



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

GB/T 40612-2021

**Plastics - Determination of aerobic biodegradation of
non-floating plastic materials in a seawater/sediment interface -
Method by analysis of evolved carbon dioxide**

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Foreword

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

Drafting.

The translation method used in this document is equivalent to ISO 19679.2020 "Final Requirements for Non-floating Plastic Materials at the Interface of Plastic Seawater Sandy Sediments"

The oxygen biodegradability is determined by the method of measuring the release of carbon dioxide".

Introduction

Products made of biodegradable plastics are designed to be recycled through organic cycles in composting plants or anaerobic digesters. Not because

These products are biodegradable (biodegradable) and are considered to be freely discarded in the environment. This is undesirable. These products should be recycled.

Collection and reuse. However, it is worthwhile to test methods to determine the degree and rate of biodegradation of plastics in natural environments (such as soil or marine environments).

Attention, in order to better describe the degradation behavior of plastics in these specific environments. In fact, some products used in the ocean are made of plastic

These products are sometimes lost or intentionally placed in the marine environment. The characteristics of biodegradable plastic materials can be

It is characterized by the application of specific test methods, which can determine the biodegradability of plastics exposed to marine sediments and seawater.

Quantitative assessment.

Plastic products are directly discarded or flow into the pelagic area (free water) with fresh water, and then are affected by material density, tides, ocean currents and waves.

The impact may sink to the sub-coast and reach the surface of the seabed. Many biodegradable plastics have a density greater than 1, so they tend to sink. From the surface (Interface with seawater) to the deep layer, the environment of the sediments changes from aerobic to anoxic to anaerobic, showing a sharply changing oxygen gradient.

Plastic seawater sandy sediment interface non-floating plastic

Determination of the final aerobic biodegradability of materials

By measuring the method of releasing carbon dioxide

1 Scope

This document describes a test method that measures the amount of carbon dioxide released by plastic materials in the sea at the junction of sea water and the seabed.

The degree and rate of decomposition of aerobic organisms on ocean sandy sediments. This test method is also applicable to other solid organic materials.

This test method is to simulate the habitat environment of different seawater sedimentation areas in the ocean under laboratory conditions, such as when the sun hits the bottom of the sea.

The benthic zone (light zone) is called the coastal zone in marine science.

The determination of the biological decomposition of plastic materials and other solid materials buried in marine sediments is outside the scope of this document.

Note. The determination of aerobic biodegradation can also be obtained by monitoring oxygen consumption, and the method is described in GB/T 40611-2021.

The conditions described in this document may be inconsistent with the optimal conditions for maximum biodegradation.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

The following terms and definitions apply to this document.

The terms and definitions used in this document in ISO and IEC can be found on the

following website.

3.1

Theoretical amount of evolved carbon dioxide

ThCO₂

The theoretical maximum value of carbon dioxide that can be generated when the test material is completely oxidized can be calculated from the molecular formula or total organic carbon (TOC).

Note. Expressed in milligrams of carbon dioxide released per milligram or per gram of test material (mgCO₂/mg test material or gCO₂/g test material).

3.2

Total organic carbon

TOC

The total amount of carbon contained in organic compounds.

Note. Total organic carbon is expressed in milligrams of carbon per 100mg compound (mgCO₂/100mg compound).

3.3

Dissolved organic carbon

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Dissolved in water, cannot be separated by special phase separation method (such as 40000m⁰-2 speed centrifugal separation for 15min or pore diameter 0.2μm~0.45μm

Filter membrane filtration) and separated organic carbon.