

**RIGID NON-PLASTICISED  
PVC PIPES AND FITTINGS**

**Technical document No. 055-  
02**

Specifications applicable to the Discharge Group

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## MODIFICATION HISTORY

Revision no.	Application date	Modifications
00	21/12/2018	Update to the document layout and reference
01	23/07/2019	Deletion of Part 2 Marking Methods and Creation of the Marking Annex

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## Part 1. SCOPE

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This Technical Document deals with the Discharge Group.

### 1.1 APPLICABLE REFERENCE STANDARDS AND ADDITIONAL SPECIFICATIONS

#### 1.1.1 Reference standards

➤ **Family - Solid-Wall PVC Pipes and Fittings**

**NF EN ISO 3126** (September 2005) Plastic piping systems – Plastic components – Determination of dimensions.

**NF T 54-030** (December 1981) Plastics - Moulded, non-plasticised PVC fittings for non-pressure, domestic wastewater discharge installations - Specifications.

**NF EN 1329-1** (July 1999) - Plastic piping systems for soil water and wastewater discharge (low and high temperature) within the buildings' structure (PVC-U) - Part 1: Specifications for pipes, fittings and the system.

➤ **Family - Structured-Wall PVC Pipes and Fittings**

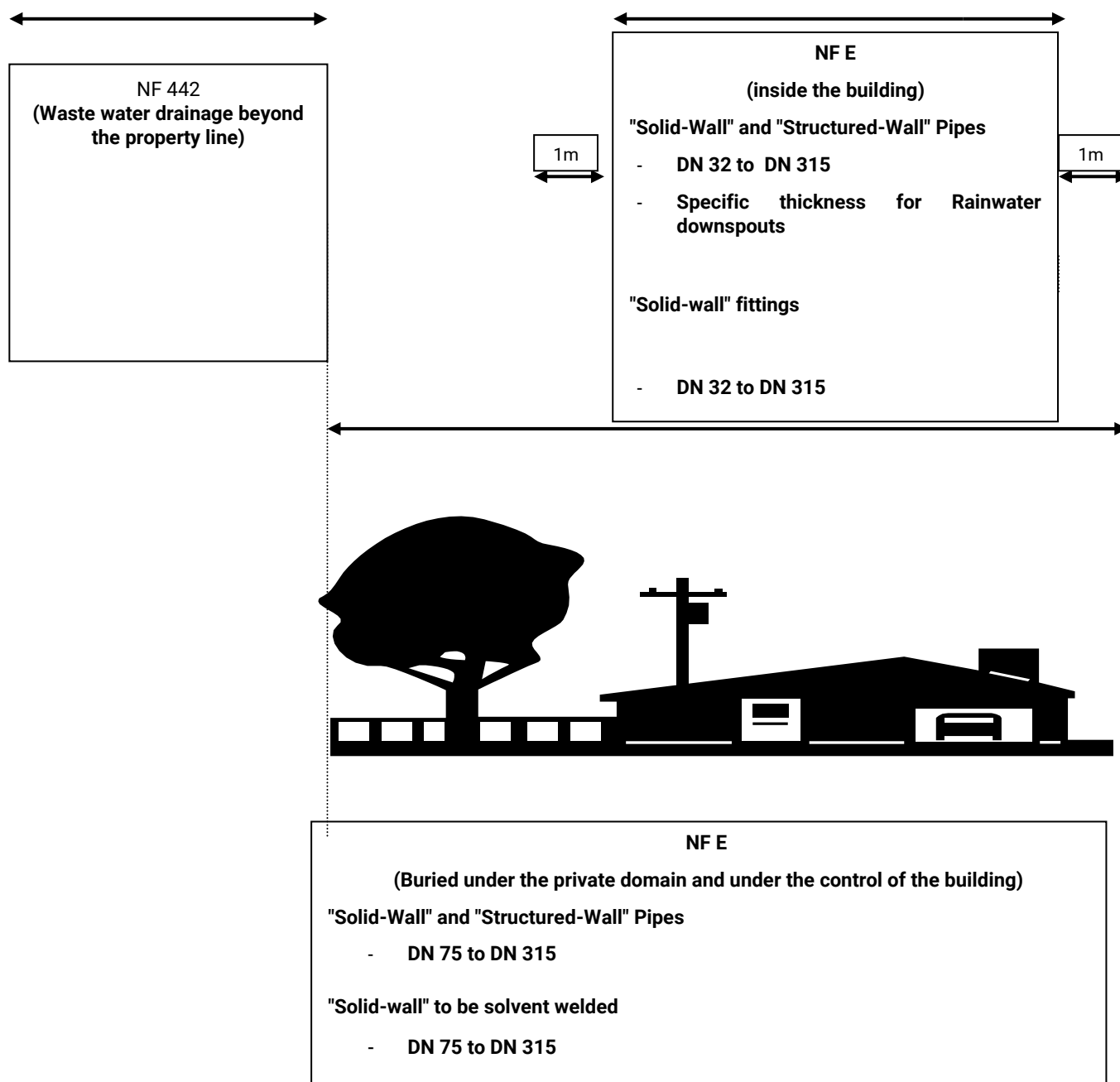
**NF EN 1453-1 (July 2000)** - Plastics piping systems with structured-wall pipes for soil and waste discharge (low and high temperature) inside buildings – Unplasticised poly(vinyl chloride) (PVC-U) – Specifications for pipes and the system.

The structured PVC pipes must be used with "solid-wall" PVC fittings that hold the NF mark.

Note: All the drawings or figures referred to in this document originate from CSTB.

### 1.1.2 Fields of application

The NF EN 1329-1 and NF EN 1453-1 standards specify the requirements for the pipes and fittings indicated for drainage applications defined in the figure below.



### 1.1.3 Complementary specifications

The reference specifications and test methods for the NF Mark Rigid Non-Plasticised PVC Pipes and Fittings are defined in the tables below. They are based on the abovementioned standards with possible additions or changes.

### 1.1.4 Groups of discharge fittings

Discharge fittings are divided into two categories, both of which must meet the applicable specifications set out in tables 1 and 2 as well as the following additional requirements:

Group I = Mid-range fittings present in the majority of installations, the interchangeability of which must be ensured. In addition to dimensional characteristics, which must comply with the specifications in table 4, their geometrical characteristics are defined in tables 5 to 10.

Group II = Additional fittings, which are only required to meet the specifications concerning their common dimensional characteristics, as specified in table 4.

Note: Group II fittings are not designed to be covered by this certification except to complement a certified range of fittings in accordance with group I.

### 1.1.5 Admission ranges

The admission range presented upon the first application for admission or a complementary admission application must include the following products, at a minimum:

Cases of pipes: 5 diameters

Cases of fittings: 5 group 1 fittings / DN and 5 DN minimum

This range may be produced on 1 or multiple sites with the same trade name.

For example:

DN 32: Elbow 87°30 FF, Elbow 45° FF, Elbow 87°30 MF, Wye 87°30 FF, Sleeve Coupling FF

DN 40: Tee FF, Elbow 45° FF, Elbow 87°30 MF, Wye 87°30 FF, Sleeve Coupling FF

DN 50: Short Reducer MF, Elbow 45° FF, Elbow 87°30 MF, Wye 87°30 FF, Sleeve Coupling FF

DN 63: Long reducing nipple MF, Elbow 45° FF, Elbow 87°30 MF, Wye 87°30 FF, Sleeve Coupling FF

DN 100: Elbow 87°30 FF, Elbow 45° FF, Elbow 87°30 MF, Wye 87°30 FF, Sleeve Coupling FF

An application to maintain the right to use the mark cannot be used to be in compliance with the requirement of a minimum range.

In cases of joint applications for group 1 and group 2 Discharge fittings, group 1 fittings must be admitted first (issuing the group 1 fittings certificate), then the group 2 fittings application may be processed.

**TABLE 1 – SOLID-WALL PVC DISCHARGE FAMILY**  
**Pipes and Fittings Specifications**

<b>Characteristics and Test methods (4)</b>	<b>Pipes</b>	<b>Fittings</b>
Reference standard	NF EN 1329-1	NF T 54-030 ; NF EN 1329-1
Appearance	(1)	(1)
Marking	(1)	(1)
Dimensions (2)	see table 3	see table 4
Socket depth		
Density NF EN ISO 1183-1 <b>Method A</b> (2)	1370 to 1460 kg/m <sup>3</sup>	
Vicat softening temperature NF EN 727 (2)	≥ 79 °C	
Tensile properties NF EN ISO 6259-1 and ISO 6259-2 (2) Maximum stress Elongation at rupture	R ≥ 45 MPa	
	A ≥ 80%	
Reversion at 150°C NF EN ISO 2505 - (2)	T ≤ 5% No blisters	
Impact resistance NF EN 744 - method (2)	TIR ≤ 10%	
Oven test at 150°C NF EN ISO 580 - method A (2)		(3)

(1) The pipes and fittings may not have any defects visible to the naked eye such as scratches, marks, grains, cracks or air pockets that negatively impact use.

The pipes and fittings must be a homogeneous, clear, medium grey-blue colour similar to the colour RAL 7037 (medium grey).

The marking must be consistent with the requirements provided in Technical Document 2 Discharge.

(2) With additional clarifications indicated in Part 2 of Technical Document 1.

(3) The fittings may not have any openings along the entire thickness of their walls in any given welding line nor deterioration of the surface, penetrating more than 1/2 the thickness of the wall, particularly near an injection point.

(4) The editions of the standards cited for use are those in force on the revision date of this certification reference system (see page 2 of this Technical Document), unless otherwise specified by the Mandated Body.



**TABLE 2 – SOLID-WALL PVC DISCHARGE FAMILY**
**Specifications for assemblies**

Characteristics and Test methods (2)	Sealing ring assembly category		Solvent welding assembly category
	FIXED	SLIP	
Assembly composition and dimensional characteristics	NF EN 1329-1 (table 11)	NF EN 1329-1 (table 15)	NF EN 1329-1
Watertightness NF T 54-037 §4.3.3.2	No leak in the assembly under internal cold water pressure of 0.5 bar		
Airtightness NF T 54-037 §4.3.3.1	No leak in the assembly under air pressure of 0.1 bar at room temperature		
Resistance to thermal shock NF T 54-037 §4.3 (1)	Verifying airtightness and watertightness before and after 5 test cycles		
Resistance to thermal shock NF EN 1055	No leaks Deflection for DN ≤ 50: < 3 mm Deflection for DN > 50: < 0.05 DN		
Airtightness NF EN 1054	No leaks Test the same assembly subjected to the test according to NF EN1055 without any angular deflection (the assembly may not contain water)		
Quality of elastomer sealing rings NF EN 681-1 or -2 (3)	NF EN 681-1 or -2		

- (1) For assemblies with < 200 mm diameters only (not performed for assemblies intended specifically for rainwater).
- (2) The editions of the standards cited for use are those in force on the revision date of this certification reference system (see page 2 of this Technical Document), unless otherwise specified by the Mandated Body.
- (3) Ozone resistance test: Rubber sealing elements that are protected and packaged separately until the time of their assembly must meet the same requirements, except using an ozone concentration of (25 ± 5) pphm instead of (50 ± 5) pphm.

**Cases of shaped fittings:**

**Group 1 fittings:** solid-wall PVC pipes used for manufacturing group 1 fittings are not necessarily NF E certified pipes.

**Group 2 fittings:** solid-wall PVC pipes used for manufacturing group 2 fittings must be NF E certified pipes.

All solid-wall PVC fittings used for manufacturing shaped fittings are NF E certified fittings.

**TABLE 3 – SOLID-WALL PVC DISCHARGE FAMILY**
**Dimensional characteristics of the pipes**

In accordance with NF EN ISO 3126 and NF EN 1329-1

- Preferred length: 2,60 m - 4 m - 6 m  
Tolerance : + 1% for L < 5 m  
+ 5 cm for L > 5 m
- Socket: in accordance with NF EN 1329-1
- Other dimensions

Average external diameter DN (mm)	Nominal Thickness th (mm)	Tolerances (mm)			on Da (1) (mm)
		on DN	Thicknesses		
			th min	th max	
32	3.0	+ 0.2 0	3.0	3,5	± 0.5
40	3.0	+ 0.2 0	3.0	3.5	± 0.5
50	3.0	+ 0.2 0	3.0	3.5	± 0.6
63	3.0	+ 0.2 0	3.0	3.5	± 0.8
75	1.5 (2)	+ 0.3 0	1.5	1.9	
75	3.0	+ 0.3 0	3.0	3.5	± 0.9
80	1.5 (2)	+ 0.3 0	1.5	1.9	
80	3.0	+ 0.3 0	3.0	3.5	± 01.0
90	3.0	+ 0.3 0	3.0	3.5	
100	1.9 (2)	+ 0.3 0	1.9	2.3	
100	3.0	+ 0,3 0	3.0	3.5	

(1) Any external diameter\_(Da)

(2) Pipes TH

**TABLE 3 (cont.) - SOLID-WALL PVC DISCHARGE FAMILY**
**Dimensional characteristics of the pipes**

Average external diameter DN (mm)	Nominal Thickness th (mm)	Tolerances (mm)		
		on DN	Thicknesses	
			th min	th max
110	2.2 (2)	+ 0.3 0	2.2	2.7
110	3.2	+ 0.3 0	3.2	3.8
125	2.5 (2)	+ 0.3 0	2.5	3.0
125	3.2	+ 0.3 0	3.2	3.8
140	3.5	+ 0.4 0	3.5	4.1
160	3.2	+ 0.4 0	3.2	3.8
160	4.0		4.0	4.6
200	3.9	+ 0.5 0	3.9	4.5
200	4.9		4.9	5.6
250	4.9	+ 0.5 0	4.9	5.6
250	6.2		6.2	7.1
315	6.2	+ 0.6 0	6.2	7.1
315	7.7		7.7	8.7

(2) Pipes TH

**TABLE 4 - SOLID-WALL PVC DISCHARGE FAMILY**  
**- Dimensional characteristics common to the fittings**

Dimensional characteristics common to the fittings								
DN	Spigot			Socket			Thickness (min)	
	Average External Diameter tolerances	Max. variation of a given diameter	Length of socket h	Average Internal Diameter tolerances	Maximum out-of-roundness	Socket depth L (1) (3)	Body of the fitting	Socket and Spigots (2)
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
<b>32</b>	+0/+0.2	0.5	≥22	+0.2/+0.4	0.35	22	3	2.0
<b>40</b>	+0/+0.2	0.5	≥26	+0.2/+0.4	0.45	26	3	2.0
<b>50</b>	+0/+0.2	0.6	≥31	+0.2/+0.4	0.55	31	3	2.0
<b>63</b>	+0/+0.2	0.8	≥37.5	+0.2/+0.4	0.7	37.5	3	2.0
<b>75</b>	+0/+0.3	0.9	≥43.5	+0.2/+0.5	0.8	43.5	3	2.0
<b>80</b>	+0/+0.3	1.0	≥46	+0.2/+0.5	0.9	46	3	2.3
<b>90</b>	+0/+0.3	1.1	≥51	+0.2/+0.5	1	51	3	2.3
<b>100</b>	+0/+0.3	1.2	≥56	+0.2/+0.5	1.1	56	3	2.3
<b>110</b>	+0/+0.3	1.4	≥60	+0.3/+0.6	1.2	≥ 60	3.2	2.4
<b>125</b>	+0/+0.3	1.5	≥60	+0.3/+0.6	1.4	≥ 60	3.2	2.4
<b>140</b>	+0/+0.4	1.7	≥60	+0.4/+0.7	1.55	≥ 60	3.2	2.4
<b>160</b>	+0/+0.4	2.0	≥60	+0.4/+0.7	1.75	≥ 60	3.2	2.4
<b>200</b>	+0/+0.5	2.4	≥ 60	+0.4/+0.9	2.2	≥ 60	3.9	2.9
<b>250</b>	+0/+0.5	3	≥ 60	+0.4/+0.9	2.75	≥ 60	4.9	3.7
<b>315</b>	+0/+0.6	3.8	≥ 60	+0.5/+1.0	3.5	≥ 60	6.2	4.7

**(1) Socket depth tolerances**  
 +0/+2 (mm) for  $\varnothing \leq 100$

**(2) Thickness of the sockets for solvent welding and the spigot**  
 $\varnothing \leq 75$  mm : th ≥ 2 mm  
 $\varnothing > 75$  mm : th ≥ 0.75 times the thickness of the body

**(3) Socket depths must be checked using go/no-go plug gauges; inspecting the socket depth of a fitting must be carried out in order to ensure functionality of the pipe-fitting.**

For solvent-weld fittings and sealing ring fittings, a 5% reduction in the thickness of the walls caused by core offset is permitted. In such cases, the average of the thicknesses of the 2 opposing walls must be equal to or greater than the abovementioned values.

**Other dimensions**

See tables 5 to 10 below.

**TABLE 5 - SOLID-WALL PVC DISCHARGE FAMILY**  
**- Dimensional characteristics of elbows [Group I]**

**MF or FF Elbow**  
**Figures 8 and 9 of Standard NF EN 1329-1**

	Elbows 20° and 22°30 FF - MF		Elbows 30° FF - MF		Elbows 45° FF - MF		Elbows 67°30 FF - MF		Elbows 87°30 FF - MF	
	Z (1)	h (2)	Z (1)	h (2)	Z (1)	h (2)	Z (1)	h (2)	Z (1)	h (2)
<b>32</b>	6	28	9	31	11	33	18	40	25	47
<b>40</b>	7.5	33	11	37	13	39	21	47	31	57
<b>50</b>	9	40	13.5	44	17	48	27	58	39	70
<b>63</b>	11	48.5	18	55	21	58.5	34	71.5	48	85.5
<b>75</b>	12	55.5	20	63	25	68.5	40	83.5	58	101.5
<b>80</b>	13.5	59.5	20	66	26	71	41.5	87.5	60	105.5
<b>90</b>	16	67	22	73	30	81	48	99	69	120
<b>100</b>	18	69	23	76	33	89	53	109	77	133
<b>110</b>	18	70	25	79	37	97	59	119	85	145
<b>125</b>	22	71	26	80	42	102	67	127	97	157
<b>140</b>	22	72	30	82	47	107	75	135	108	168
<b>160</b>	28	74	35	85	53	113	86	146	124	184
<b>200</b>	x	x	x	x	60	113	93	150	170	200
<b>250</b>	x	x	x	x	75	135	x	x	178	220
<b>315</b>	x	x	x	x	80	140	x	x	185	240

(1) Z tolerances: +/-2 for  $\emptyset < 200$  and +/-20 for  $\emptyset \geq 200$

(2) H tolerances (male side only) h-2 for  $\emptyset < 200$  and h-10 for  $\emptyset \geq 200$

(3) Other types of elbows may be NF mark certified under group II, provided that:

- The references meet all applicable requirements for fittings (tables 1, 2 and 4a "general fittings").
- The assembly dimensions (Z and/or h) are defined and communicated by the manufacturer.

**Two- or three-way elbow fittings** must comply with the same Z and h dimensions (measured symmetrically).

**TABLE 6 – Dimensional characteristics of 45° Wyes [Group I]**

**MF or FF 45° Wye**  
**Figures 14 and 15 of Standard NF EN 1329-1**

<b>Equal/reducing wyes 45° FFF - MFF (3)</b>					
<b>D1 and D3</b>	<b>D2</b>	<b>Body (1) (2)</b>			
		<b>Z1</b>	<b>Z2</b>	<b>Z3</b>	<b>h</b>
<b>32</b>	<b>32</b>	11	41	41	33
<b>40</b>	<b>32</b>	7	46	45	33
<b>40</b>	<b>40</b>	13	51	51	39
<b>50</b>	<b>32</b>	2	54	50	33
<b>50</b>	<b>40</b>	8	57	55	39
<b>50</b>	<b>50</b>	17	63	63	48
<b>63</b>	<b>50</b>	10	72	69	47.5
<b>63</b>	<b>63</b>	21	78	78	58.5
<b>75</b>	<b>50</b>	4	81	76	47.5
<b>75</b>	<b>75</b>	25	93	93	68.5
<b>80</b>	<b>80</b>	25	100	100	71
<b>90</b>	<b>50</b>	14	91	83	65
<b>90</b>	<b>90</b>	30	111	111	81
<b>100</b>	<b>50</b>	9	97	86	65
<b>100</b>	<b>100</b>	33	124	124	89
<b>110</b>	<b>75</b>	9	118	111	68
<b>110</b>	<b>110</b>	37	136	136	97
<b>125</b>	<b>100</b>	21	140	135	81
<b>125</b>	<b>110</b>	29	146	143	89
<b>125</b>	<b>125</b>	42	154	154	102
<b>140</b>	<b>110</b>	21	159	152	81
<b>140</b>	<b>140</b>	47	172	172	107
<b>160</b>	<b>110</b>	12	171	161	72
<b>160</b>	<b>160</b>	53	198	196	113
<b>200</b>	<b>200</b>	70	255	255	113
<b>250</b>	<b>250</b>	70	310	310	113

**(1) Z tolerances:**

$\emptyset \leq 50$	-2 to +4
$50 < \emptyset \leq 160$	-2 to +6
$\emptyset \geq 200$	+/-20

(2) **H tolerances:** min = h-2 for  $\emptyset < 200$  and min = h-10 for  $\emptyset \geq 200$

(3) **Other reducing wyes (different D2) may be NF mark certified under group II, provided that:**

- The references meet all applicable requirements for fittings (tables 1, 2 and 4a "general fittings").
- The assembly dimensions (Z and/or h) are defined and communicated by the manufacturer.

**Double or triple wyes must comply with the same Z and H dimensions (measured symmetrically).**

**TABLE 7 – Dimensional characteristics of 67°30 Wyes [Group I]**

Equal/reducing wyes 67°30 FFF - MFF (3)					
D1 and D3	D2	Body (1) (2)			
		Z1	Z2	Z3	h
32	32	18	26	26	40
40	32	16	30	28	42
40	40	21	32	32	47
50	32	14	36	30	45
50	40	19	38	34	50
50	50	27	40	40	58
63	50	24	46	42	61.5
63	63	34	49	49	71.5
75	50	22	54	45	65.5
75	75	40	59	59	83.5
80	80	43	62	62	90
90	50	19	62	48	70
90	90	48	70	70	99
100	50	18	65	48	74
100	100	53	78	78	109
110	75	33	78	67	93
110	110	59	85	85	119
125	100	48	91	83	108
125	110	56	94	89	116
125	125	67	97	97	127
140	110	53	104	93	113
140	140	75	108	108	135
160	110	49	113	96	109
160	160	86	123	123	146
200	200	110	160	160	170

**(1) Z tolerances:**

$\emptyset \leq 50$	-2 to +4
$50 < \emptyset \leq 160$	-2 to +6
$\emptyset \geq 200$	+/-20

**(2) H tolerances:** min = h-2 for  $\emptyset < 200$  and min = h-10 for  $\emptyset \geq 200$ 
**(3) Other reducing wyes (different D2) may be NF mark certified under group II, provided that:**

- The references meet all applicable requirements for fittings (tables 1, 2 and 4a "general fittings").
- The assembly dimensions (Z and/or h) are defined and communicated by the manufacturer.

**Double or triple wyes must comply with the same Z and h dimensions (measured symmetrically).**



**TABLE 8 – Dimensional characteristics of 87°30 Wyes [Group I]**

**MF or FF 87°30 Wye**  
**Figures 16 and 17 of Standard NF EN 1329-1**

<b>Equal/reducing wyes 87°30 FFF - MFF</b>					
<b>D1 and D3</b>	<b>D2</b>	<b>Body (1) (2)</b>			
		Z1	Z2	Z3	h
<b>32</b>	<b>32</b>	25	25	17	47
<b>40</b>	<b>32</b>	25	29	17	51
<b>40</b>	<b>40</b>	31	31	21	57
<b>50</b>	<b>32</b>	25	34	17	56
<b>50</b>	<b>40</b>	30	36	21	61
<b>50</b>	<b>50</b>	39	39	26	70
<b>63</b>	<b>50</b>	38	46	26	75.5
<b>63</b>	<b>63</b>	48	48	33	85.5
<b>75</b>	<b>50</b>	38	51	26	81.5
<b>75</b>	<b>75</b>	58	58	39	101.5
<b>80</b>	<b>80</b>	62	62	40	108
<b>90</b>	<b>50</b>	37	58	27	88
<b>90</b>	<b>90</b>	69	69	47	120
<b>100</b>	<b>50</b>	37	64	27	93
<b>100</b>	<b>100</b>	77	77	52	133
<b>110</b>	<b>75</b>	58	76	40	118
<b>110</b>	<b>110</b>	85	85	57	145
<b>125</b>	<b>100</b>	76	92	53	136
<b>125</b>	<b>110</b>	85	93	57	145
<b>125</b>	<b>125</b>	97	97	65	157
<b>140</b>	<b>110</b>	85	102	57	145
<b>140</b>	<b>140</b>	108	108	73	168
<b>160</b>	<b>110</b>	84	110	58	144
<b>160</b>	<b>160</b>	123	124	83	183
<b>200</b>	<b>200</b>	150	150	110	180
<b>250</b>	<b>250</b>	150	150	150	200

**(1) Z tolerances:**

$\emptyset \leq 50$

$50 < \emptyset \leq 160$

-2 to +4

-2 to +6

$\emptyset \geq 200$                       +/-20

**(2) H tolerance:**

min = h-2 for  $\emptyset < 200$

min = h-10 for  $\emptyset \geq 200$

**(3) Other reducing wyes (different D2) may be NF mark certified under group II, provided that:**

- The references meet all applicable requirements for fittings (tables 1, 2 and 4a "general fittings").
- The assembly dimensions (Z and/or h) are defined and communicated by the manufacturer.

**Double or triple wyes must comply with the same Z and h dimensions (measured symmetrically).**

**TABLE 9 – Dimensional characteristics of Reducers [Group I]**
**MF Reducers**  
**Figures 13 and 15 of Standard NF EN 1329-1**

Eccentric reducers FF - MF (2)			
D1	D2	Body (1)	
		Z	h min informative
40	32	10	36
50	32	20	51
50	40	12	43
63	50	18	55.5
75	40	38	81.5
75	50	28	71.5
80	50	34	80
90	50	32	83
100	75	28	84
110	75	38	98
160	110	53	113
200	160	41	115
250	200	53	113
315	250	75	135

(1) **Z tolerances:** +/-2 for  $\emptyset < 200$  and +/-15 for  $\emptyset \geq 200$

(2) **Other types of reducers may be NF mark certified under group II, provided that:**

- The references meet all applicable requirements for fittings [tables 1 and 2 (TD2) and 4a - general].
- The assembly dimensions (Z and/or h) are defined and communicated by the manufacturer.

**TABLE 10 – Dimensional characteristics of Sleeve Couplings [Group I]**

**Sleeve coupling FF**  
**Figure 12 of Standard NF EN 1329-1**

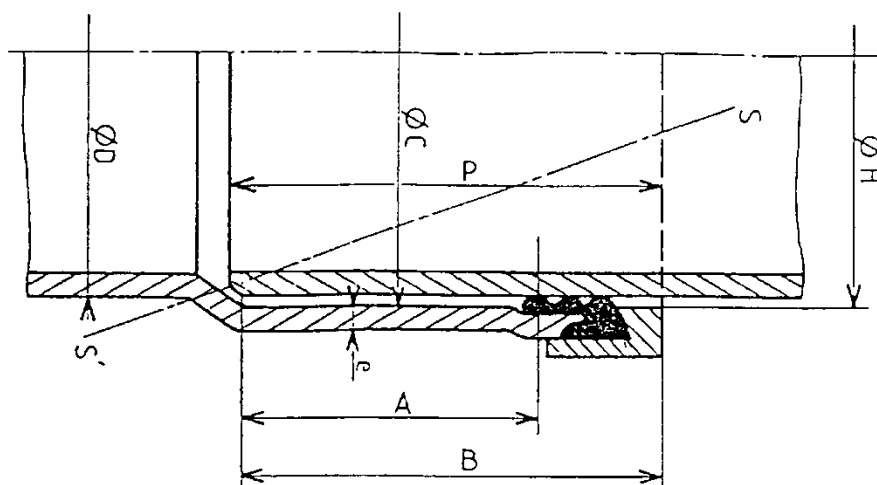
Equal sleeve couplings FF	
D	Body
	Z (1)
32	3
40	3
50	3
63	3
75	3
80	3
90	3
100	3
110	3
125	3
140	3
160	3
200	4
250	6
315	15

(1) **Z tolerances:** -1/+3 for  $\varnothing < 200$  and -1/+15 for  $\varnothing \geq 200$

(2) **Other types of sleeve couplings may be NF mark certified under group II, provided that:**

- The references meet all applicable requirements for fittings [tables 1 and 2 (TD2) and 4a - general].
- The assembly dimensions (Z and/or h) are defined and communicated by the manufacturer.

**TABLE 11 – Dimensional characteristics of simple assemblies with sealing rings**



**Diagram taken from Standard NF T 54 031 withdrawn on June 2002**

This diagram is provided for informational purposes regarding the shape of the seal; other designs may be considered.

Reuse the previous tables concerning outlet fittings for solvent welding assembly, replacing the information relating to the sockets with the below specifications.

In particular, in the case of expansion sleeves, the dimensions of the spigots are those of the fittings for solvent welding.

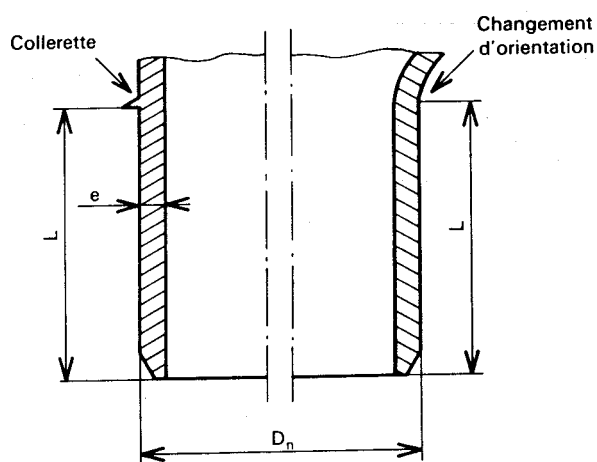
Maximum offset  $6^\circ$ .

Nominal diameter <b>D</b>	Average internal diameters		Depth		Minimum thickness of walls <b>th</b>	Minimum interlocking length <b>P</b>
	Of sockets (minimum) <b>C</b>	Guiding H Tolerances : <b>+ 1.5 0</b>	Socket maximum <b>B</b>	Chamber minimum <b>A</b>		
63	63.3	63.3	52.5	22.5	3.0	37.5
75	75.4	75.4	58.5	28.5	3.0	43.5
80	80.4	80.4	61	31	3.0	46.5
90	90.4	90.4	66	36	3.0	51
100	100.4	100.4	71	41	3.0	56
110	110.4	110.4	75	45	3.0	60
125	125.4	125.4	75	45	3.0	60
140	140.5	140.5	75	45	3.0	60
160	160.5	160.5	75	45	3.2	60

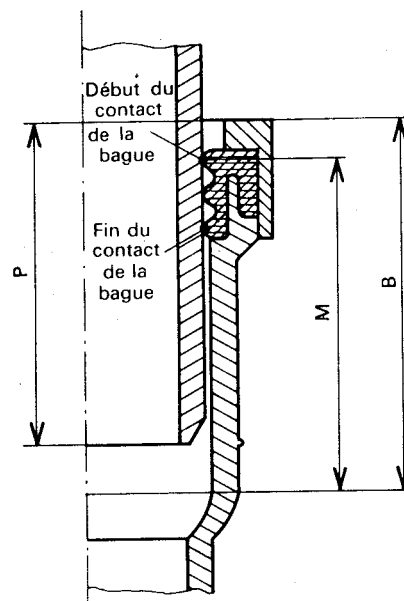
The assembly dimensions are identical to those of the parts for solvent welding.

(\*) This dimension must be at least equal to the length of the spigot, in accordance with standard NF EN 1329-1.

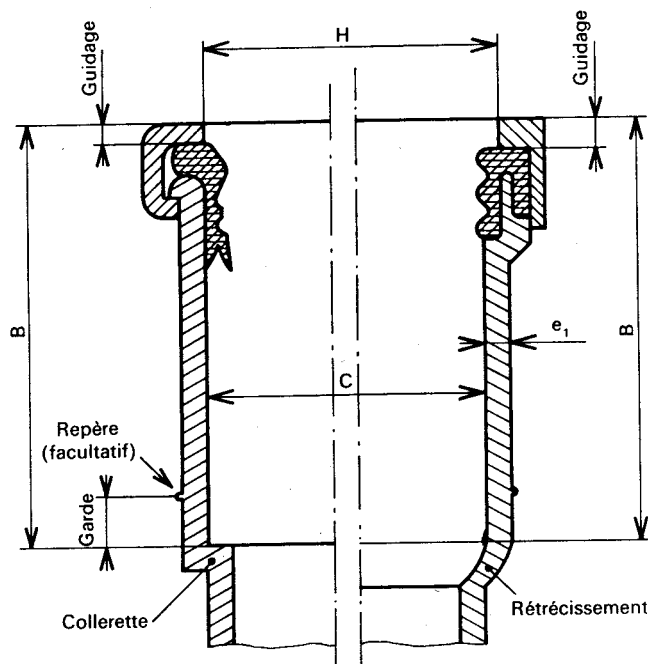
**TABLE 12 – Dimensional characteristics of slip assemblies with sealing rings**



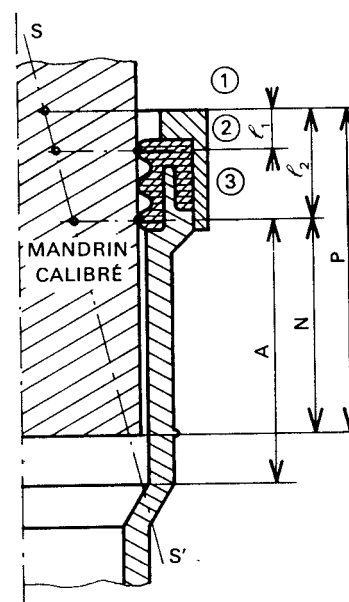
**Figure 1 – Bout mâle**



**Figure 3 – Assemblage.**



**Figure 2 – Emboîture et bague de joint**



**Figure 4 – Utilisation du mandrin calibre (ou calibre)**

Diagram taken from Standard NF T 54 031 withdrawn on June 2002

These diagrams are provided for informational purposes regarding the shape of the seal; other designs may be considered.

Reuse the previous tables concerning outlet fittings for solvent welding assembly, replacing the information relating to the sockets with the below specifications.

In particular, in the case of expansion sleeves, the dimensions of the spigots are those of the fittings for solvent welding.

Maximum offset 6°.

Nominal diameter	Average internal diameters		Depth			
	Of sockets (minimum)	Guiding H Tolerances: + 1.6 0	Socket maximum	Chamber minimum	Chamber penetration minimum	Minimum thickness of walls
D	C		B	A	N	(th)
32	32.3	32.3	115	65	50	3.0
40	40.3	40.3	115	65	50	3.0
50	50.3	50.3	115	65	50	3.0
63	63.3	63.3	115	65	50	3.0
75	75.3	75.3	115	65	50	3.0
80	80.3	80.3	115	65	50	3.0
90	90.3	90.3	115	65	50	3.0
100	100.4	100.4	115	65	50	3.0
110	110.4	110.4	115	65	50	3.0
125	125.4	125.4	115	65	50	3.0
140	140.5	140.5	115	65	50	3.0
160	160.5	160.5	115	65	50	3.5

The corresponding assembly dimensions are not standardised and are thus left to the manufacturer. They cannot be less than those of the fittings for solvent welding assembly.

**TABLE 13 - DISCHARGE FAMILY - STRUCTURED-WALL PVC PIPES**
**Pipe specifications**

Characteristics and Test methods (1)	Pipes
Reference standard	NF EN 1453-1
Appearance (2) Marking	(2)
Dimensions (3) Socket depth	See table 15
Density NF EN ISO 1183-1 <b>Method A</b> (3)	Specified by the manufacturer $\leq 1370 \text{ kg/m}^3$
Vicat softening temperature NF EN 727 (4)	$> 79^\circ\text{C}$
Longitudinal reversion at $150^\circ\text{C}$ NF EN ISO 2505 (3)	$\leq 5\%$ No blisters
Ring stiffness NF ISO 9969 (6)	$> 2 \text{ kN/m}^2$
Impact resistance NF EN 744 (3) (5)	TIR $< 10\%$

- (1) The editions of the standards cited for use are those in force on the revision date of these certification reference systems (see page 2 of this Technical Document), unless otherwise specified by the Mandated Body.
- (1) The internal and external surfaces of the pipes must be smooth, clean and free of scratches, blisters and any other surface imperfections when they are examined without magnification. The ends of the pipes must be cut cleanly and perpendicular to the pipes' axis.  
The pipes must be homogeneous in colour and preferably a clear, medium grey-blue similar to the colour RAL 7037 (medium grey).  
The marking must be consistent with the requirements provided in Technical Document 3 Discharge.
- (3) With additional clarifications indicated in part 2 of Technical Document 1.
- (4) Type test performed on a solid-wall pipe extruded for this purpose.
- (5) Applicable for all types of pipes from DN 32 to DN 315 inclusive. Type of striker: d 25 for pipes with DN  $< 110$  mm; d 90 for pipes with DN  $> 110$  mm.
- (6) Applicable for all pipes with DN 100 to DN 315 inclusive, as they are likely to be buried outside buildings.

**Specifications for associated fittings (see Table 4)**



**TABLE 14 - DISCHARGE FAMILY - STRUCTURED-WALL PVC PIPES**

**Specifications for assemblies**

<b>Characteristics and Test methods (1)</b>	<b>Specifications</b>
Watertightness NF EN 1053	No leak in the assembly
Airtightness NF EN 1054	No leak in the assembly
Resistance to temperature cycling (hot water and cold water) NF EN 1055 (2)	No leaks after 1500 cycles Deflection $\leq 0.05$ DN and $\leq 3$ mm (the lowest of these 2 values)

- (1) The editions of the standards cited for use are those in force on the revision date of this certification reference system (see page 2 of this Technical Document), unless otherwise specified by the Mandated Body.
- (2) With additional clarifications indicated in Part 2 of Technical Document 1.

**TABLE 15 - DISCHARGE FAMILY - STRUCTURED-WALL PVC PIPES**
**Dimensional characteristics of the pipes**

In accordance with NF EN ISO 3126 and NF EN 1453-1

- Preferred length: 2.60 m - 4 m - 6 m  
     Tolerances: + 1% for L < 5 m  
                   + 5 cm for L > 5 m
- Other dimensions

Nominal external diameter DN (mm)	Nominal thickness th (mm)	Tolerances			Sockets (*)	
		for DN	Thicknesses		Tolerance s	Depth
			min th	max th	for the average internal diameter	
32	3.0	+ 0.2 0	3.0	3.5	+ 0.4 DN + 0.1	22
40	3.0	+ 0.2 0	3.0	3.5	+ 0.4 DN + 0.1	26
50	3.0	+ 0.2 0	3.0	3.5	+ 0.4 DN + 0.1	30
63	3.0	+ 0.2 0	3.0	3.5	+ 0.4 DN + 0.1	36
75	3.0	+ 0.3 0	3.0	3.5	+ 0.5 DN + 0.2	40
80	3.0	+ 0.3 0	3.0	3.5	+ 0.5 DN + 0.2	42
100	3.0	+ 0.3 0	3.0	3.5	+ 0.5 DN + 0.2	46
110	3.2	+ 0.3 0	3.2	3.8	+ 0.6 DN + 0.2	48
125	3.2	+ 0.3 0	3.2	3.8	+ 0.7 DN + 0.2	51
140	3.2	+ 0.4 0	3.2	3.8	+ 0.8 DN + 0.3	54
160	3.2	+ 0.4 0	3.2	3.8	+ 0.8 DN + 0.3	58
200	3.9	+ 0.5 0	3.9	4.5	+ 0.9 DN + 0.4	60
250	4.9	+ 0.5 0	4.9	5.6	+ 0.9 DN + 0.4	60
315	6.2	+ 0.6 0	6.2	7.1	+ 1.0 DN + 0.5	60

(\*) The DN 32, 40 and 50 pipes generally do not have sockets (smooth ends).

## Part 2. MARKING CONDITIONS– REFERENCING THE NF MARK

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This Technical Document specifies the conditions of marking and referencing the NF mark provided in the certification reference system of the NF Mark - Rigid Non-Plasticised PVC Pipes and Fittings.

### 2.1 REPRODUCTION OF THE NF LOGO ON THE CERTIFIED PRODUCT

#### 2.1.1 General

The NF logo shall ensure the identification of each certified product.

The trade reference of the certified product must be reserved for the NF mark.

The manufacturer must not use the NF mark except to single out certified products without there being any risk of confusion whatsoever.

The logo's graphic tools are available from the CSTB Technical Department (Tel.: + 33 (0)1 64 68 89 52 - E-mail: [certification@cstb.fr](mailto:certification@cstb.fr)).

It is recommended that the holder remit to CSTB, in advance, all the documents upon which the NF mark appears.

The NF logo, constituting certification identification by a third party with regards to the reference standards cited on page 2 of this Technical Document, must be affixed in accordance with the conditions defined in those standards.

The black and white version of the NF logo can be used.

#### 2.1.2 Marking pipes and fittings

##### 2.1.2.1 Cases of pipes and fittings covered only by this reference system

###### a) Marking pipes

Marking of pipes must be carried out in a way that is visible and indelible and which can be read by the naked eye, on a generatrix and contain, every meter or less, the following set of information:




- ① - the trademark or symbol filed by the manufacturer with the mandated bodies if one trademark is admitted to the NF mark; if > 2 trademarks, then marking the trade name is required.
- ② - the manufacturer's identification number assigned upon notification of admission and possibly the production site designated upon notification of admission ([if there are multiple factories](#)).
- ③ - the NF monogram with the Discharge family symbol = E



or



Holders have the option to use:

- Either the new logo  followed by the letter E, as follows:  E
- Or, as an exception, when using the logo creates technical and/or material difficulties, the old logo 

The black and white version of the NF logo can be used.

**Note:** a negative version of the logo can be used.

④ - the material identification symbol: PVC

⑤ - the pipe dimensions:

For the Discharge family: nominal external diameter x nominal thickness (or minimum) and, if required, the letters "EP" for pipes intended only for above-ground drainage of rainwater and "EU" for pipes intended for wastewater discharge.

⑥ - mark for production identification: date (dd/mm/yy) or day number and year of manufacture (xxx/yy) (or batch no. indicating the manufacturing date: in this case, the definition of this number must be sent to the mandated body).

Note: the choice of marking method is left to the manufacturer. Any other additional marking is permitted on the condition that the sequence of NF information is not broken and it causes no confusion during use; in this case, the sequence of NF information must be framed by three lines of approximately 3 cm.

Unless specifically authorised by the mandated body after consultation with the Application Committee, double-marking products is prohibited when marking relates to an application that is not covered by the mark.

Examples:


**Discharge Group**

Pipes for draining wastewater

— XXX    02/01     E    PVC    100 x 3.0 EU    01 02 11 or 032 11-    —

①                    ②                    ③                    ④                    ⑤                    ⑥

PVC pipes for draining rainwater

— XXX    02/01     E    PVC    100 x 1.9 EP    01 02 11 or 032 11-    —

①                    ②                    ③                    ④                    ⑤                    ⑥

## **b) Marking fittings**

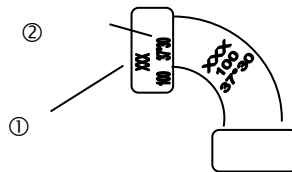
### **b.1. Mandatory information on fittings**

For fittings with diameters  $\leq 50$  mm

Each fitting must bear the following information, marked indelibly:

- ① - trademark or symbol filed by the manufacturer with the mandated bodies.
- ② - nominal dimensions (in the case of a single fitting or a reducing fitting; in the latter case, the order indicated for the designation must be followed).
- the values of the connection angles (except for tees in the Pressure family).

Example:



- If multiple trademarks are filed with the mandated bodies, the identification number of the manufacturer, assigned upon notification of admission, must be mentioned in addition to the above information.

For fittings with diameters  $> 50$  mm

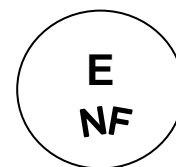
Each fitting must bear the following information, marked indelibly:

- ① - trademark or symbol filed by the manufacturer with the mandated bodies.
- ② - nominal dimensions (in the case of a single fitting or a reducing fitting; in the latter case, the order indicated for the designation must be followed).
- the values of the connection angles (except for tees in the Pressure family).
- ③ - NF monogram and family symbol arranged as shown below, notwithstanding the NF mark's graphic charter.

Holders have the option to use:

- Either the new logo  followed by the letter E, as follows:  E
- Or, as an exception, when using the logo  creates technical and/or material difficulties, the following monogram:

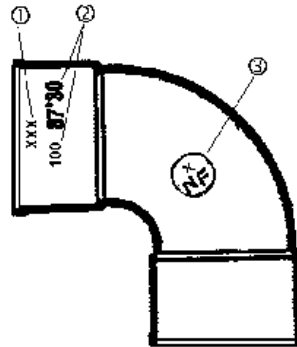
**The new certified products shall comply with the NF graphic charter in force.**



The black and white version of the NF logo can be used.

In cases of FF sleeve couplings or moulding conditions that do not allow marking of the NF monogram described above, this is optional.

Example:



- If multiple trademarks are filed with the mandated bodies, the identification number of the manufacturer, assigned upon notification of admission, must be mentioned in addition to the above information.

In cases of pressure fittings shaped from pipes which themselves are NF mark certified, the marking is completed on the pipes.

In cases of parts shaped from fittings which themselves are certified by the mark, the NF marking can be retained on the condition that the fittings were in no way modified.

**Note:** the choice of marking method is left to the manufacturer. Any other additional marking is permitted on the condition that the sequence of NF information is not broken and it causes no confusion during use.

**b.2. Additional recommended information on fittings (optional)**

Each fitting may bear the following information:

- the symbol identifying the material (PVC),
- a mark for production identification.

**b.3. Marking primary packaging (Mandatory information)**

Primary packaging must include the following indelibly marked information:

- . Company name and/or trademark filed,
- . Symbol identifying the material,
- . NF monogram as defined in paragraph 2.2 below.



or



if the holder also has the Fire Safety NF mark

The black and white version of the NF logo can be used.

**2.1.2.2. Cases of pipes and fittings that can belong to 2 families of this mark or covered by other NF marks or another certification**






Certain products can be integrated into other areas of the NF mark: NF - mark Fire Safety (PVC pipes and fittings) or certain types of pipes can be identical for two families of this mark (Discharge and Sewerage pipes).

Products holding other Fire NF marks can be marked with the corresponding logos from the reference systems in question.

The marking principles are as follows:

**a) Case of pipes**

- Pipes admitted to the NF mark - PVC Pipes and Fittings for the PVC Discharge, Pressure or Sewerage families and the material of which is classified M1 as part of the NF mark - Reaction to Fire or Me as part of the NF mark - Fire Safety: the marking on pipes is completed as follows, by the "+" sign and the logo NF M1 or NF Me:

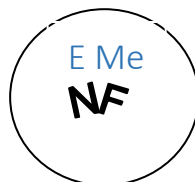
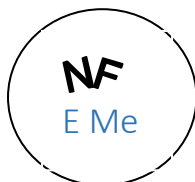
XXX	02/02		E +		M1	PVC	100 x 3.0	EU	01 02 11 or 032 11
XXX	02/02		E +		Me	PVC	100 x 3.0	EU	01 02 11 or 032 11
XXX	02/02		E			PVC	100 x 3.0	EU	01 02 11 or 032 11

- Pipes common to the Discharge and Sewerage families (for example, pipe 200 x 4.7 CR 4)

XXX	02/02		EA	PVC-U	200 x 4.9 CR4	15 10
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**b) Case of fittings**

- Fittings admitted to the NF mark - PVC Pipes and Fittings for the PVC Discharge families, the material of which is classified Me as part of the NF mark - Fire Safety: the NF monogram and the symbol of the family as well as the NF mark - Fire Safety must be present as indicated below, all general marking principles (paragraph 2.1.2) being unchanged.



## 2.2 REPRODUCTION OF THE NF LOGO ON THE PACKAGING OF THE NF-CERTIFIED PRODUCT

- The following NF monogram is to be used:



- or, by exception, due to technical difficulties, printing the NF logo on the packaging can*

**be completed without the title of the application, including in black and white:**



The NF logo must be associated with the symbol of the application in question, so that NF mark certified products can be distinguished from other products, without any risk of confusion, being:



## 2.3 MARKING CERTIFIED AND ASSOCIATED CHARACTERISTICS

All documentation relating to an NF - Rigid Non-Plasticised PVC Pipes and Fittings certified product must use the following form:

- name and address of the manufacturer,
- identification of the Reference System on which the certification is based (**see 2.4.2 of the body of the reference system**),
- (name and address of the delegate in France, if applicable),
- designation of the product (trademark and trade reference),
- licence or certificate number,
- the name or company name of the certification body or its collective Certification mark as well as its address,
- certified product characteristics:
  - Dimensional characteristics (diameter, thickness, out-of-roundness, sockets),
  - Tensile strength,
  - Impact resistance,
  - Pressure-tightness of the assembly,
  - Resistance to thermal cycling,
  - Leaktightness of the assemblies.



## 2.4 REPRODUCING THE NF LOGO ON DOCUMENTATION AND IN ADVERTISING (technical and commercial documents, labels, posters, advertising, Websites, etc.)

- The following NF monogram is to be used:



The black and white version of the NF logo can be used.

Products holding other quality marks can be marked with the corresponding logos from the reference systems in question.

## Part 3. APPLICANT/HOLDER QUALITY REQUIREMENTS

### 3.1 QUALITY CONTROL OPTION

The tests specified in these tables are to be performed with the number of specimens stipulated in the testing standards and addendums indicated in Technical Document 1 of this certification reference system specific to each product group, unless otherwise indicated in the tables.

**TABLE 16 – For pipes:**

Measurements or tests (1)	Minimum sampling frequency	Solid-wall PVC	Structured-wall PVC
Dimensions: diameter, thickness, out-of-roundness Appearance Colour Marking	By extruder: 1 every 4 hours	X	X
Density	1 test per month on 1 type at random (1)	X	X
Vicat softening temperature	1 test every 3 months on 1 type at random (1)	X	(2)
Tensile properties	By extruder: 1 test per campaign (1) (5) (6)	X	
Reversion	1 test on 1 specimen at the start of the campaign (3) (5) (1)	X	X
Ring stiffness	1 test per campaign (3) (4) (5)		X
Impact resistance	1 test per campaign (3) (5)	X	X

(1) Methods specified in Technical Document 1, Part 2.

(2) For structured-wall pipes, the tests for determining the Vicat softening temperature and gel point are type tests. They must be performed on a solid-wall pipe extruded for this purpose.

(3) Campaign: for each extruder, the period between the start of manufacturing of a product reference number and the switch to the next number.

(4) Applicable for pipes from DN 100 to DN 315 inclusive.

(5) Complete this test at least once a week (if the campaign lasts more than a week).

(6) Test to be completed on at least 5 specimens.

**TABLE 17 – For fittings:**

Measurements or tests (1)	Minimum sampling frequency
Dimensions (spigots and sockets)	Injected fittings: - per machine, per type and per dimensions: . Once every 4 hours, with increased inspections at the start of the campaign (2 specimens during the first 2 hours of production) (2)
Density	Injected fittings: 1 test per month on 1 type at random (1)
Vicat softening temperature	Injected fittings: 1 test every 3 months on 1 type at random (1)
Oven test	1 test on 1 specimen per day, per machine, per type and per dimensions (2) (1)

(1) Methods specified in Technical Document 1, Part 2.

(2) 1 specimen corresponding to as many fittings (cavities) as the mould used contains.

A campaign corresponds to the period between the start of manufacturing of a product reference number and the switch to the next number.

### 3.2 QUALITY MANAGEMENT OPTION

The implemented quality assurance plan must enable product compliance with the specifications of the standards and of this regulation.

Consequently, the manufacturer must complete or ensure completion of the specified tests per the frequencies defined in the quality assurance plan, certain tests being able to be considered "type" tests (for putting new equipment in place or using a new formulation, for example).

## Part 4. MONITORING ARRANGEMENTS BY CSTB

### 4.1 TEST PROCEDURES DURING AN APPLICATION FOR ADMISSION

**TABLE 18 – For pipes in the Discharge family – Structured-wall PVC pipes:**

	Measurement or test	Tests conducted in the factory	Tests conducted in the laboratory
	Average external diameter Appearance Marking Colour Length Any diameter Thickness Sockets (depth of groove)	All the types submitted for admission	-
	Density (1)	1 test (choice of type and category)	1 test (choice of type and category)
	Vicat softening temperature (1)	1 type test on a solid-wall pipe	1 type test on a solid-wall pipe
	Reversion at 150°C (1)	1 test	1 test per type sampled (choice of category)
	Impacts (1)	1 test	1 test per type sampled
	Ring stiffness	1 test	1 test per type sampled (choice of category)
Assembly	Watertightness	-	1 assembly of 2 DN
	Airtightness	-	1 assembly of 2 DN
	Resistance to elevated temperature cycling (1)		1 assembly of 2 DN
	Quality of elastomer sealing rings	-	1 report of tests provided by the manufacturer of elastomer sealing rings.
	Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	/

(1) With additional clarifications indicated in **Technical Document 1, Part 2**.

**As part of an application for extension limited to DN80, this diameter will be part of the periodic inspection for the year of the application.**

**TABLE 19 – For pipes in the Discharge family – Solid-wall PVC pipes:**

Measurement or test	Tests conducted in the factory	Tests conducted in the laboratory	
Average external diameter Appearance Marking Colour Length Any diameter Thickness Sockets (depth of groove)	All the types submitted for admission	-	
Density (2)	1 test (choice of type and category)	1 test (choice of type and category)	
Vicat softening temperature (2)	1 test (choice of type and category)	1 test (choice of type and category)	
Tensile characteristics (maximum stress and elongation at break) (2)	1 test (choice of category), except in the case where this test is a type test	1 test per type sampled (choice of category)	
Reversion at 150°C (2)	1 test (choice of category)	1 test per type sampled (choice of category)	
Impact resistance (2) NF EN 744	1 test	1 test per type sampled	
Assembly	Watertightness	-	1 assembly of 2 DN
	Airtightness	-	1 assembly of 2 DN
	Thermal shock resistance (1) (2)	-	1 assembly of 2 DN
	Quality of elastomer sealing rings	-	1 report of tests provided by the manufacturer of elastomer sealing rings.
	Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	/

(1) For assemblies with diameters  $\leq 160$  mm only (not performed for assemblies intended specifically for rainwater).  
5-cycle and 1500-cycle thermal shock resistance tests are performed during admission to the mark.

(2) With additional clarifications indicated in **Technical Document 1, Part 2**.

**As part of an application for extension limited to DN80, this diameter will be part of the periodic inspection for the year of the application.**

**TABLE 20 – For fittings in the Discharge family:**

Measurement or test	Tests conducted in the factory Group 1 fitting	Tests conducted in the factory Group 2 fitting	Tests conducted in the laboratory Group 1 fitting	Tests conducted in the laboratory Group 2 fitting
Average external diameter Appearance Marking Colour Thickness Assembly dimensions Sockets	All the types submitted for admission: by dimensional inspection of stock on at least half the range presented and by verification of the inspection registers for the entire range	All the types submitted for admission: by verification of instructions and inspection registers for the entire range	-	-
Vicat softening temperature (2)	1 test	1 test	1 test (3)	1 test (3)
Density (2)	1 test	1 test	1 test (3)	1 test (3)
Oven test at 150°C (2)	All fittings submitted for admission	4 fittings submitted for admission	4 fittings submitted for admission	4 fittings submitted for admission
Thermal shock resistance (1) (2) (for fittings with seals only)	-	-	1 assembly of 2 DN	/
Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	Verification of the absence of lead in the stabiliser's formulation	/	/

- (1) For assemblies with diameters  $\leq 160$  mm only  
(not performed for assemblies intended specifically for rainwater).  
5-cycle and 1500-cycle thermal shock resistance tests are performed during admission to the mark.
- (2) With additional clarifications indicated in Technical Document 1, Part 2.
- (3) These tests are performed on fittings from either group 1 or group 2.

**Thermal shock test (frequency), monitoring and admission conditions of Discharge pipes and fittings:**

Solid-Wall Discharge Pipe (*Tube Évacuation Compact* - Tec): 5 cycles admission and 5 cycles monitoring.

Structured-Wall Discharge Pipe (*Tube Évacuation Structuré* - TES): 1500 cycles admission and 1500 cycles monitoring.

Discharge fittings (*Raccords Évacuation* - REC): 5 cycles admission and monitoring according to the pipe manufactured by the Holder (1500 cycles TES and 5 cycles Tec).

## 4.2 TEST PROCEDURES DURING MONITORING OF CERTIFIED PRODUCTS

**TABLE 21 - For pipes in the Discharge family – Structured-wall PVC pipes:**

Measurement or test	Tests conducted in the factory*		Tests conducted in the laboratory
	Quality control	Quality management	
Average external diameter Appearance Marking Colour Length Any diameter Thickness Sockets (depth of groove)	5 types per visit divided between each family admitted and product category		-
Density (2)	Inspection of test records		1 type per year (choice of category)
Reversion at 150°C (2)	1 type at each visit (choice of category)	1 type per year (choice of category)	1 type per year (choice of category)
Ring stiffness	1 type at each visit (choice of category)	1 type per year (choice of category)	1 type per year (choice of category)
Impact resistance (2)	1 type at each visit	1 type per year	1 type per year
Watertightness	-	-	1 every 5 years or one test report from an EN ISO 17025 accredited body of less than 4 years
Airtightness	-	-	1 every 5 years or one test report from an EN ISO 17025 accredited body of less than 4 years
Resistance to temperature cycling (hot water – cold water) (2)	-	-	1 every 5 years or one test report from an EN ISO 17025 accredited body of less than 4 years
Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	Verification of the absence of lead in the stabiliser's formulation	/

(3) With additional clarifications indicated in Technical Document 1, Part 2.

\*: If the holder is certified for 2 product families\_ ( Me or  M1), the 2 product families will be tested in the factory and only one family will be tested in the Mark laboratory.

**TABLE 22 - For pipes in the Discharge family – Solid-wall PVC pipes:**

Measurement or test	Tests conducted in the factory		Tests conducted in the laboratory
	Quality control	Quality management	
Average external diameter Appearance Marking Colour Length Any diameter Thickness Sockets (depth of groove)	5 types per visit divided between each family admitted and product category		-
Density (1)	Inspection of test records		1 type per year (choice of category)
Vicat softening temperature (1)	Inspection of test records		1 type per year (choice of category)
Tensile characteristics (maximum stress and elongation at break) (1)	Inspection of test records		1 type per year (choice of category)
Reversion at 150°C (1)	1 type at each visit (choice of category)	1 type per year (choice of category)	1 type per year (choice of category)
Impact resistance (1) NF EN 744	1 type at each visit (choice of category)	1 type per year (choice of category)	1 type per year (choice of category)
Thermal shock resistance (2)	-	-	1 every 5 years or one test report from an EN ISO 17025 accredited body of less than 4 years
Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	Verification of the absence of lead in the stabiliser's formulation	/

(1) With additional clarifications indicated in Technical Document 1, Part 2.

(2) Test performed in accordance with the NF T 54-037 standard – checking airtightness and watertightness after 5 test cycles.

\*: If the holder is certified for 2 product families\_( Me or  M1), the 2 product families will be tested in the factory and only one family will be tested in the Mark laboratory.



**TABLE 23 - For fittings in the Discharge family made of solid-wall PVC:**

**GROUP 1**

Measurement or test	Tests conducted in the factory		Tests conducted in the laboratory
	Quality control	Quality management	
Appearance Marking Colour Average external diameter Any diameter Thickness of the fitting's body	3 diameters per visit and per category (choice of type)		-
Sockets	3 diameters per visit and per category (choice of type)		-
Vicat softening temperature (2)	Inspection of test records		1 diameter per year (choice of type and category) (3)
Density (2)	Inspection of test records		1 diameter per year (choice of type and category) (3)
Oven test at 150°C (2)	3 diameters per visit (choice of type and category)	3 diameters per year (choice of type and category)	1 diameter per year (choice of type and category)
Thermal shock resistance (1) (2) (for fittings with seals only)	-	-	1 every 5 years or one test report from an EN ISO 17025 accredited body of less than 4 years
Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	Verification of the absence of lead in the stabiliser's formulation	/

- (1) Test performed in accordance with the NF T 54-037 standard – checking airtightness and watertightness after 5 test cycles.
- (2) With additional clarifications indicated in Technical Document 1, Part 2.
- (3) These tests are performed on fittings from either group 1 or group 2.

**TABLE 23 - For fittings in the discharge family made of solid-wall PVC:**
**GROUP 2**

Measurement or test	Tests conducted in the factory		Tests conducted in the laboratory
	Quality control	Quality management	
Appearance Marking Colour Average external diameter Any diameter Thickness of the fitting's body	3 diameters per visit and per category (choice of type)		-
Sockets	3 diameters per visit and per category (choice of type)		-
Vicat softening temperature (1)	Inspection of test records		1 diameter per year (choice of type and category) (2)
Density (1)	Inspection of test records		1 diameter per year (choice of type and category) (2)
Oven test at 150°C (1)	3 diameters per visit (choice of type and category)	3 diameters per year (choice of type and category)	1 diameter per year (choice of type and category)
Quality assurance of the formulation (absence of lead)	Verification of the absence of lead in the stabiliser's formulation	Verification of the absence of lead in the stabiliser's formulation	/

(1) With additional clarifications indicated in Technical Document 1, Part 2.

(2) These tests are performed on fittings from either group 1 or group 2.