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

GB/T 47788-2026

**Textiles - Test method for accelerated hydrolysis of textile
materials and biodegradation under controlled composting
conditions of the resulting hydrolysate**

纺织品 纺织材料加速水解及水解产物在受控堆肥条件下生物降解的试验方法
(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 is modified to adopt ISO 21701:2025 "Textiles - Accelerated hydrolysis of textile materials and biocomposting of hydrolysis products under controlled composting conditions".

Degradation test methods.

Compared with ISO 21701:2025, this document has undergone the following structural adjustments.

---6.5 corresponds to 6.5 and 6.7 in ISO 21701:2025.

The technical differences between this document and ISO 21701:2025, and the reasons therefor, are as follows.

Chapter 4), to increase the applicability of the standard;

---ISO 1628-1 (see 7.3) has been replaced by the normatively referenced GB/T 1632.1, and ISO 3071 (see GB/T 7573) has been replaced by GB/T 7573.

6.7) GB/T 19277.1-2025 replaces ISO 14855-1 (see 7.4), GB/T 19277.1 replaces ISO 14855-1 (See Chapter 4, 6.3 and 8.2) GB/T 27810 replaces ISO 13885-1 (see 6.2) to adapt to my country's technical conditions;

---The phrase "Calibration for gas chromatographs" has been changed to "Calibration gas" (see 5.2) to increase the applicability of the standard;

---The compost container volume has been changed from "1L~5L" to "2L~5L" (see 6.3) to improve the consistency of the standard;

---Gas chromatograph and gas chromatographic analysis procedures have been removed (see sections 6.6 and 7.5 of ISO 21701:2025) to increase the standard's applicability.

Use of sex;

---Added a requirement that the result be accurate to 0.1% (see 8.2).

The following editorial changes have been made to this document.

---The wording and format of Clause 7.2 have been adjusted;

---Change the title of section 8.1 to "Calculation of Carbon Dioxide Amount";

---Change Appendix A to an example of a non-dispersive infrared device.

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 Textile and Apparel Council.

This document is under the jurisdiction of the National Technical Committee on Standardization of Textiles (SAC/TC209).

Introduction

According to ISO/T R11827, textile fibers can be divided into natural fibers and chemical fibers. Some chemical fibers made from organic materials have...

Biodegradable synthetic organisms can be categorized into three types based on their origin. natural materials, bio-based, and petroleum-based. A representative example is bio-based synthetic biology.

Biodegradable fibers are made of polylactic acid, while petroleum-based synthetic biodegradable fibers are made of polyethylene terephthalate, polycaprolactone, and polycarbonate.

It is made of propyl ester, polybutylene succinate, or copolymers thereof.

Due to their chemical structure, petroleum-based fibers degrade relatively slowly compared to bio-based or natural fibers. Furthermore, spinning...

The high molecular weight, crystallinity, and orientation that occur during the silk-making process can also adversely affect the biodegradability of textile materials such as fibers and yarns.

Although some standards utilize instrumental analysis, such as gas chromatography or infrared analysis, the processes and calculation methods are not standardized. Therefore, [the following is unclear and requires further context. "make..."] it is difficult to determine the biodegradability of petroleum-based textile materials using existing standards for natural fibers, bio-based fibers, or plastic materials used in packaging.

Solution.

To overcome these problems, a new method combining accelerated hydrolysis and biodegradation (using instrumental analysis of the amount of carbon dioxide produced) has been proposed.

Type testing method.

In the composting process of textile materials, microorganisms ultimately engage in a synergistic process through the combined action of two mechanisms (abiotic and biotic processes).

Hydrolysis products of biodegradable textile materials. Reproducing this process in the laboratory is both difficult and time-consuming. For convenience, in biodegradation experiments...

Accelerated hydrolysis experiments (non-biological process) were previously conducted. The rate and extent of molecular weight loss were measured to characterize the physical processes involved in the accelerated hydrolysis.

The amount of property loss was then measured, and the released carbon dioxide was directly measured using a carbon dioxide measurement system to calculate the degree of biodegradation of the hydrolysis products.

Textiles and textile materials undergo accelerated hydrolysis and hydrolysis products.

1 Scope

This document describes a test method for determining the biodegradability of textile materials, using nondispersive infrared spectroscopy and other suitable methods.

The carbon dioxide release of hydrolysis products obtained from accelerated hydrolysis of textile materials under controlled composting conditions.

This document applies to materials made from polyethylene terephthalate (PET), polycaprolactone (PCL), polypropylene carbonate (PPC), and other materials.

Petroleum-based synthetic biodegradable textiles made from butylene succinate (PBS) or copolymers thereof, as well as other biodegradable textiles.

Material.

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 1632.1 Plastics - Determination of viscosity of dilute polymer solutions using a capillary viscometer - Part 1: General rules (GB/T 1632.1-2024, ISO 1628-1:2021, MOD)
GB/T 7573 Determination of pH value of aqueous extracts of textiles (GB/T 7573-2025, ISO 3071:2020, MOD) GB/T 19277.1 Determination of the final aerobic biodegradability of materials under controlled composting conditions by measuring the amount of carbon dioxide released.

Methods Part 1: General Methods (GB/T 19277.1-2025, ISO 14855-1:2012, IDT) GB/T 19277.1-2025 Determination of the final aerobic biodegradability of materials under controlled composting conditions by measuring the amount of carbon dioxide released.

Methods for carbon oxidation - Part 1: General methods (ISO 14855-1:2012, IDT) GB/T 27810 Paints and varnishes - Gel permeation chromatography (GPC) using tetrahydrofuran as eluent (GB/T 27810-2011, ISO 13885-1:2008, IDT) the following terms and definitions apply to this document.

compost

An organic soil conditioner obtained from the biodecomposition of a mixture. This mixture mainly consists of plant residues, and sometimes also contains some organic matter.

And certain inorganic substances.

composting

An aerobic treatment method for producing compost (3.1).

Total dry solids

The amount of solids obtained by drying a known volume of material or compost to constant weight at 105°C.

[Source. GB/T 19277.1-2025, 3.4]