SLOVENSKI STANDARD
SIST EN 50672:2018

01-april-2018

Zahteve za okoljsko primerno zasnovo računalnikov in računalniških strežnikov

Ecodesign requirements for computers and computer servers

Anforderungen an die umweltgerechte Gestaltung von Computern und Computerservern

Exigences d'écoconception applicables aux ordinateurs et aux serveurs informatiques

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Ta slovenski standard je istoveten z: **EN 50672:2017**

ICS:

35.160	Mikroprocesorski sistemi	Microprocessor systems

SIST EN 50672:2018 **en,fr,de**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50672

November 2017

ICS 35.160

English Version

Ecodesign requirements for computers and computer servers

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aux serveurs informatiques

Anforderungen an die umweltgerechte Gestaltung von
Computern und Computerservern

This European Standard was approved by CENELEC on 2017-08-28. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 50672:2017 E

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European foreword

This document (EN 50672:2017) has been prepared by Technical Committee CLC/TC 100X, "Audio, video and multimedia systems and equipment and related sub-systems", Working Group 02, "Energy efficiency".

The following dates are fixed:

latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2018-08-28
latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2020-08-28

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For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

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Introduction

A preparatory study carried out by the European Commission estimated the cost-efficient improvement potential in the electricity consumption of computers between 2011 and 2020 at about 93 TWh, which corresponds to 43 Mt of CO_2 emissions, and in 2020 at between 12,5 TWh and 16,3 TWh, which corresponds to 5,0-6,5 Mt of CO_2 emissions. Consequently, computers constitute a product group for which Ecodesign requirements have been established.

Since much of the energy-savings potential of desktop thin clients, workstations, small-scale servers and computer servers is linked to the efficiency of their internal power supplies and since the technical specifications of internal power supplies for these products are similar to those for desktop computers and integrated desktop computers, the provisions on internal power supply efficiency set up for desktop computers also apply to desktop thin clients, workstations, small-scale servers and computer servers.

While the focus is put on energy consumption, computer products (and energy-related products in general) are expected to be designed in such a way to also preserve other resources.

The present European Standard provides a way to determine compliance of computers and computer servers in scope of Commission Regulation (EU) N° 617/2013 with the applicable requirements through reliable, accurate and reproducible measurement methods, which take into account the recognized state of the art, including, where available, existing harmonized standards established in conformity with the applicable European standardization legislation. It also provides guidance for declarations that are required under the same Regulation.

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1 Scope

This European Standard provides methods to determine, by means of tests, measurements and/or calculations:

— The energy consumption of desktop computers, integrated desktop computers and notebook computers in OFF mode, with Wake-on-LAN (when available) enabled and disabled;

— The energy consumption of desktop computers, integrated desktop computers and notebook computers in other modes of operation, including low power state(s);

— The lowest power state of desktop computers, integrated desktop computers and notebook computers;

— The Discrete Graphics Card (dGfx) category, when applicable;

— The internal power supply efficiency of desktop computers, integrated desktop computers, computer thin clients, workstations, small-scale servers and computer servers;

— The availability and the behaviour of a power management function.

NOTE   The "Discrete Graphics Card" may not be a physically separate printed circuit board but any hardware providing graphics acceleration function.

This European Standard also suggests methods to determine, when such information is not otherwise available from a trustable source:

— The efficiency of the external power supply supplied with the computer, if applicable;

— The noise level of desktop computers, integrated desktop computers, computer thin clients, workstations, small-scale servers and computer servers;

— The minimum number of loading cycles that the batteries can withstand;

— The total mercury content in the integrated display, when applicable.

This European Standard additionally provides guidance on information to be provided by manufacturers under some Ecodesign programmes or regulations, including, when applicable:

— The results of the above mentioned energy efficiency measurements;

— Energy efficiency parameters calculated from the above measurements (e.g. the total energy consumption, based on a pre-defined duty cycle);

— The external power supply efficiency;

— The noise levels (the declared A-weighted sound power level) of the computer;

— The minimum number of loading cycles that the batteries can withstand;

— Whether internal batteries can be "accessed and replaced by a nonprofessional user", and whether the related text is present and legible on the external packaging;

— User information on power management functionality;

— The total mercury content in the integrated display.

This European Standard applies to desktop computers, integrated desktop computers, notebook computers (including tablet computers, slate computers and mobile thin clients), desktop thin clients, workstations, mobile

workstations, small-scale servers and computer servers, that can be powered directly from the mains alternating current (a.c.), including via an external or internal power supply.

This European Standard does not cover blade systems and components, server appliances, multi-node servers, computer servers with more than four processor sockets, game consoles and docking stations.

This European Standard may be applied to any type of computer and computer server not specifically excluded, regardless of its power demand.

2   Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50563:2011, *External a.c. - d.c. and a.c. - a.c. power supplies – Determination of no-load power and average efficiency of active modes*

EN 50564:2011, *Electrical and electronic household and office equipment - Measurement of low power consumption*

EN 61960:2011, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for portable applications*

EN 62321-4, *Determination of certain substances in electrotechnical products - Part 4: Mercury in polymers, metals and electronics by CV-AAS, CV-AFS, ICP-OES and ICP-MS (IEC 62321-4)*

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EN 62554:2011, *Sample preparation for measurement of mercury level in fluorescent lamps (IEC 62554:2011)*

EN 62623:2013, *Desktop and notebook computers - Measurement of energy consumption (IEC 62623:2012)*

ECMA-74, *Measurement of Airborne Noise emitted by Information Technology and Telecommunications Equipment, 13th edition (June 2015)*

ECMA-109, *Declared Noise Emission Values of Information Technology and Telecommunications Equipment, 6th edition (December 2012)*

3   Terms, definitions and abbreviations

3.1   Terms and definitions

For the purposes of this document, the following term and definition applies.

NOTE 1   Further terms and definitions from standards and regulations related to the topic of this standard can be found in the compendium of terms used in Ecodesign Directives, Regulations and Standards, maintained by the CEN-CENELEC Ecodesign Coordination Group (EcoCG).

NOTE 2   When this European Standard is used to give presumption of conformity to a European Directive or Regulation, definitions given in the Directive or Regulation prevail.

3.1.1
rated output power
maximum continuous output power of the power supply, as specified by the manufacturer

Note 1 to entry: In EC Regulation 278/2009 the corresponding term is "nameplate output power".

[SOURCE: EN 50563:2011, definition 3.1.5, modified by removal of "external"]

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3.2 Abbreviations

a.c.	alternating current
CPU	Central Processing Unit
d.c.	direct current
DDR	Double Data Rate (applies to memory chips)
dGfx	Discrete Graphics Card
EPS	External Power Supply
ESD	Electrostatic Discharge
E_{TEC}	Total Energy Consumption (over a one-year period)
EUT	Equipment Under Test
FB_BW	Frame Buffer Bandwidth
GB/s	GigaByte per second
GDDR	Graphics Double Data Rate (applies to memory chips)
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LISN	Line Impedance Stabilization Network
mg	milligrams
PF	Power Factor
PFC	Power Factor Correction
P_{idle}	Power in idle state
P_{off}	Power in off mode
P_{sleep}	Power in sleep mode
RAM	Random Access Memory
RoHS	Restriction of the Use of Certain Hazardous Substances
RMS	Root Mean Square
WOL	Wake-On-LAN

4 Energy efficiency parameters

4.1 Energy consumption in off mode

4.1.1 Off mode without Wake-On-LAN

Energy consumption in off-mode shall be determined in accordance with EN 62623:2013, 5.3.2.

Measurement shall be performed on desktop computers, integrated desktop computers, and notebook computers, after they automatically switched to off mode, as a result of a given period of inactivity. In addition to the energy consumption, the length of the inactive period after which the computer automatically switches to off mode shall be measured and recorded.

Test setup, test conditions, and measurement instrument specifications shall comply with 6.1.

If off mode without Wake-on-LAN is not the low power mode into which the computer automatically switches after a certain period of inactivity, the computer shall be manually forced into off mode without Wake-on-LAN for the purpose of the measurement.

4.1.2   Off mode with Wake-On-LAN

For desktop computers, integrated desktop computers and notebook computers with Wake-On-LAN in off mode functionality enabled as factory default, the measurement shall be repeated after Wake-On-LAN from off mode has been re-enabled through the operating system or by other means, and the EUT placed back in off mode.

Measurement shall be performed on desktop computers, integrated desktop computers, and notebook computers, after they automatically switched to off mode with Wake-On-LAN, as a result of a given period of inactivity. In addition to the energy consumption, the length of the inactive period after which the computer automatically switches to off mode with Wake-On-LAN shall be measured and recorded.

Test setup, test conditions, and measurement instrument specifications shall comply with 6.1.

If off mode with Wake-on-LAN is not the low power mode into which the computer automatically switches after a certain period of inactivity, the computer shall be manually forced into off mode with Wake-on-LAN for the purpose of the measurement.

4.2   Energy consumption in sleep mode

4.2.1   Sleep mode without Wake-On-LAN

Energy consumption in sleep mode shall be determined in accordance with EN 62623:2013, 5.3.3.

Measurement shall be performed on desktop computers, integrated desktop computers, and notebook computers, after they automatically switched to sleep mode, as a result of a given period of inactivity. In addition to the energy consumption, the length of the inactive period after which the computer automatically switches to sleep mode shall be measured and recorded.

Test setup, test conditions, and measurement instrument specifications shall comply with 6.1.

Default settings of the EUT, as supplied to the end-user, shall be used for this test. However, if the EUT supports WOL, that function shall be disabled.

4.2.2   Sleep mode with Wake-On-LAN

For desktop computers, integrated desktop computers and notebook computers with Wake-On-LAN in sleep mode functionality enabled as factory default, the energy consumption in sleep mode with Wake-On-LAN enabled shall also be determined in accordance with EN 62623:2013, 5.3.3.

Measurement shall be performed on desktop computers, integrated desktop computers, and notebook computers, after they automatically switched to sleep mode with Wake-On-LAN, as a result of given period of inactivity. In addition to the energy consumption, the length of the inactive period after which the computer automatically switches to sleep mode with Wake-On-LAN shall be measured and recorded.

Test setup, test conditions, and measurement instrument specifications shall comply with 6.1.

4.3   Default settings of the EUT, as supplied to the end-user, shall be used for this test. However, if the EUT supports WOL, that function shall be enabled.Energy consumption in idle mode

For desktop computers, energy consumption in idle state shall be determined in accordance with EN 62623:2013, 5.3.5 ("short idle").

For integrated desktop computers, energy consumption in idle state shall be determined in accordance with EN 62623:2013, 5.3.4 ("long idle").

For notebook computers, energy consumption in idle state shall be determined in accordance with EN 62623:2013, 5.3.4 ("long idle").

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Test setup, test conditions, and measurement instrument specifications shall comply with 6.1.

4.4 Energy consumption in the lowest power mode

For desktop computers, integrated desktop computers and notebook computers where the off mode is the lowest power state, the energy consumption in the lowest power state is identical to the one determined in accordance with 4.1.1.

NOTE   There is no need to duplicate this measurement if no additional state is provided.

For desktop computers, integrated desktop computers and notebook computers with an additional power state, where the power demand is lower than in off mode, an additional measurement shall be made in accordance with EN 62623:2013, 5.3.2, where "off mode" is replaced by that additional state.

4.5 Annual total energy consumption

Annual total energy consumption shall be determined, using a theoretical duty cycle, taking into account the energy consumption measured in off mode, sleep mode and idle state. Subclauses 4.1 to 4.4 indicate how to measure the energy consumption in each of those 3 states.

For computers lacking a discrete sleep mode, energy consumption measured in idle state may, under certain conditions, replace the energy consumption in sleep mode in the applicable formula.

NOTE 1   According to regulation (EU) N° 617/2013, power in idle state (P_{idle}) may be used in place of sleep mode (P_{sleep}) for desktop computers and integrated desktop computers that lack a discrete sleep mode, but have idle state power demand less than or equal to 10 W.

NOTE 2   Examples of theoretical duty cycles applicable to certain categories of computer under Regulation (EU) N° 617/2013 are given in Annex B.

NOTE 3   Applicable limits to the annual total energy consumption may depend on the type of computer as well as the category of the installed and enabled discrete graphics card(s), if any.

4.6 Internal Power Supply (IPS) efficiency and power factor

The efficiency and the power factor of the internal power supply shall be measured for desktop computers, integrated desktop computers, thin clients, workstations, small-scale servers and computer servers.

For all types of internal power supplies, the efficiency and the power factor shall be measured at 20 %, 50 % and 100 % of the rated [nameplate] output power.

For single output internal power supplies, the efficiency shall also be measured at 10 % of the rated [nameplate] output power.

For single output internal power supplies with a rated output power greater than 500 W, the power factor shall also be measured at 10 % of the rated [nameplate] output power.

Test setup, test conditions, and measurement instrument specifications shall comply with 6.3.

This test procedure assumes that the internal power supply meets following criteria:

— Detailed input and output ratings are available on the name plate or in manufacturer's literature, specifying the maximum loads that can safely be placed on each individual dc output voltage bus and, where necessary, groupings of those voltage busses.

— The power supply has connectors that allow the d.c. output voltage busses to be connected and disconnected from the powered product non-destructively.

— The power supply can be easily detached from the housing of the product it powers, without causing harm to other circuits and components of the product

In the event the above criteria are not met, a test board shall be provided to enable testing.