NF 136 Rules Additional specifications	Connection socket and sleeve with integrated trigger for polyethylene gas fuel distribution network	SAPE102-3 March 2025

In litigation, the French version applies

TABLE OF CONTENTS

Document tracking

date	reference	evolution
January 2008	SAPE102-NF	Creation of PBDI dn 20 and 32 respectively with flow rate D25 and D100
September 2014	SAPE102-1	Change of title and integration of the management of triggers by approval and PE accessories equipped with triggers (PBDI and MBDI) D25 and D100.
January 2016	SAPE102-2	Changing the trigger test angles
March 2025	SAPE102-3	Following the GT136 working groups since 2023, modification of the monitoring plan and various clarifications in §3 including the addition of § 3.3.4 and 3.3.5

1. SCOPE OF APPLICATION

This document defines the specifications of the trigger which is integrated into the connection sockets or polyethylene sleeves intended for the gaseous fuel distribution network.

It also defines the tests carried out on an accessory equipped with the trigger in order to meet the requirements of the NF136 rules in addition to the tests guaranteeing the conformity of the accessory alone. This assembly is commonly called a Connection Socket with Integrated Trigger (PBDI) or Connection Sleeve with Integrated Trigger (MBDI).

2. TECHNICAL SPECIFICATIONS OF THE TRIGGER

2.1. FUNCTIONING

When the gas flow rate through the trigger is lower than the minimum trigger value (§ 3), the trigger is in the open position and optimally allows the passage of gas for the nominal flow rate of use of the connection.

The trigger moves to the closed position and clearly interrupts the flow of gas within the flow limits set out in paragraph 3 without external auxiliary energy. In this case, the cut-off remains effective until authorized personnel intervene, even if the fault disappears.

Reactivation after triggering is carried out from the connection valve. This valve has an inlet allowing the injection of a neutral gas (or air) which arms the trigger on opening, by balancing the pressures.

2.2. EXPECTED TECHNICAL CHARACTERISTICS

2.2.1. General information

DESIGNATIONS	SPECIFICATIONS
Operating pressure range	from 0.1 to 0.4 MPa (1 to 4 bar)
Operating temperature	from –20°C to +45°C
Nature of the gas	Natural gas - Propane and derivatives (see NF136 rules)
Mounting position	Horizontal, but must work at a 40° angle ±. The 3 test positions are -40°, 0° and +40° with a tolerance of +/-2°, 0° being the horizontal position of the PBDI or MBDI lead.
Pressure drop ***of the assembly*** at 0.1 MPa	Less than 0.0125 MPa (125 mbar) at the nominal operating flow rate of PE pipes ∅20 mm - 25 m^3/h and ∅32 mm - 100 m^3/h
Response time to closure	Less than 1 second.
Influence of gas direction	The trigger must not be degraded by the passage of gas in the opposite direction at the nominal flow rate
Waterproofing	Leak less than 0.15 l/h in Natural Gas (or 0.11 l/h in air). After aging, 1 l/h
Resistance to gas components	Insensitive
Failure rate on demand (the trigger remains stuck open for an intrinsic reason, allowing flow beyond the set values)	λ_{ground} : less than 1×10^{-3}
Failure rate (untimely closure at nominal flow rate)	λ_{int} : less than 3×10^{-6} failures/hour
Reset pressure	Upstream pressure

2.2.2. Trigger values

Nominal flow rate of the connection	PE pipe of the connection	Minimum trigger value	Maximum trigger value at 0.1 MPa	Maximum trigger value at 0.4 MPa
25 m3 / h	20 mm	40 m3 / h	50 m3 / h	90 m3 / h
100 m3 / h	32 mm	160 m3 / h	200 m3 / h	360 m3 / h

The minimum trigger value is the value below which the trigger should not trigger.

2.2.3. Behavior towards the environment

The operation of the trigger must not be disturbed by the environment (vibrations, traffic, compaction, etc.).

2.3. OPERATION – MAINTENANCE

The trigger must operate without maintenance.

The verification of the correct operation of the trigger (simulation of an incident) and its return to service after such a test are carried out without opening an excavation.

The trigger is put into service or put back into service by balancing the upstream and downstream pressures by injecting a neutral gas or air.

3. TEST SPECIFICATIONS

The test bench has the possibility of testing D25 triggers on a PE dn 20 part or D100 on a PE dn 32 part.

The PE part consists of a PE sleeve dn 20 or 32 for MBDI or connection sockets with dn 20 or dn32 derivations for PBDI.

Historically, only MBDI or PBDI with dn63 saddle were tested but the bench capacity has been expanded since 2020.

The connection sockets now accepted by the test bench have saddles from dn40 to dn125 but the tests allow validation of PBDIs with saddles up to dn200.

3.1. TEST PROCEDURE

A test body consisting of a PBDI or MBDI is welded onto a 0.5 m section of pipeline according to the electro-welding specifications in force for the type of accessory concerned. This section thus constituted is subjected to tests according to the organization defined below.

3.2. TESTS

3.2.1. Primary characteristics

3.2.1.1. Trigger and reset tests

Two series of tests are carried out at 0.1 and 0.4 MPa. The gas flow rate through the trigger is gradually increased from the starting value indicated below, until the trigger closes cleanly.

The starting values are 25 m3 / h for triggers designed for the 20 mm diameter and 100 m3 / h for triggers designed for the 32 mm diameter.

Each test is repeated at least 5 times. The reset pressure must be less than or equal to the pipeline pressure. The test body will be accepted if the trigger 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 are carried out at 0.1 and 0.4 MPa. For the nominal flow rate value, the pressure difference between upstream and downstream is recorded. The pressure loss must be less than the value set in paragraph 1.2.1.

3.2.1.3. Non-trigger test

Two series of tests are carried out at 0.1 and 0.4 MPa. For a sudden change in flow rate from 0 to 100% of the nominal flow rate, the device is checked for non-closure. The test is carried out three times. If a trigger is detected, the test is deemed unsatisfactory.

3.2.1.4. Response time to closure

Two series of tests are carried out at 0.1 and 0.4 MPa. At the time of triggering, the closing time of the device is measured by measuring the pressure drop time downstream of the test pressure to a pressure below 200 mbar. If the closing time is greater than the specified limit, the test is deemed unsatisfactory.

3.2.1.5. Leak tests from assembly to closure

Two series of tests are carried out at 0.1 and 0.4 MPa. After triggering, the leakage rate is measured by any method capable of detecting exceeding the specified limit. If a leak is detected, the test is deemed unsatisfactory.

3.2.2. Influence of mounting position

The test body must satisfy the tests of paragraph 3.2.1 for assemblies at +/- 45° relative to the horizontal plane.

3.2.3. Influence of gas direction

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

3.2.4. Stress failure test

The device is stressed 1000 times in closing and resetting (C/O for close/open). No failure must be allowed. The test body is accepted if after the stress failure test it satisfies the tests of paragraph 3.2.1.

3.2.5. Climate tests

Climate tests are carried out under the following conditions:

- air at -5°C, enclosure temperature -20°C,
- air at +20°C, enclosure temperature +45°C.

The tests are carried out in accordance with paragraph 3.2.1.

3.2.6. Dusting

The test circuit is loaded with particles representative of those encountered on the network at a rate of 30 mg/m3 and passes through the test body at the nominal flow rate for 8 hours. The test body is accepted if, after the dust test, it satisfies the tests in paragraph 3.2.1.

3.2.7. Aging 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 wall stress)
- Duration of 1000 hours,
- 1 test tube.

After testing, the operation of the test body must satisfy the tests of paragraph 3.2.1.

3.3. TEST PLANS

In case of non-compliance or doubt about the results of a test, additional (or backup) triggers can be used to repeat the test in admission or surveillance.

3.3.1. Approval of a trigger

DPB approval	**Type tests (TT)**					**Emergency samples**	
BENCH TESTS	HAS	B	C	D	E	F	G
Primary characteristics							
Trigger rearmament	1	1	1	1	1		
Pressure drop	1	1	1	1	1		
No triggering	1	1	1	1	1		
Closing response time	1	1	1	1	1		
Waterproofing	1	1	1	1	1		
Influence of mounting position (+/- 40°)	1	1					
Influence of gas direction (Opposite direction to Q_{nom})	1	1					
Stress failure test (1000 times O/C)	1	1					
Climatic tests	1	1					
~~Aging test (0.8 MPa - 80°C - 1000 h)~~							
After dusting		1					

For type testing, 7 samples are required, but 5 are normally tested, but 2 are backup. These triggers are mounted in the laboratory's so-called reference sleeves.
The 2 backup samples are used in case of mishandling or a problem related to the implementation of the tests.

3.3.2. Admission and monitoring of a PBDI

PBDI	Type tests (TT)					Surveillance tests		
BENCH TESTS	HAS	B	C	D	E	X	Y	Z /Z'
Primary characteristics								
Trigger rearmament	1	1	1			1	1	
Pressure drop	1	1	1			1	1	
No triggering	1	1	1			1	1	
Closing response time	1	1	1			1	1	
Waterproofing	1	1	1			1	1	
~~Influence of mounting position (+/- 40°)~~								
~~Influence of gas direction (Opposite direction to Q_{nom})~~								
Stress failure test (1000 times O/C)						1	1	
Climatic tests (without pressure loss in TT)	1	1				1	1	
Aging test (0.8 MPa - 80°C - 1000h)			1					
~~After dusting~~								

For type tests, 5 samples are required but 3 are tested (2 as backup).

For monitoring tests, 4 samples are taken and 2 are normally tested in accordance with § 3.3.4 .

Triggers already having approval are mounted by the holder or applicant , in connection sockets with the appropriate derivation which are the subject of the application for admission or monitoring.

3.3.3 Admission and monitoring of an MBDI

MBDI	Type tests (TT)					Surveillance tests		
BENCH TESTS	HAS	B	C	D	E	X	Y	Z /Z'
Primary characteristics								
Trigger rearmament			1			1	1	
Pressure drop			1			1	1	
No triggering			1			1	1	
Closing response time			1			1	1	
Waterproofing	1	1	1			1	1	
~~Influence of mounting position (+/- 40°)~~								
~~Influence of gas direction (Opposite direction to Q_{nom})~~								
Stress failure test (1000 times O/C)						1	1	
Climatic tests (only leakness test in TT)	1	1				1	1	
Aging test (0.8 MPa - 80°C - 1000h)			1					
~~After dusting~~								

For type tests, 5 samples are required but 3 are tested (2 as backup).

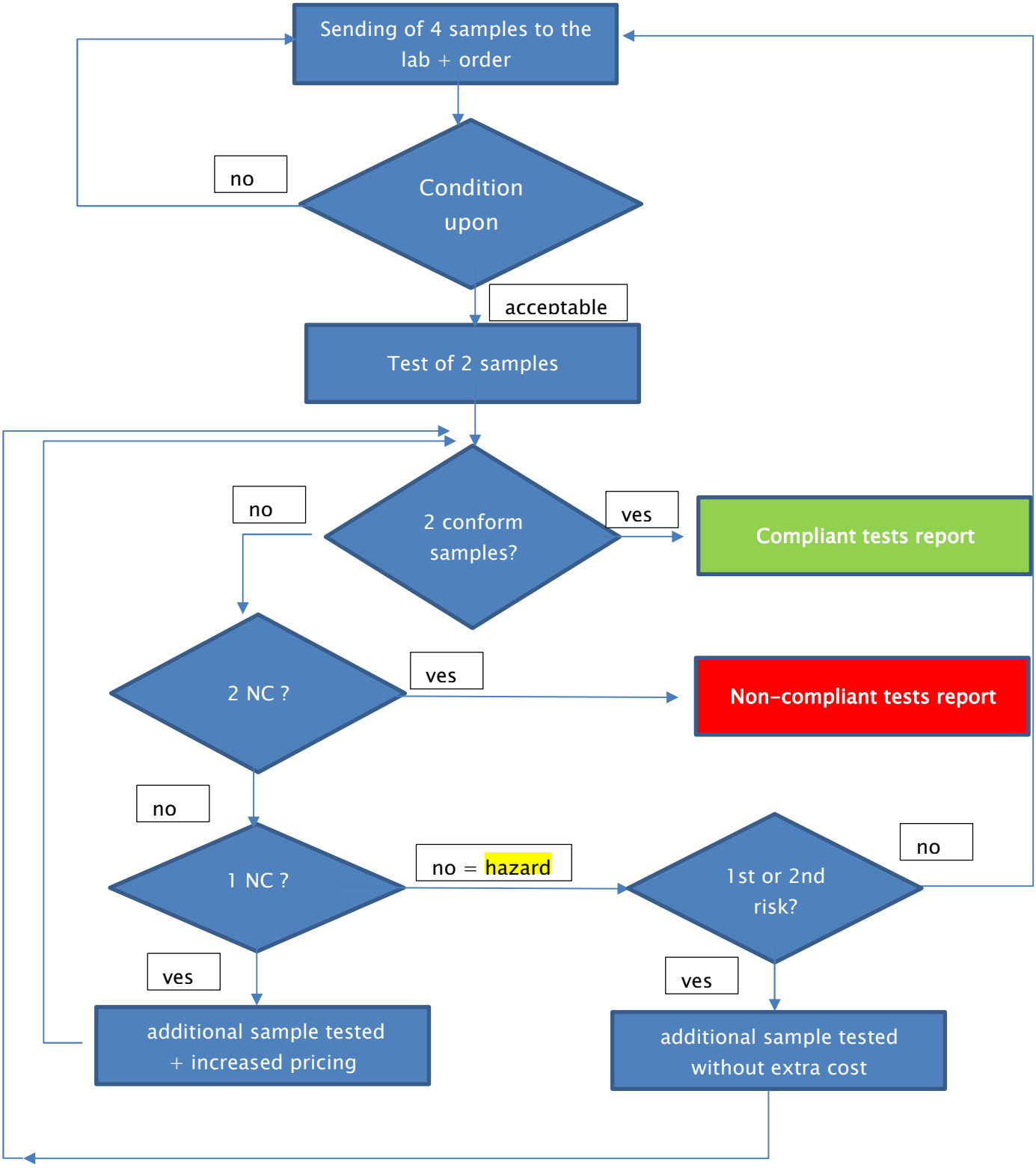
For monitoring tests, 4 samples are taken and 2 are normally tested in accordance with § 3.3.4 .

Triggers already having approval are mounted by the holder or the applicant , in sleeves which are the subject of the application for admission or monitoring.

3.3.4 Accuracy for MBDI and PBDI monitoring

3.3.4.1 Generality

Given the collection of 4 samples per trigger type, their use follows the following flowchart. Compliance is declared when 2 samples are compliant, but as soon as there are 2 non-compliant samples, the report concludes that the monitoring is non-compliant .



A “hazard” is the result of mishandling or a problem related to the implementation of the tests.

3.3.4.2 Frequency of monitoring tests

Monitoring is annual for D25 and D100 models for MBDI or PDBI.

If a holder is concerned about MBDI and PBDI, monitoring is carried out on one or the other of the assemblies. In general, the assembly chosen is the most representative of its market but an annual alternation can be carried out.

For PBDI, monitoring only concerns a saddle dn . It is determined by CERTIGAZ, often after consulting the committee at the beginning of the year. In general, the same dn is tested annually for all holders, in order to optimize the laboratory testing campaign, unless the selected dn is not available from a holder.

In all cases, an alternation of dn is ensured while favoring the dn63 saddles which represent the largest share of dn20 and dn32 connections, according to the table below from data from network managers in 2016 (committee of 11/16/2017).

dn saddle	% of connections	Cumulative % of connections
63	80	80
40	9	89
110	5	94
125	4	98
90	<1	>98
160	<1	>99
200	<1	100

Reduced surveillance

However, after a 3-year cycle with reports whose compliance is declared with 2 out of 2 compliant samples tested without any hazard, monitoring is reduced. The frequency becomes every 2 years.

When a non-compliance is detected (not a “hazard”) during reduced monitoring, monitoring becomes annual again. Reduced monitoring is only possible again in compliance with the previous paragraph.

This principle of reduced monitoring applies separately to the D25 and D100 models.

If a holder moves to reduced surveillance for both models, a reduced surveillance application period may be applied so that each year one model is monitored, alternately.

3.3.4.3 Guide to decision-making following surveillance trials

Since the minimum operating pressure of 1 bar is very rarely reached on the networks, in the event of a failure observed at this pressure, the laboratory can increase the pressure to 1.5 bar to see if the failure disappears. In this case, the test is non-compliant but it does not result in a suspension, only a warning with a request for improvement with new evaluation tests.

A leak at 4 bar but conformity at 1 bar implies a probable leak in the circumferential area with the internal diameter of the bypass or sleeve. In this case, the operation of the trigger is not called into question but the cause comes from the internal diameter of the bypass or sleeve or the performance of the external seal(s) on the trigger.
The penalty imposed by CERTIGAZ may include the references of the connection sockets without trigger with the same derivation.

When more than 2 samples had to be tested without any hazard to have 2 compliant samples, a warning is issued by CERTIGAZ with a request for improvement which will be verified during the following surveillance tests.

3.3.5. Test plan guide for trigger modifications

In addition to table 9 for the different families in the NF136 rules, the table below provides a guide for carrying out certification tests, in the event of modification of different characteristics of the components of a trigger.

The final test plan is defined by CERTIGAZ based on the nature of the modifications requested by the holder. In case of doubt, after consultation with the laboratory and the holder, the test plan in § 3.3.1 supplemented by an aging test (RH) in an associated PBDI or MBDI applies.

Changes	Primary tests	Position +/- 40°	Gas direction	Stress failure test (1000 times O/C)	Climate test	Ageing test RH: 0.8 MPa 80°C - 1000 h	Dusting
Spring (material, stiffness, wire diameter , spring diameter , free length)	5	2	2 According to modification	2	2	1	NA
Guide/axis (material, dimensions)	5	2	2	2	2	1	1
Trigger body (material, dimensions)	5	NA	2	2	2	1	NA
Valve seal (material, hardness, dimensions)	5	2	2	2	2	1	1
Joint(s) with the derivation (material, hardness, shapes, dimensions)	5	According to modification	2	2	2	1	NA
Valve seal seat bearing (shape, surface condition)	5	NA	2	2	2	1	1
Passage section	5	2	2	2	2	1	According to modification

As a reminder, primary tests include trigger/reset, load loss, non-trigger, response time and sealing tests.

Table: Test guide in case of modification with the number of samples per test