# PRESSURE & FUNCTIONAL TESTING API 6D BALL VALVES

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| Issued by: GP | | Approved by: BT | |

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## FUNCTIONAL, RESISTANCE AND PRESSURE TESTING BALL VALVES API 6D

The following indicates standard testing performed. Special testing such as torque testing, NDT, PMI, submerged tank gas testing can be performed where required.

### 1. SHELL HYDROSTATIC PRESSURE TEST

Sequence: To be performed according to point 7 of Technical Instruction AP/IT 01/00.
Range: 100% of batch.
Test pressures and times: As per point 1 of the attached Table.
Acceptance criteria: No leak admitted through the casing walls and permanent seals.

### 2. HYDROSTATIC TESTING OF SEATS

To be performed on 100% of series in both directions as per point 8 of Technical Instruction AP/IT 01/00.
Test pressures: As per attached Table 3.a.
Test times: As indicated in attached Table 3.b
Acceptance criteria:

- Soft seats: Zero leakage ISO 5208 rate A
- Metal seats: ISO 5208 Rate AA, B, C, CC, D according design and/or purchaser order.

### 3. PNEUMATIC TESTING OF SEATS

This test is OPTIONAL, per API 6D but is performed by APV.
Range: 100% of batch in both directions.
Sequence: To be performed according to point 6 of Technical Instruction AP/IT 01/00.
Test pressures and times: As per point 4 of the attached Table.
Acceptance criteria:

- Zero leaks for valves with soft seats to ISO 5208 rate A.
- Metal seats: ISO 5208 rate AA, B, C, CC, D according to design and/or purchaser order.

### 4. SPECIAL TESTING

Refer Technical Instruction API 6D AP/IT 01/00 for trunnion mounted API 6D ball valves.


70-78 Stanbel Road Salisbury Plain, South Australia 5109
Telephone +61 (0)8 8285 0033 Fax +61 (0)8 8285 0044
admin@australianpipelinevalve.com.au

# PRESSURE & FUNCTIONAL TESTING API 6D BALL VALVES



## MINIMUM PRESSURES AND TEST TIMES AS PER STD API 6D

### 1. MINIMUM CASING HYDROSTATIC RESISTANCE TEST PRESSURE (BARG)

| RATING | PRESSURE |
|---|---|
| CLASS 150 | 30 |
| CLASS 300 | 78 |
| CLASS 600 | 156 |
| CLASS 800 | 204 |
| CLASS 900 | 233 |
| CLASS 1500 | 388 |
| CLASS 2500 | 647 |

### 1. b. MINIMUM HYDROSTATIC RESISTANCE TEST TIME - CASING

| SIZE | TIME |
|---|---|
| DN 1/2" to DN 4" | 2 minutes |
| DN 6" to DN 10" | 5 minutes |
| DN 12" to DN 18" | 15 minutes |
| Over DN 20" | 30 minutes |

### 2. a. PNEUMATIC TEST PRESSURE - CASING AIRTIGHTNESS (OPTIONAL)

| RANGE | PRESSURE |
|---|---|
| All ratings and DN < 8" | 18 to 22 barg |
| All ratings and DN ≥ 8" | 14 to 18 barg |

### 2. b. CASING PNEUMATIC RESISTANCE AND AIRTIGHTNESS TEST TIME (OPTIONAL)

| SIZE | TIME |
|---|---|
| Up to DN 8" | 2 minutes |
| Over DN 10" | 3 minutes |

### 3. a. SEAT HYDROSTATIC TEST PRESSURE (BARG)

| RATING | PRESSURE |
|---|---|
| CLASS 150 | 22 |
| CLASS 300 | 56 |
| CLASS 600 | 14 |
| CLASS 800 | 152 |
| CLASS 900 | 171 |
| CLASS 1500 | 281 |
| CLASS 2500 | 474 |

### 3. b. SEAT HYDROSTATIC TESTING TIME

| RANGE | TIME |
|---|---|
| DN 1/2" to DN 4" | 2 minutes |
| DN 6" to DN 18" | 5 minutes |
| Over 20" | 10 minutes |

### 4. a. SEAT PNEUMATIC TEST PRESSURE

| | |
|---|---|
| All ratings and DN | 6 bar |

### 4. b. SEAT PNEUMATIC TESTING TIME

| |
|---|
| Same times as in Section 3.b. |

# PRESSURE & FUNCTIONAL TESTING API 6D BALL VALVES

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**TABLE 1 ADMISSIBLE LEAKS SEAT TEST ISO 5208**

**RATE AA**

| Nominal | | Hydro seat test | | | Pneumatic seat test | | |
|---|---|---|---|---|---|---|---|
| Size | DN | mm³/s | ml/min | drops/min | mm³/s | ml/min | bubbles/min |
| 1/2” | 15 | 0,09 | 0,01 | 0 | 2,7 | 0,162 | 3 |
| 3/4” | 20 | 0,12 | 0,01 | 0 | 3,6 | 0,216 | 4 |
| 1” | 25 | 0,15 | 0,01 | 0 | 4,5 | 0,27 | 5 |
| 1 1/2” | 40 | 0,24 | 0,01 | 0 | 7,2 | 0,432 | 7 |
| 2” | 50 | 0,3 | 0,02 | 0 | 9 | 0,54 | 9 |
| 2 1/2” | 65 | 0,39 | 0,02 | 1 | 11,7 | 0,702 | 12 |
| 3” | 80 | 0,48 | 0,03 | 1 | 14,4 | 0,864 | 14 |
| 4” | 100 | 0,6 | 0,04 | 1 | 18 | 1,08 | 18 |
| 6” | 150 | 0,9 | 0,05 | 1 | 27 | 1,62 | 27 |
| 8” | 200 | 1,2 | 0,07 | 2 | 36 | 2,16 | 36 |
| 10” | 250 | 1,5 | 0,09 | 2 | 45 | 2,7 | 45 |
| 12” | 300 | 1,8 | 0,11 | 3 | 54 | 3,24 | 54 |
| 14” | 350 | 2,1 | 0,13 | 3 | 63 | 3,78 | 63 |
| 16” | 400 | 2,4 | 0,14 | 4 | 72 | 4,32 | 72 |
| 18” | 450 | 2,7 | 0,16 | 4 | 81 | 4,86 | 81 |
| 20” | 500 | 3 | 0,18 | 5 | 90 | 5,4 | 90 |
| 22” | 550 | 3,3 | 0,20 | 5 | 99 | 5,94 | 99 |
| 24” | 600 | 3,6 | 0,22 | 6 | 108 | 6,48 | 108 |

**RATE C**

| Nominal | | Hydro seat test | | | Pneumatic seat test | | |
|---|---|---|---|---|---|---|---|
| Size | DN | mm³/s | ml/min | drops/min | mm³/s | ml/min | bubbles/min |
| 1/2” | 15 | 0,45 | 0,03 | 0 | 45 | 2,7 | 41 |
| 3/4” | 20 | 0,6 | 0,04 | 1 | 60 | 3,6 | 55 |
| 1” | 25 | 0,75 | 0,05 | 1 | 75 | 4,5 | 69 |
| 1 1/2” | 40 | 1,2 | 0,07 | 1 | 120 | 7,2 | 110 |
| 2” | 50 | 1,5 | 0,09 | 2 | 150 | 9 | 137 |
| 2 1/2” | 65 | 1,95 | 0,12 | 2 | 195 | 11,7 | 179 |
| 3” | 80 | 2,4 | 0,14 | 2 | 240 | 14,4 | 220 |
| 4” | 100 | 3 | 0,18 | 3 | 300 | 18 | 275 |
| 6” | 150 | 4,5 | 0,27 | 5 | 450 | 27 | 412 |
| 8” | 200 | 6 | 0,36 | 6 | 600 | 36 | 550 |
| 10” | 250 | 7,5 | 0,45 | 8 | 750 | 45 | 687 |
| 12” | 300 | 9 | 0,54 | 9 | 900 | 54 | 824 |
| 14” | 350 | 10,5 | 0,63 | 11 | 1050 | 63 | 962 |
| 16” | 400 | 12 | 0,72 | 12 | 1200 | 72 | 1099 |
| 18” | 450 | 13,5 | 0,81 | 14 | 1350 | 81 | 1237 |
| 20” | 500 | 15 | 0,90 | 15 | 1500 | 90 | 1374 |
| 22” | 550 | 16,5 | 0,99 | 17 | 1650 | 99 | 1511 |
| 24” | 600 | 18 | 1,08 | 18 | 1800 | 108 | 1649 |

**RATE B**

| Nominal | | Hydro seat test | | | Pneumatic seat test | | |
|---|---|---|---|---|---|---|---|
| Size | DN | mm³/s | ml/min | drops/min | mm³/s | ml/min | bubbles/min |
| 1/2” | 15 | 0,15 | 0,01 | 0 | 4,5 | 0,27 | 4 |
| 3/4” | 20 | 0,2 | 0,01 | 0 | 6 | 0,36 | 6 |
| 1” | 25 | 0,25 | 0,02 | 0 | 7,5 | 0,45 | 7 |
| 1 1/2” | 40 | 0,4 | 0,02 | 0 | 12 | 0,72 | 11 |
| 2” | 50 | 0,5 | 0,03 | 0 | 15 | 0,9 | 14 |
| 2 1/2” | 65 | 0,65 | 0,04 | 1 | 19,5 | 1,17 | 18 |
| 3” | 80 | 0,8 | 0,05 | 1 | 24 | 1,44 | 22 |
| 4” | 100 | 1 | 0,06 | 1 | 30 | 1,8 | 28 |
| 6” | 150 | 1,5 | 0,09 | 1 | 45 | 2,7 | 41 |
| 8” | 200 | 2 | 0,12 | 2 | 60 | 3,6 | 55 |
| 10” | 250 | 2,5 | 0,15 | 2 | 75 | 4,5 | 69 |
| 12” | 300 | 3 | 0,18 | 3 | 90 | 5,4 | 83 |
| 14” | 350 | 3,5 | 0,21 | 3 | 105 | 6,3 | 97 |
| 16” | 400 | 4 | 0,24 | 4 | 120 | 7,2 | 110 |
| 18” | 450 | 4,5 | 0,27 | 4 | 135 | 8,1 | 124 |
| 20” | 500 | 5 | 0,30 | 5 | 150 | 9 | 138 |
| 22” | 550 | 5,5 | 0,33 | 5 | 165 | 9,9 | 152 |
| 24” | 600 | 6 | 0,36 | 6 | 180 | 10,8 | 166 |

**RATE CC**

| Nominal | | Hydro seat test | | | Pneumatic seat test | | |
|---|---|---|---|---|---|---|---|
| Size | DN | mm³/s | ml/min | drops/min | mm³/s | ml/min | bubbles/min |
| 1/2” | 15 | 1,2 | 0,07 | 1 | 334,5 | 20,07 | 307 |
| 3/4” | 20 | 1,6 | 0,10 | 2 | 446 | 26,76 | 409 |
| 1” | 25 | 2 | 0,12 | 2 | 557,5 | 33,45 | 511 |
| 1 1/2” | 40 | 3,2 | 0,19 | 3 | 892 | 53,52 | 818 |
| 2” | 50 | 4 | 0,24 | 4 | 1115 | 66,9 | 1022 |
| 2 1/2” | 65 | 5,2 | 0,31 | 5 | 1449,5 | 86,97 | 1329 |
| 3” | 80 | 6,4 | 0,38 | 6 | 1784 | 107,04 | 1635 |
| 4” | 100 | 8 | 0,48 | 8 | 2230 | 133,8 | 2044 |
| 6” | 150 | 12 | 0,72 | 12 | 3345 | 200,7 | 3066 |
| 8” | 200 | 16 | 0,96 | 16 | 4460 | 267,6 | 4088 |
| 10” | 250 | 20 | 1,20 | 20 | 5575 | 334,5 | 5111 |
| 12” | 300 | 24 | 1,44 | 23 | 6690 | 401,4 | 6133 |
| 14” | 350 | 28 | 1,68 | 27 | 7805 | 468,3 | 7155 |
| 16” | 400 | 32 | 1,92 | 31 | 8920 | 535,2 | 8177 |
| 18” | 450 | 36 | 2,16 | 35 | 10035 | 602,1 | 9199 |
| 20” | 500 | 40 | 2,40 | 39 | 11150 | 669 | 10221 |
| 22” | 550 | 44 | 2,64 | 43 | 12265 | 735,9 | 11243 |
| 24” | 600 | 48 | 2,88 | 47 | 13380 | 802,8 | 12265 |

**RATE D**

| Nominal | | Hydro seat test | | | Pneumatic seat test | | |
|---|---|---|---|---|---|---|---|
| Size | DN | mm³/s | ml/min | drops/min | mm³/s | ml/min | bubbles/min |
| 1/2” | 15 | 1,5 | 0,1 | 1 | 450 | 27 | 413 |
| 3/4” | 20 | 2 | 0,1 | 2 | 600 | 36 | 550 |
| 1” | 25 | 2,5 | 0,2 | 2 | 750 | 45 | 688 |
| 1 1/2” | 40 | 4 | 0,2 | 4 | 1200 | 72 | 1100 |
| 2” | 50 | 5 | 0,3 | 5 | 1500 | 90 | 1375 |
| 2 1/2” | 65 | 6,5 | 0,4 | 6 | 1950 | 117 | 1788 |
| 3” | 80 | 8 | 0,5 | 8 | 2400 | 144 | 2200 |
| 4” | 100 | 10 | 0,6 | 10 | 3000 | 180 | 2750 |
| 6” | 150 | 15 | 0,9 | 14 | 4500 | 270 | 4126 |
| 8” | 200 | 20 | 1,2 | 19 | 6000 | 360 | 5501 |
| 10” | 250 | 25 | 1,5 | 24 | 7500 | 450 | 6876 |
| 12” | 300 | 30 | 1,8 | 29 | 9000 | 540 | 8251 |
| 14” | 350 | 35 | 2,1 | 34 | 10500 | 630 | 9626 |
| 16” | 400 | 40 | 2,4 | 38 | 12000 | 720 | 11002 |
| 18” | 450 | 45 | 2,7 | 43 | 13500 | 810 | 12377 |
| 20” | 500 | 50 | 3,0 | 48 | 15000 | 900 | 13752 |
| 22” | 550 | 55 | 3,3 | 53 | 16500 | 990 | 15127 |
| 24” | 600 | 60 | 3,6 | 58 | 18000 | 1080 | 16502 |

# TECHNICAL INSTRUCTION FOR FUNCTIONAL, RESISTANCE AND TIGHTNESS TESTS FOR API 6D BALL VALVES - EVALUATION AND PRODUCTION TEST

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TECHNICAL INSTRUCTION: FUNCTIONAL, RESISTANCE AND TIGHTNESS TESTS FOR BALL VALVES.

## 1. OBJECT

The object of these tests is verify the functionality, mechanical resistance and, at the same time, the tightness of the pressure retaining components according to the applicable guidelines specified in the customer order or, in their absence, the design guidelines of the product, whose pressure values, testing times and required tests are specified in the corresponding AP/PT6 Technical Instruction & API 6D of this instruction.
Scope: API 6D trunnion mounted ball valves.

## 2. PROCESS

1. The test-bed must allow all the required pressures to be reached (1.5 x PN) and incorporate all the necessary accessories for the correct running of the tests: vents, water and air connections, manometers, receptacles with the necessary quantity of water, etc...
2. The valves to be tested will be completely assembled, preferably with their actuators/gear box/levers, with the exceptions due to safety or capacity reasons; in this case alternative functional tests will be done out of the test-bed.
3. The valves must be clean and free of any dirt which could distort the results. In the case of ferritic materials, these are protected from rust with a suitable primer.
4. It must be checked that the manometers to be used are calibrated, the calibration is in use and the pressures to be measured are located between 30 and 70 % of the top of the manometer scale. When the test pressure value is situated between two divisions of the scale, it will be rounded off to the next higher division.
5. Quality of testing water:
   Valves of ferritic materials: Pottable water with corrosion inhibitor.
   Stainless steel valves: Pottable water with/without corrosion inhibitor.
   Hydrostatic test shall be carried out with potable water with corrosion inhibitor diluted at 3%.
6. The tests required as per the guidelines specified in the customer order will be carried out, which the pressure values and testing times that are detailed in the corresponding AP/PT6 Technical Instruction & API 6D to this instruction and following the sequence of time below.
7. After the satisfactory tests, the internal and external parts of the valves will be cleaned and dried and they will then be identified and transferred for painting.

## 3. ANTISTATIC TEST

(Optional)
The electrical resistance between ball and stem to the stem and body shall not exceed 10Ω.
Sequence: The resistance shall be measured on dry valves before pressure testing. The electrical resistance shall be measured using a direct-current power source not exceeding 12V.

## 4. FULL END THRUST TEST

The valve has to undergo Full end thrust function test after fitting the valve ends with the flanges. It is preferable to perform function test during the ambient shell test as described in 7.0.

## 5. SHELL TIGHTNESS TEST

(Optional)

1. The valve inlet and outlet are closed off with flanges.
2. The valve is adjusted until the ball is in a half open position.


70-78 Stanbel Road Salisbury Plain, South Australia 5109
Telephone +61 (0)8 8285 0033 Fax +61 (0)8 8285 0044
admin@australianpipelinevalve.com.au

# TECHNICAL INSTRUCTION FOR FUNCTIONAL, RESISTANCE AND TIGHTNESS TESTS FOR API 6D BALL VALVES - EVALUATION AND PRODUCTION TEST



3. The valve is submerged in water, at room temperature, for the period of time shown in AP/PT6 Technical Instruction as per API 6D.
4. The internal part of the valve is filled with dry, clean and oil free nitrogen or air, to the pressure indicated in AP/PT6 Technical Instruction & API 6D.
   Safety warning: do not pressurise the valve before submerging it.
5. Acceptance criteria: zero bubbles emerging from the walls of the valve, the packing and the permanent joints.
6. Release the pressure from the valve before removing it from water.

## 6. SEATS PNEUMATIC TEST

1. The valve inlet and outlet are closed off with flanges.
2. The valve is adjusted until the ball is in a half open position.
3. The valve is filled with dry, clean and oil free nitrogen or air through the lower flange, to the pressure indicated in AP/PT6 Technical Instruction & API 6D. If the test pressure is above 10 barg the test must be carried out with the valve submerged in water, for safety reasons.
4. The valve is adjusted until it is in the closed position.
5. The pressure is released through the upper flange and it is connected to a tube with an internal diameter of 4mm, the end of which is submerged between 3 and 6mm below the surface of water.
6. Acceptance criteria: zero bubbles in the case of soft seats as per ISO 5208 rate A. In the case of metallic seats the ANSI/FCI 70-2-2006 Class VI criteria will be applied as standard, ISO 5208 leakage rates can be applied where specified.
7. The valve is operated until it opens, it is pressurised again to the test pressure, then closed again and the pressure is released through the lower flange, checking the lower closing by means of the bubbles.
8. See test pressures and times AP/PT6 Technical Instruction & API 6D.

## 7. SHELL HYDROSTATIC TEST

1. Mount the valve on the test-bed, closing off the inlet and outlet ports, and with the ball in the half open position, fill completely the interior with water, until it overflows through the vent connection provided in the upper flange. The stem must be accessible to operate the valve.
2. Close the vent connection.
3. Valve shall be operated for one complete open/close cycle, then half open (at least 10° to ensure pressurization of the cavity)
4. Check for the absence of leaks at the temporary joints, used for the test. Dry the external surface of the valve.
5. Apply the required test pressure. Close the water inlet and maintain the pressure for the required time.
6. Leaks through the pressure retaining parts are not permitted, except through the temporary joints, which are installed for the carrying out of the test, and only provided that they do not obstruct the interpretation of the results. Permanent deformations will not be allowed.
7. Take the test parameters from AP/PT6 Technical Instruction & API 6D.

## 8. SEATS HYDROSTATIC TEST

1. Close off the valve inlet and outlet ports with flanges.
2. The valve is adjusted until the ball is in a half open position.
3. The valve is filled with water through the lower flange, until it overflows from the venting in the upper flange.
4. The valve is operated until it closes and is pressurised through the lower flange.
5. The pressure is maintained for the required time and it is checked that there are no drops from the drain/vent and upper flange vent. (The leakage shall be measured in opposite side only when there is no provision of drain/vent)
6. Acceptance criteria: zero leaks in the case of soft seats. In the case of metallic seats the ANSI/FCI 70-2-2006 Class V criteria will be applied or as per ISO 5208 leakage rates as required.
7. The valve is operated to open under pressure, checking that the actuating device is operational.
8. Follow the same operation for the other seat.
9. See pressures and testing times table, in AP/PT6 Technical Instruction & API 6D.

## 9. GAS SHELL TEST. (TEST MEDIUM 99% NITROGEN+1% HELIUM)

(Optional)

With both ends closed and the ball in half open position (minimum opening 10 deg), the valve shall be completely filled with the test fluid including the cavity, taking care that all the air will be shout off from the valve through the uppermost vent of the body, execution or through the opposite side of Gas filling point without the vent execution. The high pressure gas shell test pressure shall be applied as 1.1 times of Rated Pressure and after stabilization (if necessary) shall be maintained for a specified time as per AP/PT6 Technical Instruction & API 6D.
During the holding time the entire surface of the valve and the body/bonnet/adaptor joint shall be examined and there shall no visible leakage.

**10. SEATS GAS/PNEUMATIC TEST – HIGH PRESSURE AND LOW PRESSURE**
(Optional)

1. Close off the valve inlet and outlet ports with flanges.
2. The valve is adjusted until the ball is in a half open position.
3. The valve is filled with nitrogen/air through the lower flange, until it overflows from the venting in the upper flange.
4. The valve is operated until it closes and is pressurised through the lower flange.
5. The pressure is maintained for the required time and it is checked that there are no drops from the drain / vent and upper flange vent. (The leakage shall be measured in opposite side only when there is no provision of drain/vent)
6. Acceptance criteria: zero leaks in the case of soft seats. In the case of metallic seats the ANSI/FCI 70-2-2006 Class V criteria will be applied or as per ISO 5208 leakage rates as required.
7. The valve is operated to open under pressure, checking that the actuating device is operational. (See point 7).
8. Follow the same operation for the other seat.
9. See pressures and testing times table, in AP/PT6 Technical Instruction & API 6D.
10. Points 10.2 to 10.7 will be repeated for each side as per client requirements, 5 times recommended.

**11. FUNCTIONAL TEST: CONTROL OF OPERATING TORQUES**
(Optional)

1. Dynamometric wrenches suitable to the expected torque values must be used.
2. First test: Shall be performed for minimum two times in case of design evaluation / any specific homologation. It is made without pressure before doing resistance test and the operating torque value found must be no more than 15% above APV's published torques unless higher torque seats like PEEK or metal are used.
3. Second test: it is made when carrying out points 8.7 and 8.8 opening the valve with the dynamometric wrench and full rating pressure inside. - Shall be performed for minimum five times on each side in case of design evaluation / any specific homologation.
4. Third Test: Shall be performed for minimum two times applying pressure on both sides in case of design evaluation / any specific homologation.
5. The torques found with and without pressure will be written on the Route Sheet.
6. If an actuator is mounted, it will be able to actuate the valve. It will be tested without pressure. Under customer requirement the valve can be tested to the maximum working pressure. The actual torque of the valve must be less than the required safety factor calculated maximum for the actuator.
7. The maximum opening force over the lever or the hand wheel will be 300 N. If bigger, a gear operator will be mounted.

The above points has been elaborated as below
(a) BTO and BTC without pressure – 2 times.
(b) BTO – 5 times each side
(c) BTO and BTC by applying line pressure at both sides simultaneously
*** BTO – Break To Open & BTC – Break To Close.*

**12. DOUBLE BLOCK AND BLEED TEST**
(Where applicable - optional)
This test is exclusively applied to all the valves which incorporate floating seats, guided ball and a vent/drain device in the body. (Trunnion valves) where customers specifies a DB&B facility.

1. The valve inlet and outlet ports are blocked with flanges and the valve body .
2. With the valve half-open, the valve and its cavity shall be completely filled with test fluid.

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3. The valve shall then be closed and the valve body vent valve opened to allow excess test fluid to overflow from the valve cavity test connection.
4. The test pressure shall be applied to both valve ends alternatively.
5. Seat tightness shall be monitored via overflow through the valve cavity connection.
   The time for the test depends on the size of the valve. See AP/PT6 Technical Instruction & API 6D.
6. Under order the process from 8.1 up to 8.5 can be repeated but with the valve fully open.
7. Zero leaks are admissible in both cases. . In the case of metallic seats the ANSI/FCI 70-2-2006 Class VI criteria will be applied unless ISO 5208 leakage rates are specified.

**13. BODY CHAMBER RELIEVING TEST (CAVITY RELIEF TEST)**

(Where applicable)

1. This test is carried out exclusively on those valves with “Cavity Relief” design seats.
2. To be able to carry out this test the valves to be tested must have a drain hole in the body.
3. The valve is operated to the fully closed position.
4. The body chamber is pressurised with water through its drain hole.
5. Slowly increasing this pressure, the chamber must be alleviated automatically through the seats to a value of less than 133 % of the hydrostatic test pressure.

**14. ADDITIONAL TESTING**

(Special)

These additional testing has to be performed as applicable for homologating and evaluation of seal performance.

1. Fugitive Emission Testing (FET) – As per ISO 15848 Part 1 and 2 – Latest Edition
2. Cryogenic Testing (Low Temperature Testing) –As per BS6755 / MESC Specification (as applicable).

**15. TEST: “BEHIND” TEST**

(Where applicable)

1. This test will be applied exclusively on those valves that incorporate floating seats, guided ball and vent device/drain in the body (Trunnion valves).
2. Only will be necessary to realise the test on those valves that have had leaks, even in the case that the detected leak has been admissible, it will be necessary to apply this test to verify that the leak is not due to the “Behind”.
3. Valve is placed in vertical position on the bank or work surface, that allows to see comfortably the inside bore in the outlet of the valve.
4. Being the valve in totally closed position, a compressed air supply device will be connected to the drain hole with a manoreductor, which will allow to monitor the pressure applied and to increase it of controlled form.
5. It will be sprayed by soapy water the seat’s upper zone (between seat and body) to verify.
6. The pressure will be increased slowly, until reaching the pressure of the seat tests, observing if any bubble appears in the area of behind of the seat or “Behind”. In case the cavity relief takes place and the leak appears between seat and ball, cellulose paper can be used to cover this zone and prevent that the bubbles invade the “Behind” zone.
7. No leaks by the “Behind” will be accepted.

**16. OTHER SPECIFIC TEST REQUIREMENTS**

Other tests unless specified in the procedure shall be considered and carried out as per Specific Customer Specification.

**17. DOCUMENTATION AND IDENTIFICATION**

1. The results of the tests carried out as stated in the applicable specification are documented on check lists, indicating the tests carried out, the pressure values used, the result and the operator’s stamp.
2. The valve will also be identified by the operator’s I.D. and customer’s inspector in case the order requires it.