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Standards

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PUBLIC REVIEW DRAFT: KS 2448-1:2013: DOUBLE-CAPPED FLUORESCENT LAMPS — PERFORMANCE SPECIFICATIONS — PART 1: MINIMUM ENERGY PERFORMANCE STANDARDS (MEPS)

This Draft Kenya Standard has been prepared by the Electric Lamps and Accessories Technical Committee in accordance with the procedures of the Bureau, and is now being circulated for public comments.

The Committee would appreciate any comments on this Draft Standards, which should be submitted before **2013-03-12** using the attached template. It will also be appreciated if those who have no specific comments to make but find the draft standard generally acceptable can notify us accordingly. **Absence of any reply or comments shall be deemed to be an acceptance of the technical contents of the draft Kenya standard and shall constitute an approval vote.**

Suggestions entailing amendments of the text should include wording preferred and the relevant clause number quoted against any comments made.

This draft standard is subject to change and should not be referred to or used as a Kenya Standard.

All correspondence pertaining to this draft standard should be addressed to the Managing Director, Kenya Bureau of Standards for the attention of Zacheus Mwatha (zimwatha@kebs.org).

Yours faithfully,

Zacheus Mwatha

For: DIRECTOR
STANDARDS DEVELOPMENT AND INTERNATIONAL TRADE
ZIM

Double-capped fluorescent lamps — Performance specifications — Part 1: Minimum Energy Performance Standards (MEPS)

PUBLIC REVIEW DRAFT, JANUARY 2013

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The following organizations were represented in the technical committee.

IEEE Kenya Section
Institute of Engineers of Kenya
Association of Consulting Engineers of Kenya (ACEK)
Energy Regulatory Commission
Power Technics Ltd.
Nationwide Electrical Industries
Consumer Federation of Kenya
The Kenya National Chamber of Commerce and Industry
Kenya Association of Manufacturers
Consumer Information Network
Intertek International Ltd.
SGS Kenya Ltd.
National Environmental Management Authority (NEMA)
Ministry of Public Works
Ministry of Energy (MoE)
Jomo Kenyatta University of Agriculture and Technology (JKUAT)
University of Nairobi
Kenyatta University
Mombasa Polytechnic University College
Kenya Electricity Transmission Co. Ltd.
Kenya Bureau of Standards - Secretariat

REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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Double-capped fluorescent lamps — Performance specifications — Part 1: Minimum Energy Performance Standards (MEPS)

Foreword

This Kenya Standard was developed by the Technical Committee on Electric lamps and Wiring Accessories and is in accordance with the procedures of the Bureau.

References

For the purposes of this standard, the references to International Standards should be replaced by references to the appropriate Kenya Standards where they have been declared.

PUBLIC REVIEW DRAFT

Double-capped fluorescent lamps — Performance specifications — Part 1: Minimum Energy Performance Standards (MEPS)

1 SCOPE

1.1 This Draft Kenya Standard specifies Minimum Energy Performance Standard (MEPS) requirements for double-capped [FD¹⁾ and FDH²⁾] tubular fluorescent lamps with a nominal length of 550 mm to 1500 mm and having nominal lamp wattage of 16 watts or more, that are within the scope of IEC 60081.

This standard further specifies the following:

- a) efficacy determination;
- b) minimum energy performance standard requirements;
- c) colour rendering index requirements; and
- d) test report format.

This standard covers lamps for general illumination purposes, for use in luminaires and with lamp ballasts connected to a 230 V 50 Hz single phase or similar mains supply. Lamps that are intended for use only with high frequency (electronic) ballasts are also covered.

1.2 This standard does not apply to lamps that are clearly not intended for general illumination, specifically:

- a) lamps with a dominant colour or with an output that is predominantly outside the visible spectrum;
- b) lamps for colour matching and that have a colour rendering index greater than 90 and a colour appearance approximating to a point on the black body locus;
- c) lamps that are specifically for use in an industrial or agricultural process;
- d) lamps for medical applications; or
- e) lamps that have been given written exemption by the relevant regulatory authority on the grounds that they are for a specific purpose other than general illumination and are clearly distinguishable from lamps for general illumination.

This standard does not specify electrical safety requirements.

1.3 This Standard shall be used in conjunction with IEC 60081 and IEC 62554.

2 Normative references

The following referenced documents are indispensable for the application 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.

CIE 13.3—1995, *Method of measuring and specifying colour rendering properties of light sources*

IEC 62321:2008, *Electrotechnical products – Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)*

1) FD is a linear double capped fluorescent lamp.

2) FDH is a double capped fluorescent lamp for high frequency ballasts only.

IEC 62554 Sample preparation for measurement of mercury level in fluorescent lamps

IEC 60081, *Double-capped fluorescent lamps — Performance specifications*

3 Definitions

For the purposes of this standard, the terms and definitions given in IEC 60081 and the following apply.

3.1

check test

full or part test in accordance with IEC 60081 to verify the initial efficacy, maintained efficacy and/or colour rendering index of an individual model. A further test in accordance with IEC 62554 to verify the quantity of mercury present in each fluorescent lamp.

3.2

Colour Rendering Index (CRI)

relative measure of the shift in surface colour of an object when lit by a particular lamp, compared with how the object would appear under a reference light source. CRI is a numerical representation that rates the 'colour rendering' ability of a light source in comparison with natural daylight, which has a CRI of 100.

3.3

efficacy

ratio of lamp lumen output to the power dissipated in the lamp under the specified conditions of measurement. Symbol: F , units: lumens watts⁻¹. Efficacy is normally determined at a specified point in the lamp life (refer to 3.4 and 3.5).

3.4

initial efficacy

efficacy measured on a new lamp after 100 h of operation. Symbol: F_{100} , units: lumens watts⁻¹.

3.5

maintained efficacy

efficacy measured at 5000 h of lamp life. Symbol: F_M , units: lumens watts⁻¹. Maintained efficacy F_M shall be determined as stated in 4.2.

3.6

family of models

range of models of the one brand, for which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, efficacy, and performance characteristics (including colour rendering index). The term 'model' is synonymous with 'family of models'.

3.7

measured quantities

quantities used in this standard measured during tests carried out in accordance with IEC 60081 and IEC 62554

3.8

rounding

unless otherwise stated, numbers shall be rounded and recorded to five significant figures

3.9

supplier

In Kenya 'supplier' means manufacturer or, where a completed product is manufactured for exclusive supply to a second agent, the second agent may be identified as the supplier. For products manufactured outside Kenya 'supplier' means manufacturer's local agent or importer, having an address in the country(s) where the product is sold (Kenya).

4 Performance requirements

4.1 General

All fluorescent lamps covered within the scope of Clause 1.1, shall conform to the performance criteria specified in clauses below.

4.2 Minimum Energy Performance Standard (MEPS)

Each tubular fluorescent lamp shall meet the requirements in Table 1 for initial efficacy (F_{100}), maintained efficacy (F_M) and minimum CRI.

F_M may be calculated from test data measured at more or less than 5 000 h as follows:

- a) Where lumen data is not available for 5 000 h, any unadjusted single measurement at more than 5 000 h may be used to confirm the F_M requirements.
- b) Where a lumen measurement is available for over 2 000 h but less than 5 000 h, F_M may be calculated as follows:
 - (i) by linear extrapolation from the F_{100} value through the measured data point to 5 000 h; or
 - (ii) by linear interpolation between a point in the range of 2 000 h to 5000 h and second point in the range 5 000 h to 8 000 h.
- c) Where a lumen measurement is available for over 5 000 h but less than 8 000 h, F_M may be calculated by linear interpolation between a point in the range of 2 000 h to 5 000 h and second point in the range 5 000 h to 8000 h.

Table 1 — Lamp efficacy requirements

Lamp nominal length L, mm mandatory	$550 \leq L < 700$	$700 \leq L < 1150$	$1150 \leq L < 1350$	$1350 \leq L < 1500$
Lamp typical power, watts (informative)	16 - 24	17 - 40	28 - 50	35 - 80
Initial efficacy, Maintained efficacy	$F_{100} \geq 66.0$ and $F_M \geq 57.5$	$F_{100} \geq 74.0$ and $F_M \geq 61.0$	$F_{100} \geq 80.0$ and $F_M \geq 70.0$	$F_{100} \geq 85.0$ and $F_M \geq 70.0$
Minimum CRI	79	79	79	79

4.3 Test conditions for determining Minimum Energy Performance Standard of tubular fluorescent lamps

Initial lamp efficacy (lumen output and lamp power) shall be determined in accordance with IEC 60081, except that tests on high frequency operated lamps with a nominal diameter of 16 mm (T5) may be made at and temperature of 35°C (instead of 25 °C).

Maintained efficacy (lumen output and lamp power) shall be determined in accordance with IEC 60081
Colour rendering index (CRI) shall be determined in accordance with CIE 13.3—1995.

4.4 Number of tests and processing of data

For the purposes of verification of the rated values of a model at least one unit of the nominated model should be tested in accordance with the standards specified in 4.3.

More than one unit may be tested at the supplier's discretion. A test report in accordance with Annex B should be submitted for each of the MEPS requirements specified in 4.2.

NOTE Products may be registered on the basis of manufacturer's published data.

4.5 Environment criteria

4.5.1 General

This clause specifies the maximum permissible quantity of mercury in a fluorescent lamp and further specifies test procedures to determine the quantum of mercury. The requirements in Clauses 4.5.2 to 4.5.4 shall apply.

4.5.2 Permissible limit

The maximum quantity of mercury present in fluorescent lamps shall not exceed 15 mg.

4.5.3 Test procedure

The quantity of mercury present is determined in accordance with the relevant clauses of IEC 62554.

4.5.4 Compliance

Compliance is verified in accordance with clauses of IEC 62554.

5 Application and test results formats

5.1 Application for registration

5.1.1 General

For registration or approval of Minimum Energy Performance standard requirements, clauses 5.1.2 and 5.1.3 shall apply.

5.1.2 Registration

For MEPS registration of the tubular fluorescent lamp brand and model, or type, an application in the format shown in Annex A of this standard shall be submitted. To register, the state regulatory authority should be contacted.

5.1.3 Test report

A test report summary in accordance with Annex B for each model tested should be submitted with the MEPS application.

5.1.4 Supporting documents

All supporting documents and test reports used in the MEPS application and any summary report in Annex B shall be made available to the relevant regulatory authority upon request. These records shall be retained for at least six years after the last date of manufacture or import, whichever is applicable.

5.1.5 MEPS transition

All products within the scope of MEPS manufactured or imported for sale into Kenya one year after the gazettment of MEPS.

ANNEX A (normative)

Application for registration of tubular fluorescent lamp for MEPS

A1 Scope

This annex sets out the required format for submitting an application for registration and record keeping.

A2 Application form

(Please type or print)

SECTION 1: Details of manufacturer/importer			
Name of applicant:	.....	
Company name:	.....	
Company address:	.....	
Contact person: (A name, address and contact details for a person in Kenya shall be provided)	Name:	.....
	Address:	.....
	Position/Title:	.....
	Telephone:	.....
	Facsimile:	.....
	E-mail:	.....
The Standard under which this application is made:	KS 2448-1:2013		
Is the application meant for a single model or a family of models? (identify one)	<input type="checkbox"/> Single		
	<input type="checkbox"/> Multiple		
SECTION 2: Description of Tubular Fluorescent Lamp			
Country of manufacture:			
Name of manufacturer:			
Brand name:			
Model name(if available):			
Model number or family number:			
Year and month model(s) first manufactured		imported:	
If registering a family of models, list all model names and numbers covered by this application:			
Year and month in which model first available in Kenya:			
Does the lamp model have any markings to indicate date, serial number or batch number? (indicate correct answer)	Yes:		
	No:		
If the date of manufacture is permanently marked on the rating plate in a non-encrypted format provide a description of the date format			
Does this model or family replace or supplement another	Yes		

model or family with the same specifications? (identify one)	No	
If yes, indicate relevant details:	Model name:	Model number: Registration number:
SECTION 3: TESTING AND TEST REPORT		
Which of the following does the test and report rely on?	1 A test report summary submitted with a previous application 2 A summary test report in the approved format that is supplied with this application 3 Published data by the manufacturer 4 Unpublished data from the manufacturer 5 Correspondence from the manufacturer 6 Other data — please specify	
	<i>(Proceed to Section 4 if options 3, 4, 5 or 6 are selected)</i>	
	<i>(If option 1 is selected, note the source registration number and proceed to Section 4)</i>	
Test laboratory type: (identify one)	<input type="checkbox"/> Own 'in-house' or manufacturer's laboratory <input type="checkbox"/> Independent laboratory	
Test laboratory name:		
Test laboratory address:		
Test laboratory location: (indicate whether in Kenya or outside Kenya)		
Contact details of the person who conducted the tests:		
Test laboratory accreditation:		
Application to standard (indicate correct answer)	<input type="checkbox"/> KS 2448-1:2013 <input type="checkbox"/> Other-please specify	
Test Standard used: (Identify standard by number)	<input type="checkbox"/> KS 2446-2:2013 <input type="checkbox"/> Other-please specify	
Test report number(s) and date(s):		
SECTION 4: SPECIFIC PRODUCT DETAILS		
Nominal length (mm)		
Nominal diameter (mm)		
Nominal wattage (Watts)		
International Lamp Coding System (ILCOS) code		
Lamp frequency	50 Hz:	
	High frequency:	
SECTION 5: Test Results/Rated Values		
Data below is based on rated values or test results supported with a summary test report in accordance with Annex B		
Is the data below based on	<input type="checkbox"/> Rated values <input type="checkbox"/> Test results	

Colour rendering index (CRI) [According to CIE 13.3-1995]	
Initial lumens (L)	
Initial lamp watts (W)	
Initial efficacy, F_{100} (lumens/watt)	
Maintained lumens (L)	
Maintained lamp watts (W)	
Maintained efficacy, F_M (lumens/watt)	
SECTION 6: Minimum Energy Performance Standards (minimum efficiency)	
MEPS are mandatory for all tubular fluorescent lamps that are covered within the scope of this Standard (see Clause 1.1). Detailed MEPS requirements are set out in Clause 4.	
Lamp nominal length (mm) :	.....
Applicable MEPS levels	
Initial efficacy (lumens/watt):	.....[lumens/watt] (see Table 1)
Maintained efficacy (lumens/watt):	.....[lumens/watt] (see Table 1)
Rated/Tested levels	
Initial efficacy (lumens/watt):	.....[lumens/watt] (see Table)
Maintained efficacy (lumens/watt):	.....[lumens/watt] (see Table)
Performance prerequisite declaration	
Does this model comply with MEPS? (Identify one)	<input type="checkbox"/> Yes <input type="checkbox"/> No
SECTION 7: Mercury Content	
Mercury present in fluorescent lamps determined in accordance with IEC 62554.	.....mg

SECTION 8: DECLARATION

I declare that the details stated above are true and correct in accordance with the requirements of **KS 2448-1:2013**.

Signature of Applicant:..... Date

For office use only:

Date received: Registration number

ANNEX B (informative)

Summary test report for a tubular fluorescent lamp for MEPS

This annex sets out the preferred format for a test report where the lamp is tested to IEC 60081.

Test Report of a Tubular Fluorescent Lamp for Energy Efficiency

(Please type or print)

DESCRIPTION OF TUBULAR FLUORESCENT LAMP	
Brand name:	
Model name or family name (if available):	
Model number or family number:	
Batch number:	
Nominal length (mm)	
Nominal diameter (mm)	
Nominal wattage (watts)	
ILCOS code	
Country of manufacture:	
LABORATORY DETAILS	
Test laboratory type: (identify one)	<input type="checkbox"/> Own 'in-house' laboratory <input type="checkbox"/> Independent laboratory
Test laboratory name:	
Test laboratory location: (Identify one)	
Test laboratory address:	
Test laboratory accreditation:	
NOTE Laboratory details for each test to be included, where more than one laboratory has been used.	
TEST RESULTS	
Tests should be undertaken in accordance with IEC 60081. Photometric characteristics should be measured in accordance with the relevant recommendation of the CIE (Commission Internationale de l'Eclairage)	
Initial lumens test	
Test report number:	
Test laboratory name:	
Date of test:	
Lamp batch tested:	
Test standard used	IEC 60081 Other-specify
Reference ballast brand and model:	
Ballast supply voltage (V):	
Ballast supply frequency (Hz):	
Highest recorded ambient temperature (°C):	

Lowest recorded ambient temperature (°C):	
Lamp supply voltage (V):	
Lamp current (A):	
Lamp input power (W):	
Initial luminous flux (lumens) (L):	
Initial efficacy F100 (calculated) (100 hours):	
Initial efficacy (calculated) (100 hours)	
Maintained lumens test	
Test report number:	
Test laboratory name:	
Date of test:	
Lamp batch tested:	
Test Standard used	IEC 60081 Other-specify
Reference ballast brand and model:	
Ballast supply voltage (V):	
Ballast supply frequency (Hz):	
Highest recorded ambient temperature (°C):	
Lowest recorded ambient temperature (°C):	
Lamp supply voltage (V):	
Lamp current (A):	
Lamp input power (W):	
Maintained luminous flux (lumens) (L):	
Maintained efficacy FM (calculated) (5000 hours):	
Colour rendering index (CRI)	
Test report number:	
Test laboratory name:	
Date of test:	
Lamp batch tested:	
Test Standard used:	CIE 13.3—1995 Other (specify)
Reference ballast brand and model:	
Ballast supply voltage (V):	
Ballast supply frequency (Hz):	
Colour Rendering Index	
Mercury present in fluorescent lamp:	_____ mg
determined in accordance with:	IEC 62554, other-specify

**ANNEX C
(informative)**

Energy efficiency class

The energy efficiency class of a lamp shall be determined as follows:

Lamps shall be classified in class A if:

- a) Fluorescent lamps without integral ballast (those requiring a ballast and/or other control gear to connect them to the mains)

$$W \leq 0.15 \Phi + 0.0097\Phi$$

- b) Other lamps

$$W \leq 0.24 \Phi + 0.0103\Phi$$

where

Φ is the lumen output of the lamp

where

W is the power input into the lamp in watts.

If a lamp is not classified in class A, reference wattage W_R shall be calculated as follows:

$$W_R \leq 0.88 \Phi + 0.049\Phi$$

when $\Phi > 34$ lumens

where

Φ is the lumen output of the lamp.

An energy efficiency index E_I is then set as—

$$E_I = \frac{W}{W_R}$$

where

W is the power input into the lamp in watts.

The energy efficiency classes are then set in accordance with Table C1.

Table C1: Energy Efficiency

Energy efficiency class	Energy efficiency Index E_I
B	$E_I < 60\%$
C	$60\% \leq E_I < 80\%$
D	$80\% \leq E_I < 95\%$
E	$95\% \leq E_I < 110\%$
F	$110\% \leq E_I < 130\%$
G	$E_I \geq 130\%$