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**Compostable drinking straws —  
Specification**

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## Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 558 was prepared by Technical Committee RSB/TC 067, *Consumer Products*

In the preparation of this standard, reference was made to the following standard:

ISO/DIS 5424: Industrial compostable drinking straws

The assistance derived from the above source is hereby acknowledged with thanks.

## Committee membership

The following organizations were represented on the Technical Committee on *Consumer Products* (RSB/TC 067) in the preparation of this standard.

University of Rwanda/College of Sciences and Technology (UR/CST)

AGROPY

Standards for Sustainability (SfS)

University of Rwanda/College of Education (UR/CE)

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

SULFO Rwanda Industries

JEENA TRADE Co. Ltd

Rwanda Standards Board (RSB) – Secretariat

## Introduction

Plastic drinking straws are used worldwide for many years, which caused 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 drinking straws to help tackle these issues.

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# Compostable drinking straws— Specification

## 1 Scope

This Draft Rwanda Standard specifies the requirements, sampling and test methods for compostable drinking straws.

It covers drinking straws made from natural plant material, such a plant fibers or Corn PLA. It will also cover drinking straws made from papers.

## 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 17088, *Plastics – Organic recycling – Specifications for compostable plastics*

ISO 291, *Plastics – Standard atmospheres for conditioning and testing*

ISO 638-1, *Paper, board, pulps and cellulosic nanomaterials – Determination of dry matter content by oven-drying method – Part 1: Materials in solid form*

ISO 18188, *Specification of polypropylene drinking straws*

ISO 2859-1/Amid. 1, *Sampling procedures for inspection by attributes – Part 1: Sampling scheme indexed by acceptance quality limit (AQL) for lot-by-lot inspection – Amendment 1*

ISO 17294-2, *Water quality – application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of selected elements including uranium isotopes.*

EN 14582, *Characterization of waste – Halogen and sulphur content – Oxygen combustion in closed systems and determination methods*

## 3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

### 3.1

#### **compost**

organic soil conditioner obtained by biodegradation of a mixture consisting principally of vegetable residues, occasionally with other organic material and having a limited mineral content

### 3.2

#### **compostable plastic**

plastic that undergoes degradation by biological processes during composting to yield CO<sub>2</sub>, water, inorganic compounds and biomass at a rate consistent with other known compostable materials and leave no visible, distinguishable or toxic residue

Note 1 to entry: "Hazardous" is used synonymously to toxic.

### 3.3

#### **composting**

aerobic process designed to produce compost starting from biodegradable waste

Note 1 to entry: Composting is classified into industrial composting, home composting and worm composting.

### 3.4

#### **corn Polylactic acid (corn PLA)**

made from fermented corn starch instead of petroleum, but it can also be made from cassava or sugarcane starch.

### 3.5

#### **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.

### 3.6

#### **drinking straw**

hollow tubes for drinking water, beverages and liquid foods

### 3.7

#### **straight straw**

straight-type straws with ends that are perpendicular to the axis

### 3.8

#### **flexible straw**

straw that has a curved corrugation and can be bent at will



**3.9****pointed straw**

straw that is machined into a bevel at one end

**3.10****spoon straw**

straw that is processed into a spoon at one end

**3.11****telescopic straw**

retractable straw formed by connecting two or more straws

**4 Requirements****4.1 Raw materials**

Raw materials used shall be conforming to the food or food contact requirements. Additives, e.g. colorants, shall also be food grade. Printing shall not be done on the drinking straws.

**4.2 Appearance**

Compostable drinking straws shall be free of visible contaminants and structural defects such as visible cracks or splits.

**4.3 Standard size**

Specification and size requirements shall meet the requirements as specified in table 1.

**Table 1 – Specifications and size requirements**

S/N	Parameters	Requirements	Test method
1.	Length deviation, %, max.	2	Annex A
2.	Outer diameter deviation, %, max.	3	
3.	Maximal wall thickness to minimum wall thickness ratio, max.	1.2	
4.	End spreading rate of spoon type straw, %, min.	65	
5.	Damage rate after straightening the corrugated pipe, %, max.	2	
6.	Total mass deviation of 100 straws, %, max.	5	

#### 4.4 Industrial compostability

The industrial compostability shall be in accordance with the requirements of ISO 17088.

#### 4.5 Water content

For paper straws and straws made of other natural polymer materials, the water content shall not be less more than 10% (m/m) when tested in accordance with ISO 638-1 Straws made of other biodegradable polymer materials are not required.

#### 4.6 Solubility resistance

For paper straws and other straws made of natural polymer materials, after immersion in liquid, there shall be no warping, bending, cracking, etc. of more than 5 mm, which may cause the straw to not be used normally. Straws made of other biodegradable polymer materials are not required.

#### 4.7 Concentration of heavy metals and other elements

The concentration of heavy metals and other toxic substances shall comply with the requirements prescribed in table 2.

Table 2 – Specifications and size requirements

S/N	Elements	Limits	Test methods
1.	Zinc (Zn), mg/kg, max.	150	ISO 17294-2
2.	Copper (Cu), mg/kg, max.	50	
3.	Nickel (Ni), mg/kg, max.	25	
4.	Cadmium (Cd), mg/kg, max.	0.5	
5.	Lead (Pb), mg/kg, max.	10	
6.	Mercur (Hg), mg/kg, max.	0.2	
7.	Chromium (Cr), mg/kg, max.	50	
8.	Molybdenum (Mo), mg/kg, max.	1	
9.	Selenium (Se), mg/kg, max.	0.75	
10.	Arsenic (As), mg/kg, max.	5	
11.	Cobalt (Co), mg/kg, max.	30	
12.	Fluor (F), mg/kg, max.	100	EN 14582

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### 5 Packaging

5.1 In counting the number of boxes from randomly extracted 2 boxes of straws, no inadequate number of boxes shall be found.

5.2 The number of straws in each bag (boxes) of the 2 bags (boxes) randomly drawn shall not be less than 98% of the nominal number.

5.3 In the same batch, if less than adequate number of packages (boxes) is found, the batch shall be judged as unqualified; In case of an unqualified number of straws in the package (box), double number of samples shall be taken for re-examination. If the results of the re-examinations are qualified, this item (packing quantity) is judged as qualified, otherwise the item will be rejected.

## 6 Labelling

The package of straws shall be marked with the following information:

- a) Name and address of the manufacturer;
- b) Name of the product, as “compostable drinking straws”;
- c) Material used;
- d) Number of straws in a package;
- e) Production date;
- f) Best before date;
- g) Country of origin;and
- h) Any information regarding health and safety for the users.

## 7 Sampling

Sampling shall be done in accordance with ISO 2859-1

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## Annex A (normative)

### Test methods

#### A.1 Conditioning and testing atmosphere

The standard environment for sample conditioning and testing shall be performed in accordance with procedures as specified in ISO 291.

#### A.2 Standard sizes

##### A.2.1 Length deviation

The length of straw shall be measured using a graduated ruler or other suitable means, capable of reading to 0.5 mm or less.

The value of the length deviation of the straw is calculated by using the following formula:

$$\Delta l = \frac{l - l_0}{l_0} \times 100$$

Where,

$\Delta l$  is the length deviation of the straw, expressed as a percentage (%);

$l$  is the measured length, in millimetres (mm); and

$l_0$  is the nominal length, in millimetres (mm).

##### A.2.2 Calculation of average deviation of thickness

$$\Delta \bar{e} = \frac{e - e_0}{e_0} \times 100$$

Where,

$\Delta \bar{e}$  is the average thickness deviation, expressed as a percentage (%);

$e$  is the average thickness, in millimetres (mm); and

$e_0$  is the nominal thickness, in millimetres (mm).

### A.2.3 Outer diameter deviation

Measure the outer diameter of straw at one end, using a Vernier calipers or other suitable means capable of reading to 0.02 mm or less.

The value of the outer diameter deviation of the straw is calculated by using the following formula:

$$\Delta d = \frac{d - d_o}{d_o} \times 100$$

Where,

$\Delta d$  is the outer diameter deviation of the straw, expressed as a percentage (%);

$d$  is the measured diameter, in millimetres (mm); and

$d_o$  is the nominal diameter, in millimetres (mm).

### A.2.4 Wall thickness uniformity

The straw wall thickness uniformity shall be tested in accordance with the method specified in ISO 18188, paragraph 6.3.4.

### A.2.5 Spoon type end development rate

Unfold the spoon-shaped straw section of spoon type straw. Measure the maximum width using a graduated ruler or other suitable means, capable of reading to 1 mm or less.

The value of the spoon type end development rate of the straw is calculated by using the following formula:

$$\Delta k = \frac{k}{\pi d_o} \times 100$$

Where,

$\Delta k$  is the outer diameter deviation of the straw, expressed as a percentage (%);

$k$  is the measured maximum width, in millimetres (mm); and

$d_o$  is the nominal diameter, in millimetres (mm).

### A.2.6 Damage rate after straightening the corrugated pipe

Randomly select 100 straws from the same batch of products and perform damage rate by visual inspection after straightening the corrugated pipe.

Fracture, breakage and cracking properties shall be evaluated by straightening the corrugated pipe.

### A.2.7 Mass deviation

Randomly choose 300 straws from the same batch of products, and divide them into 3 groups, with 100 straws in each group.

Measure the mass of each group (100 straws), using a balance or other suitable means, capable of reading to 0,1 g or less.

The value of mass deviation of the straw is calculated by using the following formula:

$$\Delta g = \frac{g - g_0}{g_0} \times 100$$

Where,

$\Delta g$  is the mass deviation of the straw, expressed as a percentage (%);

$d$  is the measured mass, in gram (mm); and

$d_0$  is the nominal mass, in gram (mm).

## Bibliography

[1] ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*, 2016

[2] ISO/IEC TR 10000-1, *Information technology— Framework and taxonomy of International Standardized Profiles— Part 1: General principles and documentation framework*

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