



SLOVENSKI STANDARD

SIST EN 579:1997

01-februar-1997

Cevni sistemi iz polimernih materialov - Cevi iz zamreženega polietilena (PE-X) - Določanje stopnje zamreženosti z ekstrakcijo v topilu

Plastics piping systems - Crosslinked polyethylene (PE-X) pipes - Determination of
degree of crosslinking by solvent extraction

Kunststoff-Rohrleitungssysteme - Rohre aus vernetztem Polyethylen (PE-X) -
Bestimmung des Vernetzungsgrades durch Lösemittelextraktion

Systemes de canalisations en plastiques - Tubes en polyéthylène réticulé (PE-X) -
Détermination du taux de gel par extraction solvant

[https://standards.iteh.ai/catalog/standards/sist/05210ca8-93ba-4b18-9462-](https://standards.iteh.ai/catalog/standards/sist/05210ca8-93ba-4b18-9462-6a53ba7ddc58/sist-en-579-1997)

Ta slovenski standard je istoveten z: EN 579:1993

ICS:

23.040.20 Cevi iz polimernih materialov Plastics pipes

SIST EN 579:1997

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 579:1997

<https://standards.iteh.ai/catalog/standards/sist/05210ca8-93ba-4b18-9462-6a53ba7dde58/sist-en-579-1997>

EUROPEAN STANDARD

EN 579:1993

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 1993

UDC 621.643.2-036.742.2:620.1:543.832

Descriptors: Plastics, pipes, polyethylene, crosslinked, tests, determination, extraction, solvent

English version

**Plastics piping systems - Crosslinked
polyethylene(PE-X) pipes - Determination of
degree of crosslinking by solvent extraction**

Systèmes de canalisations en plastiques - Tubes
et polyéthylène réticulé (PE-X) - Détermination
du taux de gel par extraction solvant

Kunststoff-Rohrleitungssysteme - Rohre aus
vernetztem Polyethylen (PE-X) - Bestimmung des
Vernetzungsgrades durch Lösemittelextraktion

(standards.iteh.ai)

SIST EN 579:1997

<https://standards.iteh.ai/catalog/standards/sist/05210ca8-93ba-4b18-9462-6a53ba7ddc58/sist-en-579-1997>

This European Standard was approved by CEN on 1993-06-25. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This standard was prepared by CEN/TC 155 "Plastics piping systems and ducting systems".

This standard is based on a proposal for a draft International Standard ISO/DP 10147 "Crosslinked polyethylene (PE-X) pipes - Degree of crosslinking as determined by solvent extraction" prepared by the International Organization for Standardization (ISO). It is a modification of ISO/DP 10147 for reasons of applicability to a variety of such materials and for alignment with texts of other standards on test methods.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 1994, and conflicting national standards shall be withdrawn at the latest by January 1994.

The modifications are:

- no process-dependent product requirements are given;
- editorial changes have been introduced.

SIST EN 579:1997

The material-dependent test parameters and/or performance requirements are incorporated in the referring standard(s).

No existing European Standard is superseded by this standard.

The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Plastics piping systems - Crosslinked polyethylene (PE-X) pipes - Determination of degree of crosslinking by solvent extraction

1 Scope

This standard specifies a method for the determination by solvent extraction, of the degree of crosslinking of crosslinked polyethylene (PE-X) pipe.

It is applicable to pipes of PE-X not containing filler.

2 Principle

A test piece is immersed in a specific boiling solvent for a specific period of time and the proportion by mass of insoluble material is measured.

The percentage of insoluble material is used to express the degree of crosslinking.

ITIH STANDARD PREVIEW
(standards.iteh.ai)

NOTE: It is assumed that the following test parameter is set by the standard making reference to this standard:

- if necessary, the number of test pieces (see 5.2).

3 Material

Solvent, comprising analytically pure xylene, to which 1 % antioxidant [2,2'-methylene-bis(4-methyl-6-tert-butylphenol)] has been added.

WARNING: Xylene is a harmful and flammable solvent which can be absorbed through the skin and as such should be handled and disposed of carefully and in accordance with applicable environmental rules. Attention is drawn to any relevant regulations and associated exposure limits. Expose only in a ventilated hood. Check the effectiveness of the hood before starting the tests. Do not inhale the vapour. Excessive inhalation of the vapour may cause dizziness, or headache, or both. In the event of excessive inhalation, seek fresh clean air.

4 Apparatus

4.1 Round bottom flask, of at least 500 ml capacity and having a sufficiently large mouth to admit a test piece (see clause 5).

4.2 Heating mantle, to fit the flask (see 4.1) and with sufficient heating capacity to boil xylene (boiling range 130 °C to 140 °C).

4.3 Reflux condenser, with joint to fit the flask.

4.4 Ring stand and appropriate clamps.

4.5 Lathe with a sharp blade, suitable for machining the test piece from the pipe (see clause 5).

4.6 Cage with lid, large enough to contain a test piece (see clause 5). The cage shall be made of wire cloth or mesh, of aluminium or stainless steel, with a pore size of $(125 \pm 25) \mu\text{m}$. The wire cloth or mesh shall be free of grease, oils or other contaminants soluble in xylene. It shall be washed with acetone and dried before use.

4.7 Vacuum oven or oven with forced ventilation, capable of maintaining the applicable conditions (see 6.6).

iTeh STANDARD PREVIEW (standards.iteh.ai)

5 Test pieces

5.1 Preparation of test pieces

[SIST EN 579:1997](https://standards.iteh.ai/catalog/standards/sist/05210ca8-93ba-4b18-9462-0a55ba7d4c58/sist-en-579-1997)

The test piece shall be taken in the form of a shaving of $(0,2 \pm 0,02)$ mm thickness from the end of a pipe section. The width of the shaving shall correspond to the wall thickness of the pipe and the length shall be at least equal to one circumference.

NOTE: It is recommended that a lathe is used to obtain the shaving.

5.2 Number of test pieces

Unless otherwise specified in the referring standard, at least two test pieces shall be used.

6 Procedure

6.1 Weigh a clean, dry cage and lid (see 4.6) to the nearest 1 mg, as mass m_1 .

6.2 Place a test piece (see 5.1) in the cage and weigh the cage, lid and test piece together to the nearest 1 mg, as mass m_2 .

6.3 Place the cage, complete with lid and test piece, in the flask and ensure that there is sufficient solvent (see clause 3):

- a) to maintain total immersion of the cage;
- b) to provide a ratio by mass of solvent to test piece of at least 500:1.

6.4 Boil the solvent vigorously, to ensure good agitation, for 8 h \pm 5 min.

6.5 Remove the cage, with lid and the residue of the test piece, from the boiling solvent and allow it to drain.

6.6 Complete the drying of the cage, lid and residue together by placing them for 3 h in either:

- a) a vacuum oven at (140 \pm 2) °C under a vacuum (negative pressure) of at least 0,85 bar (85 kPa) [i.e. approximately 0,15 bar (15 kPa) absolute pressure or less]; or
- b) a forced-ventilation oven at (140 \pm 2) °C with an adequate extraction facility.

6.7 Cool the combination of cage, lid and residue to ambient temperature and determine their combined mass to the nearest 1 mg as mass m_3 .

6.8 Repeat the procedure of 6.1 to 6.7 at least once, using a fresh test piece each time.

7 Calculation and expression of results

7.1 Calculate the degree of crosslinking of each test piece, G_i , as a percentage by mass of insoluble material, using the following equation:

$$G_i = \frac{m_3 - m_1}{m_2 - m_1} \times 100$$

where:

G_i is the degree of crosslinking of the individual test piece, expressed as a percentage;

m_1 is the mass of the cage and lid, in milligrams (see 6.1);

m_2 is the combined mass of the original test piece, cage and lid, in milligrams (see 6.2);

m_3 is the combined mass of the residue, cage and lid, in milligrams (see 6.7).

Express the result for G_i to the nearest whole number.

7.2 Calculate the average degree of crosslinking, G , from the individual results for G_i .

8 Test report

The test report shall include the following information:

- a) a reference to this standard and to the referring standard;
- b) the identity of the test piece(s);
- c) the degree of crosslinking for each test piece, G_i , and the average value, G , in percent;
- d) any factors which may have affected the results, such as any incidents or any operating details not specified in this standard;
- e) the date of test.

ITEH STANDARD PREVIEW

(standards.iteh.ai)

SIST EN 579:1997

<https://standards.iteh.ai/catalog/standards/sist/05210ca8-93ba-4b18-9462-6a53ba7ddc58/sist-en-579-1997>