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Interested committees:

Title: Draft BS EN ISO 18489 Polyethylene (PE) materials for piping systems — Determination of resistance to slow crack growth under cyclic loading — Cracked Round Bar test method.

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Introduction

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For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 18489

Thermoplastic materials for piping systems — Determination of resistance to slow crack growth under cyclic loading — Cracked Round Bar (CRB) test method

*Matériaux thermoplastiques pour systèmes de canalisations —
Détermination de la résistance à la propagation lente de fissures
sous un chargement cyclique — Méthode d'essai de la barre
ronde fissurée (CRB)*

ICS: 23.040.20; 23.040.45

This document has not been edited by the ISO Central Secretariat.

ISO/CEN PARALLEL PROCESSING

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138 Plastics pipes, fittings and valves for the transport of fluids, Subcommittee SC 05, General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications.

This second edition cancels and replaces the first edition (ISO 18489:2015), which has been technically revised.

The main changes are as follows:

- Improved [Clause 7.7](#) for initial crack length calculation
- Improved informative [Annex A](#) for recalculation between different specimen diameters and added information in [A.2](#) and [A.3](#) for the single point evaluation.
- All test parameters for different materials are shifted in the informative [Annexes B, C and D](#) and materials PP and PA-U added. New photographs of fracture surfaces after testing for PE included.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Knowledge about the resistance to long-term failure mechanisms as a result of crack initiation and slow crack growth (SCG) is important for the ranking and pre-selection of thermoplastic materials, especially for long-term applications such as pipes and fittings made of thermoplastic pipe materials. Several tests to determine the relevant failure mechanisms are available today where elevated temperatures and also the combination with stress cracking liquids are used to decrease the time frame for testing.

Developments in modern polyethylene materials have led to a significant increase of resistance to crack initiation and slow crack growth so that testing with available methods exceeds practical time frames. Therefore, new accelerated methods, preferably at application relevant temperatures and without additional time reducing liquids, are required.

This test method achieves a significant decrease of testing time even at ambient temperatures of 23 °C. This is more relevant to the temperature range of many applications and testing at this temperature does not change the structural status of the polymer. Acceleration of material testing is achieved by the specimen geometry and the cyclic loading regime to result in completion of testing in a relatively short time^{[2],[3],[4]}.

Thermoplastic materials for piping systems — Determination of resistance to slow crack growth under cyclic loading — Cracked Round Bar (CRB) test method

1 Scope

This document specifies a method to determine the resistance to slow crack growth (SCG) of thermoplastic materials, pipes, and fittings. The test is applicable to samples taken from compression moulded sheets, extruded rods, sheets or pipes and injection moulded fittings of suitable thickness.

This document provides a method that is suitable for an accelerated fracture-mechanics characterization at ambient temperatures of 23 °C.

This document specifies test parameters for polyethylene (PE), polypropylene (PP) and unplasticized polyamide (PA-U).

Furthermore, this test can be applied to characterise the slow crack growth resistance of virgin, as well as non-virgin (reused, recycled) thermoplastic materials.^[5]

This test method can be adapted for other thermoplastics materials by developing the procedure using different test parameters.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 2818, *Plastics — Preparation of test specimens by machining*

ISO 16396-1, *Plastics — Polyamide (PA) moulding and extrusion materials — Part 1: Designation system and basis for specifications*

ISO 16396-2, *Plastics — Polyamide (PA) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties*

ISO 16770, *Plastics — Determination of environmental stress cracking (ESC) of polyethylene — Full-notch creep test (FNCT)*

CEN/TS 14541-2:2022, *Plastics pipes and fittings — Utilisation of thermoplastics recyclates — Part 2: Recommendations for relevant characteristics*

EN 14758-1:2023, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene with mineral modifiers (PP-MD) — Part 1: Specifications for pipes, fittings and the system*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>