



## **AENOR N Mark Specific Rules for polyethylene compounds (PE) intended for the manufacturing of pipes and fittings for water supply and sewerage under pressure**

Note: This document is a translation of the Spanish document RP 001.36 rev 13 approved by the Plastics Technical Certification Committee (CTC-001). Spanish version always prevails over this translation

### **RP 001.36**

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## 1 Purpose and scope

Pursuant to paragraph 3.2 of the General Rules on the Certification of Products and Services with N Mark, hereafter the General Rules, the present Specific Rules describe the specific certification scheme for polyethylene compounds (PE) intended for the manufacturing of pipes and fittings for water supply, for human consumption including raw water prior to treatment, drainage and sewerage under pressure, vacuum sewer systems and water for other purposes. The present Specific Rules complete the AENOR N Mark Specific Rules for plastic materials – common requirements (RP 001.00). The General Rules always prevail over the present Specific Rules.

The N Mark for polyethylene compounds (PE) intended for the manufacturing of pipes and fittings for water supply, for human consumption including raw water prior to treatment, drainage and sewerage under pressure, vacuum sewer systems and water for other purposes, hereafter the Mark, denotes product compliance with the UNE EN 12201-1:2024 and/or ISO 4427-1:2019.

## 2 Definitions and special requirements

The client of the N Mark Certificate for any polyethylene compound must send both, the application form and the reference curves for the product.

**Type:**

- PE 40 compounds
- PE 80 compounds
- PE 100 compounds
- PE 100-RC compounds

**Serie:** it considers serie the material that has the same density and the same melt flow rate within a type.

The client is required to communicate to the Committee, any change that should concern the compound, according to Annex A of the CEN/TS 12201-7

## 3 Sampling and testing for granting and maintaining the Product N Mark Certificate

### 3.1 Sampling and test to be carried out by the laboratory (See RP 001.00)

AENOR will select and mark the necessary samples to carry out in the laboratory the tests stated in table 1 for each serie.

### 3.2 Test results valuation

The test criterion valuation is stated in table 1. The meaning of the criterion is as follows:

- **Valuation 1:** Test results must comply with the requirements of the standard. In consequence, no value will be allowed to be out of tolerances.

	TESTS	GRANTING/MAINTAINING	RESULTS EVALUATION
TESTS TO BE CARRIED OUT BY THE LABORATORY	Compound density (1)	Once per series	1
	Carbon black content	Once per series	1
	Carbon black dispersion (black compound)	Once per series	1
	Pigment dispersion (blue compound)	Once per series	1
	Water Content (2)	Once per series	1
	Volatile content (2)	Once per series	1
	Oxidation induction time	Once per series	1
	Melt mass-flow rate (MFR) for PE40, PE80 and PE100	Once per series	1
	Resistance to slow crack growth (SCG). Strain-Hardening Test (SHT) Only compound PE 100-RC.	One per compound	1
	Resistance to slow crack growth (SCG). Accelerated Full Notch Creep Test (AFNCT) (3) Only compound PE 100-RC.	One every two years per compound	1
	Resistance to slow crack growth Cracked Round Bar Test (CRB). Only compound PE 100-RC	One every two years per compound	1
	Tensile strength for butt-fusion (for PE80 and PE100)	Once per series every five years	1
	Slow crack growth-pipe size 110 mm SDR 11 Only compound PE 80 y PE 100	Once per series	1

	Resistance to slow crack growth Accelerated Notched Pipe Test (ANPT) Only compound PE 100-RC (DN110 SDR11) (4)	One per compound	1
	Resistance to weathering (not applicable for Black compound)	Once per series every five years	1
	Rapid crack propagation (PE80 and PE100) (5)	Once per series every two years	1
	Hydrostatic strength 80°C 165h (PE40)	Two classes	1

TABLE 1

**Note (1):** In case of litigation, to perform this test must take into account, as mentioned in Note 1 of ISO 1183-2, the conditions for prepare the samples set out in the corresponding material specification and indicated by the manufacturer. This preparation must be realized in any of the conditions described in Table 3 (compression molding) and table 4 (extruded obtained according to ISO 1133-1) [ISO 17855-2](#).

**Note (2):** Only applicable if the measured volatile content is not in conformity to its specified requirement. In case of dispute the requirement for water contents shall apply. An alternative test method, ISO 760:1978(5) may be used. The requirement applies to the compound producer at the stage of manufacturing and to the compound user at the stage of processing (if the water content exceeds the limit, drying is required prior to use).

**Note (3):** If the client of the certificate has a previous test (Type test) carried out on 8 specimens (according to section 8.2 of the test standard ISO 16770), the minimum number of specimens for the AFNCT test, both in concession and follow-up, shall be 4 specimens, one for each level of stress indicated in the standard, and this number may be increased in the case of very scattered results. The maximum test duration for each specimen in the absence of breakage shall be 750h".

**Note (4):** As no valid correlation between the test conditions/specifications with the new detergent (Dehyton PL) and the current detergent (Arkopal N100) is available, the Accelerated Notch Test (ANPT) is replaced by the Strain-Hardening Test (SHT).

**Note (5):** The manufacturer shall indicate in the application the chosen method to carry out the rapid crack propagation test:

- S4 test (ISO 13477)
- FST test (UNE EN ISO 13478)

For PE-80 and PE-100 compounds: If the S4 test is chosen the applicant will indicate if he wishes to carry out the pass / no pass test with the standard specifications or if he prefers to determine the critical pressure at 0°C temperature. In this last case will apply the +2.6 coefficient for critical pressure. This coefficient is included in the standard to limit, if it is the case, the maximum nominal pressure for the pipes made of this compound and the mean outside diameter of them to 250 mm.

The rapid crack propagation, slow crack growth (except SHT and AFNCT), resistance to weathering, tensile strength for butt-fusion and hydrostatic strength 80° 165h tests must be carried out on pipe. Therefore, during the inspection in the client plant the necessary amount of compound to produce the pipe requested in the standard shall be selected.

This extrusion will carry out wherever the client wish in his installations, if he has them available or in the installations of a pipe manufacturer. In this last case it will be preferred that the pipe manufacturer has an AENOR product certificate.

AENOR shall be present during the pipe extrusion. They will carry out the extruded pipe dimensional control and will mark the samples to be sent to the approved laboratory by the client.

## 4 Manufacturer internal control

### 4.1 Characteristics under factory production control (See RP 001.00))

All the characteristics under factory production control stated in this paragraph are referred for each type and series of polyethylene compound.

- **Final Product Control:** the tests and their frequency are indicated in the next table 2.
  - The manufacturer shall have its own laboratory or outsourced allowing him to perform the tests specified in table 2, complying as a minimum with the established frequencies.

TESTS	FREQUENCY
Compound density	Every production batch
Carbon black content	Once a day, minimum per production batch
Carbon black dispersion (black compound)	Per production batch
Pigment dispersion (blue compound)	Per production batch
Water Content (1)	Per production batch
Volatile content (1)	Per production batch
Oxidation induction time	Per production batch
Melt mass-flow rate (MFR) for PE40, PE80 and PE100	Per production batch
Resistance to slow crack growth Strain-Hardening Test (SHT) Only compound PE 100-RC.	According to the manufacturer's internal procedure
Resistance to slow crack growth Accelerated Notched Pipe Test (ANPT) Only compound PE 100-RC (DN110 SDR11) (2) (3)	According to the manufacturer's internal procedure
Resistance to slow crack growth . Accelerated Full Notch Creep Test (AFNCT) (2) Only compound PE 100-RC.	According to the manufacturer's internal procedure
Resistance to slow crack growth Cracked Round Bar Test (CRB). (2) Only compound PE 100-RC	
Tensile strength for butt-fusion (for PE80 and PE100)	Type test
Slow crack growth-pipe size 110 mm SDR 11	According to the manufacturer's internal procedure
Resistance to weathering (not applicable for Black compound)	Type test
Rapid crack propagation (4) (PE80 and PE100)	According to the manufacturer's internal procedure
Hydrostatic strength 80°C 165h (PE40)	Once a year

TABLE 2

**Note (1):** Only applicable, if the measured volatile content is not in conformity with specified requirement. In case of dispute the requirement for water content shall be used. As an alternative method, ISO 760:1978(4) may apply. The requirement applies for the compound manufacturer in the phase of manufacture and to the user of the compound during the processing (if the water content exceed the limit, it is necessary to dry it before the using).

**Note (2):** Only if no follow-up has been carried out by a Certification Body in the same period.

**Note (3):** As no valid correlation between the test conditions/specifications with the new detergent (Dehyton PL) and the current detergent (Arkopal N100) is available, the Accelerated Notch Test (ANPT) is replaced by the Strain-Hardening Test (SHT).

**Note (4):** As manufacturer internal control, it is allowed to carry out this test with pipes of outside diameter 110m SDR 11.

## 5 Marking of certified products (See RP 001.00)

Marking that may appear on the bags and in delivery notes is as follows. This marking is obligatory in the manufacturer's analysis bulletin.

- Reference to the word: AENOR;
- N Mark logotype (advisable but not compulsory);
- Certificate number: 001/XXX;
- Trademark;
- Number of the standards: UNE EN 12201-1 and/or ISO 4427

**Example:**

AENOR - N - 001/XXX - Trademark - UNE EN 12201-1

If it is included in the delivery notes, it should be clearly indicated which of the products included in the delivery note is certified.



## Annex C

### Descriptive questionnaire of the product

CLIENT:

MANUFACTURER COMPANY:

FACTORY SITE:

PRODUCT:

STANDARD:

TRADEMARK(S):

DATE:

TYPE:

PE 80 

PE 100 

PE 100-RC 

#### TECHNICAL CHARACTERISTICS

- MFR:
- DENSITY:

#### ADDITIONAL DOCUMENTATION TO DELIVER WITH THE APPLICATION FORM

- Conditions of the samples preparation previous to the density determination
- Reference curves of the product
- **Technical sheet of the material**

For any modification of the range, the client will send this descriptive questionnaire updated in duplicate to the Committee Secretariat, indicating the modifications. The Committee Secretariat will inform the client about the procedures to follow in each case.

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**SIGNATURE AND STAMP OF THE MANUFACTURER**