

DRAFT ZANZIBAR NATIONAL STANDARD

Illuminating candles — Specification

Foreword

This draft Zanzibar National Standard has been developed by the Chemical Products Standards Technical Committee (TCC1). In accordance with ZBS general procedures, this draft standard is presented to the public in order to receive any technical and editorial comment concerns.

In the preparation of this standard, assistance was derived from the following sources:

US 762: 2017, *Illuminating candles — Specification*

IS 11359: 1985 (*Reaffirmed 2022*), *Specification for wax candles*

RS 585: 2025, *Candle — Specification*

Technical Committee Representatives

This draft Zanzibar National Standard was prepared by the Chemical Products Standards Technical Committee which consists of representatives from the following organizations:

Chief Government Chemist Laboratory Agency (CGCLA)
Kisinga Youth and Women Foundation Centre (KYWFC)
Ministry of Health (MoH)
SUMAIT University
Tanzania Bureau of Standards (TBS)
Zanzibar Environmental management Authority (ZEMA)
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Illuminating candles — Specification

1 Scope

This draft Zanzibar National Standard specifies the requirements, sampling and test methods for candles suitable for illuminating purpose.

This standard does not apply to decorative (ornamental) candles.

2 Normative references

The following referenced documents are indispensable for the application of this draft Zanzibar National Standard. For dated references, only the cited edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7010, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

3 Terms and definitions

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

3.1

burning time

time taken for a candle to burn down completely

3.2

defective

candle that fails in one or more respects to conform to the relevant requirements of this standard

3.3

unit

candles from the same manufacturer, packed in accordance with the Weights and Measures Act

3.4

wick

string or cord that runs through the center of the candle and is responsible for drawing up the melted wax (fuel) to the flame, allowing the candle to burn.

4 Requirements

4.1 General requirements

4.1.1 The candle shall be clean, free from dirt and foreign matter, free from fracture (breaks) and distortions (warps, sags, runs, two or more fused together), free from trapped air bubbles and with a uniform finish.

4.1.2 The candle shall be straight, cylindrical with a properly finished shoulder and completely flat base without recess.

4.1.3 The candle may be white or coloured.

4.1.4 The candle shall be free from unpleasant odour during burning and non- burning. The flame shall be non-smoking and non-sputtering.

4.1.5 The candle shall be made from non-toxic materials, including wax, wick, color and fragrance, ensuring safety for indoor use.

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4.1.6 The wick shall be of a good quality braided or twisted cotton yarn. It shall be properly centred and shall extend to the entire length of the candle. It shall not be visible except for protrude beyond the tip of the candle.

4.2 Specific requirements

Illuminating candles shall comply with the specific requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1: Specific requirement for Illuminating candles

S/No	Characteristic	Requirement	Test method
i.	Wick ^a length, mm	5.0 ± 2.5	-
ii.	Length, mm,	150 ± 5	Annex A
		220 ± 5	
iii.	Diameter sizes, mm		Annex B
	• Length 150 ± 5	10 ± 0.5	
	• Length 220 ± 5	20 ± 1	
iv.	Mass, g, <i>min.</i>		Annex C
	• Diameter 10 ± 0.5	20 ± 0.1	
	• Diameter 20 ± 1	30 ± 0.1	
v.	Burning time, h, <i>min.</i>		Annex D
	• Diameter 10 ± 0.5	2.5	
	• Diameter 20 ± 1	4	
vi.	Burning quality	uniform	Annex D
vii.	Smoking	Absent	Annex D
viii.	Wax drip, mass fraction, %, <i>max.</i>	5	Annex D
ix.	Resistance to deformation	Shall not become deformed	Annex E
x.	Mean horizontal luminous intensity, cd, <i>min.</i>		Annex F
	• Length 150 ± 5	0.75	
	• Length 220 ± 5	1.5	

^a The wick is for protruded beyond the tip of the candle.

5 Packaging

The candles shall be packaged in a unit wrapped in suitable material that will have no detrimental effect on the quality of the product during normal transportation and storage. The units shall be packed in a box that prevents contamination of the product, so marked as to state the number of units contained in that box and strong enough to withstand normal handling and transportation.

6 Labeling

6.1 Each unit and each box shall be legibly and indelibly labelled in Kiswahili and/or English with the following information:

- product name as 'Illuminating candles' or 'Candles';
- name and address of the manufacturer;
- country of origin;
- list of ingredients;

- e) batch number;
- f) number of candles;
- g) diameter of the candles;
- h) cautionary statements

6.2 Each package shall be marked with appropriate safety symbols as specified in ISO 7010

7 Sampling

Sampling shall be in accordance with Annex G.

DRAFT FOR STAKEHOLDERS COMMENTS

Annex A
(Normative)
Measurement of candle length

Measure to the nearest millimetre (from the base to the shoulder), the length of a candle from the sample. Repeat with another two candles. Calculate the average of the three readings and check for compliance with Table 1.

DRAFT FOR STAKEHOLDERS COMMENTS

Annex B
(Normative)
Measurement of candle diameter

Measure the diameter of the candle using vernier caliper by placing the external jaws around the widest part of the candle. Take measurements at three different points along the length of the candle and calculate the average diameter. Repeat with another two candles. Calculate the average of the three and check for compliance with Table 1.

DRAFT FOR STAKEHOLDERS COMMENTS

**Annex C
(Normative)
Measurement of candle mass**

Measure the mass of the candle using the weighing balance by placing the candle on the balance to obtain its mass. Repeat with another two candles. Calculate the average mass of the three readings and check for compliance with Table 1.

DRAFT FOR STAKEHOLDERS COMMENTS

Annex D (Normative) Burning time and quality and wax drip

D.1 Procedures

D.1.1 Take four candles from the test sample selected in accordance with Annex F and store them in a cool place for at least 24 h before evaluation.

D.1.2 Wipe the candles with a soft cloth to remove any loose wax particles. Ensure that $5.0 \text{ mm} \pm 2.5 \text{ mm}$ of the wick is exposed at the tip of the candle, but take care that no contact is made between the wick and the bare hands to prevent contamination of the wick.

D.1.3 Determine the mass of each candle and calculate the average mass of the four candles.

D.1.4 Determine the mass of each of four clean flat metal plates.

D.1.5 Position each plate at least 150 mm away from any wall, edge of table or other plates, in a draught-free room at a temperature of $22 \text{ }^{\circ}\text{C} \pm 2.5 \text{ }^{\circ}\text{C}$. Avoid placing the candles in the running air (away from an open window or fan)

D.1.6 Light each candle and without delay, position the lit candle in the centre of plate by means of a small amount of molten wax produced by the candle, in such a manner that the wick is completely vertical.

D.1.7 Record the burning time of each candle.

D.1.8 Determine the average burning time of the four candles and check for compliance with Table 1.

D.1.9 Determine the mass of each of the four plates with the wax that dripped during the burning test.

D.1.10 Calculate the wax dripped for each candle by subtracting the mass of each of the four clean plates determined in D.1.4, from the mass of each of the four plates with the dripped wax, determined in D.1.9. Then calculate the average mass of wax dripped for the four candles.

D.2 Calculation

The wax drip, expressed as a percentage, shall be calculated as follows:

$$\text{Wax drip} = (M_2 - M_1) / M_3 \times 100$$

Where;

M_2 is the average mass, in grams, of wax dripped and plate;

M_1 is the average mass, in grams, of the plates; and

M_3 is the average mass, in grams, of candles.

Check for compliance with Table 1

D.3 Burning quality

The candles shall burn uniformly with an even flame. The flame - shall consume the candle and wick without dripping, excessive smoking, objectionable odour, and without the necessity of trimming wick. Record the burning qualities of the candles (see B.1 and B.2) and check for compliance with Table 1.

Annex E
(Normative)
Resistance to deformation

E.1 Apparatus

E.1.1 Oven or conditioner, capable of maintaining a temperature of $38\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$

E.1.2 Box, wide enough for six candles to fit in tightly, in a horizontal position

E.1.3 Aluminium plate, flat, of a size that will fit into the box for the full length and width of the box

E.1.4 Mass pieces

E.2 Procedure

E.2.1 Place six candles in two layers in a horizontal position in the box.

E.2.2 Place the aluminium plate on top of the candles. Place the mass pieces on the aluminium plate so that the combined mass of mass pieces and plate exerts a load of $1.8\text{ kg} \pm 0.2\text{ kg}$ to the candles under test.

E.2.3 Allow this assembly to stand in the oven or conditioner for 24 h at $38\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$.

E.2.4 Remove the mass pieces and aluminium plate and check the candles for compliance with Table 1.

Annex F (Normative) Determination of Mean Horizontal Luminous Intensity (MHLI)

F.1 Conventional method

F.1.1 Apparatus

F.1.1.1 Photometer bench

F.1.1.2 Photometer head

F.1.1.3 Sub-standard electric lamp

F.1.1.4 Candle stand

F.1.1.5 Balance

F.1.1.6 Stopwatch or timer

F.1.2 Procedure

F.1.2.1 Mount the test, candle on a candle stand straight, placed on a table fixed on one of the carriages of the photometer bench (see Figure A.2). The candle shall be lighted and kept burning free from draught for 10 minutes. It shall be then extinguished and weighed with candle stand (see Figure A.1). The candle shall be relighted and kept burning for 5 minutes to attain steady state condition, free from draughts. The middle portion of the flame, photometer head and sub-standard electric lamp shall be in the same horizontal plane and photometer head shall be placed perpendicular to the incident light from the flame. The sub-standard lamp and the photometer head shall be kept at any convenient position on the bench.

F.1.2.2 The burning candle shall be moved back and forth on one side of the photometer head until the position of balance is reached. Measurement shall be made in a horizontal plane by changing the position of the candle in four directions at right angles to the axis of the candle differing by 90°.

F.1.3 Results

A number of readings in each direction shall be taken and the average of all these measurements in four directions shall be the mean horizontal luminous intensity (MHLI).

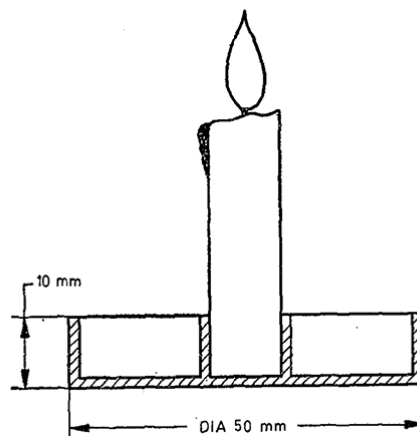


Figure A.1: Candle stand

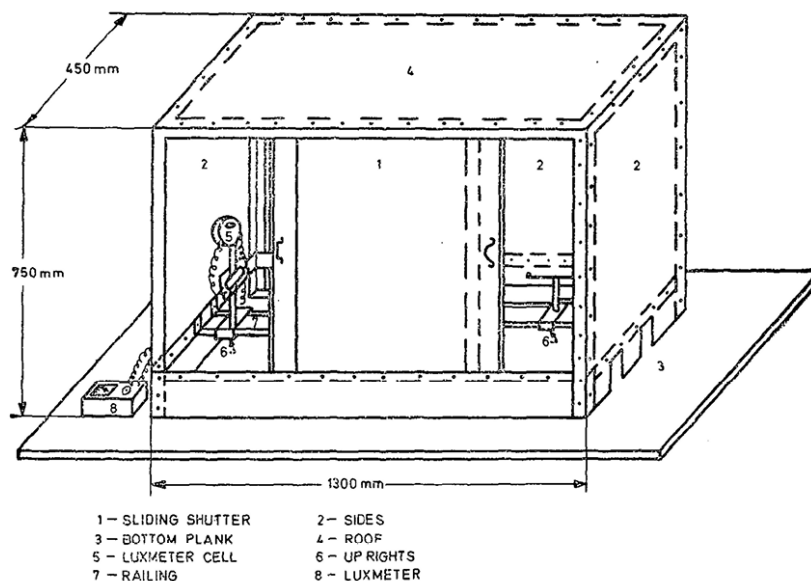


Figure A.2: Enclosure for measurement of Mean Horizontal Luminous Intensity

F.2 Alternate method

F.2.1 Luxmeter and Other Equipment

F.2.1.1 The measurement of MHLI of the candle shall be done, in a wooden enclosure, having dimensions of 300 X 450 X 750 mm (see Figure A.2) painted black from inside with dull black paint after placing the candle on a candle stand (see Figure A.1). The wooden enclosure shall consist of following:

- Luxmeter;
- Optical bench;
- Two up-rights, which can be slid over the bench; and
- A rotatable metallic disc mounted on the upright for placing the candle with candle stand.

F.2.1.2 The enclosure may have a sliding door in the front. The top may be made into two halves, fixed with hinges, so that one half may be lifted off when measurements are not being made, while candle is still burning inside the enclosure.

F.2.1.3 Suitable openings may be provided at the bottom of the enclosure for entry of fresh air.

F.2.2 Procedure

F.2.2.1 To carry out the test, the candle shall be mounted straight on a candle stand (see Figure A.1) placed on a table fixed on one of the carriages of the photometer bench. The candle shall be lighted in the enclosure free from draft and kept burning for 10 min. It shall be the extinguished and weighed with candle stand.

F.2.2.2 The candle shall be relighted and kept burning for 5 min to attain a steady state condition, in the enclosure. The distance between the flame and photometric cell shall be adjusted to 100 cm or any convenient distance. The flame and photometric cell shall be in the same horizontal plane and maximum incident light from the flame shall fall on the cell.

F.2.2.3 Measurements of lux shall be made in four directions by rotating the metallic disc on which the candle is placed, differing by an angle of 90°. Such readings shall be taken after every 15 min (that is after 15 min, 30 min, 45 min and 1 hour). Average of these readings shall be taken and known as E.

During the test, if any abnormality occurs, such as flame disturbed by draft or any mishandling of the candle, the whole test shall be repeated.

F.2.1.4 Calculations

Mean Horizontal Luminous Intensity (MHLI) 'shall be calculated as follows:

$$\text{MHLI (cd)} = E \times d^2$$

Where,

E, is the average illuminance measured by the lux meter

d, distance between the candle flame and the photometric cell, in metres

Annex G
(Normative)
Sampling criteria and compliance with this standard

G.1 Sampling

G.1.1 General

The procedure in D.1.2 and D.1.3 shall be applied in determining whether candles conform to the relevant requirements of this standard.

G.1.2 Sample for inspection

Inspect the boxes of units for compliance with the relevant requirements of 6.1 and 6.2, and then select at random 15 sample units from different boxes.

G.1.3 Sample for testing

From the sample units taken in accordance with D.1.2, select 12 candles to provide a composite sample.

G.2 Compliance with the standard

Candles shall be deemed to comply with the requirements of this standard if, after inspection of the relevant units and relevant boxes and testing of the samples taken in accordance with D.1.3, no defective is found.