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# AENOR N Mark Specific Rules for polyethylene pipes for the supply of gaseous fuels

Note: This document is a translation of the Spanish document RP 001.05 rev. 14, approved by the Plastics Technical Certification Committee (CTC-001). Spanish version always prevails over this translation.

## RP 001.05

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# Index

# 1 Object 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 plastics Polyethylene (PE) pipes for the supply of gaseous fuels. The present Specific Rules complete the AENOR N Mark Specific Rules for plastic materials – common requirements (RP 01.00). The General Rules always prevail over the present Specific Rules.

The N Mark for plastics Polyethylene (PE) pipes for the supply of gaseous fuels, hereafter the Mark, denotes product compliance with the UNE-EN 1555-2:2022 standard.

# 2 Definitions and special requirements

The N Mark certificate of product for polyethylene pipes for the supply of gaseous fuels is granted for a range of dimensions manufactured whit given polyethylene compound, a compound that will necessarily have to be in possession of the certificate of the N Mark of product.

**Type of compound:** Three types are defined depending on the compound with which they are manufactured:

- PE 80 pipes
- PE 100 pipes
- PE 100-RC pipes

**Type of pipe:** Three types of pipes are defined based on their wall structure:

- PE pipes (outside diameter $d_n$) including any identification stripes
- PE pipes with co-extruded layers on either or both the outside and/or inside of the pipe (total outside diameter $d_n$), as specified in Annex A of the UNE-EN 1555-2:2022 standard, where all layers have the same MRS rating and correspond to the same supplier.
- PE pipes (outside diameter $d_n$) with a peelable layer, contoguous thermoplastics additional layer on the outside of the pipe ("coated pipe") as specified in Annex B of the UNE-EN 1555-2:2022 standard.

**Class:** It is called a class of pipes to the set of the same ones that have the same diameter and nominal dimensions.

**Dimensional group:** The following diameter groups are considered:

- **Group 1:** Nominal outer diameter dn < 75
- **Group 2:** Nominal outer diameter 75 ≤ dn < 250
- **Group 3:** Nominal outer diameter 250 ≤ dn <710
- **Group 4:** Nominal outer diameter 710 ≤ dn ≤ 800

## 2.1 Range extension for an already certified compound

The procedure to follow when a client requests the extension of its range depends on whether it has previously certified some class within that group or is the first time it requests a class in a dimension group.

In the first case, the client shall request, by letter sent to the Secretariat of the Committee, the extension ofits manufacturing range, together with the records of the tests provided for in Table 1 of these Specifics Rules relating to the concession. In case of acceptance, the certificate will be modified. The client will keep samples of the classes for which he has requested the extension to make them available to AENOR at the next inspection visit.

In the second case, the client will send the application to the secretary of the committee with the classes he wishes to certify. AENOR will carry out the initial inspection visit in accordance with the provisions of section 3 of this document, selecting the samples necessary to carry out the tests provided for in Table 1 of this document.

## 2.2 Compound expansion

When a pipe manufacturer wishes to extend its certification to a new polyethylene compound, it shall send the application forms (Annex A, B and C) to the Secretariat of the Committee, this application assuming the opening of a new concession file, being necessary to carry out all the activities provided for in section 3 of this document.

# 3 Sampling and testing for granting and maintenance of the product N Mark certificate

## 3.1 Testing to be carried out in factory (See RP 001.00)

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

Follow-up tests shall be carried out randomly on samples existing in the warehouse at the time of the inspection visit.

## 3.2 Sampling and tests to be carried out the laboratory (See RP 001.00)

AENOR will select and seal the samples necessary to carry out the tests indicated in table 1 in the laboratory

Follow-up tests shall be carried out randomly on samples existing in the warehouse at the time of the inspection visit.

## 3.3 Evaluation of test results

Table 1 contains the evaluation criterion for each test. The codes listed in the Specific Rules apply to the following criteria:

- **Criterion nº 1:** The test shall comply with the established in the Standard. Any value out of tolerance will not be allowed
- **Criterion nº 2:** It will be allowed that a maximum of 2% by default and 5% by excess of the measures carried out is out of tolerances.

| | TEST | GRANTING | TRACKING | EVALUATION OF RESULTS |
|---|---|---|---|---|
| TESTS TO BE CARRIED OUT BY THE INSPECTOR IN THE FACTORY | Aspect | 10 random pipes/coiled pipe | 10 random pipes / rolls | 1 |
| | Color (uniformity) | 10 random pipes / coiled pipe | 10 random pipes / rolls | 1 |
| | Mean outside diameter | 3 pipes or coiled pipe / class | 3 pipes or rolls / class | 1 |
| | Wall thickness | 3 pipes or coiled pipe / class | 3 pipes or rolls / class | 2 |
| | Ovality | 3 pipes in straight sections / diameter | 3 pipes in straight sections / diameter | 1 |
| TESTS TO BE CARRIED OUT IN THE EXTERNAL LABORATORY | Hydrostatic Strength 20° 100 h (1) | 2 diameters / group | 1 diameter / group | 1 |
| | Hydrostatic Strength at 80° 165 h (1) | 2 diameters / group | | |
| | Hydrostatic Strength 80° 1000 h (1) | 2 diameters / group | | 1 |
| | Elongation at break (1) | 2 diameters / group | | 1 |
| | Resistance to Slow Crack Growth (Notched Pipes test e > 5 mm) Only PE 80 pipes and PE 100 pipes | 2 diameters / group | | 1 |
| | Oxidation induction time (5) | 2 diameters / group | | 1 |
| | Melt flow rate (5) | 2 diameters / group | | 1 |
| | Longitudinal Reversion (1) | 2 diameters / group | | 1 |
| | Circumferential Reversion (1) | 2 diameters of group 3 or 4 | | |
| | Resistance to rapid crack Propagation (RCP) (2) | 1 diameter / largest group and maximum thickness requested | -- | 1 |
| | Resistance to slow crack growth Strain-Hardening Test (STH) Only pipes PE 100 RC (5) | 1 diameters of group 1 or 2 | 1 diameters of group 1 or 2 every two years | 1 |
| | Resistance to slow crack growth Accelerated Notched Pipe Test (ANPT) Only pipes PE 100-RC (1) | 1 diameter of group 2 (6) (DN110mm SDR11) | 1 diameter of group 2 every two years (6) (DN110mm SDR11) | 1 |
| | Resistance to slow crack growth Cracked Round BarTest (CRB). Only pipes PE 100-RC | 1 diameters of group 3 or 4 | 1 diameters of group 3 o 4 every two years | 1 |
| | Resistance to internal pressure at 80° 165 h of the butt fusion welded joint in normal conditions and in extreme conditions (1) | 1 diameter / group | 1 diameter / group Every five years | 1 |
| | Tensile strength of the butt fusion welded joint under normal and extreme conditions (1) | 1 diameter / group (DN>90mm) | 1 diameter / group Every five years (DN>90mm) | 1 |
| | Integrity of the structure after deflection (only for co-extruded pipes) (1) | 2 diameters /group | 1 diameter /group | 1 |
| | Resistance to internal pressure at 20° 100 h after Squeeze-off (1) | 1 diameter (DN 63 SDR 11) | -- | 1 |

| | | | | |
|---|---|---|---|---|
| | Resistance to internal pressure at 80° 165 h after Squeeze-off (1) | 1 diameter (DN 63 SDR 11) | -- | 1 |
| | Resistance to internal pressure at 80° 1000 h after Squeeze-off (1) | 1 diameter (DN 63 SDR 11) | -- | 1 |

**TABLE 1**

(1) Delamination should not occur during all tests of the co-extruded pipe.

(2) The pipe manufacturer will have to perform this test only in the event that the pipe manufactured exceeds in thickness that of the pipe that the supplier of the compound tested for the certification of the same.

(3) This test shall only apply to group 2 and 3 diameters. The test shall be carried out on the pipe of each group which has a larger circular crown reaction surface, and which shall generally correspond to the largest diameter.

(4) The test shall be carried out with pipes manufactured in the same production centre and with the same compound.

(5) For pipes with co-extruded layers, these tests should be applied to the individual co-extruded layers respectively.

(6) Suspended as long as there is no valid correlation between the test conditions/specifications with the new detergent (Dehyton PL) and the current one (Arkopal N100).

# 4 Manufacturer internal control

## 4.1 Characteristics subject to control (See RP 001.00)

**Raw materials**: Only the compounds of PE 80 and PE 100 that have the AENOR product certificate and that appear in the pipe manufacturer's certificate may be used.

- **Controls during manufacture:** The tests and their frequency are shown in Table 2.
- **Controls on the final product:** The tests and the frequency of the tests are shown in Table 2.

| TRIALS | FREQUENCY |
|---|---|
| Aspect | Coiled pipe: every hour or every coiled pipe, if the coiled time is more than one hour<br>Bars: every 4 h |
| Color (uniformity) | |
| Mean outside diameter | |
| Wall thickness | |
| Ovality | |
| Elongation at break (1) | Per production batch, minimum 1 per week (groups 1 and 2)<br>Per production batch (group 3) |
| Melt flow rate (in mass) (2) | |
| Oxidation induction time (2) | |
| Hydrostatic Strength 80° C 165 h (1) | |
| Hydrostatic Strength 20°C 100 h (1) | 1 time per year per group |
| Hydrostatic Strength 80°C 1000 h (1) | |
| Resistance to Slow Crack Growth<br>Only pipes PE PE 80 and PE 100 | |
| Longitudinal reversion (1) | |
| Integrity of the structure after deflection (only for co-extruded pipes) (1) | |
| Circumferential reversion (1) | 1 time per year (groups 3 or 4) |
| Resistance to slow crack growth Strain-Hardening Test (STH)<br>Only pipes PE 100 RC (2) | 1 diameter of group 1 and 2<br>Every two years |
| Resistance to slow crack growth<br>Accelerated Notched Pipe Test (ANPT)<br>Only pipes PE 100-RC | 1 diameter of group 2<br>Every two years (3)<br>(DN110mm SDR11) |
| Resistance to slow crack growth Cracked Round BarTest (CRB).<br>Only pipes PE 100-RC | 1 diameter of group 3 or 4<br>Every two years |

TABLE 2

(1) Delamination should not occur during all co-extruded pipe tests

(2) For pipes with co-extruded layers, these tests should be applied to the individual co-extruded layers respectively.

(3) Suspended as long as there is no valid correlation between the test conditions/specifications with the new detergent (Dehyton PL) and the current one (Arkopal N100)

Production Batch shall be understood as the set of pipes, whit the same nominal diameter, wall thickness, and marking, manufactured continuously with the same compound(s) in the same extrusion line.

The same batch is still considered, as long as there is no stop of the extruder(s) longer than two hours.

## 5 Marking of certified products

The marking on the pipes shall include at least the following:

— Reference to AENOR;

— N Mark logotype

— Certificate number or contract number signed with AENOR: 001/XXX;

— Trademark;

— For pipes of dn ≤ 32 mm: nominal outer diameter x nominal thickness;

— For pipes of dn > 32 mm: nominal outer diameter and SDR;

— The reference to the UNE EN 1555 standard;

— Degree of tolerance, for DN/DO ≥ 280 mm;

— Type of pipe if applicable;

— Internal fluid: GAS;

— Indication of the material and designation;

— Manufacturer information, manufacturing period, year and month;

— Code assigned to the compound.

The colour of the marking shall be as follows:

— Yellow or orange-yellow pipe

- SDR 17 white
- SDR 11 red

— Black or black pipe with bands

- SDR 17 red or white
- SDR 11 white or yellow

The pipes shall be marked at least every metre.

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# Annex C

# Descriptive Questionnaire for PE Pipes

CLIENT:

MANUFACTURER COMPANY:

PLACE OF MANUFACTURE:

PRODUCT:

MATERIAL:

STANDARD:

TRADEMARK(S) COMMERCIAL(S):

DATE:

| RANGE FOR WHICH YOU APPLY FOR THE TRADEMARK | | | |
|---|---|---|---|
| **DIMENSIONS (DN)** | **SDR** | **TYPE** | **COMPOUND / BANDS COMPOUND** |
| | | | |
| | | | |
| | | | |
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| | | | |

For any modification of the data indicated, the client will send to the Secretariat of the Committee this updated descriptive questionnaire.

In..... to..... of..... of 20....

**SIGNATURE AND SEAL OF THE MANUFACTURER**