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

GB/T 32682-2026

Replacing GB/T 32682-2016

**Plastics - Determination of environment stress cracking (ESC)
of polyethylene - Full-notch creep test (FNCT)**

塑料 聚乙烯环境应力开裂 (ESC) 的测定 全缺口蠕变试验 (FNCT)
(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 replaces GB/T 32682-2016 "Determination of Environmental Stress Cracking (ESC) in Polyethylene - Full-Notch Creep Test".

Compared with GB/T 32682-2016, the main technical changes in "(FNCT)" are as follows, apart from structural adjustments and editorial modifications.

- a) The scope of application has been changed (see Chapter 1, Chapter 1 of the 2016 edition);
 - b) Added nominal remaining area, measured remaining area, nominal tensile stress, actual tensile stress, reference tensile stress, and reference tensile stress.
- Terminology and definitions for failure time under stress (see 3.4-3.9);
- d) The accuracy requirements for temperature measuring devices have been changed (see 5.3, 2016 version 5.3);
 - e) The precision of the timer has been changed (see 5.4, 2016 version 5.4);
 - f) The requirements for blade thickness have been changed (see 5.5, 2016 version of 5.5);
 - g) The microscopy measurement methods and accuracy have been changed (see 5.6, 2016 edition of 5.6);
 - h) The tolerance for the notch depth of the specimen has been increased (see Table 1);
 - i) The sample preparation method has been expanded and the conditions for compression molding have been changed (see 6.3);
 - j) The "milling of the notch" has been changed (see 6.4, 7.3 in the 2016 edition);
 - k) The conditioning time of the sample in the test temperature environment reagent after

loading has been changed (see 6.5, 7.4 in the 2016 version);

l) Added "Recommended Reagents" (see 7.2);

m) The number of samples has been changed (see 8.2, 8.1 in the 2016 edition);

n) Added requirements for removing individual samples (see 8.5);

o) Added measurement of the remaining area after the specimen is destroyed (see 8.6).

This document is modified to adopt ISO 16770:2019 "Plastics - Environmental stress cracking (ESC) of polyethylene - Full-notch creep test".

(FNCT)

Compared with ISO 16770:2019, this document has undergone the following structural adjustments.

---Adjust the requirements for non-overflow molds and demolding temperature in Table 2 to the main text and Table 2 respectively;

---Appendix A corresponds to Appendix C in ISO 16770:2019;

Appendix B corresponds to Appendix A in ISO 16770:2019;

---Appendix C corresponds to Appendix B in ISO 16770:2019.

a) ISO 7500-2 (see 5.1) has been replaced with the normatively referenced GB/T 16825.2 to adapt to my country's technical conditions and add [further details needed].

Operability;

b) The requirement for instrument calibration (see 5.1) has been removed to increase the operability of this document;

c) The precision of the timer was changed (see 5.4) to improve data accuracy;

d) The tolerance for the notch depth of the specimen has been increased (see Table 1), improving data accuracy;

e) ISO 20753 (see 6.3.1) has been replaced with the normatively referenced GB/T 37426 to adapt to my country's technical conditions and increase operability.

Actual nature;

f) ISO 2818 (see 6.3.2, 6.3.4) has been replaced with the normatively referenced GB/T 39812 to adapt to my country's technical conditions, and additional...

Operability;

g) Note 2 on preheating pressure has been changed to the main text (see Table 2) to improve operability;

h) ISO 294-1 has been replaced by the normatively referenced GB/T 17037.1, and ISO 17855-2 has been replaced by GB/T 1845.2 (see GB/T 17037.1).

6.3.3), to adapt to my country's technological conditions and increase operability;

i) The requirement for conditioning samples in tropical regions (see 6.5) has been removed to better reflect the actual regional distribution in my country;

j) Reagent No. 1, TX-10 (see 7.2.1), was added to adapt to my country's technical conditions and increase operability.

The following editorial changes have been made to this document.

---Two notes in the principle have been deleted (see Chapter 4 of ISO 16770:2019);

---The order of the index numbers in the assembly drawings of the loading device and the sample fixture has been changed (see Figures 1 and 2);

---Change the type of the injection-molded multipurpose specimen from "1A" to "A1" (see 6.3.1 and 6.3.3);

---Note added. Reagent No. 1 can be used for other aging times without affecting the test results (see note 7.2.1);

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 Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Plastics Standardization (SAC/TC15).

1 Scope

This document describes a test method for determining the stress cracking resistance of polyethylene (PE) materials in a reagent. This method is applied to specimens/samples or...

A notched sample is cut from the product, immersed in a reagent such as a surfactant solution at a specified temperature, and a static tensile load is applied to determine the sample.

Destroying time.

This document applies to polyethylene raw materials, pipes, welded pipe fittings, and blow-molded containers in corrosive environments (such as hazardous goods and chemicals).

Evaluation of the impact of polyethylene products.

This document applies to specimens machined to selected dimensions from compression

molded pieces, injection molded specimens, or products (such as molded parts and pipes).
When the specimen...

The influence of orientation.

2 Normative references

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 1845.2 Plastics - Polyethylene (PE) Molding and Extrusion Materials - Part 2: Specimen Preparation and Determination of Properties (GB/T 1845.2-2021, ISO 17855-2:2016, MOD) GB/T 16825.2 Inspection of static uniaxial testing machines - Part 2: Inspection of applied forces in tensile creep testing machines (GB/T 16825.2-2018, ISO 7500-2:2006, IDT) GB/T 17037.1 Plastics - Preparation of Injection Molded Specimens from Thermoplastic Materials - Part 1: General Principles and Multipurpose Specimens and Long Specimens Preparation of strip specimens (GB/T 17037.1-2019, ISO 294-1:2017, MOD) GB/T 37426 Plastic specimens (GB/T 37426-2019, ISO 20753:2018, MOD) GB/T 39812 Machining preparation of plastic specimens (GB/T 39812-2021, ISO 2818:2018, IDT)

3 Terms and Definitions

The following terms and definitions apply to this document.

Destroy failure

The two parts of the sample were completely separated.

The cross-section shows no visible signs of permanent material deformation such as extension, elongation, or necking.

Note 1: If the brittle area is less than 20% of the remaining area, it is considered to be ductile failure.

Note 2: The formation of the central stretch ligament may be the beginning of the transition from brittle to ductile failure.

Note 3: See Appendix A for examples.