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DRAFT EAST AFRICAN STANDARD

Primary plastic balloon — Specification

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 072, *Plastics and Related Products.*

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

Introduction

A balloon is a flexible membrane bag that can be inflated with a gas, such as helium, hydrogen, nitrous oxide, oxygen, or air. For special purposes, balloons can be filled with smoke, liquid water, granular media (e.g. sand, flour or rice), or light sources. Modern day balloons are made from materials such as rubber, latex, polychloroprene, or a nylon fabric, and can come in many different colors. A balloon's properties, including its low density and low cost, have led to a wide range of applications. Balloons are used as toys, as hot air balloons, in medicine, in water play, and decorations.

Balloons are available as latex balloons, foil balloons, LED balloons

Primary plastic balloon — Specification

1 Scope

This Working Draft East African Standard specifies the requirements, sampling, and test methods for primary plastic balloons including, foil/Mylar balloons

This standard does not apply to LED balloons, barrage balloons, and balloon catheters.

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

ISO 8124-3, *Safety of toys — Part 3: Migration of certain elements*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
toy balloon
small balloon mostly used for decoration, advertising and as a toy

3.2
foil/Mylar balloon
decorative balloon made from a thin, flexible plastic film coated with a metallic layer, typically polyester or nylon

3.3
barrage balloon
large, unscrewed, gas-filled balloons tethered to the ground with steel cables, historically deployed as a defensive military measure to protect ground targets from low-flying enemy aircraft.

3.4
balloon catheter
medical type of balloon used in various procedures, these are inserted into blood vessels or other body parts and inflated to apply pressure or clear blockages

3.5
LED balloon
decorative balloon that contain light-emitting diodes (LEDs) inside or attached to them, designed to illuminate the balloon for visual or decorative purposes

5 Requirements

5.1 General requirements

5.1.1 Films shall be uniform in appearance and free from visible contaminants, inclusions, or foreign particles.

5.1.2 All materials (films, inks, adhesives) shall comply with the chemical safety limits specified in Clause 5.2.4.

5.1.3 Balloons shall not contain small detachable parts that pose a choking hazard to children.

5.1.4 Mouth-actuated sections (if any) shall withstand repeated use without structural degradation.

5.2 Specific requirements

5.2.1 Film thickness

Primary plastic balloons shall have an average thickness of ≥ 0.038 mm and no single measurement shall fall below 0.032 mm when tested in accordance with Annex A.

5.2.2 Limits for heavy metals

Migration limits for heavy metals contained in the colorants shall be in accordance with those in ISO 8124-3 when tested in accordance with the methods listed there in.

5.2.3 Barrier Performance

Oxygen permeability rate shall not exceed 10 $cm^3/(m^2 \cdot day \cdot bar)$ at 23 °C and 50 % relative humidity (RH) when tested in accordance with Annex B.

5.2.4 Chemical limits

Chemical limits in primary plastic balloons shall be in accordance with Table 1.

Chemical	Limit	Test method
Lead (Pb)	≤ 100 mg/kg	ISO 8124-3
Cadmium (Cd)	≤ 75 mg/kg	ISO 8124-3
Phthalates (DEHP, DBP, BBP)	≤ 0.1% each	ISO 8124-6
Residual monomers (e.g., styrene)	≤ 500 mg/kg	ISO 13741-1

6 Labelling

The container of the primary plastic balloons shall be legibly and indelibly labelled in English/Kiswahili and/or any other official language with the following information:

a) name and physical address of manufacturer and/or registered trademark;

b) country of origin.

c) number of balloons in the container

d) safety warnings (e.g., choking hazards, age limits, disposal guidance)

7 Sampling

Sampling shall be done in accordance with ISO 2859-1.

Annex A
(normative)

Determination of thickness of plastic film and sheeting

A.1 Apparatus

A measuring device capable of measuring thickness to an accuracy of 4 µm with plane upper and lower measuring surfaces having a diameter of (6 ± 1) mm that are parallel to within 5 µm and have polished surfaces, and which applies a compression force of (0.75 ± 0.25) N.

A.2 Procedure

A.2.1 Prepare plastic bags by cutting the sides, without stretching, into two single sheets.

A.2.2 Ensure that the specimens and the faces of the measuring device are free from contamination (e.g. dust).

A.2.3 Check the zero point of the measuring device before starting the measurements and recheck after each series of measurements.

A.2.4 When determining the thickness, lower the foot gently to avoid deforming the material.

A.2.5 Measure the thickness of any sheet at 10 equidistant points across the diagonal of any 100 mm × 100 mm area.

A.2.6 Determine whether the thickness complies with the requirements of 5.2.1.

Annex B
(normative)

Determination of oxygen permeability rate

B.1 Apparatus

B.1.1 Permeation cell with two chambers separated by the film sample

B.1.2 Temperature and humidity control (set to 23 °C and 50 % RH)

B.1.3 Gas supply: 100 % oxygen on the upstream side; nitrogen as a carrier gas on the downstream side

B.1.4 Coulometric oxygen sensor to quantify oxygen passing through the film

B.2 Procedure

B.2.1 Mount the conditioned specimen in the permeation cell, sealing edges to prevent leaks.

B.2.2 Feed 100 % O_2 to the upstream chamber at a controlled pressure (typically 1 bar).

B.2.3 Flow nitrogen through the downstream chamber at a constant rate to carry permeated O_2 to the sensor.

B.2.4 Maintain 23 °C and 50 % RH in both chambers throughout the test.

B.2.5 You record the volume of oxygen (cm^3) that passes through your film specimen during the test.once equilibrium is reached.

B.2.6 Divide that oxygen volume by the surface area of the specimen to get a rate per square metre.

B.2.7 Divide by the time (in days) over which you measured the flow. Converting hours or minutes into days standardizes all results to a daily basis.

B.2.8 Divide by the pressure difference (in bar) you applied across the film during testing.

B.2.9 Calculate the oxygen permeability rate (OPR) using the equation:

$OPR = O_2$ volume (cm^3) / [Area (m^2) ×Time (day)×Pressure (bar)]

Bibliography

[1] https://en.wikipedia.org/wiki/Toy_balloon

[2] https://en.wikipedia.org/wiki/Balloon

[3] ISO 8124-1, *Safety of toys - Part 1 Safety aspects related to mechanical and physical properties*