Biodegradability

Non-exhaustive list of standardization committees and standards

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ISO/TC 122, Packaging, Subcommittee SC 4, Packaging and environment

ISO/TR 17098:2013 - Packaging material recycling — Report on substances and materials which may impede recycling

Scope: This Technical Report provides a non-exhaustive overview of substances and materials that may cause a sustained impediment to recycling activities and is intended to assist in the assessment requirements set out in ISO 18604.

It describes substances or materials which cause problems or inhibit the recycling process, or which have a negative influence on the quality of recycled material, where technical solutions are not expected to be developed in the near future.

These examples are, however, qualified by the fact that the recycling operations can vary regionally, that technology is constantly changing, and that the use to which the recycled material is put will also determine whether the presence of such substances and materials is a problem.

ISO/TC 122, Packaging, Subcommittee SC 4, Packaging and environment

ISO 21067-2:2015 Packaging — Vocabulary — Part 2: Packaging and the environment terms

Scope: This part of ISO 21067 defines terms used in the field of packaging and the environment. It does not include terminology already covered by ISO 21067-1 or other International Standards such as ISO 14050.

ISO 18601:2013 Packaging and the environment — General requirements for the use of ISO standards in the field of packaging and the environment

Scope: This International Standard specifies requirements and procedures for the other International Standards in this series on packaging and the environment: ISO 18602, ISO 18603, ISO 18604, ISO 18605, and ISO 18606.

This International Standard is applicable to a supplier responsible for placing packaging or packaged goods on the market.

International Union of Leather Technologists and Chemists Societies (IUC Commission, IULTCS) in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, Leather

ISO 20136:2017 Leather — Determination of degradability by micro-organisms

Scope: This document specifies a test method to determine the degree and rate of aerobic biodegradation of hides and skins of different animal origin, whether they are tanned or not, through the indirect determination of CO2 produced by the degradation of collagen.

The test material is exposed to an inoculum (activated sludge from tannery wastewater) in an aqueous medium.

The conditions established in this document correspond to optimum laboratory conditions to achieve the maximum level of biodegradation. However, they may not necessarily correspond to the optimum conditions or maximum level of biodegradation in the natural medium.

In general, the experimental procedure covers the determination of the degradation degree and rate of the material under controlled conditions, which allows the analysis of the evolved carbon dioxide produced throughout the test. For this purpose, the testing equipment complies with strict requirements with regard to flow, temperature and agitation control.

This method applies to the following materials:

- natural polymers of animal stroma (animal tissue/skins),
- animal hides and skins tanned (leather) using organic or inorganic tanning agents,
- leathers that, under testing conditions, do not inhibit the activity of microorganisms present in the inoculum.

ISO/TC 147, Water quality, Subcommittee SC 5, Biological methods.

ISO/TR 15462:2006 Water quality — Selection of tests for biodegradability

Scope: This Technical Report gives an overview of biodegradation tests for the aquatic environment standardized by ISO and provides recommendations on their use. In Annex A, the biodegradation guidelines for the aquatic medium of the OECD are included, because these methods are sometimes identical to ISO standards or are useful supplements. In addition, inhibitory tests with bacteria and mixed bacterial inocula are included in this Technical Report because a possible toxicity on the inoculum is important information for the choice and performance of biodegradation tests. It is very helpful to determine bacteria toxicity in advance using the same inoculum as the planned biodegradation test before starting biodegradation testing.

ISO 10634:2018 Water quality — Preparation and treatment of poorly water-soluble organic compounds for the subsequent evaluation of their biodegradability in an aqueous medium

Scope: This document specifies techniques for preparing poorly water-soluble organic compounds (i.e. liquid and solid compounds) with a solubility in water of less than approximately 100 mg/l and introducing them into test vessels for a subsequent biodegradability test in an aqueous medium using standard methods.

The subsequent tests on biodegradability are primarily methods using the analysis of the released carbon dioxide described in ISO 9439 and the determination of the oxygen described in ISO 9408 and following the usual precautions for ISO 10707. Thus, one can notice that the methods measuring the removal of dissolved organic carbon (DOC) are not appropriate.

This document does not specify the biodegradation test methods. It is restricted to describing techniques for introducing the test compounds into the test medium and to keeping them in a dispersed state. These techniques are implemented while observing the experimental conditions described in the standardized methods for evaluating biodegradability. ISO 9439, based on CO2 evolution, is not suitable for testing volatile compounds.

Some of the preparation methods described in this document might not be accepted by regulators for making conclusions on the ready biodegradability of tested compounds.

ISO 7827:2010 Water quality — Evaluation of the "ready", "ultimate" aerobic biodegradability of organic compounds in an aqueous medium — Method by analysis of dissolved organic carbon (DOC)

Scope: This International Standard specifies a method for the evaluation of the “ready” and “ultimate” biodegradability of organic compounds at a given range of concentrations by aerobic microorganisms. In this context, this International Standard also gives specific definitions for the terms “ready” and “ultimate”.

The method applies to organic compounds which are:

a) soluble at the concentration used under the conditions of the test [dissolved organic carbon (DOC) concentrations of 10 mg/l to 40 mg/l];
b) non-volatile or having a negligible vapour pressure under the conditions of the test;
c) not significantly adsorbable on glass and activated sludge;
d) not inhibitory to the test microorganisms at the concentration chosen for the test.

The method is not suitable for waste waters, as they usually contain significant amounts of water-insoluble organic carbon, which is not included in DOC measurements.

ISO 11733:2004 Water quality — Determination of the elimination and biodegradability of organic compounds in an aqueous medium — Activated sludge simulation test

Scope: This International Standard specifies a method for the determination of the elimination and the biodegradability of organic compounds by aerobic micro-organisms. The conditions described simulate a waste-water treatment plant. Two test systems can be used: activated sludge plants or porous pots. The tests can optionally be performed under conditions of nitrification and denitrification (Annex A) and coupling of the units (Annex B).

The method applies to organic compounds which, under the conditions of the test, are

a) soluble in tap water at the test concentration and not expected to be transformed to insoluble metabolites if biodegradation, in addition to elimination, is determined;
b) poorly water-soluble, but which are satisfactorily dispersible in water and allow detection with suitable analytical means (e.g. organic carbon measurements);
c) non-volatile, or which have a negligible vapour pressure under the test conditions;
d) not inhibitory to the test micro-organisms at the concentration chosen for the test. Inhibitory effects can be determined by using a suitable test method (e.g. ISO 8192[15] or ISO 15522[27]). Compounds inhibitory at concentrations used in this test may be tested at concentrations less than their EC20 value, followed by higher practical concentrations after a period of acclimatization.

The method can also be used to measure the biodegradation and elimination of dissolved organic compounds in wastewater (also called "test compound" in the method).
If more or different information is required to predict the behaviour of test compounds or wastewater in a treatment plant, other degradation tests may be performed. For appropriate use of this method and for alternative biodegradation methods, see ISO/TR 15462 and for general information on biotesting, see ISO 5667-16.

ISO/TC 61, Plastics

ISO 15270:2008 Plastics — Guidelines for the recovery and recycling of plastics waste

Scope: This International Standard provides guidance for the development of standards and specifications covering plastics waste recovery, including recycling. The standard establishes the different options for the recovery of plastics waste arising from pre-consumer and post-consumer sources as illustrated diagrammatically in Annex A. The standard also establishes the quality requirements that should be considered in all steps of the recovery process, and provides general recommendations for inclusion in material standards, test standards and product specifications. Consequently, the process stages, requirements, recommendations and terminology presented in this International Standard are intended to be of general applicability.

ISO/TC 61, Plastics, Subcommittee SC 5, Physical-chemical properties

ISO 19679:2016 Plastics — Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sediment interface — Method by analysis of evolved carbon dioxide

Scope: This International Standard specifies a test method to determine the degree and rate of aerobic biodegradation of plastic materials when settled on marine sandy sediment at the interface between seawater and the seafloor, by measuring the evolved carbon dioxide.

This test method is a simulation under laboratory conditions of the habitat found in different seawater/sediment-areas in the sea, e.g. in a benthic zone where sunlight reaches the ocean floor (photic zone) that, in marine science, is called sublittoral zone

The determination of biodegradation of plastic materials buried in marine sediment is outside the scope of this International Standard.

Measurement of aerobic biodegradation can also be obtained by monitoring the oxygen consumption, as described in ISO 18830.

The conditions described in this International Standard may not always correspond to the optimum conditions for the maximum degree of biodegradation to occur.

ISO 18830:2016 Plastics — Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sandy sediment interface — Method by measuring the oxygen demand in closed respirometer

Scope: This International Standard specifies a test method to determine the degree and rate of aerobic biodegradation of plastic materials when settled on marine sandy sediment at the interface between seawater and the seafloor, by measuring the oxygen demand in a closed respirometer.

Measurement of aerobic biodegradation can also be obtained by monitoring the carbon dioxide evolution. This is not in the scope of this International Standard but of ISO 19679.

This test method is a simulation under laboratory conditions of the habitat found in different seawater/sediment-areas in the sea, e.g. in a benthic zone where sunlight reaches the ocean floor (photic zone) that, in marine science, is called sublittoral zone

The determination of biodegradation of plastic materials buried in marine sediment is outside the scope of this International Standard.

The conditions described in this International Standard may not always correspond to the optimum conditions for the maximum degree of biodegradation to occur.

ISO 17088:2012 Specifications for compostable plastics

Scope: This International Standard specifies procedures and requirements for the identification and labelling of plastics, and products made from plastics, that are suitable for recovery through aerobic composting. The four following aspects are addressed:

a) biodegradation;

b) disintegration during composting;
c) negative effects on the composting process and facility;
d) negative effects on the quality of the resulting compost, including the presence of high levels of regulated metals and other harmful components.

This specification is intended to establish the requirements for the labelling of plastic products and materials, including packaging made from plastics, as “compostable” or “compostable in municipal and industrial composting facilities” or “biodegradable during composting” (for the purposes of this International Standard, these three expressions are considered to be equivalent). The labelling will, in addition, have to conform to all international, regional, national or local regulations (e.g. European Directive 94/62/EC).

NOTE The recovery of compostable plastics through composting can be carried out under the conditions found in well-managed composting plants, where the temperature, water content, aerobic conditions, carbon/nitrogen ratio and processing conditions are optimized. Such conditions are generally obtained in industrial and municipal composting plants. Under these conditions, compostable plastics will disintegrate and biodegrade at rates comparable to yard trimmings, kraft paper bags and food scraps.

ISO 14853:2016 Plastics — Determination of the ultimate anaerobic biodegradation of plastic materials in an aqueous system — Method by measurement of biogas production

Scope: This International Standard specifies a method for the determination of the ultimate anaerobic biodegradability of plastics by anaerobic microorganisms. The conditions described in this International Standard do not necessarily correspond to the optimum conditions for the maximum degree of biodegradation to occur. The test calls for exposure of the test material to sludge for a period of up to 90 d, which is longer than the normal sludge retention time (25 to 30 d) in anaerobic digesters, although digesters at industrial sites can have much longer retention times.

The method applies to the following materials:

— natural and/or synthetic polymers, copolymers or mixtures thereof;
— plastic materials which contain additives such as plasticizers, colorants or other compounds;
— water-soluble polymers;
— materials which, under the test conditions, do not inhibit the microorganisms present in the inoculum. Inhibitory effects can be determined using an inhibition control or by another appropriate method (see e.g. ISO 13641). If the test material is inhibitory to the inoculum, a lower test concentration, another inoculum or a pre-exposed inoculum can be used.

ISO 14855-1:2012 Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide — Part 1: General method

Scope :This part of ISO 14855 specifies a method for the determination of the ultimate aerobic biodegradability of plastics, based on organic compounds, under controlled composting conditions by measurement of the amount of carbon dioxide evolved and the degree of disintegration of the plastic at the end of the test. This method is designed to simulate typical aerobic composting conditions for the organic fraction of solid mixed municipal waste. The test material is exposed to an inoculum which is derived from compost. The composting takes place in an environment wherein temperature, aeration and humidity are closely monitored and controlled. The test method is designed to yield the percentage conversion of the carbon in the test material to evolved carbon dioxide as well as the rate of conversion.

Subclauses 8.6 and 8.7 specify a variant of the method, using a mineral bed (vermiculite) inoculated with thermophilic microorganisms obtained from compost with a specific activation phase, instead of mature compost. This variant is designed to yield the percentage of carbon in the test substance converted to carbon dioxide and the rate of conversion.

The conditions described in this part of ISO 14855 may not always correspond to the optimum conditions for the maximum degree of biodegradation to occur.

ISO 10210:2012 Plastics — Methods for the preparation of samples for biodegradation testing of plastic materials

Scope: This International Standard describes methods for the preparation of test samples used in the determination of the ultimate aerobic and anaerobic biodegradability of plastic materials in an aqueous medium, soil, controlled compost or anaerobic digesting sludge. The methods described are designed to provide dimensional consistency of test samples, resulting in improved reproducibility of test results during the determination of the ultimate biodegradability of the product.

These methods apply to the following materials:

- natural and/or synthetic polymers, copolymers or mixtures of these;
- plastic materials that contain additives, such as plasticizers or colorants;
- plastic composite materials that contain organic or inorganic fillers;

— products made from the above materials.

ISO 15985:2014 Plastics — Determination of the ultimate anaerobic biodegradation under high-solids anaerobic-digestion conditions — Method by analysis of released biogas

Scope: This International Standard specifies a method for the evaluation of the ultimate anaerobic biodegradability of plastics based on organic compounds under high-solids anaerobic-digestion conditions by measurement of evolved biogas at the end of the test. This method is designed to simulate typical anaerobic digestion conditions for the organic fraction of mixed municipal solid waste. The test material is exposed in a laboratory test to a methanogenic inoculum derived from anaerobic digesters operating only on pretreated household waste. The anaerobic decomposition takes place under high-solids (more than 20 % total solids) and static non-mixed conditions. The test method is designed to yield the percentage of carbon in the test material and its rate of conversion to evolved carbon dioxide and methane (biogas).

The conditions described in this International Standard might not always correspond to the optimum conditions for the maximum degree of biodegradation to occur.

ISO/TC 61, Plastics, Subcommittee SC 6, Ageing, chemical and environmental resistance.

ISO 15314:2018 Plastics — Methods for marine exposure

Scope: This document describes three methods for the exposure of plastics in a marine environment. Method A covers exposures where specimens float on the surface, method B covers exposures where specimens are partially immersed method C covers exposures where specimens are completely immersed. Although intended for marine (salt water) exposure, the methodology can be used with outdoor brackish water and fresh-water exposures as well. Direct weathering of plastics on land is described in ISO 877-1, ISO 877-2 and ISO 877-3.

Method A is particularly applicable to enhanced-degradability plastics where the environmental degradation under marine floating exposure is expected to be accelerated relative to that of regular plastic materials.

This document specifies the general requirements for the apparatus, and procedures for using the test methods described.

It lists properties that can be used to evaluate changes in plastics subjected to marine exposure. More specific information about methods for determining the changes in properties of plastics on exposure and reporting these results is given in ISO 4582.

ISO/TC 61, Plastics, Subcommittee SC 14, Environmental aspects.

ISO/DIS 17088 Plastics — Organic recycling — Specifications for compostable plastics

Scope: This document specifies procedures and requirements for plastics, and products made from plastics, that are suitable for recovery through organic recycling. The four following aspects are addressed:

a) disintegration during composting;
b) ultimate aerobic biodegradation;
c) no adverse effects of compost on terrestrial organisms;
d) control of constituents.

These four characteristics are suitable to assess the effects on the industrial composting process and facility.

This specification is intended to be used as the basis for systems of labelling and claims for plastics materials and products.

This document does not provide information on requirements for the biodegradability of plastics which end up in the environment as litter. It is also not applicable to biological treatment undertaken in small installations by householders.

NOTE 1 The recovery of compostable plastics through composting can be carried out under the conditions found in well-managed industrial composting processes, where the temperature, water content, aerobic conditions, carbon/nitrogen ratio and processing conditions are optimized. Such conditions are generally obtained in industrial and municipal composting plants. Under these conditions, compostable plastics will disintegrate and biodegrade at rates comparable to yard trimmings, kraft paper bags and food scraps.

NOTE 2 “Organically recoverable”, “compostable”, “compostable in municipal and industrial composting facilities” or “biodegradable during composting” are expressions considered to be equivalent to organically recyclable for the purposes of this document.

ISO 14851:2019 Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium — Method by measuring the oxygen demand in a closed respirometer

Scope: This document specifies a method, by measuring the oxygen demand in a closed respirometer, for the determination of the degree of aerobic biodegradability of plastic materials, including those containing formulation additives. The test material is exposed in an aqueous medium under laboratory conditions to an inoculum from activated sludge.

If an unadapted activated sludge is used as the inoculum, the test simulates the biodegradation processes which occur in a natural aqueous environment; if a mixed or pre-exposed inoculum is used, the method is used to investigate the potential biodegradability of a test material.

The conditions used in this document do not necessarily correspond to the optimum conditions allowing maximum biodegradation to occur, but this document is designed to determine the potential biodegradability of plastic materials or give an indication of their biodegradability in natural environments.

The method enables the assessment of the biodegradability to be improved by calculating a carbon balance.

The method applies to the following materials.

- Natural and/or synthetic polymers, copolymers or mixtures thereof.
- Plastic materials which contain additives such as plasticizers, colorants or other compounds.
- Water-soluble polymers.
- Materials which, under the test conditions, do not inhibit the microorganisms present in the inoculum. Inhibitory effects can be determined using an inhibition control or by another appropriate method (see, for example, ISO 8192[2]). If the test material is inhibitory to the inoculum, a lower test concentration, another inoculum or a pre-exposed inoculum can be used.

ISO 22404:2019 Plastics — Determination of the aerobic biodegradation of non-floating materials exposed to marine sediment — Method by analysis of evolved carbon dioxide

Scope: This document specifies a laboratory test method to determine the degree and rate of aerobic biodegradation level of plastic materials. This test method can also be applied to other materials.

Biodegradation is determined by measuring the CO2 evolved by the plastic material when exposed to marine sediments sampled from a sandy tidal zone and kept wet with salt-water under laboratory conditions.

This test method is a simulation under laboratory conditions of the habitat found in sandy tidal zone that, in marine science, is called eulittoral zone.

The conditions described in this document might not always correspond to the optimum conditions for the maximum degree of biodegradation to occur.

Deviations from the test conditions described in this document are justified in the test report.

ISO 14855-2:2018 Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide — Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test

Scope: This document specifies a method for determining the ultimate aerobic biodegradability of plastic materials under controlled composting conditions by gravimetric measurement of the amount of carbon dioxide evolved. The method is designed to yield an optimum rate of biodegradation by adjusting the humidity, aeration and temperature of the composting vessel.

The method applies to the following materials:

- natural and/or synthetic polymers and copolymers, and mixtures of these;
- plastic materials that contain additives such as plasticizers or colorants;
- water-soluble polymers;
- materials that, under the test conditions, do not inhibit the activity of microorganisms present in the inoculum.

If the test material inhibits microorganisms in the inoculum, another type of mature compost or pre-exposure compost can be used.

ISO 14852:2018 Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium — Method by analysis of evolved carbon dioxide

Scope: This document specifies a method, by measuring the amount of carbon dioxide evolved, for the determination of the degree of aerobic biodegradability of plastic materials, including those containing formulation additives. The test material is exposed in a synthetic medium under standardized laboratory conditions to an inoculum from activated sludge, mature compost or soil under aerobic, mesophilic conditions.

If an unadapted activated sludge is used as the inoculum, the test result can be used to assess the aerobic biodegradation processes which occur in a waste water treatment plant environment. If a mixed or pre-exposed inoculum is used, the method can be used to investigate the potential biodegradability of a test material.

The conditions used in this document do not necessarily correspond to the optimum conditions allowing maximum biodegradation to occur, but this test method is designed to measure the biodegradation of plastic materials and give an indication of their potential biodegradability.

The method enables the assessment of the biodegradation to be improved by calculating a carbon balance (optional, see Annex C).

The method applies to the following materials:

- natural and/or synthetic polymers, copolymers or mixtures thereof;
- plastic materials which contain additives such as plasticizers, colorants or other compounds;
- water-soluble polymers;
- materials which, under the test conditions, do not inhibit the microorganisms present in the inoculum. Inhibitory effects can be determined using an inhibition control or by another appropriate method (see, for example, ISO 8192[1]). If the test material is inhibitory to the inoculum, a lower test concentration, another inoculum or a pre-exposed inoculum can be used.

ISO 17556:2019 Plastics — Determination of the ultimate aerobic biodegradability of plastic materials in soil by measuring the oxygen demand in a respirometer or the amount of carbon dioxide evolved

Scope: This document specifies a method for determining the ultimate aerobic biodegradability of plastic materials in soil by measuring the oxygen demand in a closed respirometer or the amount of carbon dioxide evolved. The method is designed to yield an optimum degree of biodegradation by adjusting the humidity of the test soil.

If a non-adapted soil is used as an inoculum, the test simulates the biodegradation processes which take place in a natural environment; if a pre-exposed soil is used, the method can be used to investigate the potential biodegradability of a test material.

This method applies to the following materials:

- natural and/or synthetic polymers, copolymers or mixtures of these;
- plastic materials which contain additives such as plasticizers or colorants;
- water-soluble polymers.

It does not necessarily apply to materials which, under the test conditions, inhibit the activity of the microorganisms present in the soil. Inhibitory effects can be measured using an inhibition control or by another suitable method. If the test material inhibits the microorganisms in the soil, a lower test material concentration, another type of soil or a pre-exposed soil can be used.

ISO 16929:2019 Plastics — Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test

Scope: This document is used to determine the degree of disintegration of plastic materials in a pilot-scale aerobic composting test under defined conditions. It forms part of an overall scheme for the evaluation of the compostability of plastics as outlined in ISO 17088.

The test method laid down in this document is also used to determine the influence of the test material on the composting process and the quality of the compost obtained. It cannot be used to determine the aerobic biodegradability of a test material. Other methods are available for this (for example, see ISO 14851, ISO 14852 or ISO 14855-1 and ISO 14855-2).

ISO/**DIS** 23977-1 Plastics — Determination of the aerobic biodegradation of plastic materials exposed to seawater — Part 1: Method by analysis of evolved carbon dioxide

Scope: This document specifies a laboratory test method for determining the degree and rate of the aerobic biodegradation level of plastic materials. Biodegradation is determined by measuring the CO2 evolved from plastic materials when exposed to seawater sampled from coastal areas under laboratory conditions.

The test is performed with either seawater only ("pelagic seawater test") or with seawater to which little sediment was added ("suspended sediment seawater test").

The pelagic seawater test simulates the conditions found in offshore areas with low water currents and low tidal movements, whereas the suspended sediment seawater test simulates conditions which might be found in coastal areas with stronger water currents and tidal movements.

The conditions described in this proposal may not always correspond to the optimum conditions for the maximum degree of biodegradation, but this test method is designed to give an indication of the potential biodegradability of plastic materials.

NOTE This document is addressing plastic materials but can also be used for other materials.

DIS= draft

ISO/**DIS** 23977-2 Plastics — Determination of the aerobic biodegradation of plastic materials exposed to seawater — Part 2: Method by measuring the oxygen demand in closed respirometer

Scope: This proposal specifies a laboratory test method for determining the degree and rate of the aerobic biodegradation level of plastic materials. Biodegradation of plastic materials is determined by measuring the oxygen demand in a closed respirometer when exposed to seawater sampled from coastal areas under laboratory conditions.

The test is performed with either seawater only ("pelagic seawater test") or with seawater to which little sediment was added ("suspended sediment seawater test").

The pelagic seawater test simulates the conditions found in offshore areas with low water currents and low tidal movements, whereas the suspended sediment seawater test simulates conditions which might be found in coastal areas with stronger water currents and tidal movements.

The conditions described in this proposal may not always correspond to the optimum conditions for the maximum degree of biodegradation, but this test method is designed to give an indication of the potential biodegradability of plastic materials.

NOTE This document is addressing plastic materials but can also be used for other materials.

ISO 13975:2019 Plastics — Determination of the ultimate anaerobic biodegradation of plastic materials in controlled slurry digestion systems — Method by measurement of biogas production

Scope: This document specifies a method of evaluating the ultimate anaerobic biodegradability of plastic materials in a controlled anaerobic slurry digestion system with a solids concentration not exceeding 15 %, which is often found for the treatment of sewage sludge, livestock faeces or garbage. The test method is designed to yield a percentage and rate of conversion of the organic carbon in the test materials to carbon dioxide and methane produced as biogas.

The method applies to the following materials, provided they have a known carbon content:

- natural and/or synthetic polymers, copolymers or mixtures;
- plastic materials that contain additives such as plasticizers, colorants, or other compounds;
- water-soluble polymers.

It does not apply to materials which exhibit inhibitory effects on the test microorganisms at the concentration chosen for the test.

NOTE Inhibitory effects can be determined by an inhibition test (e.g. ISO 13641-1 or ISO 13641-2).

ISO 17422:2018 Plastics — Environmental aspects — General guidelines for their inclusion in standards

Scope: This document provides a structure for inclusion of environmental aspects in standards for plastics products. It proposes an approach which is directed at minimizing any adverse environmental impact without detracting from the primary purpose of ensuring adequate fitness for use of the products under consideration.

The guidance provided by this document is intended primarily for use by standards writers. Over and above its primary purpose, however, this document provides guidance of value to those involved in design work and other activities where environmental aspects of plastics are being considered.

NOTE This document is intended to promote the following practices:

a) the use of techniques for identifying and assessing the environmental impact of technical provisions in standards, and for minimizing their adverse effects;
b) the adoption of good practices such as:
    1) procedures for pollution avoidance, e.g. through end-of-life options and its proper management;
    2) material and energy conservation in the light of the intended use (and foreseeable misuse) of the product;
    3) safe use of hazardous substances;
    4) avoidance of technically unjustifiable restrictive practices;
    5) promotion of performance criteria rather than exclusion clauses such as are based, for example, only on chemical composition criteria;
    6) use of renewable resources and minimization of the use of non-renewable resources, if the life cycle assessment shows favourable;
c) the adoption of a balanced approach in standards development to issues such as environmental impact, product function and performance, health and safety, and other regulatory requirements;
d) the regular review and revision of existing standards in the light of technical innovations, permitting improvement in the environmental impact of products and processes;
e) the application of life cycle analytical approaches wherever applicable and technically justifiable.

ISO/TR 21960:2020 Plastics — Environmental aspects — State of knowledge and methodologies

Scope: This document summarizes current scientific literature on the occurrence of macroplastics and microplastics, in the environment and biota. It gives an overview of testing methods, including sampling from various environmental matrix, sample preparation and analysis. Further, chemical and physical testing methods for the identification and quantification of plastics are described.

This document gives recommendations for three steps necessary for the standardization of methods towards harmonized procedures for sampling, sample preparation and analysis.

This document does not apply indoor and health related aspects.

NOTE The collection of plastics or microplastics in the environment by citizen social monitoring projects is not in the scope of this document. Although such projects can help sensitize the society to environmental problems and can even reduce the entry and presence of plastics in the environment, this monitoring concept is not considered suitable for a robustly representative and scientific analysis of microplastics in the environment via standardization.

ISO 22766:2020 Plastics — Determination of the degree of disintegration of plastic materials in marine habitats under real field conditions

(see bio-based)

ISO TC38 Textiles

ISO 21701: 2019 Textiles — Test method for accelerated hydrolysis of textile materials and biodegradation under controlled composting conditions of the resulting hydrolysate

ISO/TC 34, Food products, Subcommittee SC 16, Horizontal methods for molecular biomarker analysis.

ISO 16577:2016 Molecular biomarker analysis — Terms and definitions

Scope: This International Standard gives the definition of terms used in the International Standards published in the frame of ISO/TC 34/SC 16.

ISO/TC 207, Environmental management, Subcommittee SC 7, Greenhouse gas management and related activities.

ISO 14064-1:2018 - Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals

Scope: This document specifies principles and requirements at the organization level for the quantification and reporting of greenhouse gas (GHG) emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organization's GHG inventory.

The ISO 14064 series is GHG programme neutral. If a GHG programme is applicable, requirements of that GHG programme are additional to the requirements of the ISO 14064 series.

ISO/TC 268, Sustainable cities and communities.

ISO 37120:2018 Sustainable cities and communities — Indicators for city services and quality of life

Scope: This document defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life. It follows the principles set out in ISO 37101 and can be used in conjunction with ISO 37101 and other strategic frameworks.

This document is applicable to any city, municipality or local government that undertakes to measure its performance in a comparable and verifiable manner, irrespective of size and location.

Guides

ISO/Guide 64:2008 Guide for addressing environmental issues in product standards

Scope : This Guide provides guidance on addressing environmental issues in product standards. It is primarily intended for product standards writers. Its purpose is

- to outline the relationship between the provisions in product standards and the environmental aspects and impacts of the product,
- to assist in drafting or revising provisions in product standards in order to reduce potential adverse environmental impacts at different stages of the entire product life-cycle,
- to emphasize that taking into account environmental issues in product standards is a complex process and requires balancing competing priorities,
- to recommend the use of life-cycle thinking when defining environmental provisions for a product for which a standard is being drafted, and
- to promote the future development of relevant sector guides for addressing environmental issues in product standards by standards writers, consistent with the principles and approaches of this Guide.

Whenever a new product standard is drafted or an existing product standard is revised or intended to be revised, the project managers and their technical committee chairman/convenors are encouraged to actively promote the application of this Guide. Furthermore, at any stage in the standard development process, experts are encouraged to include environmental issues in their comments.

In order to take account of the diversity of products and their specific environmental impacts, as well as the need for relevant environmental knowledge, it is useful for standards writers to involve environmental experts in the work. The project managers and their technical committee chairman/convenors might wish to take into account other relevant, current sector-specific guidance and environmental provisions identified in related standards.

Unless they are closely related with environmental issues, this Guide does not address issues of occupational health and safety or consumer safety as separate or specific aspects of the product life-cycle. Standards writers can find guidance on these issues in other guides.