NF 136 Rules Additional specifications	Tapping tee and coupler with integrated excess flow valve for polyethylene networks for the supply of gaseous fuels	SAPE102-2 January 2016

In litigation, the French version applies

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Document follow-up

Date	Reference	Change
January 2008	SAPE102-NF	Creation of PBDI DN 20 and 32 respectively with flow D25 and D100
September 2014	SAPE102-1	Change in title and integration of the management of excess flow valves by approval and PE accessories equipped with excess flow valves (PBDI and MBDI) D25 and D100.
January 2016	SAPE102-2	Change in test angles of excess flow valves

1. SCOPE

This document defines the specifications of excess flow valves incorporated into polyethylene tapping tees or couplers intended for gaseous fuel distribution systems.

It also defines the tests performed on an accessory equipped with the excess flow valve to meet the requirements of the NF136 rules in addition to the tests that guarantee the compliance of the accessory alone. This assembly is commonly called Tapping tee with integrated excess flow valve (PBDI) or Tapping coupler with integrated excess flow valve (MBDI).

2. TECHNICAL SPECIFICATIONS OF THE EXCESS FLOW VALVE

2.1. OPERATION

When the gas flow through the excess flow valve is lower than the minimum trip value (§ 3), the excess flow valve is in open position and allows the optimal passage of gas for the nominal flow of use of the tapping.

The excess flow valve will move to closed position and will fully stop the passage of gas within the limits of the flows set out in paragraph 3 without external auxiliary energy. In this case, the cut-off remains effective until the intervention of authorised personnel, even if the fault disappears.

Return to service after tripping is carried out from the tapping valve. This valve has an inlet for injecting a neutral gas (or air) that opens the excess flow valve by balancing the pressures.

2.2. EXPECTED TECHNICAL CHARACTERISTICS

2.2.1. General

DESCRIPTION	SPECIFICATIONS
Operating pressure range	0.1 to 0.4 MPa (1 to 4 bar)
Operating temperature	– 20°C to + 45°C
Nature of the gas	Natural gas - Propane and derivatives
Mounting position	Horizontal, but shall operate at an angle of ± 40°. The 3 test positions are -40°, 0° and + 40° with a tolerance of +/- 2°, where 0° is the horizontal position of the branch of the PBDI or MBDI.
Pressure drop ***of the assembly*** at 0.1 MPa	Less than 0.0125 MPa (125 mbar) at the nominal flow of PE pipes ∅ 20 mm - 25 m^3/h and ∅ 32 mm - 100 m^3/h
Response time at closing	Less than 1 second.
Influence of gas direction	The excess flow valve shall not be damaged by gas flow in the opposite direction at the nominal flow
Leaktightness	Leakage less than 0.15 l/h in Natural Gas (i.e. 0.11 l/h in air). After ageing, 1 l/h
Resistance to gas constituents	Insensitive
Failure rate on demand (the excess flow valve remains blocked while open for an intrinsic reason, allowing a flow beyond the set values)	λ_{sol}: less than 1×10^{-3}
Failure rate (untimely closure at nominal flow)	λ_{int}: less than 3×10^{-6} failure/hour
Reset pressure	Upstream pressure

2.2.2. Trip values

Nominal flow of the tapping	PE pipe DN of the tapping	Minimum trip value	Maximum trip value at 0.1 MPa	Maximum trip value at 0.4 MPa
25 m^3/h	20 mm	40 m^3/h	50 m^3/h	90 m^3/h
100 m^3/h	32 mm	160 m^3/h	200 m^3/h	360 m^3/h

The minimum trip value is the value below which the excess flow valve must not trip.

2.2.3. Behaviour with respect to the environment

The operation of the excess flow valve shall not be disrupted by the environment (vibrations, circulation, compacting, etc.).

2.3. OPERATION – MAINTENANCE

The excess flow valve shall operate maintenance-free.

The verification of the proper functioning of the excess flow valve (simulation of an incident) and its return to service after such a test shall be done without excavation.

The excess flow valve shall be placed in or returned to service by balancing the upstream and downstream pressures by injecting a neutral gas or air.

3. TEST SPECIFICATIONS

3.1. TEST PROCEDURE

A test specimen consisting of a PBDI or MBDI shall be welded to a 0.5-m pipe section according to the electro-welding specifications in force for the type of accessory concerned. This section thus constituted shall be tested according to the plan defined below.

3.2. TESTS

3.2.1. Primary characteristics

3.2.1.1. Trip and reset tests

Two series of tests shall be performed at 0.1 and 0.4 MPa. The gas flow through the excess flow valve is gradually increased from the starting value indicated below until the excess flow valve closes fully. The starting values shall be 25 m^3/h for excess flow valves designed for 20 mm diameter and 100 m^3/h for excess flow valves designed for 32 mm diameter. Each test shall be repeated at least 5 times. The reset pressure shall be less than or equal to the line pressure. The test specimen shall be accepted if the trip values recorded are within a tolerance of plus or minus 5% of those indicated in paragraph 2.2.2.

3.2.1.2. Pressure drop tests

Two series of tests shall be performed at 0.1 and 0.4 MPa. For the nominal flow value, the difference in pressure between upstream and downstream is recorded. The pressure drop shall be less than the value set in paragraph 1.2.1.

3.2.1.3. Non-tripping test

Two series of tests shall be performed at 0.1 and 0.4 MPa. For an abrupt change in flow from 0 to 100% of the nominal flow, it is verified that the device does not close. The test shall be performed three times. If a trip is detected, the test shall be deemed unsatisfactory.

3.2.1.4. Response time at closing

Two series of tests shall be performed at 0.1 and 0.4 MPa. At the moment of tripping, the closing time of the device shall be measured by measuring the pressure drop time downstream of the test pressure at a pressure of less than 200 mbar. If the closing time is greater than the specified limit, the test shall be deemed unsatisfactory.

3.2.1.5. Leaktightness tests on the assembly at closing

Two series of tests shall be performed at 0.1 and 0.4 MPa. After the trip, the leak rate is measured by any method capable of detecting whether the specified limit is exceeded. If a leak is found, the test shall be deemed unsatisfactory.

3.2.2. Influence of the mounting position

The test specimen shall comply with the tests laid down in paragraph 3.2.1. for mounting at +/- 45° with respect to the horizontal plane.

3.2.3. Influence of gas direction

A gas flow is injected in the opposite direction of the initial direction corresponding to the nominal flow at 0.6 MPa for 2 minutes. After this test, the operation of the test specimen shall satisfy the tests laid down paragraph 3.2.1.

3.2.4. Failure on demand test

The device shall be subjected to strain 1,000 times at closing and reset. No failure shall be allowed. The test specimen shall be accepted if it satisfies the tests laid down in paragraph 3.2.1. after the failure on demand test.

3.2.5. Climatic tests

The climatic tests shall be performed under the following conditions:

- air at - 5°C, chamber temperature - 20°C,
- air at + 20°C, chamber temperature + 45°C,

The tests shall be performed according to paragraph 3.2.1.

3.2.6. Dust accumulation

The test circuit shall be loaded with particles representative of those encountered on the network at a rate of 30 mg/m3 and shall pass through the test specimen at the nominal flow for 8 hours. The test specimen shall be accepted if it satisfies the tests laid down in paragraph 3.2.1 after the dust test.

3.2.7. Ageing tests

Hydraulic pressure test according to Standard NF EN 1555-3, table 4, with the following specific parameters:

- Temperature at 80°C,
- Pressure of 0.8 MPa, (instead of a wall strain)
- Duration of 1,000 hours
- 1 test specimen.

After the tests, the operation of the test specimen shall satisfy the tests laid down in paragraph 3.2.1.

3.3. TEST PLAN

In case of non-compliance or doubt about the results of a test, additional (or backup) excess flow valves may be used to repeat the admission or monitoring test.

3.3.1. Approval of an excess flow valve

DPB approval	Type Tests (TT)					Backup samples	
BENCH TESTS	A	B	C	D	E	F	G
Primary characteristics							
Trip reset	1	1	1	1	1		
Pressure drop	1	1	1	1	1		
Non-tripping	1	1	1	1	1		
Response time at closing	1	1	1	1	1		
Leaktightness	1	1	1	1	1		
Influence of mounting position (+/- 45°)	1	1					
Influence of gas direction (Opposition direction at Q_{nom})	1	1					
Failure on demand test (1,000 times)	1	1					
Climatic tests	1	1					
~~Ageing test (1000 h)~~							
After dust accumulation		1					

For type tests, 7 samples are required but normally 5 are tested (2 for backup).

These excess flow valves are mounted in the reference couplers of the laboratory.

3.3.2. Admission and monitoring of a PBDI

PBDI	Type Tests (TT)					Monitoring tests		
BENCH TESTS	A	B	C	D	E	X	Y	Z
Primary characteristics								
Trip reset	1	1	1			1	1	
Pressure drop	1	1	1			1	1	
Non-tripping	1	1	1			1	1	
Response time at closing	1	1	1			1	1	
Leaktightness	1	1	1			1	1	
~~Influence of mounting position (+/- 45°)~~								
~~Influence of gas direction (Opposition direction at Q_{nom})~~								
Failure on demand test (1,000 times)						1	1	
Climatic tests (without pressure drop in TT)	1	1				1	1	
Ageing test (1000 h)			1					
~~After dust accumulation~~								

For type testing, 5 samples are required but 3 are tested (2 for backup) and for annual monitoring tests, 3 samples are taken and 2 are tested.

Excess flow valves that have an approval already are mounted in tapping tees with the appropriate branch that are covered by the application for admission or monitoring.

3.3.3 Admission and monitoring of a MBDI

MBDI	Type Tests (TT)					Monitoring tests		
BENCH TESTS	A	B	C	D	E	X	Y	Z
Primary characteristics								
Trip reset			1			1	1	
Pressure drop			1			1	1	
Non-tripping			1			1	1	
Response time at closing			1			1	1	
Leaktightness	1	1	1			1	1	
~~Influence of mounting position (+/- 45°)~~								
~~Influence of gas direction (Opposition direction at Q_{nom})~~								
Failure on demand test (1,000 times)						1	1	
Climatic tests (only leaktightness in TT)	1	1				1	1	
Ageing test (1000 h)			1					
~~After dust accumulation~~								

For type testing, 5 samples are required but 3 are tested (2 for backup) and for annual monitoring tests, 3 samples are taken and 2 are tested.

Excess flow valves that have an approval already are mounted in couplers that are covered by the application for admission or monitoring.