES

USER'S MANUAL for INSTALLATION, USE and MAINTENANCE

Technical Manual N°008.en

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1.0 – INTRODUCTION

This manual has been prepared to provide the end user with general guidelines in the installation, operation and routine maintenance of VITAS valves.

The instructions contained within this manual apply to all VITAS- Fabricated Through Conduit Gate Valves.

If after reviewing the instruction of this manual you require additional instructions or assistance, please contact VITAS customer service (see front sheet).

2.0 – WARNING, CAUTIONS AND NOTES

Warning, cautions and notes within the manual are used to define a special situation for the following purpose.

- W** *Warning provides information related to a potentially hazardous condition. If the warning is not strictly followed or observed, an injury to personnel or severe damage to the equipment could result.*
- C** *Cautions provide information related to a potentially damaging condition. Non compliance with the caution could result in damage to the equipment.*
- N** *Notes are information that is useful in procedure on practice. Notes are intended for assistance and provide useful information.*

3.0 – GENERAL DESCRIPTION.

3.1 – FEATURES.

Fabricated construction

Floating seat rings

Self-aligning and floating seat parallel slide gate valves

Full opening-through conduit or reduce bore

Metal to metal primary seal; soft insert or “O-ring” secondary seal

Independent upstream & downstream seat seal

Block and bleed under all pressure condition

Body cavity can be vented or drained when valve is in fully open or fully closed position

Self relieving; excess body pressure is relieved internally into line

Self cleaning gate

In line repair

Double sealing on the stem

3.2 – CATALOGUE.

A copy of our catalogue is available on request, but for details check your dwg. Order.

4.0 – TECHNICAL DATA (name plate & valve information).

The nameplate permanently attached to the valve, provided you with the rated working pressure, temperature range and material used.

On the rim of the flanges provide the serial number that has been assigned to each valve.

When ordering replacement parts, reference to the information provided on the nameplate will aid to ensuring that You receive correct component parts for Your valves.

For further information go through this manual or contact VITAS Customer Service.

W Never attempt to modify VITAS valves in any parts without authorization and assistance of VITAS, otherwise the mechanical guarantee is not more applicable and severe damage to the equipment could result.

5.0 – HANDLING AND STORAGE.

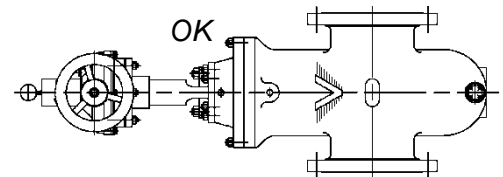
5.1 – HANDLING

VITAS valves are shipped from the factory in box, crates or on skids.

Protruding parts, such as the handwheel, indicator rods, and stem protector are sometimes removed from the valves and either attached to the box or crate or packaged separately.

W Always handle through conduit valves with stem in vertical position or stem in horizontal position and flanges in vertical position.

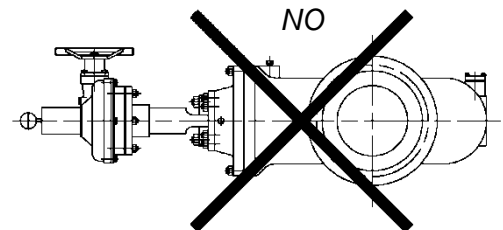
Handling the valve with flanges in horizontal position, can result in a damages of internal components (skirt or slab guides)



C All valves and associated parts should be inspected carefully for any visible sign and damage and if necessary, claims promptly submitted to the carrier.

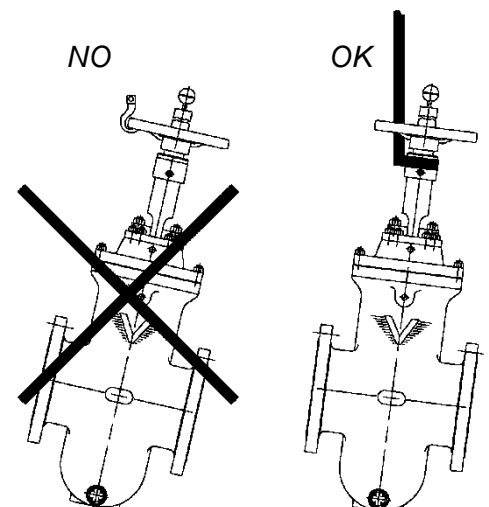
Any parts shipped loose or separately should be properly installed immediately to prevent lost or damage.

Care should be taken in handling the valve to prevent damage, particularly to an equipment extending above the valve bonnet and any fittings protruding from the valve body it self.



N Most handling can be accomplished by hooking diagonally into holes on each side of the end flanges.

W When lifting lug are not available, never attempt to lift any valve by the handwheel or gland bolting. Also, caution must be exercised if straps are slung around the valve body to prevent damage to protruding body bonnet fittings.



C Transport, unpack and store carefully not to scratch the surfaces of flanges or gasket and not to allow inclusion of hazardous matters into the valves.

Wooden plate or plastic caps should not be removed until the piping installation.

5.2 – STORAGE

- W** *If the valves are to be stored for any extended period of time, the flange or end protector should be examined to ensure they are fastened securely, and any other open areas should be sealed to prevent any moisture damage.
All valves should be securely held in place by banding or other means of support to prevent accidental damage to due movement of the valves.*
- N** *Prior to installation, confirm that there is no scratch on the surfaces of flanges and stem, and clean insides of the valve with dry cloth. Especially, as the seat surfaces are the most important portion for obtaining the valve function, special attention should be paid so as not to scratch or damage these surfaces.*

6.0 – INSTALLATION.

6.1 – PRELIMINARY CONSIDERATION FOR INSTALLATION:

- N** - Use experienced trained personnel.
- Observe all standard safety precaution.
- Always use proper tools.

6.2 – GENERAL INFORMATION

All VITAS Valves are shipped from the factory in the closed position and normally will have a coating of rust protective oil.

- C** *Before installing the valves, all oil or grease (used to protect the valve) should be removed taken care not to damage the seat contact surface. Following installation of the valve, operate the gate disc fully open and closed at least once prior to hydrostatic testing of the line to ensure freedom of operation. After competition of hydrostatic testing, the valve should be drained to eliminate any water or test fluid which may have been trapped in the valve.*

6.3 - VALVE CONNECTION TYPE.

Depending on valve end configuration, three (3) basic installation procedure are used:

- BUTT WELDS in accordance with ANSI B16.25
- FLANGED ENDS in accordance with ANSI B16.5 or ASME B16.47 Type A or B.
- CLAMP ENDS

Valves supplied by VITAS are manufactured using carbon steel bodies and bonnets or alloy or stainless steel material.

6.3.1 - BUTT WELDING ENDS.

- W** *Proper welding is required to ensure a pressure tight seat and to retain their ability to withstand stress. Remember that the valve, pipe and weld root must be of compatible materials and the welding be performed by a properly trained welder and approved weld procedures and qualifications (this combination is carefully checked by VITAS).*
- C** *Be sure to leave proper gap between the end of the pipe and the end of the valve. This will allow for expansion of the materials as it is welded, any extended welding time could cause*

excessive heat build up on the valve seat area which could cause damage such as loosening of the seat rings, surface distortion etc.

To avoid this problem we suggest to maintain the valve open and allowing the part to cool after each pass of the weld and alternate welding passes from one valve to the next. For alloy steel valves or when welding specification or service conditions require PWHT, the valve may be ordered with pup pipe already welded and heat treated in the factory before valve assembly. The specified PWHT can then be performed in line without affecting the valve. When welding the valve directly in the line makes sure the valve is close position. Shortly after welding, open and close the valve to check for proper operation to make sure no binding has occurred due to welding heat. Also welding slag and spatters are to be completely removed and cleaned to avoid damage on seats areas.

6.3.2 – FLANGED ENDS.

Make sure that two like flanges are being fitted together. Usually the proper set-up is either plain face to plain face or raised face to raised face flange. Tighten the flange bolts in a crossover patten as follows:

- C**
- A - Slightly torque all bolts using a crossover bolt sequence. Bolts should be tightened evenly to prevent cocking of the flange and uneven gasket loading.*
 - B - Repeat step 'A' using additional torque until all bolts are tightened properly
This may require several re-torque since as one bolt is torqued it will relieve stress on the adjacent bolts.*
 - C -On high pressure. High temperature applications, it is recommended that the bolts be retightened after 24 hours of operation to compensate for any relaxation or creep that may have occurred.*

6.3.3 – CLAMP ENDS.

Care must also be taken in installing these types of valves.

First inspect all clamps and before assembly to make sure that seal portion are not damages.

Always insert the special clamp gasket through valve and pipe and close the extremity ends with appropriate clamp and relative bolting.

Close alternate the four bolting in a cross section until are tightened properly.

7.0 – VITAS API 6D THROUGH CONDUIT GATE VALVE TYPE

These valves are the types of construction that utilizes floating seats and slab type of Gate. The seats use an initial spring force to initiate a seal between gate and seat.

Subsequent application on line pressures to the valve tightens the seal between the gate and seat. These valves are designed and fabricated in a manner that any trapped internal body fluids will be vented to the conduit passage if internal pressure builds a point where it exceeds the line pressure (self relieving by the seat construction).

Note:*in some special request can be supply the “double piston effect”. In this case is assembled on the body a pressure relieve valve .*

7.1 – VALVE POSITIONING

Positioning the valve in the pipe run is very important. Prior to actual installation, check for clearance around the valve to ensure adequate space for proper operation. Also keep in mind the need for clearance for future maintenance and repair. Once proper positioning and clearance have been assured the system should be cleaned of all foreign matter. Whenever possible, blow out the

pipeline with water to remove grit and dirt. Also be sure to remove the valve end protectors and again check the valve for cleanliness

- C** VITAS Through Conduit slab gate type is a bi-direction valve, therefore the installation is not critical. The valve is designed to seal flow from both side.
- N** API 6D gate valves should be installed with the stem in an upward position. However, an alternative stem position is at an angle between the vertical and horizontal axis that will allow for complete drainage. If installed with the stem below the horizontal axis, complete drainage is not possible and solids may accumulate in the valve body, which will greatly affect the valve operation and service life.

7.2 – OPERATING INSTRUCTION

This valve design utilizes the floating seat concept and does not require mechanical force to affect a seal between seat and gate. This type of valve should be operated to a fully opening or fully closing the valve.

- C** Do not apply excessive torque to a gate of valve after it has reached the fully open or closed position since this could result in damage of the gate, stem or operating nut.

8.0 – VENTING, DRAINING AND LUBRICATION

8.1 – GENERAL

VITAS API 6D Gate valves are equipped with body fittings (plug or grease fittings). These fittings are used for venting, draining and lubrication of the seats, the stem and the gate of the valve. The valves should be placed in the full open or closed position before venting, draining or lubricating.

Before these fittings may be used, the safety cap (if grease fittings are used) must be removed to access the main body of the fitting. Visually inspect the safety cap prior to removal to ensure that the two vent holes are not plugged with dirt or other material. It is recommended that two wrenches be used to remove the safety cap. While standing off the sided/never stand directly in front of any pressure fitting. While removing safety cap, if any leakage is seen, discontinue removal of the safety cap until leakage stops. Continuous leakage from the vent holes indicates that the internal check valve contained in the body fitting is damaged or not fully seated. It is recommended that you retighten the safety cap and use an alternate fitting. Any fittings that leaks should be examined and replaced.

8.2 – VENTING OR DRAINING

- W** Do not attempt to remove the fittings provided without ensuring that all internal pressure has been relieved. Once venting or draining has been completed, remove the fitting from the body fittings and
Replace if is necessary.

8.3 – LUBRICATION

VITAS API 6D Gate valve does not depend on the use of grease to guarantee a good seal, but a minimum of lubrication will help to ensure a long life and trouble free service.

8.3.1 – BODY LUBRICATION (if applicable)

If the valve became hard to operate it may be necessary to lubricate periodically the body internals. Internal lubrication helps to reduce corrosive effects on the fluids. Any grease of #3, #4 or #5 grease compatible with the fluids is acceptable.

8.3.2 – SEAT LUBRICATION (if applicable)

Seat lubrication is provided to affect a temporary seal between seat and gate. The valve must be in fully open or fully closed position. Remove the safety caps from the grease fittings and lubricate the valve seats through a grease gun. Pressure required for seats lubrication, must be greater than the internal pressure.

After the seats have been lubricated replace the safety caps and operate the valve to spread the grease over the seats.

8.3.3 – GEAR HOUSING LUBRICATION

On valve equipped with Bevel Gear Operators, the operators are basically sealed units which can be considered to be permanently lubricated.

VITAS recommend that the operators be at least partially disassembled every three years to inspect the condition of the lubrication and components parts.

Should dirt, water or other foreign matter, be found during the inspection, the units should be flushed using a commercial cleaner/degreaser such as which is non corrosive and does not affect seal materials such as Buna N or Viton.

All bearings, gears and other close fitting parts should be liberally coated by hand with grease prior to re-assembly.

8.3.4 – STEM NUT BEARING

On valves not equipped with B.G.O., injection fittings will be found located on the bearing housing. Any good grade of grease may be used on these parts.

Only a small amount of grease is required: over lubricating the stem bearings will result in leakage of grease around the bearing housing.

8.4 – LUBRICANT CHART

All suggested grease are for general hydrocarbons service.
 The frequency of lubrication should be based upon historical data on the installed valve.
 The grease must be changed every 2 years, or more frequently in reference of the number of operation.

PART TO BE LUBRICATED	SUGGESTED GREASE LIST	
	(low ambient temp.) (-60 °C to +65 °C)	(common ambient temp.) (-30 °C to +85 °C)
RUNTIME MAINTENANCE		
YOKE BUSHING BEVEL GEAR STEM THREADING	TECNOLUBESEAL GX100	AGIP GR MU3 EP1 BP LTX 1
STEM PACKING SEATS	TECNOLUBESEAL 643 Synthetic HV Plug Valve Lubricant & Sealant NORDSTROM 950	TECNOLUBESEAL 607L Valve Plus SEALWELD Total-Lube 911
IN CASE OF LEAKAGE		
STEM	TECNOLUBESEAL Liquid-O-Ring 104S Valve Synthetic 622 arctic grade SEALWELD Winterseal 2525	TECNOLUBESEAL Semi Liquid 505 506SYN Semi-Liquid Packing SEALWELD 5050
SEAT	SEALWELD Winterseal 2525 Valve Synthetic 622 arctic grade LUBCHEM 50-300 NORDSTROM 555 WG	TECNOLUBESEAL Valve Synthetic Peanut SEALWELD 5050 LUBCHEM 50-400
INTERNAL PARTS ASSEMBLY GREASE		
	TECNOLUBESEAL Valve Synthetic 622 arctic grade	TECNOLUBESEAL: BC 101 (-15 / +120°C) SEALWELD Total-Lube 911
BOLTING ANTISEIZE		
	MOLYKOTE P-74 (-40 ÷ +200°C)	TECNOLUBESEAL: WLR111 (-15 ÷ +100°C)
RUST PROTECTION (for not painted parts)		
TECNOLUBE SEAL RUSTY 75 SEAL RUSTY 207 MACON MACONFLUID RS-P		

NOTE: ABOUT THE APPLICATION SEE MAINTENANCE INSTRUCTION.
 With ambient temperatures below -60°C, we suggest to remove all lubricants and greases and apply a thin film of PTFE.
 For special applications and food service, please, contact VITAS division of Valvitalia S.p.a,

9.0 – MAINTENANCE

9.1 – RECOMMENDED PREVENTIVE MAINTENANCE.

C *Maintenance programs vary greatly from application to application, dependent on factors such as operational frequency, fluid make up, external environment etc.
The end user should establish a routine maintenance program to extend the life of the valves and minimize downtime for repair.*

9.1.1 – Monthly

- 1. Visually inspect the valve for signs of leakage or corrosion*
- 2. Visually inspect stem packing to avoid any leakage from stuffing box.*
- 3. Lubricate the valve if necessary (stem an stem nut).*

9.1.2 – Half yearly

- 1. Cycle the valve fully open and closed or least once to check for freedom of operation.*
- 2. Remove the stem protection and lubricate the valve stem*
- 3. Repeat steps 1, 2 and 3 from the monthly maintenance recommendations.*

9.2 – MAINTENANCE INSTRUCTION

Valves are normally shipped from the manufacturing plant with adequate protection for indoor storage for up three months. This protection consists of a rust preventative and plastic or wooden valve end protectors. The valves are shipped in the closed position (or open if reverse acting) to protect the seat surfaces during transportation. Upon receipt, the valves should be inspected for shipping damage. If the end protectors are removed for inspection purpose, be sure to re-install them to maintain internal cleanliness. If caps are missing, an inspection of the valve cavity is required. All foreign matter must be removed.

If cleaning of the valve is required care must be taken as to the type of solvents used, particularly if the valve is to be connected to the line by welding. The maintenance and repair of VITAS valves is usually limited to the adjustment of the packing gland and the lubrication of yoke sleeve as previously stated. Should you require other repairs the following information should be used as a guide in your repairs.

9.2.1 – STEM PACKING INSTRUCTIONS

9.2.1.1 – STANDARD CONSTRUCTION

*Standard valves are provided of double sealing on the stem.
The only periodic maintenance is the correct lubrication of the stem.*

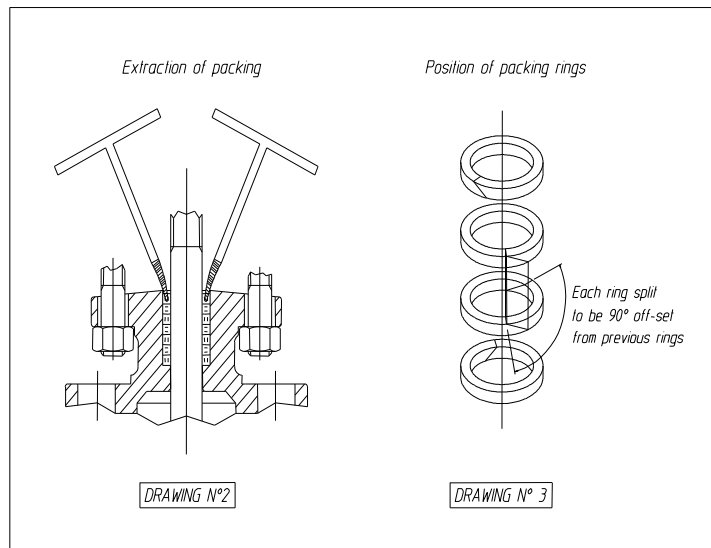
9.2.1.2 – VALVE WITH CHEVRON TYPE PACKING CONSTRUCTION

*VITAS API 6D Gate valves can be equipped CHEVRON V type rings that provides they confer different characteristics of sealing (self energizing with increasing internal pressure) .
The packing can be energized with additional grease injector (if applicable) .
The only periodic maintenance is the correct lubrication of the stem.*

9.2.1.3 – VALVE WITH GLAND PACKING DESIGN

Some VITAS API 6D Valves are equipped with outside screw and yoke gland packing design. In order to stop any leakage from around the stem it is normally only necessary to tighten the gland bolts, increasing the pressure in the packing box. If the leakage continues, it will be necessary add additional packing rings or replace the rings. To add or replace packing rings the valve shall be put in back-seat position, vent the valve body in accordance to the instruction for venting and loosen the gland bolts.

- W** Re-packing is not recommended while the valve is in service.
- N** To extract packing, remove the gland nuts and studs, lift the gland flange and gland out of the stuffing box. Remove old packing, use an extractor tool of the correct size (see dwg. n°2). Any remains of old packing must be removed from the stuffing box and the stem. Clean the stem and stuffing box and examine it for damage. Install new packing rings, one at a time, with the diagonal cut in each ring 90 degree away from the cut in the ring previously installed.



- C** Each ring should be firmly compressed into position before the next ring is added. Rings should fit snugly into the stuffing box. Install the gland and the gland flange and secure with the gland nuts, tighten the nuts uniformly and as long as required to prevent leakage.

If you are installing the graphite sealing rings, you must cut them in half or do only one incision and then carefully divide the ring to install it in the stuffing box

Procedure to insert is then the same as stated for normal packing.

9.2.1.4 – FIRE SAFE DESIGN

VITAS API 6D Valves can be equipped with secondary graphite sealing gasket on stem and bonnet to prevent leakage in case of fire .

9.3 – VALVE DISASSEMBLY AND REASSEMBLY

9.3.1 – YOKE BUSHING AND YOKE DISASSEMBLY

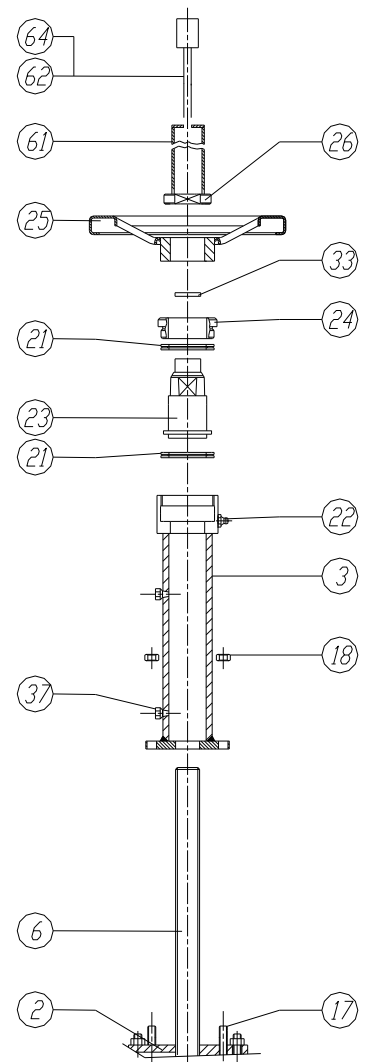
(for actuated or gear operated valves is sufficient to unscrew the bolt on coupling flange in order to disassembly the actuator or the b.g.o.)

Complete disassembly procedures are listed below. However, it is recommended that disassembly be limited only to the extent required to carry out repairs.

W Isolate and de-pressurize the system and operate the valve to its full raised position. If the gate is in either full open or full closed position a residual pressure may be rein in the valve body. Sfiatare the valve body in accordance to the instruction for venting.

- 1 - Unscrew the index ball (64) on the stem, together at the index rod (62).
- 3 - Unscrew the nut (26) together at the stem protector (61) (it's welded on).
- 4 - Remove the hand wheel (25) on the yoke bushing (23)
- 5 - Unscrew the stem block (33)
- 6 - Unscrew the thrust ring (24), (if there is a tack-weld please remove the same).
- 7 - Now is possible to take off the upper bearing (21).
- 8 - Unscrew the yoke bushing (23), from the stem, please attention to hold stop the stem when make this operation.
- 9 - Then is possible to take of the second thrust bearing (21)
- 10 - Now is possible to disassembly the yoke: unscrew the yoke nut (18)
- 11 - Remove the yoke on the valve,

N Please, careful don't lose the nut and do not bend or scratch the stem .



9.3.2 – BONNET DISASSEMBLY

12 - Now is possible to disassemble the bonnet, but, before that, is important to take of the bushing (157) with fire safe gasket and slip strip (when applicable) and yoke gasket (98 & 98A). This gaskets must be always changed.

13 - Then is possible to unscrew the bonnet nuts (36)

14 - Before to raise the bonnet is important that the gate (5) is in closed position, take careful this important position.

Now it is possible to raise the bonnet, (in the big valves there are two threaded holes. In this case use then for to raise). Being well of attention to don't damage the stem when lifth the bonnet

15 - After that you can remove off the stem packing (12) and the bottom ring (11) with internal lip seal and external oring from the bonnet. Check very well if this particular is damages and replace soft seals. Now is possible to remove the back seat (7) from the bonnet, you can help you with a special key because this particular is threaded into the bonnet. The o-ring (141) must be changed.

16 - The gasket in graphite (8a if applicable) and the bonnet o-ring (8), must be changed always

17 - At this stage, check that the valve was closed, because only in this way you can dismantle the remaining components. Nevertheless, before dismantling, to tie to the top of the stem (6) the lifting eye for his removal from the body in the valve.

9.3.3 – SLAB DISASSEMBLY

To perform this operation it is important to provide with the necessary equipment to expand the seats.

N This equipment is furnished as optional. They are two conic plate that are inserted into special slots on the seats. When pressing down the plates, the valve seat go away. Push both tools together.

18 - Take off the stem. Is possible to use the stem for raise the gate.

19 - only after the installation of special tools, you can remove the gate from his housing.

For large size valve, to move the slab use an eyebolt that shall be screwed in the suitable hole located in the upper part of the same (normally the hole is located near the stem/slab head connection).

Clean carefully this area to find the threading hole.

Lift the slab taking care not to damage the seats, place it in a very clean area supported by wooden tools with soft plastic on top. Verify accordingly that there are no abrasions or seizing in the seat area; do not up set in the area where is located the stem head; verify very well that the bevel on the bore is not damaged and it is necessary clean it with a very smooth sandpaper.

9.3.4 – SEAT DISASSEMBLY

It is not difficult to disassemble the seats, but more attention shall be paid to remove it from the pocket area not loose the spring seat (91), because if it calls down on the bottom of the valve it will be difficult from the pocket area (or from drain) to get them back.

20 - after to raise the gate you can take off the tool from the lugs on the seats.

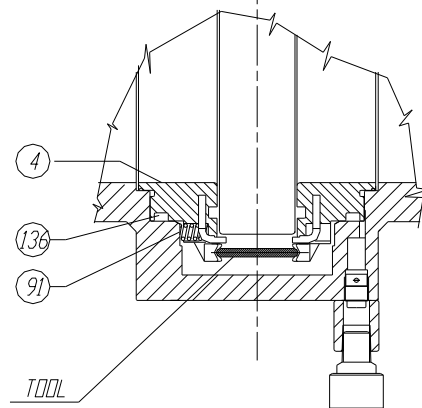
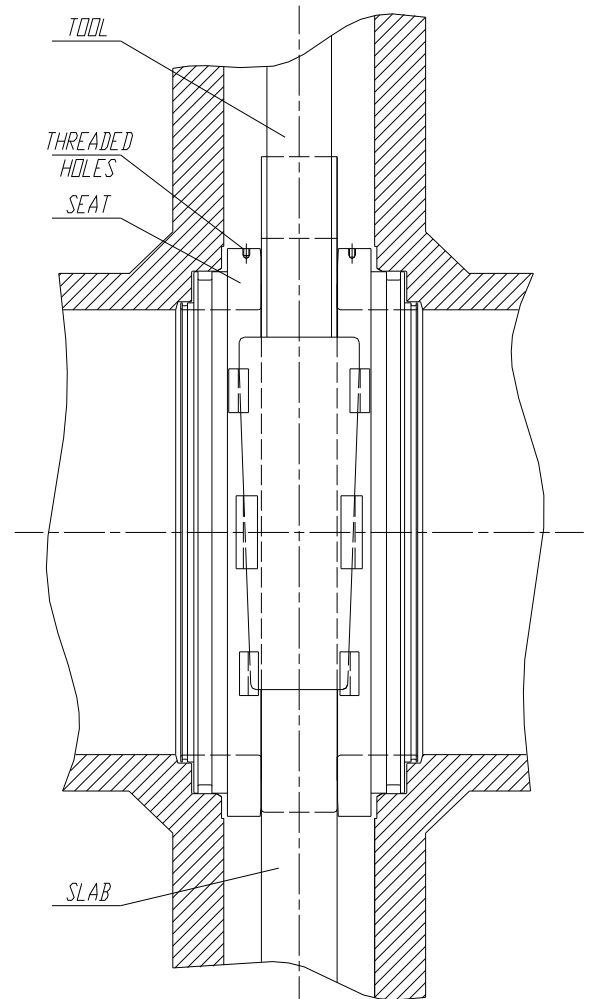
For the seats of big dimensions use lifting bands and eyebolts fitted in the threaded holes in order to avoid any possible damage.

21 - when you have in your hand the seat check very well the o-ring (136 and 136a), and the insert on the contact face sealing. In any case if this particulars are damaged must be changed, but must be done from our company or our specialized people.

The seat o-ring (136 and 136a) can be changed from your maintenance people.

22 - when you check the insert, check very well around the circumference of it, so is possible to note if there are a scrtach or cut, in this case must be replaced.

W If the seats have to be replaced, it is better not to recover the seats with machining if these are not approved from VITAS Engineers.



VIEW FROM TOP OF THE BODY FLANGE

9.3.5 – SEAT INSTALLATION

- N** before the assembly, carefully check the specification of materials you have all parts necessary for mounting, taking an virtual reassembly on the parts to wich go applied
- N** Gather all necessary materials to assemble and arrange them in order
- C** verify well all parts where gasket lodges are not damaged or dirt. If necessary, clean them.

23 - before to riassembling the seat checket well that there are not sign of rust into the body inside, if yes remove it with a paper abrasive and clean well.

24 - put on the holes in the seat (4) a some of grease and fit the spring (91) inside. Put the o'ring gasket (136) and the grease o'ring (136a) into his groove, then put the assmbly inside the valve

C Before placing the seats in the valve body be sure that all surfaces on body and seats are clean and free of all burrs and foreign material

N The seats are then placed in the body through the bonnet opening with the top or narrow part in the centre and in line with the run of the valve. They should have just sufficient clearance to run freely in the body.

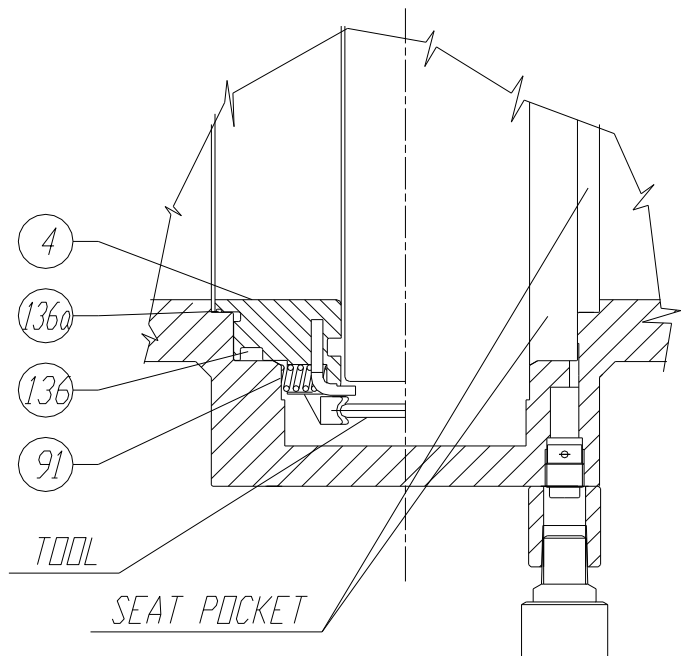
N A small amount of light oil may be applied to the seat to move the set in place.

25 - now repeat how made in para 24 for other seat, and then put the tools as indicated in para 20, only so you can put inside the gate in the body, it's always important that all parts mentioned must be checked and lubricated

26 - after to have put the seat inside the body and the tool are pushed, is possible to lodge the gate

N sliding it in lower position.

27 - now is possible to raise the tools of the seats, is better if this operation is made at the same time



9.3.6 - GASKET REPLACEMENT

Examine the gasket-seating surface of the body and the bonnet for evidence of wear damage or deterioration. Discard the old gasket. Replace or repair all damaged parts, then clean seating surfaces to remove all rust, gasket residue and other debris. Next polish gasket-seating surfaces using a fine emery cloth. Remove any radial scratches or other damage, taking care that the emery cloth does not remain in the valve. A radial scratch across the seating surface may allow for a leakage path. To affect a good seat, the gasket-seating surface must be flat and should have a finish between 1,6 and 3,2 Ra μm . Again, clean the surface to remove all polishing residue. Install

a new gasket and reassemble the valve. No gasket-sealing compound should be used when installing the gasket. Re-tighten the bolts as previously stated in paragraph 10.1.3.

28 - now is possible to lodge the body-bonnet gasket.

29 - put the o-ring (8) and the gasket (8a, if applicable) in his groove

30 - to position the stem (6) in his lodging on the gate (5). Put the o-ring (141) in his groove. Tighten the back seat (7) into the bonnet (2).

31 - now is possible to assembly the bonnet (2) on the body, careful to pass it along the stem and take attention do not damage the stem or the back seat.

32 - insert through the holes on body and bonnet the body studs (35), then screw the nuts (36)

33 - now is possible to put in his groove the bottom ring (11, with lip seal and oring), the stem packing (8), and to run the yoke (3) on the stem (6), then is possible to screw the yoke nut (18) very well

34 - put the lower bearing in his housing in the yoke and screw the yoke bushing (23) on the stem (6). The yoke bushing doesn't have to flatten the bearing, but it has to be free, then you can put the second bearing (23). All these parts must be greased very well. Now is possible to screw the thrust ring (24) on the yoke.

Look if the stem grease fitting is damages if yes is better to change it.

(If gear operated valve, re-assembly the b.g.o.)

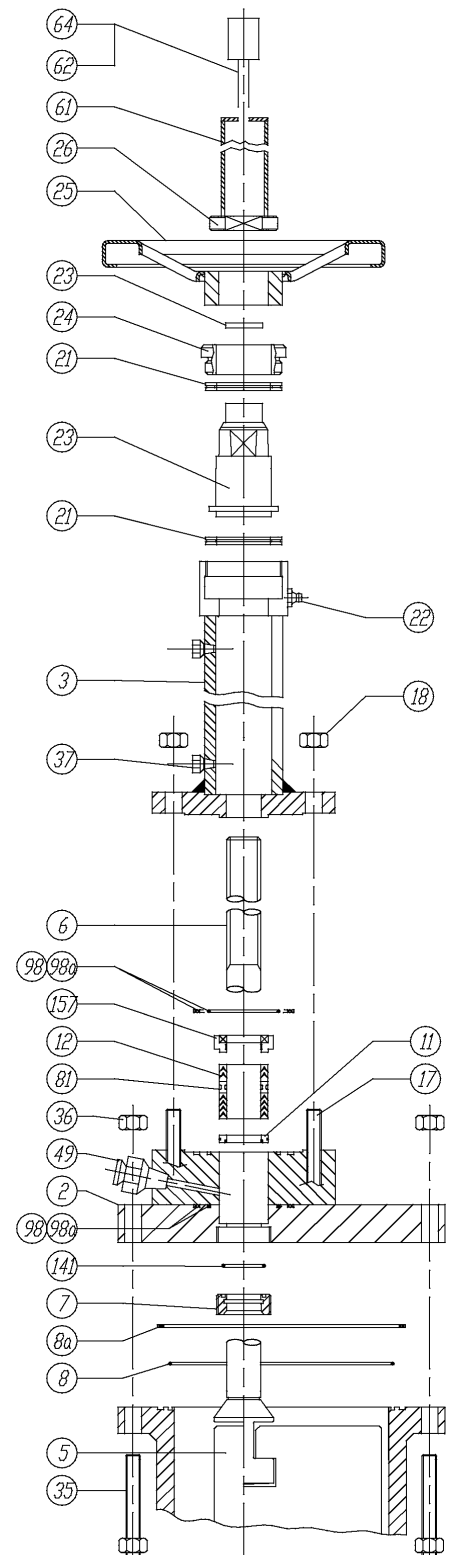
35 - screw the stem block (33) on the stem and if there is a slotted headless pin and screw it very weel.

Put on the handwhell (25), and the stem protection (61), screw the index rod on the stem and the index (64) on the rod.

C carefully check the strength of the safety of all components.

To avoid bolts over stressing in valve reassemble shall be follow the bolting torque table that allowed for each size.

To guarantee a perfect tightness the gasket must be compressed to an established amount. For this reason, the depth of female groove on to the body and the thickness of gasket itself must be kept within close tolerance to obtain the required gasket compression once the two mating flanges come into contact.



Once two flanges become in contact, a sudden increase of torque force is perceived. No further torque is then required, even if the value is lower than the one listed on the chart. If the joint is leaking, a re-check of gasket contact surfaces and the gasket itself has to be made.

9.4 - BOLTING TORQUE TABLE & SEQUENCE

BOLT SIZE ASME B1.1	ASTM A193 B7 ASTM A320 L7		ASTM A193 B7M ASTM A320 L7M		ASTM A193 B8-B8M ASTM A193 B8C cl.1	
	[Nm]	[FtLbs]	[Nm]	[FtLbs]	[Nm]	[FtLbs]
1/4	12,2	9,0	9,3	7	3,5	2,6
5/16	23,9	17,7	18,2	13	6,8	5,0
3/8	43,4	32,1	33,1	24	12,4	9,2
7/16	69,9	51,7	53,3	39	20,0	14,8
1/2	106,6	78,7	81,2	60	30,5	22,5
9/16	153,8	113,6	117,2	87	44,0	32,5
5/8	181,2	133,9	138,1	102	51,8	38,3
3/4	321,7	237,7	245,2	181	92,0	67,9
7/8	517,9	382,5	394,6	292	148,1	109,4
1	776,5	573,6	591,8	437	222,0	164,0
1 1/8	1137,2	840,0	866,6	640	325,1	240,2
1 1/4	1601,2	1182,8	1220,2	901	457,8	338,2
1 3/8	2173,7	1605,6	1656,5	1224	621,5	459,1
1 1/2	2707	1999	2063	1524	774	571,6
1 5/8	3502	2587	2669	1971	1001	739,6
1 3/4	4405	3254	3357	2480	1259	930,3
1 7/8	5465	4037	4165	3076	1563	1154,2
2	6704	4952	5109	3774	1917	1415,8
2 1/4	9690	7158	7384	5454	2770	2046,4
2 1/2	13430	9920	10234	7560	3840	2836,3
2 3/4	16360	12084	13774	10174	5168	3817,1
3	21397	15805	18014	13307	6759	4992,4
3 1/4	27379	20224	23051	17027	8648	6388,2
3 1/2	34352	25375	28921	21363	10851	8015,1
3 3/4	42478	31378	35763	26417	13418	9911,2
4	51748	38225	43568	32182	16346	12074,0

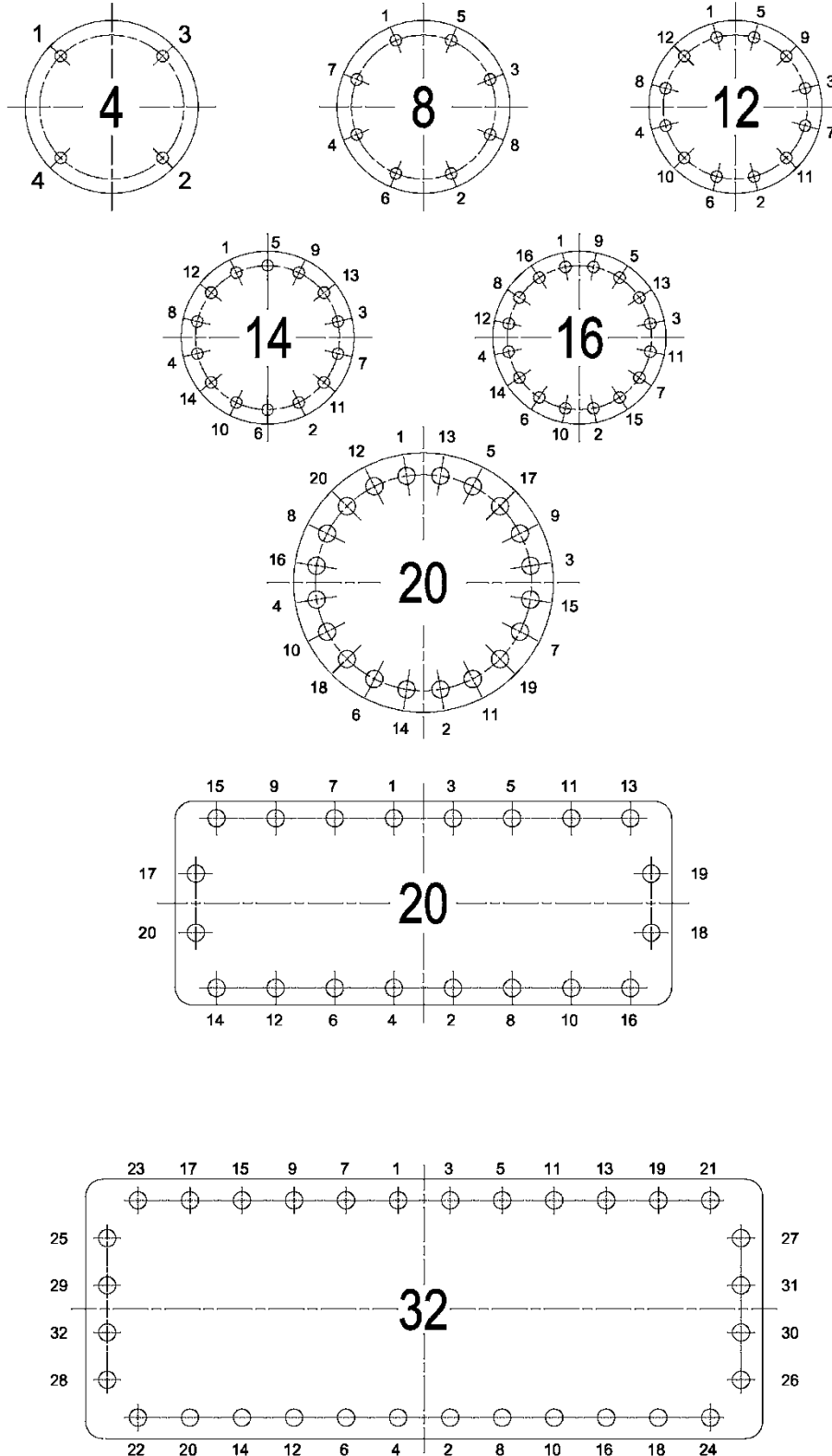
N Lubricate bolt and nut threads and nut bearing face (where it contacts the flange).
Bolts can be coated with grease MOLYKOTE P-74 or TECNOLUBESEAL WLR111
Different torques are obtained from -50% (in good lubrication), up to +100% (dry) according to the values given in Table

Adjust nut torque wrench to half the value required for each size and tighten the bolts in a crossed way as shown in the next page.

Adjust nut torque wrench on the final torque and tighten bolts as described above.

Re-torque after hydraulic shell test or 24 hours. Most of the short term bolt preload loss occurs within 24 hours after initial tightening.

MOST COMMON BOLT SEQUENCES



9.5 - LIST OF TOOLS

- *Special tools for seat/slab removal.*
- *Grease sealant kit*
- *Grease injection pump.*

10.0-SPARE PARTS

List of spare parts for standard maintenance of valves:

- Graphite gasket (if applicable)
- stuffing box packing
- body/bonnet gaskets
- seats O-ring

For extra ordinary maintenance an other components are available as spare upon request.

11.0 – PRECAUTIONS.

WORKING PRESSURE AND TEMPERATURE

When using the valve, be sure to work with proper pressure temperature combination within the maximum allowed as per rating marked on valve nameplate. The rating table are those of ANSI/ASME B16.34.

VALVE MATERIAL CHOICE

It is client responsibility to choose the material based upon the fluid and operation condition. With a correct choice a long valve life is expected, vice versa corrosion, erosion or other factors can lead to a reduced valve life.

PIPELINE LOAD

The valve has not been designed for support purposing, and hence the client must avoid any significant pipeline load concentration at valve interface. In particular case VITAS can supply the necessary information to allow the customer to perform the relevant verification, or be required to perform the verification based on client data.

CYCLIC LOAD

In case of significant number of cycles and load variations further stress analysis shall be performed to verify the valve strength. If the case VITAS can supply the necessary information to allow the customer to perform the relevant verification, or be required to perform the verification based on client data.

START-UP

Once the valve has been installed with all the prescriptions and precautions as described in the previous chapters, the valve can be started-up.

NORMAL OPERATION

When in operation, the valve can be hand-operated from open to close or vice versa by the hand wheel. Before to operate the valve, take care of the temperature of the hand wheel is not too hot or cold to get injuries to the operator hands.

NORMAL SHUT-DOWN PROCEDURE

No special prescriptions are required for shut-down procedure.

VALVE MODIFICATION

In no case the user is allowed to modify the geometry or the material of valve components. This action determines the immediate expiring of CE marking and guarantee.

12 – POTENTIAL FAILURE AND TROUBLESHOOTING

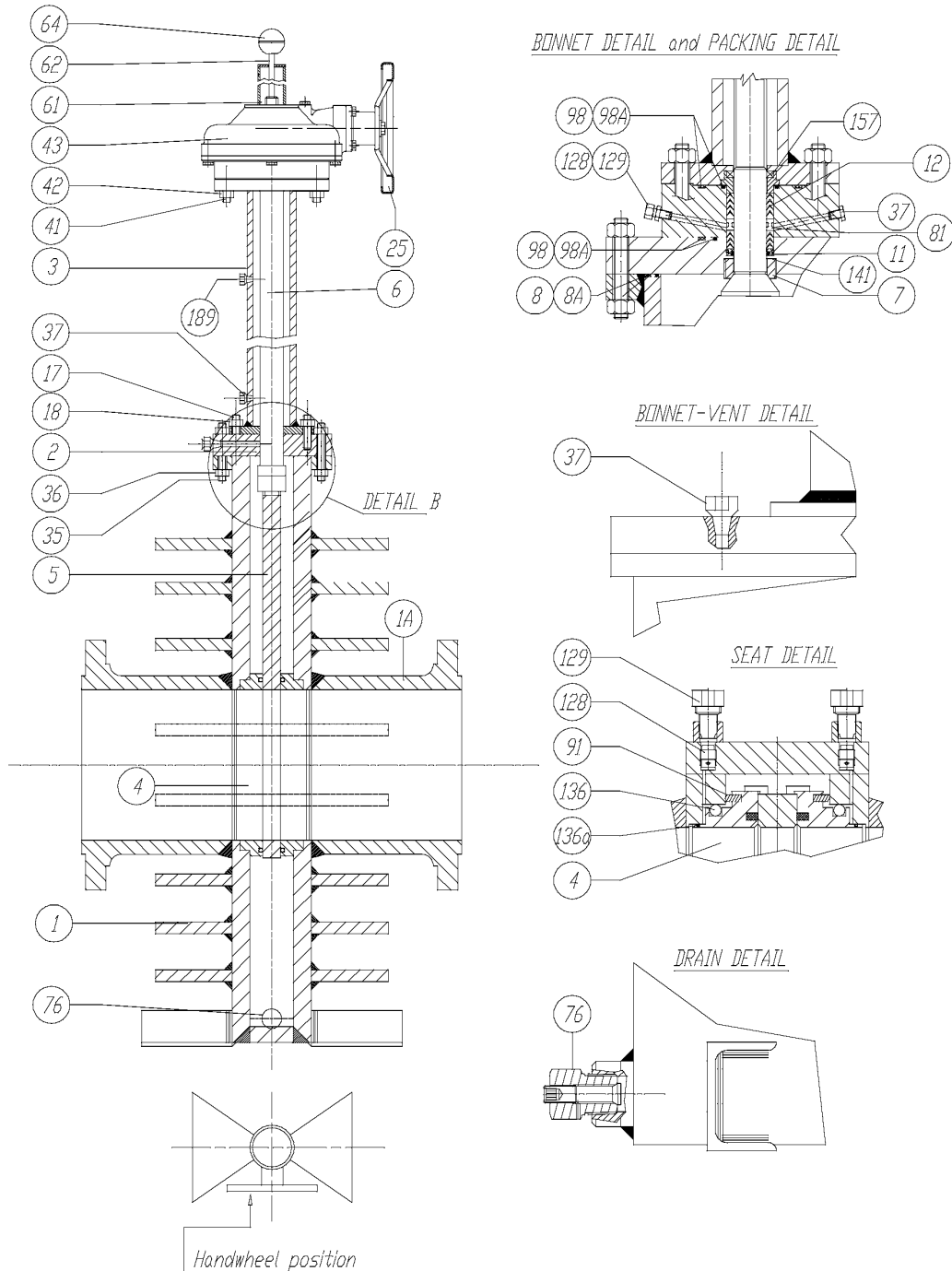
FAILURE	CAUSE	TROUBLE SHOOTING
Valve leaking around stem packing.	<ol style="list-style-type: none"> 1- Gland flange nuts loose 2- Rings of packing not enough 3- Packing aged or failure 4- Stem (striped) sealing damage 	<ol style="list-style-type: none"> 1- Equally tighten eyebolt nuts 2- Add packing or inject bulk packing 3- Replace packing 4- Stem shall be maintained by reparation or replacement conjunction with the maintenance of pipeline facilities
Body grease fittings leaking	<ol style="list-style-type: none"> 1- Internal ball check not seated 2- Safety caps loose 3- Body grease fittings threads damaged 	<ol style="list-style-type: none"> 1- See instruction for venting 2- Re-tighten safety cap 3- Call customer service for spare parts
Leakage between sealing surface	<ol style="list-style-type: none"> 1- Seat seal ring damage 2- damage to seal insert between seat and gate (if applicable) 3- Scratch on the seat 4- t or gate 5- Not fully closed or open 	<ol style="list-style-type: none"> 1- Call customer service for spare parts 2- Call customer service for spare parts 3- Inject grease on the seat and call customer service 4- Fully close or open the valve
Leakage between body/bonnet flanges	<ol style="list-style-type: none"> 1- Bonnet bolts loose 2- Bonnet gasket failure 	<ol style="list-style-type: none"> 1- Proper tighten bonnets nuts 2- Replace bonnet gasket
Valve is hard to operate	<ol style="list-style-type: none"> 1- Insufficient internal lubrication 2- Ice built up present in yoke tube or bearing house 3- Foreign part in flow line 	<ol style="list-style-type: none"> 1- See section for lubrication 2- Insert antifreeze 3- Try small movement open and close and vice versa
Valve stem rotates but valve will not operate	<ol style="list-style-type: none"> 1- Valve stem broken or thread shears 	<ol style="list-style-type: none"> 1- Call customer service for spare parts
Operation failure	<ol style="list-style-type: none"> 1- Packing too tight 2- Stem nut over worn 3- Stem bent 4- Foreigner existence between stem and stem nut or gland flange 	<ol style="list-style-type: none"> 1- Proper loose gland flange nuts 2- Replace stem nut 3- Rectify or replace stem 4- Clean foreign matter
Body and bonnet broken and leaked	<ol style="list-style-type: none"> 1- Static head 2- Fatigue 3- Freezing broken 	<ol style="list-style-type: none"> 1- When working on the entire system, proceed cautiously, avoiding sudden movements and sudden overlap. 2- Replace valve that exceeds guarantee period or is found with early fatigue defection 3- Drain away water in winter when valve is not used
Valve will not open or close	<ol style="list-style-type: none"> 1- Valve already in open or closed position 2- Ice present in operator system or body internal cavity 	<ol style="list-style-type: none"> 1- Reverse rotation direction 2- Slightly heat the ice-covered area.
Valve will not fully close	<ol style="list-style-type: none"> 1- Sediment built up in body cavity 	<ol style="list-style-type: none"> 1- Drain and flush the valve
Restriction in through bore	<ol style="list-style-type: none"> 1- Debris or sediment in bore 2- Valve not fully open 	<ol style="list-style-type: none"> 1- Clean flow bore 2- Fully open the valve

If the problem persists contact VITAS Customer Service for further instructions.

13.0 – HEALTH, SAFETY, AND THE ENVIRONMENT (HSE)

PLEASE RESPECT THE ENVIRONMENT: the packaging of valves and spares parts, damaged or replaced components and disused valves must be disposed of in accordance with local and state regulations in force in the installation area

14.0 – CROSS SECTIONAL DRAWING AND PARTS LIST



1	BODY	18	NUTS FOR DITTO	81	LANTERN RING
1a	BODY PIPE	25	HANDWHEEL	91	SPRINGS
2	BONNET	33	STEM BLOCK	98	YOKE GASKET
3	YOKE	35	BONNET STUD BOLTS	98a	FIRE SAFE GASKET
4	SEAT	36	NUTS FOR DITTO	128	CHECK VALVE
5	SLAB GATE	37	PLUG	129	SEAT GREASE INJECTOR
6	STEM	41	FLANGE ADAPTATOR BOLTS	130	SEAT SKIRT
7	BACK SEAT	42	NUTS FOR DITTO	136	SEAT SEAL O'RING
8	BONNET GASKET	43	BEVEL GEAR	136a	SEAT SEAL O'RING
8a	FIRE SAFE GASKET	61	STEM PROTECTION	141	O'RING
11	BOTTOM RING + Lip seal	62	INDEX ROD		BUSHING + FIRE SAFE
12	PACKING	64	INDEX BALL	157	GASKET + SLIP STRIP
17	YOKE STUD BOLTS	76	DRAIN VALVE		(when applicable)
				189	RELIEVE PLUG