

**Information technology equipment — Minimum
Energy Performance Standards — Computer
monitors**

Part 1:

Performance and energy rating requirements

KS 2879-1:2019

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Information technology equipment— Minimum Energy Performance Standards (MEPS) — computer monitors

Part 1:

Performance and energy rating labels requirements

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DKS 2879-1:2019

Foreword

This Standard was prepared by the Technical Committee 98 WG on Sustainability for and by ICT, under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This standard provides designers, manufacturers, exporters, test laboratories, regulators and users of computers with a test method to assess the energy efficiency of computer monitors.

This series consists of two parts under the general title, **Information Technology equipment — Minimum Energy Performance Standards (MEPS) — Computer Monitors**

Part 1 — Performance and Energy Label Requirements

Part 2 — Test Methods

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

- i) ENERGY STAR® Program Requirements Product Specification for Computers-Eligibility Criteria Version 7.0 ENERGY STAR Computer Specification
- ii) ENERGY STAR Program Requirements for Displays (Sep 2015)
- iii) EU 75 Ecodesign (2010) Ecodesign requirements for computers and computer servers

Acknowledgement is hereby made for the assistance derived from these sources.

Information technology equipment — Minimum energy performance standards (MEPS) — computer monitors, Part 1: Performance and energy rating labels requirements

1. Scope and application

1.1. Scope

This standard specifies the minimum energy performance standards (MEPS) and energy rating label requirement for computer monitors. The power consumption of the computer monitors shall be measured according to current version of Part 2 of this standard.

1.2. Application

This Standard does not apply to the following;

- a) Electronic displays used exclusively for digital signage or digital picture frames.
- b) Electronic Displays used exclusively for advertising
- c) *High performance electronic displays* — An electronic display using in plane switching (IPS) OR Vertical Alignment (VA) technology and offering-
 - i) Native pixel resolution greater than or equal to 2.3 (1920 * 1200) mp; and
 - ii) Viewing angle greater than or equal to 178 degrees (at contrast ratio of min. 1:10); and
 - iii) Colour gamut greater than or equal to 72% of PAL; and
 - iv) Diagonal size greater than or equal to 61 cm (24 inches)
- d) *Specialized electronic displays* Intended for use primarily in commercial, professional fields, engineering, medicine, graphic arts, etc., and not intended for sale to the general public. Examples include the following:
 - i) Those defined as professional products that are in scope of European Standard, EN 55103
 - ii) Medical products as set out in the IEC 60601 series.
 - iii) Those that comply with PS 3.1 – 2011, the digital imaging and communications in medicine (DICOM) standard (for medical electronic displays). Products used in diagnostic medical applications do not have a power state meeting the definition of Standby Active (Sleep) Mode (e.g. FDA's specifications for medical devices that require luminance to be maintained over the lifetime of the electronic displays among other requirements) that prevent such electronic displays from implementing power management capabilities
 - iv) Products that can display content through installed content through installed serial digital interface (SDI) signal path/s including medical electronic displays intended by manufacturers to be used in the diagnosis , treatment or monitoring of a patient.
- e) *Combined products* — Products with video electronic display capability and other functionality including one or more of the following:
 - i) Built-in integrated networking functionality, the circuitry for which cannot be physically separated or switched independently from electronic displays component. Examples of such functionality include, but are not

DKS 2879-1:2019

restricted to, video- conferencing capability, VoIP capability and PColP capability. The inclusion of just a camera, microphone, and/or loudspeakers is not considered a network function.

- ii) Integrated PCs, tablet computers, slates, electronic readers, smart phones, and Personal digital assistants.

f) *Public displays* Products intended for electronically displaying content to multiple users, such as in public settings, conference rooms, etc., with one or more of the following characteristics:

- i) The product has a screen size of 81cm (32 inches) or above.
- ii) The product is marketed as a product that is intended to be viewed by more than one user at a time
- iii) The product is not intended for desktop use
- iv) The product is not supplied with a means of allowing it to be freestanding.
- v) The product requires installation on a permanent basis (it cannot be easily moved without tools being used).

g) *Large displays* Devices with a display size greater than 152 cm (60 inches) diagonally.

h) Products classified, marketed and /or sold as televisions or TVs includes products with an integrated television tuner, products with a computer input port (e.g. VGA) that are marketed and sold primarily as televisions, and component televisions.

1.3. Applications

This standard shall be read in conjunction with Part 2.

2. Normative References

Information Technology equipment — Minimum Energy Performance Standards (MEPS) — Computer Monitors, Part 2 Test methods

KS IEC 62087-1, Audio, video, and related equipment – Determination of power consumption – Part 1: General

KS IEC 62087-2, Audio, video, and related equipment – Determination of power consumption – Part 2: Signals and media

3. Terms and definitions

For the purpose of this standard, the definitions given in part 1, IEC 60050-3300 and IEEE 100 , and those below apply.

3.1

Automatic Brightness Control (ABC)

The self- acting mechanism that controls the brightness of a display as a function of ambient light.

3.2

Computer Monitor

a commercially available product with a display screen and associated electronics. often encased in a single housing, that as its primary function displays visual information from a computer, workstation or server via one or more inputs, such as VGA,DVI, HDMI or IEEE 1394, or through a wireless connection

Examples Common computer monitor technologies include liquid crystal display (LCD), light Emitting Diode (LED) , Cathode Ray tube(CRT) and plasma display panel (PDP)

3.3

Family of modes

In general, computer monitors do not have families of models for energy consumption purposes.

Note 1 to entry Multiple models may be included as a family if

- a) they are marketed as in the same class or category of product;
- b) they have same energy performance characteristics (i.e. use the same declared data or characteristics on which compliance with MEPS

and/or labelling is assessed);

c) they have identical relevant physical characteristics (e.g. overall size, and any other dimensions or component arrangement) which might affect performance;

d) they rely on the same test report data (and use those reported data for purposes required by the Standard) ; and

e) they are not more than 10 individual models*.

3.4

Measured Quantities

Quantities measured using Part 2 of this standard.

3.5

Off Mode

The operational mode of a computer monitor that is_

- a) connected to a power source;
- b) engaged by a mechanical power switch; and
- c) not providing any function.

3.6

On Mode

The operational mode of a computer monitor that is_

- a) is connected to a power source
- b) has all mechanical (hard)power switches turn on; and
- c) is performing its primary function of producing an image.

3.7

Registration

Registration with relevant authority in Kenya.

3.8

Standby active (sleep) mode

The operational mode of a computer monitor that _

- a) is connected to a power source;
- b) has all mechanical (hard) power switches turned on; and
- c) has been placed into s low- power mode by receiving a signal from an externally connected device (e.g. computer, game console or set top box) or by cause of an internal function such as a sleep timer or occupancy sensor.

DKS 2879-1:2019

4. Determining the minimum energy performance of computer monitors

4.1 General

- i) Unless otherwise stated, numbers shall be rounded and recorded to accordance with KS EAS 124:1999, Rounding off numerical values.
- ii) Power measurements shall be performed according to Part 2 of the Kenya Standard.
- iii) On mode power measurements shall be rounded to one decimal place.
- iv) Off mode and standby active mode power measurements shall be rounded to two decimal places. The test voltage and frequency shall 240V and 50 Hz respectively.
- v) For a computer monitor that is powered by an external power supply (EPS), the computer monitor shall be tested with the supplied EPS. The power measurements and other related measurements required by this Standard are those of the combination of the computer monitor and the EPS.

4.2 On mode MEPS power requirements

4.2.1 MEPS requirements for computer monitors that do not have ABC enabled by default

For computer monitors where ABC is not enabled by default, the on mode (P_{avg}) power consumption shall be equal to or less than the values specified in Table 1. On mode power consumption shall be as measured in Part 2 of this standard.

TABLE 1 — Minimum energy performance requirements

Computer monitor category	Maximum on mode power consumption (W)
Diagonal screen size < 76 cm Screen Resolution ≤ 1.1 MP	$P_{O(MEPS)} = (6 \times \text{Screen Resolution in MP}) + (0.00775 \times \text{Screen area in cm}^2) + 3$
Diagonal screen size < 76 cm Screen Resolution > 1.1 MP	$P_{O(MEPS)} = (9 \times \text{Screen Resolution in MP}) + (0.00775 \times \text{Screen area in cm}^2) + 3$

4.2.2 MEPS requirements for monitors that have ABC enabled by default

For computer monitors where ABC is enabled by default, on mode (P_{avg}) power shall be as calculated in equation 2.1 and shall be equal to or less than the values specified in Table 1.

$$(P_{avg}) = (0.8 \times P_h) + (0.2 \times P_l)$$

.....Equation 4.2.2

Where

- P_{avg} = the average on the mode power consumption in watts, rounded to the nearest tenth of a watt
- P_h = the on mode power consumption in high ambient lighting conditions
- P_l = the on mode power consumption in low ambient lighting conditions

Note The formula assumes the display will be low in ambient lighting conditions 20% of the time.

4.3 Standby active mode power requirements

Standby active (also known as sleep) shall be equal to or less than 2W.

4.4 Off mode power requirements

- i) Off mode shall be equal to or less than 1 W.
- ii) A mechanical switch, where provided, shall be actuated to put the device into off mode. If there is more than one such switch, the most readily available shall be used. If there is no mechanical power off switch this requirement does not apply.

5. Determination of energy rating for computer monitors

5.1 Measuring conditions

- i) On (average) power measurements shall be performed using the dynamic broadcast content video signals supplied with IEC 62087, Ed.2.0 or Ed.3.0, and using the measuring conditions for computer monitors in On (average) mode as specified in Part 2 with ABC disabled either through a menu option or applying 300Lux or more to the ABC sensor.
- ii) The input on the computer monitor to which the video test signal is applied shall be specified in the test report. The image on the computer monitor screen shall be adjusted so that the test video covers the entire screen.
- iii) The test voltage and frequency shall be 240V and 50 Hz respectively.

5.2 Projected annual energy consumption (PAEC)

5.2.1 General

The PAEC of a computer monitor shall be determined in accordance with Equation 3.1

5.2.2 Calculation of PAEC

$$\text{PAEC} = 0.365 \times [(\text{computer monitor On (average)} \times 10) + (14\text{-hour standby active})] \text{ kWh/Yr}$$

Where

Computer monitor On (average) = the power measurement in watts of On (average) mode using dynamic broadcast content in AS/NZS 62087.1 rounded to one decimal place.

14-hour standby active = the standby energy consumption as determined by Clause 4.3

5.3 Determination of standby active (sleep) mode

In standby active mode, the computer monitor is normally waiting for a command from a computer connected to the computer monitor to switch on. This mode is a low power mode.

The 14 hour standby shall be calculated in accordance with Equation 5.3

$$14 \text{ hour standby active} = 24 \text{ hour measured standby active} \times 0.58$$

..... Equation 5.3

Where

24 hour measured standby active is measured in Wh in standby active mode over a 24-hour period.

DKS 2879-1:2019

5.4 Comparative energy consumption (CEC)

The CEC for a model shall be an integer in units of kilowatt-hour/year. It shall not be less than the PAEC (refer to Clause 3.2). The chosen value of the CEC shall appear on the energy label and shall be used to determine the star rating index.

5.5 Energy efficiency validity

The CEC value shall be accepted as valid if, when a single sample of a labelled model is subjected to a check test, is PAEC is such that

$$\text{PAEC} \leq 1.1 \times \text{CEC}$$

If this is not the case, the CEC shall be accepted as valid if three additional units are tested and the average PAEC of these additional units is such that-

$$\text{PAEC}_{\text{av}} \geq 1.1 \times \text{CEC}$$

For validation of standby energy usage, the standby energy consumption shall be measured over a 24-hour period. shall be used to determine the 14-hour standby energy use.

$$14 \text{ hour calculated Standby active} = 0.58 \times 24\text{-hour standby active}$$

.....Equation 5.5

Where

$$24\text{-hour standby Active} = \text{The energy measurement in Wh over a 24-hour period.}$$

NOTE The 10% in the equations 3.3 and 3.4 is not permitted to be applied as a tolerance to the original test measurements, which are used to support an application for registration. The 10% is an allowance only for possible variation in test results on test samples due to production variability, sampling, error and all measurement uncertainties in or between laboratories.

6. Determination of star rating index and requirements for energy labels for computer monitors

6.1 STAR RATING INDEX (SRI)

The SRI for a computer monitor shall be calculated in accordance with Equation 1 below

$$\text{SRI} = 1 + \frac{\log(\text{CEC}/\text{BEC})}{\log(1 - \text{ERF})}$$

..... Equation 6.1

Where

SRI = star rating index

Log = log to base 10

CEC = comparative energy consumption

BEC = base energy consumption, calculated as $65.41 + 0.0934 \times \text{screen area in cm}^2$

ERF = energy rating factor and is 20% or 0.2

The energy rating shall be in accordance with Table 2.

Table 2: Determination of Star Rating

SRI	Star Rating
1.0 ≤SRI< 2.5	1
2.5 ≤SRI< 5.0	2
5.0 ≤SRI< 7.5	3
7.0 ≤SRI< 10.0	4
10.0 ≤SRI	5

6.2 Label type and size

The computer monitor label shall be as specified in **Annex A**.

6.3 Label positioning and attachment

The label shall be attached so that is not obscured when the computer monitor is displayed, using a fixing mechanism that discourages removal of the label in the store. The label shall be attached to the computer monitor in one of the following two ways:

- (a) Attached to the top of the computer monitor
- (b) Attached directly to the screen or mask

In addition to one of the above, a label may also be placed on the packaging of the computer monitor.

The energy rating label may be incorporated into another label as long as the energy rating label conforms to the minimum size criteria in 6.2 above.