

CERTIFICATION

NF Certification System Technical Management Appendix: Valves-Hydraulic Fountain Fittings



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Part 1. PURPOSE

The purpose of this document, the Technical Management Appendix to the NF045 Reference System, revision 07, is to describe the manufacturer's production quality requirements as well as the inspection methods used by the CSTB regarding each "Valves-Hydraulic Fountain Fittings" family of products, whose specifications are laid down in the following Technical Documents: 197-02, 197-03, 197-04, 197-05 et 197-06.

Part 2. CAST-IRON GATE VALVES

1 Quality requirements of the manufacturer's production

The functional quality of the production will be ensured by the manufacturer according to one of the following procedures:

- Standard procedure: based on 100% inspection at production end according to the Table.
- Adapted procedure: based on the control of the elements of design, manufacture and quality assurance operations during production, making it possible to apply the final inspection operations according to the Table.

1.1 Standard procedure

The minimal quality assurance operations to be carried out during production shall be those specified in the Table.

The test fluid shall be water.

Table 1 – Minimum quality assurance operations during production

| Object of the quality assurance operations | Frequency | Nominal Diameter (DN) | Test time (*) (in seconds) |
|---|--|-----------------------|----------------------------|
| Resistance and tightness of the jacket under internal pressure equal to the largest of 2 values: PEA or 1.5 x PFA | 100% | ≤ 50 | 15 |
| | | 65 ≤ DN ≤ 150 | 60 |
| | | 200 ≤ DN ≤ 300 | 120 |
| | | DN > 300 | 300 |
| Tightness of the gate disk (seat) at 1.1 PFA | direction 1:100% direction 2: – DN ≤ 200: Sampling plan approved by CSTB – DN ≥ 250: 100% | ≤ 50 | 15 |
| | | 65 ≤ DN ≤ 150 | 60 |
| | | > 150 | 120 |
| leak-tightness of the gate disk (seat) at 0.5 bar | Sampling plan approved by CSTB | ≤ 50 | 15 |
| | | 65 ≤ DN ≤ 200 | 30 |
| | | 250 ≤ DN ≤ 400 | 60 |
| | | > 400 | 120 |
| Maximum operating torque ^a | 100% | | |
| Coating | See Technical Document No. 1 | | |
| Marking | 100% | | |

^a For these quality assurance operations during production, the torque measurements are carried out statically.

Note: The PEA (Allowable site test pressure) and PFA (Allowable operating pressure) definitions and values are those given in Standard NF EN 1074-1.

Test time: Time allocated for measuring the leak under steady-state conditions

(*): The testing time may be under the given time, **but never under 10 seconds**, on condition that:

- the test procedure and the testing and measuring means used during production ensure the validity and reproducibility of the tests performed (a capability file shall have been drawn up and shall be made available),
- the validity of the tests performed during production is verified at least once a month by means of laboratory tests on products reported to be compliant and non-compliant during production.

The test results are recorded.

The tightness tests may be validated either visually or automatically. In the event of an automatic validation, the test parameters shall have been subjected to validation. A validation dossier shall be drawn up and made available for consultation during audits.

1.2 Adapted procedure

This procedure only concerns **valves with DN ≤ 150**.

The final production tests according to the Table cannot be carried out unless the requester/holder provides evidence of the validation of the following elements:

- Complete design file comprising: the functional specifications, the definition file, the 3D drawing file, the technical specifications, the standard part and pilot batch report, the product qualification report.
- All elements specifying the quality assurance operations carried out on the components and during the product production process (subcontracted and/or internal).
- Elements demonstrating that the components having semi-finished or non-retouched functional surfaces have been made in 3D (design, production moulds, quality assurance operations on the first pieces).
- Experience feedback (pilot batch and/or full production).

Moreover,

- The static tightness torques, measured according to EN 1074-1 §5.2.2.1, are at least 40% lower than the standard MOT,
 - after the static fatigue tests performed according to EN 1074-2 §5.5 (type tests),
 - during the type tests, the quality assurance operations during production and the review inspection tests carried out by CSTB on the products in their delivery state.
- The final tightness quality assurance operation means shall be automated and their reliability and repeatability shall be regularly verified.
- In case of isolated or serial defects, a quality procedure shall establish the measures to be taken.

The test fluid shall be water.

Table 2 – Minimum quality assurance operations during production

| Object of the quality assurance operations | Frequency | Nominal Diameter (DN) | Test time (*) (in seconds) |
|---|-------------------------------|-----------------------|----------------------------|
| Resistance and tightness of the sleeve under internal pressure equal to the largest of 2 values: PEA or 1.5 x PFA | 100% | ≤ 50 | 15 |
| | | 65 ≤ DN ≤ 150 | 60 |
| Tightness of the gate disk (seat) at 1.1 PFA | 25% on a random side | ≤ 50 | 15 |
| | | 65 ≤ DN ≤ 150 | 60 |
| leak-tightness of the gate disk (seat) at 0.5 bar | 25% on a random side | ≤ 50 | 15 |
| | | 65 ≤ DN ≤ 150 | 30 |
| Maximum operating torque ^a | 100% | | |
| Coating | See Technical Document 197-01 | | |
| Marking | 100% | | |

^a For these quality assurance operations during production, the torque measurements are carried out statically.

Note: The PEA (Allowable site test pressure) and PFA (Allowable operating pressure) definitions and values are those given in standard NF EN 1074-1.

Test time: Time allocated for measuring the leak under steady-state conditions

(*): The testing time may be under the given time, **but never under 10 seconds**, on condition that:

- the test procedure and the testing and measuring means used during production ensure the validity and reproducibility of the tests performed (a capability file shall have been drawn up and shall be made available),
- the validity of the tests performed during production is verified at least once a month by means of laboratory tests on products reported to be compliant and non-compliant during production.

The test time is the time defined, and the test results are recorded.

The tightness tests may be validated either visually or automatically. In the event of an automatic validation, the test parameters shall have been subjected to validation. A validation dossier shall be drawn up and made available for consultation during audits.

2 Procedures for the quality assurance operations carried out by CSTB

The tests are carried out during admission and surveillance audits in compliance with the Table.

The tests are carried out according to the requirements defined in the product standards.

Table 3 – Tests to be carried out on gate valves during the audit

| Tests |
|---|
| Standard dimensional characteristics |
| Mechanical strength and Leak-tightness of the jacket under internal pressure (PEA or 1.5 PFA) |
| Mechanical strength of the gate disk under differential pressure (1.5 PFA or PFA+5) (*) |
| Leak-tightness of the gate disk under 1.1 PFA (*) |
| Leak-tightness of the gate disk under 0.5 bars (*) |
| No. of turns and No. of idle turns |
| Operating torque |
| Strength test torque |
| Tightness of the gate disk under 1.1 PFA |
| Tightness of the gate disk under 0.5 bars |
| Operating torque |
| Full flow |
| Coating thickness |
| Degree of polymerisation |
| Porosity |
| Resistance of the coating to impacts |

The tests within a product family must be carried out on a sample per type of gate disk and sealing system design at the shaft's passage and at the pressure rating.

The variants relative to connecting systems, etc. are to be covered by specific inspection and testing.

(*): When forming part of a monitoring inspection, this test is carried out in one single direction of circulation

Part 3. METALLIC BUTTERFLY VALVES

1 Quality requirements of the manufacturer's production

The minimal quality assurance operations to be carried out during production shall be those specified in the reference product standards and in the Table.

Table 1: Minimum in-production inspection

| Object of the quality assurance operations | Butterfly valves |
|---|--------------------------------|
| Envelope 1.5 PFA (allowable operating pressure); | Sampling plan approved by CSTB |
| Obturator seal efficiency 1.1 PFA (allowable operating pressure); | Sampling plan approved by CSTB |
| Obturator seal efficiency 0.1 PFA (allowable operating pressure); | Sampling plan approved by CSTB |
| Operating torque ^a | Sampling plan approved by CSTB |
| Compliance with the order | per unit (100% of products) |

^a Torque measures can be made at static pressure for this test during manufacturing.

2 Procedures of inspections carried out by CSTB

Table 2: Tests on tapware carried out during the audit

| Tests | Butterfly valves |
|---|------------------|
| Standard dimensional characteristics | X |
| Envelope 1.5 PFA (allowable operating pressure); | X |
| Obturator seal efficiency 1.1 PFA (allowable operating pressure); | X |
| Obturator seal efficiency 0.1 PFA (allowable operating pressure); | X |
| Sealing range | X |
| Operating torque | X |
| Strength test torque | X |
| Operability | X |
| Coating thickness | X |
| Degree of polymerisation | X |
| Resistance of the coating to impacts | X |
| Porosity | X |
| Closing time | X |

The tests within a product family shall be carried out on one unit per type of gate disk and sealing system design, for the most frequently produced pressure rating if the family contains several pressure ratings.

Special tests may be made for variants.

Part 4. PILLAR FIRE HYDRANTS

1 Manufacturer's production quality requirements

The minimal quality assurance operations to be carried out during production shall be those specified in the reference product standards and in the Table.

Table 1: Minimum in-production inspection

| Object of the quality assurance operations | Frequency | Test time (in seconds) |
|--|-------------------------------|------------------------|
| Resistance and leak-tightness of the jacket under internal pressure equal to the higher of the two values, PEA or 1.5 x PFA ^(a) | 100% | 60 |
| Tightness of the obturator at 1.1 PFA | 100% | 30 |
| Operation (Number of turns, drainage, etc.) | 100% | |
| Operating torque ^(b) (80 Nm max) | 100% | |
| Compliance with the order | 100% | |
| Coating | See Technical document 197-01 | |
| Marking | 100% | |
| ^(a) : For this quality assurance operation, one of the inlet plugs normally installed can be replaced by a plug specific to the test. ^(b) For this quality assurance operation, the torque is checked on static and this can be carried out during the leak-tightness check cycles. | | |

Note: The PEA (Allowable site test pressure) and PFA (Allowable operating pressure) definitions and values are those given in standard NF EN 1074-1.

2 Procedures of inspections carried out by CSTB

The tests are carried out during admission and surveillance audits in compliance with the Table below.
 The tests are carried out in accordance with the requirements defined in products standards.

Table 2: Tests to be performed on the pillar fire hydrants during the audit

| Tests |
|---|
| Standard dimensional characteristics |
| Resistance and tightness of the sleeve under internal pressure equal to the largest of 2 values: PEA or 1.5 x PFA |
| Leak-tightness of the obturator - Low pressure |
| Leak-tightness of the obturator - High pressure |
| Number of turns |
| Number of turns corresponding to beginning of opening |
| Drain time |
| Flow rate (*) |
| Operating torque |
| Strength test torque |
| Leak-tightness of the obturator - Low pressure |
| Leak-tightness of the obturator - High pressure |
| Number of turns |
| Bending strength test (standard EN1074-6/Appendix A) (**) |
| Resistance to the force above the floor level (standard EN1074-6/Appendix B) |
| Coating thickness |
| Degree of polymerisation |
| Porosity |
| Resistance of the coating to impacts |

(*): During monitoring, the test is to be conducted on an outlet, and on the largest diameter, preferably.

(**): Test to be performed when modifying either the design or a change of supplier, etc.

Part 5. FIRE HYDRANTS

1 Manufacturer's production quality requirements

The minimal quality assurance operations to be carried out during production shall be those specified in the reference product standards and in the Table.

Table 1: Minimum in-production inspection

| Object of the quality assurance operations | Frequency | Test time (in seconds) |
|---|-------------------------------|------------------------|
| Resistance and leak-tightness of the jacket under internal pressure equal to the larger of the 2 values: PEA or 1.5 x PFA | 100% | 60 |
| Tightness of the obturator at 1.1 PMA | 100% | 30 |
| Operation (Number of turns, drainage, etc.) | 100% | |
| Operating torque ^(a) (80 Nm max) | 100% | |
| Compliance with the order | 100% | |
| Coating | See Technical document 197-01 | |
| Marking | 100% | |
| ^(a) For this quality assurance operation, the torque is checked on static and this can be carried out during the leak-tightness check cycle. | | |

Note: The PEA (Allowable site test pressure) and PFA (Allowable operating pressure) definitions and values are those given in Standard NF EN 1074-1.

2 Procedures of inspections carried out by CSTB

The tests are carried out during admission and surveillance audits in compliance with the Table below.
The tests are carried out according to the requirements defined in the product standards.

Table 2: Tests to be performed on the fire hydrants during the audit

| Tests |
|---|
| Standard dimensional characteristics |
| Resistance and leak-tightness of the sleeve under internal pressure equal to the larger of the 2 values: PEA or 1.5 x PFA |
| Obturator tightness |
| Number of turns |
| Number of turns corresponding to beginning of opening |
| Drain time |
| Flow rate |
| Operating torque |
| Strength test torque |
| Obturator tightness |
| Number of turns |
| Coating thickness |
| Degree of polymerisation |
| Porosity |
| Resistance of the coating to impacts |

Part 6. SUCTION DEVICES

1 Quality requirements of the manufacturer's production

The minimal quality assurance operations to be carried out during production shall be those specified in the reference product standards and in the Table.

Table 1: Minimum in-production inspection

| Object of the quality assurance operations | Frequency | Test time (in seconds) |
|---|-------------------------------|------------------------|
| Resistance and leak-tightness of the sleeve under internal pressure equal to the higher of the two values, PEA or 1.5 x PFA ^(a) | 100% | 60 |
| <i>For type H devices</i> , Leak-tightness of the seat at 1.1 PFA high pressure | 100% | 30 |
| <i>For type H devices</i> , Operation (Number of turns, drainage, etc.) | 100% | |
| <i>For type H devices</i> , Operating torque (80 Nm max) ^(b) | 100% | |
| Compliance with the order | 100% | |
| Coating | See Technical document 197-01 | |
| Marking | 100% | |
| <p>^(a): For this quality assurance operation, one inlet plug normally installed can be replaced by a plug specific to the test. ^(b) For this quality assurance operation, the torque is checked on static and this can be carried out during the leak-tightness check cycle of the seat.</p> | | |

Note: The PEA (Allowable site test pressure) and PFA (Allowable operating pressure) definitions and values are those given in Standard NF EN 1074-1.

2 Procedures of inspections carried out by CSTB

The tests are carried out during admission and surveillance audits in compliance with the Table below.
 The tests are carried out in accordance with the requirements defined in standards NF S61-240 and NF EN 1074-6.

Table 2: Tests to be performed on the water suction hydrants during the audit

| Tests |
|---|
| Design |
| Standard dimensional characteristics |
| Flow rate |
| Resistance and leak-tightness of the sleeve under internal pressure equal to the larger of the 2 values: PEA or 1.5 x PFA |
| For type H devices, Leak-tightness of the obturator |
| For type H devices, Number of turns |
| For type H devices, Number of turns corresponding to beginning of opening |
| For type H devices, Drainage time |
| For type H devices, Operating torque |
| For type H devices, Resistance test torque |
| For type H devices, Leak-tightness of the obturator |
| For type H devices, Number of turns |
| Reversibility device |
| Coating thickness |
| Degree of polymerisation |
| Resistance of the coating to impacts |
| Porosity |

