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AENOR N Mark Specific Rules for unplasticized Poly (vinyl chloride) Pipes for pressurized water conduction and for underground and aerial pressurized sanitation

NOTE: This document is a translation of the Spanish document RP 001.02 rev. 22, approved by Plastics Technical Certification Committee (CTC-001). Spanish version always prevails over this translation.

RP 001.02

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1 Purpose and scope

This specific rules describes, in compliance with section 3.2 of the General rules for the AENOR Certification of Products and Services with Mark N, hereinafter the General Rules, the certification scheme for non-plasticized poly (vinyl chloride) pipes for water conduction and for buried or aerial sanitation with pressure, in accordance with the UNE-EN ISO 1452-1:2010, UNE-EN ISO 1452-2:2010 and UNE-EN ISO 1452-5:2011 standards, complementing the Specific Rules of the AENOR N Mark for plastic materials – common requirements (RP 001.00). The General Regulations prevail in any case over these Specific Regulations.

2 Definitions and special requirements

Class: A class of pipes is the set of pipes that have the same diameter and nominal thickness.

Intended use:

- W For pressurized water supply for human consumption
- P For sewer and drainage under pressure
- W+P For both uses

Type: Depending on the joining system, the following types are established:

- Type 0: Smooth Pipes
- Type 1: Pipes with embouchure for gluing
- Type 2: Pipes with embouchure for elastic joint connection
- Subtype 2A: Elastic joints with built-in sealing ring
- Subtype 2B: Elastic joints without sealing ring

Diameter groups: Depending on the diameters, the following groups are established:

- Group 1: $dn < 75$
- Group 2: $75 \leq dn < 250$
- Group 3: $250 \leq dn < 710$
- Group 4: $710 \leq dn \leq 1000$

When pipes are manufactured by means of a co-extrusion process, the manufacturer shall ensure that the material used for the extrusion of the different layers is of the same formulation and comes from the same batch of mixture, and that no difference in color between the layers is visible to the finished product.

Clients of the Mark for the products listed in this Particular Rules should comply with the RD 140/2003 transposition of Community Directive 98/83/EC through migration tests according to UNE-EN 12873-1 standard, performed every five years.

3 Sampling and testing for granting and maintaining the N Mark product certificate

3.1 Tests to be carried out in factory

During the initial inspection or maintenance visit, AENOR will carry out the tests indicated in Table 1 at the factory.

AENOR will verify the general characteristics and, in particular, the color of the pipes, which must be grey, blue or cream for pipes intended for the supply and conduction of pressurized water, while this color will be grey or brown for pipes intended for buried or aerial pressure sanitation.

3.2 Sampling and tests to be carried out by the laboratory

AENOR will select and marked the necessary samples, both of the pipes and of the elastic joints, to carry out the tests indicated in Table 1 in the laboratory.

The endpoint for each trial is defined in RP 001.00. However, as an exception, for pipes covered by the scope of this certification, assessment criterion 3 is defined below, which applies to the measurement of the thickness of the smooth zone:

- **Criterion No. 3**: A maximum of 10% of the measures carried out will be allowed to be out of tolerance, provided that the number of non-compliances by default is not greater than 5%. In the event of default non-compliance, the point values shall not be less than 5% of the nominal value and the average thickness shall be equal to or greater than the nominal thickness.

	TEST	GRANTING/MAINTAING EVERY 5 YEARS	RESULTS EVALUATION
TESTS TO BE CARRIED OUT BY THE INSPECTOR IN THE FACTORY	Appearance	S	1
	Mean Outsite Diameter	1 pipe per class	2
	Inner diameter at half embouchure	1 pipe per diameter and type of embouchure	2
	Thickness in the smooth area	1 pipe per class	3
	Ovality	1 pipe per diameter	2
	Embouchure length	1 pipe per diameter (Lmin.)	2
	Effective Length	10 random pipes	2
TESTS TO BE CARRIED OUT IN THE LABORATORY	Impact Resistance (Note 1)	15% classes, minimum 2	1
	Longitudinal retraction (Note 2)	15% classes, minimum 2	1
	Vicat temperature (Note 2)	1 random class	1
	Resistance to Dichloromethane at a Specific Temperature (Degree of Gelation) (Note 3)	5% classes, minimum 1DN per diameter group	1
	Uniaxial tensile (Alternative test method to dichloromethane resistance) (Note 2, 3 and 4)	5% classes, minimum 1DN per diameter group	1
	DSC (Alternative Test Method to Dichloromethane Resistance) (Note 3 and 5)	5% classes, minimum 1DN per diameter group	1
	Opacity	1 pipe, the smallest thickness (for W use only)	1
	Internal pressure 20° 1 h (Note 6)	5% classes, minimum 1DN per diameter group	1
	Internal pressure 60° 1000h (Note 6)	1 class every 5 years	1
	Short-term strength for both types of integrated pipe embouchure	EJ: 1 class/subtype of gasket Gluing: 1 random class	1
	Chemical characteristics	1 Random pipe (W Use Only)	1
	Density	1 random pipe	1
	Short-term internal hydrostatic pressure tightness (Note 7)	EJ: 1 class/subtype of gasket	1
	Short-term negative air pressure tightness (Note 7)	EJ: 1 class/subtype of gasket	1
	Long-term internal hydrostatic pressure tightness (Note 7)	Granting: Gluing: 1 random class EJ: 1 class/subtype of gasket Maintaing: Gluing: 1 random class EJ: 1 gasket class/subtype (random subtype)	1
	Short-term internal hydrostatic pressure and negative air pressure tightness (Note 7)	EJ: 1 class random, double cuffs only	1

TABLE 1

Note 1: The interpretation of the result that the AENOR laboratory will carry out with respect to the impact test will be that set out in the UNE EN ISO 3127 standard.

The number of specimens must allow at least 50 impacts to be made; all specimens started must be completed.

The following criterion shall apply:

If the IRR ≤ 10%; compliant.

If the IRR > 10%; non-compliant.

The IRR is calculated with the following formula with a confidence level of 90%.

IRR = (number of breaks/ total number of impacts) x 100 x 0.9

Note 2: The result of these tests shall be expressed with the same significant figures as established in the product standard, and the rounding rule shall be applied to the nearest value as indicated:

Digit < 5, the previous number is not modified (**Example**: 5.2 would be 5; 45.3 would be 45; 80.4 would be 80).

Digit ≥ 5, the previous number is increased by one unit (**Example**: 4.6 would be 5; 44.7 would be 45; 79.8 would be 80).

Note 3: For DN < 400 mm, the test to be carried out with respect to the degree of gelling will be that of uniaxial tensile strength. The evaluation criterion to be applied is that if the tensile test is non-compliant, the dichloromethane resistance test will be carried out.

In the event of a dispute, the dichloromethane resistance method should be used.

For DN ≥ 400, the manufacturer shall indicate to AENOR the test to be carried out regarding the degree of gelling, either uniaxial tensile strength or dichloromethane resistance. In addition to the assay chosen by the manufacturer, the laboratory will always perform the DSC.

Note 4: In the case of the tensile strength test, the number of specimens to be tested will be in accordance with the provisions of UNE-EN ISO 6259-1 and UNE-EN ISO 6259-2.

The average value of the tensile strength shall be the average of the specimens tested and shall be greater than or equal to the requirement (45 MPa). In the event of an anomalous individual value, the test shall be repeated with two more specimens, on the same generator.

For elongation, the average of the specimens tested must be greater than or equal to the requirement (80%). In the event of an anomalous individual value, the test shall be repeated with two more specimens, on the same generator.

The result of the tensile and elongation tests shall be expressed with the same significant figures as those established in the product standard, and the rounding rule shall be applied to the nearest value as indicated in Note 2.

Note 5: The DSC test shall be performed for ≥400 mm pipes, after the tensile or dichloromethane test has been performed. The specimens will be extracted on the intermediate zone of the thickness in four positions located at 0°, 90°, 180°, and 270° with respect to a randomly taken generator. If bleaching has occurred in the previous dichloromethane test, the 0° position will be taken over the area of greater whitening. Regarding the criterion

of minimum processing temperature, it is established that for individual values the requirement is 180° and for the average value of the processing temperature (T_{onset}) it is T≥185°C.

Note 6: Internal pressure resistance tests on DN≥400 pipes shall be carried out on a single specimen. The internal pressure resistance tests on DN≤355 pipes shall be carried out on three specimens.

Note 7: In the case of leak tests, these shall be carried out on a single specimen.

As a rule, efforts will be made to test the entire certified range throughout the time of validity of the Trademark concession.

4 Manufacturer internal control

4.1 Raw materials

The manufacturer must guarantee that the mixtures, compounds involved in the manufacture of the pipes, have appropriate characteristics. In addition, will assure that the specifications of the material received in the Certificate of Analysis comply with the established purchase requirements.

4.2 Final product controls

The tests and their frequency are shown in Table 2.

TEST	FREQUENCY
Appearance	Every 4 hours per extrusion line
Mean Outside Diameter	Every 4 hours per extrusion line
Thickness in the smooth area and e4	Every 4 hours per extrusion line
Ovality	Every 4 hours per extrusion line
Embouchure length	Every 4 hours per extrusion line
Effective Length	Every 4 hours per extrusion line
Impact Resistance (Note 1)	Per manufacturing period, minimum once a week
Longitudinal retraction (Note 2)	1 time a day/extrusion line
Vicat temperature (Note 2)	Once a year
Resistance to Dichloromethane at a Specific Temperature (Degree of Gelation) (Note 3)	By manufacturing period, at the beginning of the production period
Uniaxial tensile (Alternative test method to dichloromethane resistance) (Notes 2, 3 and 4)	By manufacturing period, at the beginning of the production period
Opacity (Only if declared by the manufacturer)	Every 5 years and whenever the formulation changes (W use only)
Internal pressure resistance 20°C 1 h (Note 5)	Per manufacturing period, minimum once a week
Internal pressure resistance 60°C 1000 h (Note 5)	Once a year
Short-term strength for both types of integrated pipe embouchure	EJ: 1 class per year per subtype of gasket used in that year Gluing: 1 class per year
Chemical characteristics	One class per year (W only)
Density	One class per year and as long as the formulation changes
Short-term internal hydrostatic pressure tightness (Note 6)	EJ: 1 class per year per subtype of gasket used in that year
Short-term negative air pressure tightness (Note 6)	EJ: 1 class per year per subtype of gasket used in that year
Long-term internal hydrostatic pressure tightness (Note 6)	EJ: 1 class per year per subtype of gasket used in that year Gluing: 1 time a year
Short-term internal hydrostatic pressure and negative air pressure tightness (Note 6)	EJ: 1 class per year, double cuffs only

TABLE 2

Note 1: The interpretation of the result, with respect to the impact test, will be that set out in the UNE EN ISO 3127 standard.
The number of specimens must allow at least 50 impacts to be made; all specimens started must be completed.

The following criterion shall apply:

If the IRR ≤ 10%; compliant.

If the IRR > 10%; non-compliant.

The IRR is calculated with the following formula with a confidence level of 90%.

IRR = (number of breaks/ total number of impacts) x 100 x 0.9

Note 2: The result of these tests shall be expressed with the same significant figures as established in the product standard, and the rounding rule shall be applied to the nearest value as indicated:

Digit < 5, the previous number is not modified (**Example**: 5.2 would be 5; 45.3 would be 45; 80.4 would be 80).

Digit ≥ 5, the previous number is increased by one unit (**Example**: 4.6 would be 5; 44.7 would be 45; 79.8 would be 80).

Note 3: The manufacturer shall choose the test method for factory production control, considering national legislation or internal health and safety policies. The DSC test is not intended for use for factory production control.

Note 4: In the case of the tensile strength test, the number of specimens to be tested will be in accordance with the provisions of UNE-EN ISO 6259-1 and UNE-EN ISO 6259-2.

The average value of the tensile strength shall be the average of the specimens tested and shall be greater than or equal to the requirement (45 MPa). In the event of an anomalous individual value, the test shall be repeated with two more specimens, on the same generator.

For elongation, the average of the specimens tested must be greater than or equal to the requirement (80%). In the event of an anomalous individual value, the test shall be repeated with two more specimens, on the same generator.

The result of the tensile and elongation tests shall be expressed with the same significant figures as established in the product standard, and the rounding rule shall be applied to the nearest value as indicated in Note 2:

Note 5: Internal pressure resistance tests on DN≥400 pipes shall be carried out on a single specimen. The internal pressure resistance tests on DN≤355 pipes shall be carried out on three specimens.

It will be allowed to carry out the 1000-hour tests on a single specimen, considering the duration of the test, and that it is a process control test and not a product release test.

Note 6: In the case of leak tests, they shall be carried out on a single specimen. As a rule, efforts will be made to test the entire certified range throughout the time of validity of the Trademark concession.

5 Marking of certified products

Marking on all types of pipes shall be carried out at least every meter, including the following:

- The word AENOR;
- N Mark Logo;
- Certificate or contract number signed with AENOR: 001/XXX;
- Trademark;
- The UNE-EN ISO 1452 standard;
- Nominal outside diameter d_n x wall thickness e_n;
- Nominal pressure (PN) in bar;
- PVC indication;
- Manufacturer information (manufacturing period, year, extrusion line, in figures or code);
- Intended use (W, P o W+P).

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Annex C1

Pipes Descriptive Questionnaire

CLIENT:

MANUFACTURING COMPANY:

FACTORY SITE:

PRODUCT:

STANDARD:

TRADEMARK(S):

DATE:

RANGE FOR WHICH THE MARK IS REQUESTED				
PN (Bar)	**DN (mm)**	**INTENDED USE (W, P, W+P)**	**TYPE (0, 1, 2A or 2B)**	**ELASTIC JOINT MODEL (1)**

Note 1: Elastic joint model: set of elastic joints that respond to the same design in shape and dimensions, which are made of the same material(s) (of the joint and the sealing ring) and have the same hardness class (Shore A).

The customer must accompany the Product Descriptive Questionnaire referred to in Annex C1 with the corresponding technical data sheet from the supplier that includes design, material, and Shore A hardness class.

In the event of modifying or using a new gasket model, the client must inform the Secretary of the Committee attaching the new technical sheet.

For any modification of the manufacturing range, the customer shall send this updated descriptive questionnaire in duplicate to the Committee Secretariat.

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MANUFACTURER'S SIGNATURE AND SEAL