

| |
|--|
| Lurgi Oel-Gas-Chemie GmbH |
| P.O. Letter No.: 4553015-001/1.69666/136 |
| Project No.: 1.69666-01-GEM |
| Project Title: Zagros Mega Methanol Plant, Bandar Assaluyeh, Iran |
| Item Number : 00050 |
| ID-No. : HK 650 |

TECHNICAL MANUAL NO. 14

Code IGI-F

INSTALLATION AND OPERATING MANUAL METAL SEATED FLOATING BALL VALVES WITH GRAPHITE GASKETS

Date:
16/03/98

ASSEMBLING ON THE LINE:

"SFEROVA" valves code **IGI-F** (metal to metal split body) are tested supplied, ready for assembling in OPEN position with PVC protection on the flanges.

The seal is bi-directional and closing is obtained by turning the handle 90° clockwise.

Pipeline washings should precede, as a rule, the assembling.

Before locating the valve between the counterflanges, remove the PVC protections and insert the suitable gaskets; then proceed to fix with proper screws and nuts.

DISASSEMBLING AND MAINTENANCE OF THE VALVE:

1. Remove the valve from the pipeline.
2. Remove the handle (12) unscrewing the nut (14).
3. Unscrew and remove the bolting (11) and extract the body adapter (2) from the body of the valve (1).
4. Extract the ball (3) when it is in CLOSED position.
5. Unscrew the counternut (14), remove the cups springs (13), the stuffing packing (10) and the graphite ring (7); then push the stem (4) towards the inside of the valve and extract it.
6. Remove the O-Ring (9) and the gasket (8) from the stem (4).
7. Remove the seat (5) and the back-seat gasket (5A) from the body of the valve (1).
8. Remove from body adapter (2) the gasket (6), the other seat (5) and the back-seat gasket (5A).

ASSEMBLING OF THE VALVE:

1. Accurately clean all components of the valve, taking particularly care to the seats and seat and stem housings; if the further employment of the valve allows it, lubricate the parts. As a rule, substitute all the gaskets with a new complete soft kit.
2. Insert the spiral wound gasket (5A) and the seat (5) in the body (1) with proper pressure to establish good adherence.
3. Assemble the ring (8) and the O-Ring (9) on the stem (4), and from the inside of the body insert the stem in its housing, insert the other ring (7), the stuffing packing (10) and the cups springs (13).
4. Screw the nut (14) on the stem with proper locking to establish good pressure on the stuffing packing.
5. Insert the ball (3), keeping it in CLOSED position.
6. Insert the spiral wound gasket (5A) and the seat (5) in the body adapter (2) and, in its body-housing (1), insert the gasket (6).
7. Couple the body adapter (2) with the body of the valve (1).
8. Insert and screw nuts or screws (11) lightly tightening at cruciform, always keeping the valve CLOSED (never semiopen).
9. Assemble the handle (12) and screw the nut (14) on the stem.
10. Perform some opening and closing manoeuvres and, always keeping the valve CLOSED, strongly tighten at cruciform the screws or nuts (11).



SFEROVA s.n.c.

di Villa Igino & F.lli Crippa

20050 Ronco Briantino / MI / Italy
via E. Mattei, 18

**VALVOLE A SFERA
BALL VALVES**

telefono 039.6079599
telefax 039.6079582
MECC. MI 181095
CCIAA Milano 864661
tribunale Monza reg. soc. 9489
c.f. 01852220159 - p.i. IT 007252709

TECHNICAL MANUAL NO. 01

Lurgi Oil-Gas-Chemie GmbH
P.O. Letter No.: 4553015-000 + 004/1.69666/136
Project No.: 1.69666-01-GEM
Project Title: Zagros Mega Methanol Plant,
Bandar Assaluyeh, Iran
Item Number: 00030 + 00040
ID-No.: HK 301

Code TQ2
Code KF4
Code KF5

BALL VALVES

Data: 15/05/92

ASSEMBLING ON THE LINE:

SFEROVA valves code **TQ2** (Split Body) are tested supplied, ready for assembling in OPEN position with PVC protection on the flanges.

The seal is bi-directional and closing is obtained by turning the handle 90° clockwise. Pipeline washings should precede, as a rule, the assembling. Before locating the valve between the counterflanges, remove the PVC protections and insert the suitable gaskets; then proceed to fix with proper screws and nuts.

DISASSEMBLING AND MAINTENANCE OF THE VALVE:

1. Remove the valve from the pipeline.
2. Remove the handle (12) unscrewing the nut (14).
3. Unscrew and remove the bolting (11) and extract the body adapter (2) from the body of the valve (1).
4. Extract the ball (3) when it is in CLOSED position.
5. Unscrew the counternut (14), remove the cups springs (13), the stuffing packing (10) and the graphite ring (7); then push the stem (4) towards the inside of the valve and extract it.
6. Remove the O-Ring (9) and the ptfе ring (8) from the stem (4).
7. Remove the seat (5) from the body of the valve (1).
8. Remove from body adapter (2) the gasket (6) and the other seat (5).

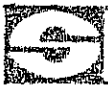
ASSEMBLING OF THE VALVE:

1. Accurately clean all components of the valve, taking particularly care to the seats and stem's housings; if the further employment of the valve allows it, lubricate the parts.
2. Insert the seats (5) in the body (1) with proper pressure to establish good adherence.
3. Assemble the ring (8) and the O-Ring (9) on the stem (4), and from the inside of the body insert the stem in its housing, insert the other ring (7), the stuffing packing (10) and the cups springs (13).
4. Screw the nut (14) on the stem with proper locking to establish good pressure on the stuffing packing.
5. Insert the ball (3), keeping it in CLOSED position.



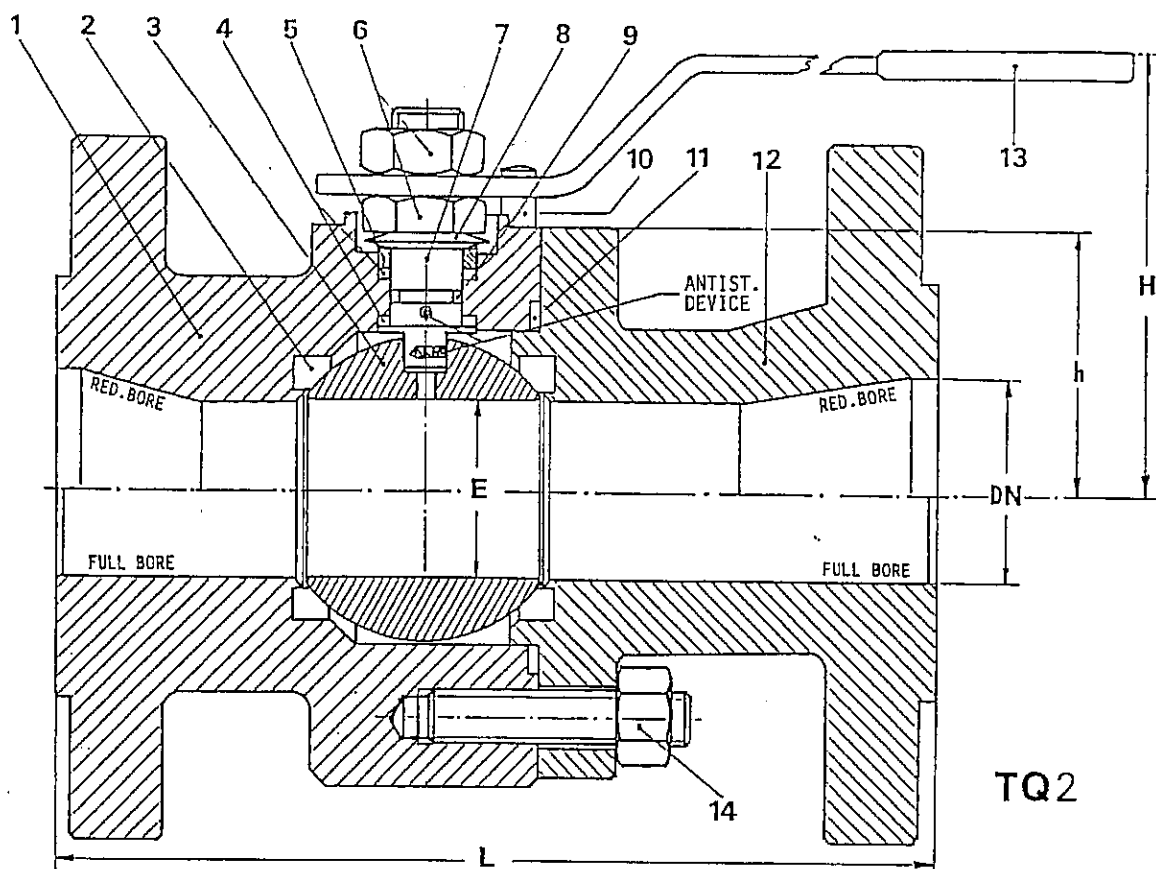
SFEROVA s.n.c.

7. Couple the body adapter (2) with the body of the valve (1).
8. Insert and screw nuts or screws (11) locking at cruciform, always keeping the valve CLOSED and never semiopen.
9. Assemble the handle (12) and screw the nut (14) on the stem.
10. Perform some opening and closing manoeuvre and, always keeping the valve CLOSED, strongly tighten at cruciform the screws or nuts (11).



TECH. QUAL. DEPAR.

Publika R.



| ITEM | PART NAME | MATERIAL SPECIFICATION | | |
|------|------------------|---------------------------------|---------------------------------|---------------------------------|
| | | CS | LF2 | S.S. |
| 1 | BODY | ASTM A 105 | ASTM A 350 LF2 | ASTM F304-F316 |
| 2 | SEATS | PTFE | PTFE | PTFE |
| 3 | BALL | ASTM F 304 | ASTM F 304 | ASTM F304-F316 |
| 4 | PACKING RINGS | PTFE/GRAPHITE | PTFE/GRAPHITE | PTFE/GRAPHITE |
| 5 | STUFFING PACKING | ASTM F 304 | ASTM F 304 | ASTM F 316 |
| 6 | NUT / LOCK NUT | C.S. GALVANIZED | C.S. GALVANIZED | ASTM F 304 |
| 7 | STEM | ASTM F 304 | ASTM F 304 | ASTM F304-F316 |
| 8 | CUPS SPRINGS | Cr-Va STEEL | Cr-Va STEEL | Cr-Va STEEL |
| 9 | O-RING | VITON | VITON | VITON |
| 10 | STOP PIN | C.S. 8.8 | C.S. 8.8 | ASTM F 304 |
| 11 | BODY GASKET | GRAPHITE | GRAPHITE | GRAPHITE |
| 12 | BODY ADAPTER | ASTM A 105 | ASTM A 350 LF2 | ASTM F304-F316 |
| 13 | HANDLE | C.S. Galvanized plastic covered | C.S. Galvanized plastic covered | C.S. Galvanized plastic covered |
| 14 | BOLTS / NUTS | A 193 B7 -A1942H | A320 L7-A194Gr.4 | A 193B8-A194-BA |

| VALVE SIZE D N | E | L | | | h | H |
|----------------------|-----|-------|-----|-----|-------------|------|
| | | CLASS | | | | |
| | | 150 | 300 | 600 | 900 1500 | |
| 1/2 | 14 | 108 | 140 | 165 | 216 | 105 |
| 3/4 | 20 | 117 | 152 | 191 | 229 | 114 |
| 1 | 25 | 127 | 165 | 216 | 254 | 50 |
| 1.1/4 | 31 | 140 | 178 | 229 | 279 | 64 |
| 1.1/2 | 35 | 165 | 190 | 241 | 305 | 71 |
| 2x1.1/2 | 30 | 178 | 216 | 292 | 368 | 71 |
| 2 | 50 | 178 | 216 | 292 | 368 | 74 |
| 2.1/2x2 | 50 | 190 | 241 | 330 | | 74 |
| 2.1/2 | 62 | 190 | 241 | 330 | | 83 |
| 3x2.1/2 | 62 | 203 | 283 | 356 | | 83 |
| 3 | 76 | 203 | 283 | 356 | | 95 |
| 4x3 | 76 | 229 | 305 | | | 95 |
| 4 | 96 | 229 | 305 | | | 109 |
| 6x4 | 96 | 267 | 403 | | | 109 |
| 6x6 | 118 | 267 | 403 | | | 134 |
| 6 | 144 | 394 | 403 | | | 152 |
| 8x6 | 144 | 292 | | | | 152 |
| 8 | 194 | | | | | 190 |
| 10x8 | 194 | 330 | | | | GEAR |
| 10 | 241 | | | | | |
| 12x10 | 241 | | | | | |

SEE TQ3 TYPE

(*) RECOMMENDED SPARE PARTS.

| | | |
|-------------|-----------------------|-------------|
| TQ2 TYPE | MANUFACTURED STOCK | FROM BAR |
|-------------|-----------------------|-------------|

Remarks: When FIRE SAFE is required,
Items 4 and 11 will be in GRAPHITE.



SFEROVA

Via E. Mollet, 10
13200 BOMBA SRIANIMO (MILITARY)
PHONE 010-6079599
TELEX 132104 HEPNOT 1
FAX 020-6079581

| | | |
|--|-------------|-----------|
| REV. | DESCRIPTION | DATE |
| | | |
| SUBJECT | | CODE |
| BALL VALVES TQ2 | | TQ2 |
| VENUE | WAVE | DATE |
| | ASTM | 30 DEC 87 |
| PROPERTY: RESERVE & THERE ARE SUPPORTING DOCUMENTS | | SCALE |
| CONFIDENTIAL INFORMATION, PROTECTIVE OF RIGHTS | | |
| DO NOT BE USED FOR ANY PURPOSE OTHER THAN FOR | | |
| DATE | | DATE |
| | | 9103 |

| | |
|---------------------------|---|
| Lurgi Oel-Gas-Chemie GmbH | |
| P.O. Letter No.: | 4553015-000+001+004/1.69666/136 |
| Project No.: | 1.69666-01-GEM |
| Project Title: | Zagros Mega Methanol Plant, Bandar Assaluyeh, Iran |
| Item Number : | 00010 + 00020 |
| ID-No. : | HK 650 |

TECHNICAL MANUAL NO. 08.3

22/04/96

USE AND MAINTENANCE MANUAL METAL SEATED TRUNNION MOUNTED BALL VALVES CODE IGI-T WITH GRAPHITE GASKETS

1. VALVE INSTALLATION ON THE PLANT:

SFEROVA ball valves code **IGI-T** are test supplied, ready for assembling in OPEN position with PVC protection on the flanges.

The valve is bi-directional and closing is obtained by turning the handle 90° clockwise or acting on the possible actuator.

To perform a correct installation of the valves proceed as follows:

- 1.1 Accurately clean the line flanges.
- 1.2 Remove the PVC protection from the valve flanges.
- 1.3 Insert the valve between the line flanges taking care to avoid support gasket step damaging.
- 1.4 Insert the proper gasket between valves flanges and line flanges.
- 1.5 Proceed to fix the valve with proper bolts and nuts.

2. GRAPHITE STEM GASKETS ADJUSTING

- GRAPHITE STEM GASKETS (15) ARE PARTS SUBJECT TO WEAR AND TEAR. PERIODICALLY AND/OR IN EVENT OF LEAKAGE, THEY HAVE TO BE ADJUSTED EMPLOYING THE PROPER DEVICE AND CONSIDERING THE FOLLOWING INSTRUCTION:

- 2.1 Screw the two exact opposite cap screws (82) under the adapter flange (24) operating gradually on both the screw and with the same clockwise turns of key.
- 2.2 Perform, if possible, some manoeuvres verifying that there are not friction and the ball perfectly move in open/closed position.
- 2.3 Verify that the possible leakage trough the stem gaskets have been eliminated.

- IN THE EVENT THAT, AFTER SOME GASKET (15) ADJUSTING, IS NOT POSSIBLE TO ELIMINATE THE LEAKAGE, THEY HAVE TO BE REPLACED AS INDICATED IN PARA 3. ORDINARY MAINTENANCE.

3. ORDINARY MAINTENANCE (STEM GASKET / GLAND PLATE)

- BEFORE PERFORMING ANY DISASSEMBLING ENSURE THAT THERE IS NO PRESSURE IN THE PIPELINE.
- WHEN THE VALVE IS "BLOCK AND BLEED" TYPE, ORDINARY MAINTENANCE CAN BE PERFORMED WITH PRESSURE IN THE PIPELINE AND WITH VALVE IN CLOSED POSITION.
- WHEN THE VALVE IS "DOUBLE BLOCK AND BLEED" TYPE, ORDINARY MAINTENANCE CAN BE PERFORMED WITH PRESSURE IN THE PIPELINE AND WITH VALVE EITHER OPEN OR CLOSED POSITION.
- ANYHOW ENSURE THAT DISASSEMBLED PARTS WILL NOT CAUSE DAMAGES TO THEMSELVES OR TO ANYONE/ANYTHING.

3.1 STEM / GLAND PLATE DISASSEMBLING

3.1.1 Unscrew the drain plug (69) in order to let out pressure from body cavity.

NOTE: Before performing this operation, with "block and bleed" valve type, control that valve is in CLOSED position. No contra-indication with "double block and bleed" type valve.

3.1.2 Unscrew the screw (36) and remove the handle (6). For actuated valves proceed to actuator disassembling following manufacturer instructions.

3.1.3 Unscrew the screw (39) and remove the stem key (29) utilising a screwdriver. Control that the stem key is not damaged (in the event it will be replaced).

3.1.4 Unscrew the screw (82) and lift the stem gasket flange (80) employing the same screw (82).

3.1.5 Unscrew the adapter flange cap screws (25) and lift the adapter flange (24) taking care not to lose the stop pins (35).

Scriber two reference marks which, when assembling, will indicate the gland plate position on the gland plate (22).

3.1.6 Unscrew the gland cap screws (26) and lift the gland plate (22) utilising a screwdriver and turning the gland plate (22).

Scriber two reference marks which, when assembling, will indicate the gland plate position on the body (1).

3.2 GASKET INSPECTION

3.2.1 Remove the stem (5) from the gland plate (22) and after a careful cleaning, control the seizing marks absence on the gasket connection area (72); in the event, they have to be removed, or better replace the stem.

Moreover, carefully control ball (3) and stem (5) coupling. If it will have a radial gap higher than ½ grade and/or it will be too damaged, both concerning components shall be replaced.

3.2.2 Remove the stem graphite gasket (15), the lantern (73) and the other stem graphite gasket (15) and carefully control that any cavitations have formed in their housing. In the event, they have to be remove with a shave hook and/or a with emery cloth.

Accurately clean above mentioned gaskets housing with a degreasing fluid drenched cloth and always replace the graphite gasket when disassembled.

3.2.3 Remove the gland graphite gasket (17) and carefully control that any cavitations have formed in its body housing and in the gland plate (22); in the event, remove them with a shave hook or with an emery cloth.

Accurately clean above mentioned gasket housing with a cloth drenched with degreasing fluid and always replace the graphite gasket when disassembled.

3.2.4 Remove the stem thrust washer (34) and control that it is not damaged; in the event, replace it. Furthermore control that the stem bearing (31) is not damaged; in the event, replace it.

3.2.5 Verify that stop pins (35) are not damaged; in the event, replace them.

3.3 STEM / GLAND PLATE RE-ASSEMBLING

3.3.1 Insert the stem (5) in its ball housing (3) only after an accurate cleaning.

3.3.2 Insert on the stem the thrust washer (34) with the self-lubricating material covered side upwards.

3.3.3 Insert the graphite gasket (17) on the gland plate (22) fixing it with some grease.

3.3.4 Insert the gland plate (22) on the stem (5) and successively in the body (1) referring to scriber marks performed during disassembling.

Push it to the bottom utilising the screws (26) and, with light hammer-strokes on the key, ensure a good tightening.

3.3.5 Insert the stem graphite gasket (15), the lantern (73) and the other stem graphite gasket (15) in their housing in the gland plate (22).

3.3.6 Insert the adapter flange (24) on the stem (5) placing it referring to scriber marks performed during disassembling.

Screw the cap screws (25) and tight as per para 3.3.4.

3.3.7 Insert the gland plate (81) and the stem gasket flange (80) on the stem (5) and screw the cap screw (82).

3.3.8 Insert the stem key (29) and screw its screw (39).

3.3.9 Insert the handle (6) on the stem (5) and screw its screw (36).

For actuated valves proceed to actuator assembling following manufacturer instructions.

4. EXTRAORDINARY MAINTENANCE (COMPLETE VALVE DISASSEMBLING)

- BEFORE PERFORMING VALVE DISASSEMBLING RIGOROUSLY ENSURE THAT THERE IS NO PRESSURE IN THE PIPELINE.
- ENSURE THAT DISASSEMBLED PARTS WILL NOT CAUSE DAMAGES TO THEMSELVES OR TO ANYONE/ANYTHING.

4.1 VALVE DISASSEMBLING

4.1.1 For actuated valves proceed to actuator disassembling following manufacturer instructions.

4.1.2 Unscrew line flange nuts handling with the key on the pipeline side.

NOTE: Before proceeding to this operation you must ensure being able to support the valve through a proper lifting-gear.

4.1.3 Remove the valve from the pipeline taking care to avoid support gasket step damaging.

Place it, 90° turned, with a flange laying on an accurately cleaned plane.

4.1.4 Unscrew the body nuts (10). Scriber two reference marks which, when assembling, will indicate closure (2) and body (1) position.

4.1.5 Inserting some lifting lugs in line flange holes, lift the closure (2) of about 500 mm taking care not to damage the body coupling step.

At this point pay particular attention to the seat (4) which, not being hold in the closure, could fall down causing damages to themselves or to anyone.

Move the closure (2) and, turning it of 180°, lay it on the plane with the seat (4) upwards.

4.2 SEATS AND CLOSURE GASKETS DISASSEMBLING

4.2.1 Lift the seat (4) inserting and levering two screwdrivers in opposite position.

4.2.2 Utilising a screwdriver, remove the seat graphite gasket (84) and carefully control that any cavitations have formed in its housing on the seat (4). In the event, they have to be removed with a shave hook and/or emery cloth.

Clean a.m. gasket housing with a cloth drenched with degreasing fluid and always replace the graphite gasket when disassembled.

Accurately clean, with the same degreasing fluid, all the seat (4) and control if the frontal seat surface got damaged. In the event, replace the whole seat.

4.2.3 After the accurate cleaning of the seat gasket (84) connection area in the closure (2), control that there are no cavitations and/or vertical signs; in the event, remove with an emery cloth.

4.2.4 Remove the graphite body gasket (8) and carefully control that any cavitations have formed in its body (1) and closure (2) housing; in the event, remove them with a shave hook and/or with an emery cloth.

Accurately clean above mentioned gasket housing with a degreasing fluid drenched cloth and always replace the graphite gasket when disassembled.

4.2.5 Unscrew completely the remaining body nuts (10). Scriber two reference marks which, when assembling, will indicate the closure (2) on the body (1).

Screwing on the upwards body-closure nuts (11) two female threaded lifting-lugs, lift the complete body (1) paying attention not to damage the closure coupling step and lay it on the plane.

4.2.6 Disassemble the seat (4) and the closure gaskets (8) as shown in para 4.2.

4.3 BALL DISASSEMBLING

4.3.1 Turn the ball (3) placing it in open position.

Inserting a wire rope in the bore, ensure being able to support the valve through a proper lifting-gear.

4.3.2 Disassemble the adapter flange (24), the gland plate (22), the stem (5) and perform the gaskets check as shown in para 3.1 and 3.2.

4.3.3 Disassemble the trunnion (23) and perform the gaskets check as shown for gland plate (22) in para 3.1.6 and 3.2.3.

4.3.4 Lift the ball (3) and lay it on a perfectly cleaned plane paying attention not to damage the grinding surface.

Accurately clean all its parts with degreasing fluid and control that connection point between bore and spherical surface is not damaged; in the event, it is needed to polish the best you can with a very thin emery cloth.

4.3.5 Remove the lower thrust washer (33) and control that is not damaged; in the event, replace it. Furthermore control that the ball bearing (30) is not damaged; in the event, replace it.

4.4 BALL RE-ASSEMBLING

4.4.1 Control that all the parts to be re-assembled are accurately cleaned and not damaged.

4.4.2 Perform the stem (5) pre-assembling in the gland plate (22) as shown in para 3.3.2 to 3.3.4.

4.4.3 Verify that all body-closure studs (11) are well tighten in the body.

4.4.4 Lift the ball (3) as in para 4.3.1 and lower in the body (1) inside taking care not to damage it.

4.4.5 Insert the gland plate (22) in the body referring to scribe marks performed during disassembling and pay attention that the stem (5) takes perfectly place in its ball housing. Push it to the bottom utilising the screws (26) and, with light hammer-strokes on the key, ensure a good tightening.

4.4.6 Perform the trunnion (23) pre-assembling as shown for gland plate (22) in para 3.3.3. Insert the lower thrust washer (33) in the ball (3) and the trunnion (23) in the body referring to scribe marks performed during disassembling. Push it to the bottom utilising the screws (27) and, with light hammer-strokes on the key, ensure a good tightening.

4.4.7 At this point remove the ball lifting rope. Verify that ball bearings (30) and (31), in the event they got replaced, do not present gaps in the coupling with gland plate (22) and trunnion (23).

4.5 SEAT RE-ASSEMBLING

4.5.1 Insert the graphite closure gasket (8) on the closure (2).

4.5.2 Insert the seat springs (37) in their closure (2) housing .

4.5.3 Insert the seat graphite gasket (84) on its seat (4) housing after controlling that there are no impurity in them. Accurately grease this area in order to facilitate the closure seat inserting.

4.5.4 Pushing with strength, insert the seat (4) in its closure (2) housing paying attention not to damage the gasket (84). For big size valves it is advisable to provide with a proper equipment.

4.5.5 Assemble the other closure (2) as shown from para 4.5.1 to para 4.5.4.

4.6 VALVE RE-ASSEMBLING

4.6.1 Screwing on the upwards body-closure studs (11) two female threaded lifting-lugs, lift the complete body (1) and, taking care not to damage the coupling step, lay it on a closure (2).

4.6.2 Screw the body-closure nuts (10). With the help of a torque wrench, ensure a good tightening.

4.6.3 Turn the remaining closure 180° and lay it with the body coupling flange on the plane. Inserting lifting-lugs in the line flange holes, lift the closure and, paying attention not to damage the body (1) coupling step, lay it on the above mentioned body.

During this operation take particular care to the seat (4) which, not being hold in the closure, could fall down causing damages to themselves or to anyone.

4.6.4 Screw the body-closure studs (10). With the help of a torque wrench, ensure a good tightening.

4.6.5 Turn the valve 90° with the stem in upwards position.
Insert the stem graphite gasket (15), the lantern (73) and the other stem graphite gasket (15) in their gland plate (22) housing.

4.6.6 Insert the adapter flange (24) on the stem (5) and place it referring to scribe marks performed during disassembling.
Screw the screws (25) and tighten as shown in para 4.4.5.

4.6.7 Insert the gland plate (81) and the stem gasket flange (80) on the stem (5) and screw the cap screw (82).

4.6.8 Insert the stem key (29) and screw its screw (39).

4.6.9 Insert the handle (6) on the stem (5) and screw its screw (36).
For actuated valves it is advisable proceeding to actuator assembling after having installed the valves on the line and following actuator manufacturer instruction.

5. VALVE FINAL CHECK

- BEFORE PROCEED TO INSTALL THE VALVE ON THE LINE, PERFORM SOME MANOEUVRES VERIFYING THAT THERE ARE NO FRICTION AND THAT THE BALL PERFECTLY MOVE IN OPEN/CLOSED POSITION.
- WHEN POSSIBLE, PERFORM THE HYDROSTATIC TEST ON THE VALVE.

6. RECOMMENDED SPARE PARTS

| POS. | DESCRIPTION | QTY.' |
|------|---------------------|-------|
| 008 | BODY GASKET | 2 |
| 015 | STEM GASKET | 2 |
| 017 | GLAND GASKET | 1 |
| 018 | TRUNNION GASKET | 1 |
| 084 | SEAT GASKET | 2 |
| 030 | BALL BEARING | 1 |
| 031 | STEM BEARING | 1 |
| 033 | LOWER THRUST WASHER | 1 |
| 034 | STEM THRUST WASHER | 1 |

NOTE: For NACE service valves it is advisable replacing also SEAT SPRINGS (37).