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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 18474-2026

Replacing GB/T 18474-2001

**Pipes and fittings made of crosslinked polyethylene (PE-X) -
Test method for the degree of crosslinking**

交联聚乙烯 (PE-X) 管材与管件 交联度的试验方法
(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document supersedes GB/T 18474-2001 "Test Method for Crosslinking Degree of Polyethylene (PE-X) Pipes and Fittings", and is consistent with...

Compared with GB/T 18474-2001, apart from structural adjustments and editorial changes, the main technical changes are as follows.

- Added terminology (see Chapter 3);
- The solvent requirements have been changed (see 5.1, 4.1 in the 2001 edition);
- The requirements for antioxidants have been changed (see 5.2, 4.2 in the 2001 edition);
- The requirements for reflux condenser coils have been changed (see 6.1, 3.1 in the 2001 edition);
- The requirements for sample bags have been changed (see 6.4, 3.9 of the 2001 edition);
- The requirements for the balance scale have been changed (see 6.7, 3.7 in the 2001 edition);
- The requirement to remove the non-crosslinked polyethylene material layer before sample preparation has been added (see 7.1);
- The requirements for sample quality have been changed (see 7.3, 5.1 of the 2001 edition);
- Added requirements for the preparation of surface or intermediate layer samples for pipes or fittings (see 7.4);
- Added requirements for the equipment used when preparing test specimens from pipes

and fittings (see 7.5);

---The amount of solvent added has been changed (see 8.3, 6.3 in the 2001 edition);

---Added requirements for the use of redistillation solvents and solvents in arbitration tests (see 8.3);

---The extraction time has been changed, and the starting point for timing the extraction time has been clarified (see 8.4, 6.6 in the 2001 version);

---The conditions for drying the samples have been changed (see 8.6, 6.8 in the 2001 edition);

---Added requirements for evaluating the impact of the quality of the filler material in the specimen on the test results (see 9.2);

---The conditions for retesting have been changed (see 9.3, 7.2 in the 2001 edition);

---The content of the test report has been changed (see Chapter 10, Chapter 8 of the 2001 edition).

This document is modified to adopt ISO 10147:2011 "Cross-linked polyethylene (PE-X) pipes and fittings - Determination of gel content and estimation of cross-linking degree".

This document has undergone significant structural adjustments compared to ISO 10147:2011. A table comparing the structural numbering changes between the two documents is provided.

See Appendix A.

This document differs significantly from ISO 10147:2011. The relevant clauses are indicated in vertical margins.

Single lines (|) are indicated. A summary of these technical differences and their causes can be found in Appendix B.

The following editorial changes have been made to this document.

---Added a note on the relationship between screen aperture and mesh count (see 6.4).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China National Light Industry Council.

This document is under the jurisdiction of the National Technical Committee on Standardization of Plastic Products (SAC/TC48).

1 Scope

This document describes the principle, reagents, instruments, equipment, sample preparation, and testing procedures for cross-linking degree testing of cross-linked polyethylene (PE-X) pipes and fittings.

Procedures, calculations and results presentation, and test reports.

This document applies to the determination of the degree of crosslinking of cross-linked polyethylene (PE-X) pipes and fittings.

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 19278 General Terminology and Definitions for Thermoplastic Pipes, Fittings and Valves

3 Terms and Definitions

The terms and definitions defined in GB/T 19278 and the following terms and definitions apply to this document.

Degree of crosslinking A physical quantity that indicates the degree of crosslinking of a crosslinked polymer.

Note: There are many methods to describe the degree of crosslinking, such as using the average molecular mass of the chain between two adjacent crosslinking points, or using the proportion of crosslinked structural units in the total crosslinking.

The degree of crosslinking is expressed as a fraction of the structural units. It is usually characterized by gel content, and the crosslinking values obtained by different characterization methods are not comparable.

[Source. GB/T 19278-2018, 2.1.17, with modifications]

4 Principles

The sample was extracted in xylene solvent for a specified time, and the mass before and after extraction was measured. The undissolved residue was used as the basis for the determination of the sample.

The percentage of the total sample mass (i.e., gel content) is used as the degree of crosslinking of the sample.

5 Reagents

Warning---Xylene is a hazardous and flammable solvent that can be absorbed through the skin. Handle with care. Please note the exposure limits specified in relevant regulations.

This solvent may only be used in a fume hood. Check the effectiveness of the fume hood before starting the test. Wear appropriate protective equipment and never inhale the vapor.

Excessive inhalation of vapors may cause dizziness and/or headaches. If you accidentally inhale too much vapor, breathe fresh, clean air immediately.

5.2

Antioxidant. Purity not less than 99%, any of the following can be selected.

- a) 2,2'-Methylenebis-(4-methyl-6-tert-butylphenol) (Antioxidant 2246).
- b) 3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionates (such as antioxidant 1010 and antioxidant 1076).