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Plastics — Industrial compostable plastic shopping bags

Plastiques — Sacs à provisions en plastique compostables en compostage industriel

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Foreword

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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 61, *Plastics*, Subcommittee SC 14, *Environmental aspects.*

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

Increased use of plastic shopping bags can cause several environmental problems, such as terrestrial pollution and contamination of soil, water and marine environment pollution. These pose a severe risk to ecosystems, biodiversity and human health. Recently, many countries, regions, and cities have enacted legislation to ban or severely reduce the use of plastic shopping bags to help tackle these issues.

This document does not aim to bypass this legislation; it aims to specifically address the following aspects where plastic shopping bags suitable for industrial composting can be appropriate for specific uses:

a) offering methods for testing industrial compostability, followed by demonstrating the impact of industrial compostable shopping bags on the ecological environment;

b) providing a reference for the evaluation of industrial compostable plastic shopping bags for industrial composting.

Development of this document is expected to improve the quality control of plastic shopping bags suitable for industrial composting, in countries, regions, and cities where industrial composting is available. Furthermore, this document ensures provision of industrial compostable shopping bags to be stronger.

Plastics — Industrial compostable plastic shopping bags

1 Scope

This document specifies the requirements, test methods, test regulations, packaging, transportation and storage of industrial compostable plastic shopping bags.

This document is applicable to plastic shopping bags made from industrial compostable plastic resin as the main raw material, processed by heat sealing or bonding, etc.

This document does not apply to industrial compostable plastic bags such as industrial compostable roll bags (also known as tear bags or point break bags made from above materials) and other bags that are only used in packaging and are not used for carrying shopping.

This document enables to characterise the compostable plastic bags following two testing approaches that bring to the definition of two classes (class I and class II).

NOTE In some regions, industrial composting is referred to as professional composting.

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 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 4592, *Plastics — Film and sheeting — Determination of length and width*

ISO 4593, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*

ISO 7765-1:1988, *Plastics film and sheeting — Determination of impact resistance by the free-falling dart method — Part 1: Staircase methods*

ISO 17088, *Plastics — Organic recycling — Specifications for compostable plastics*

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
industrial compostable plastic shopping bags
bags made of industrial compostable plastic resin as the main raw material, and having a structure suitable for carrying goods, which are intended to use for packaging and carrying shopping (as groceries in stores, restaurants and other places) and intended for industrial composting when the use is finished

3.2
industrial composting
composting process performed under controlled conditions on industrial scale with the aim of producing compost for the market

Note 1 to entry: In some regions, industrial composting is referred to as professional composting.

[SOURCE: ISO 17088:2021, 3.13]

4 Requirements

4.1 Dimension deviation

4.1.1 Types and dimensions

Shopping bags are classified into two categories: class I and class II according to sealing strength and stress at break requirements (refer to 4.3 for detail). Class II consists of bags that have a sealed bottom and are punched to form handles (often called "T-shirt bags"). Class II shopping bags are divided into four types according to their volume as indicated in Table 1.

Table 1 — Types and dimensions

Type	Denomination	Volume V litres
L	Large bag	$V > 25$
M	Medium bag	$15 \le V \le 25$
S	Small bag	$9 \le V < 15$
XS	Extra small	$V < 9$

The volume in litres is calculated according to Formula (1) that refers to Figure 1.

$$V = \frac{W^2}{\pi} \times \left(L - \frac{W}{\pi} \right) \times 9 \times 10^{-7} \quad (1)$$

where

$L = (l_1 - l_2)$

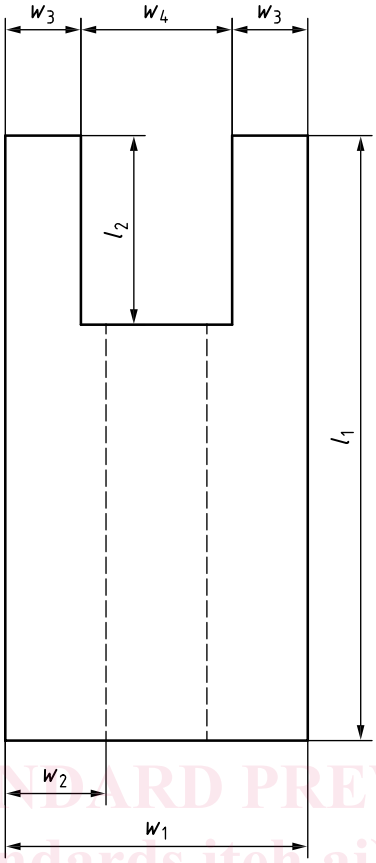
$W = (w_1 + 2w_2)$

w_1 is the total width, in millimetres (mm);

w_2 is the gusset width, in millimetres (mm);

l_1 is the total length, in millimetres (mm);

l_2 is the cutting length, in millimetres (mm).



Key

w_1 total width
w_2 gusset width
w_3 handles width
w_4 cutting width
l_1 total length
l_2 cutting length

Figure 1 — Schematic representation showing each parameter of a shopping bag for volume calculation

4.1.2 Thickness and deviation

For class I, the thickness limit deviation and the average deviation shall be in accordance with the requirements of Table 2.

Table 2 — Thickness deviation

Nominal thickness e mm	Thickness limit deviation mm	Range mm	Average thickness deviation %
e=0,015	+0,010 -0,006	0,016	+20 -6
0,015 < e ≤ 0,020	+0,010 -0,008	0,018	+20 -6

Table 2 *(continued)*

Nominal thickness *e* mm	Thickness limit deviation mm	Range mm	Average thickness deviation %
0,020 < *e* ≤ 0,025	+0,010 -0,008	0,018	+15 -10
0,025 < *e* ≤ 0,030	+0,010 -0,008	0,018	+15 -10
0,030 < *e* ≤ 0,035	+0,010 -0,008	0,018	+15 -10
0,035 < *e* ≤ 0,040	+0,009 -0,009	0,018	+14 -9
0,040< *e* ≤ 0,100	+0,010 -0,010	0,020	+14 -9

For class II, the average tolerance on thickness must be within the range −5 % and +15 % of the declared nominal thickness (as described in 5.2.1.3).

4.1.3 Width deviation

The width deviation of industrial compostable plastic shopping bags shall be in accordance with the requirements of Table 3.

Table 3 — Width deviation

Nominal width *w* mm	Limit deviation mm
w ≤ 380	±20
380 < *w* < 600	±25
w ≥ 600	±30

4.1.4 Length deviation

The length deviation of industrial compostable plastic shopping bags shall be in accordance with the requirements of Table 4.

Table 4 — Length deviation

Nominal length *l* mm	Limit deviation mm
l ≤ 380	±20
380 < *l* < 600	±25
l ≥ 600	±30

4.2 Print quality

4.2.1 Appearance of print

For industrial compostable plastic shopping bags with prints, the printing ink shall be even, and the pattern and text shall be legible and intact.

4.2.2 Stripping rate

The stripping rate shall be less than 20 % of tested area.

4.3 Physical and mechanical properties

The physical and mechanical properties shall be in accordance with the requirements of Tables 5, 6, 7 and 8.

Table 5 — Physical and mechanical performance requirements

Test item	Requirement	
	Class I	Class II
Lifting test	None of the three bags breaks	None of the three bags breaks
Drop test	None of the three bags breaks	Not required
Water leakage	None of the three bags leaks	None of the three bags leaks
Sealing strength	Shown in Table 6	Shown in Table 7
Dart impact	Number of none breakage ≥ 8	Number of none breakage ≥ 8
Stress at break	Not required	Shown in Table 8

Table 6 — Sealing strength requirement for class I

Nominal load bearing m kg	Requirements N/15 mm
$m \leq 2$	≥ 2
$2 < m \leq 6$	≥ 4
$6 < m \leq 10$	≥ 6
$m > 10$	≥ 8

Table 7 — Sealing strength requirement for class II

Type	Requirements N/15 mm
L	≥ 5
M	
S	≥ 3
XS	