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Environmental Engineering (EE);
Applicability of EN 45552 to EN 45559 methods for assessment of material efficiency aspects of ICT network infrastructure goods in the context of circular economy

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Environmental Engineering (EE).

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Modal verbs terminology

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Introduction

In order to facilitate a shift to a more sustainable economy, Circular Economy (CE) has been proposed as one of the main ways forward. In this context, CE combined with Information and Communication Technology (ICT) could enable decoupling of economic growth and environmental impact, see ETSI TR 103 476 [i.1] and Recommendation ITU-T L.1022 [i.6]. In 2015, the European Commission issued Mandate 543 (M/543 [i.12]) Standardization Request with regard to ecodesign requirements on material efficiency aspects for energy-related products, see ETSI TR 103 476 [i.1] requesting European standardization organizations to develop standards. ETSI TC-EE accepted this mandate for ICT network infrastructure goods, and CEN-CENELEC delivered a series of standards EN 45552 [1] to EN 45559 [8] to cover the products within their scope. The present document is intended to provide input for standardization related to Mandate M/543 [i.12]. The present document aims to show in which ways the finished material efficiency standards EN 45552 [1] to EN 45559 [8] may or may not be directly applicable to ICT network infrastructure goods. The present document is intended to provide an aid for further standardization, taking into account the specificities of ICT network infrastructure goods which include complex products designed for long operating lifetime, high availability and professional operation and maintenance processes in a business-to-business environment.

1 Scope

The present document defines an assessment of the direct applicability of the general material efficiency standards to ICT network infrastructure goods in the context of circular economy. The existing generic standards address durability; ability to remanufacture; repair, reuse, and upgrade; recyclability and recoverability; assessment of recycled content and reused components; critical raw material content and information provision. The present document highlights where further work on metrics/KPI and measurement methodologies may be needed for ICT network infrastructure goods beyond each of the general standards. Specific product standards will take precedence over the present document. The present document is a product family standard and will not define specific product requirements.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] EN 45552:2020: "General method for the assessment of the durability of energy-related products", (produced by CEN and CENELEC).

[2] EN 45553:2020: "General method for the assessment of the ability to remanufacture energy-related products", (produced by CEN and CENELEC).

[3] EN 45554:2020: "General methods for the assessment of the ability to repair, reuse and upgrade energy-related products", (produced by CEN and CENELEC).

[4] EN 45555:2019: "General methods for assessing the recyclability and recoverability of energy-related products", (produced by CEN and CENELEC).

[5] EN 45556:2019: "General method for assessing the proportion of reused components in energy-related products", (produced by CEN and CENELEC).

[6] EN 45557:2020: "General method for assessing the proportion of recycled material content in energy-related products", (produced by CEN and CENELEC).

[7] EN 45558:2019: "General method to declare the use of critical raw materials in energy-related products", (produced by CEN and CENELEC).

[8] EN 45559:2019: "Methods for providing information relating to material efficiency aspects of energy-related products", (produced by CEN and CENELEC).

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 103 476: "Environmental Engineering (EE); Circular Economy (CE) in Information and Communication Technology (ICT); Definition of approaches, concepts and metrics".

NOTE: Available at https://www.etsi.org/deliver/etsi_tr/103400_103499/103476/01.01.02_60/tr_103476v010102p.pdf.

[i.2] ETSI EN 303 800-1: "Environmental Engineering (EE); Assessment of material efficiency of ICT network infrastructure goods (circular economy); Part 1: General".

[i.3] ETSI EN 303 800-2: "Environmental Engineering (EE); Assessment of material efficiency of ICT network infrastructure goods (circular economy); Part 2: server and data storage product secure data deletion functionality".

[i.4] ETSI EN 303 800-3: "Environmental Engineering (EE); Assessment of material efficiency of ICT network infrastructure goods (circular economy); Part 3: server and data storage product availability of firmware and of security updates to firmware".

[i.5] ETSI EN 303 800-5: "Environmental Engineering (EE); Assessment of material efficiency of ICT network infrastructure goods (circular economy); Part 5: server and data storage product disassembly and disassembly instruction".

[i.6] Recommendation ITU-T L.1022: "Circular Economy: Definitions and concepts for material efficiency for Information and Communication Technology".

[i.7] COM(2017) 490 final: "Communication from the Commission to the European Parliament, the Council, the European economic and social committee and the Committee of the regions on the 2017 list of Critical Raw Materials for the EU".

[i.8] ETSI ES 203 199 (V1.2.1): "Environmental Engineering (EE); Methodology for environmental Life Cycle Assessment (LCA) of Information and Communication Technology (ICT) goods, networks and services".

[i.9] EN IEC 62308: "Equipment reliability - Reliability assessment methods".

[i.10] ETSI EN 300 019-1 (all sub-parts): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1: Classification of environmental conditions".

[i.11] ETSI EN 300 019-2 (all sub-parts): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2: Specification of environmental tests".

[i.12] M/543 Commission implementing Decision C(2015)9096 of 17.12.2015 on a standardisation request to the European standardisation organisations as regards ecodesign requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council.

[i.13] Preliminary ISO/IEC 82474-1 Working Draft: "Material declaration - Part 1: General requirements".

[i.14] European Commission, 2016/C 272/01, Commission Notice - The "Blue Guide" on the implementation of EU products rules, OJEU C 272 Volume 59, 26 July 2016.

[i.15] TR 45550:2020: "Definitions related to material efficiency", (produced by CEN and CENELEC).

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

NOTE: Refer to TR 45550 [i.15] for an extensive account of relevant definitions.

component: hardware constituent of a product that cannot be taken apart without destruction or impairment of its intended use [5]

NOTE: A populated printed circuit board may be considered a component and/or a part from the perspective of the present document.

critical raw material: materials which, according to a defined classification methodology, are economically important, and have a high-risk associated with their supply [i.15]

NOTE: For the purpose of EN 45558 [7], CRMs are those materials listed in annex 1 of COM(2017) 490 final [i.7]. Future updates to this list will apply and replace former versions of this list.

durability: ability to function as required, under defined conditions of use, maintenance and repair, until a limiting state is reached [i.15]

NOTE 1: The degree to which maintenance and repair are within the scope of durability will vary by product or product group [i.15].

NOTE 2: The user of EN 45552 [1] has to define the criteria for the transition from limiting state to End of Life (EoL). For more information see Figure D.1 in EN 45552 [1].

ICT network: set of nodes and links that provide physical or over the air information and communication connections between two or more defined points

EXAMPLE: Wireless network, fixed network, Local Area Network (LAN), home network and server network, access networks, core networks, cloud computing networks [i.8].

ICT network infrastructure goods: information and communication equipment used in ICT network except ICT Goods used by subscribers

part: hardware, firmware or software constituent of a product [2]

recoverability: ability of a waste product to be recovered [4]

NOTE: Recoverability is not defined in TR 45550 [i.15] but just recovery and energy recovery.

recyclability: ability of a product to be recycled at End of Life [4]

NOTE: Recyclability is not defined in TR 45550 [i.15] but just recycling.

recycled content: share of material which is either pre-consumer material or post-consumer material, of a specified total mass [6]

NOTE 1: Recycled content is not defined in TR 45550 [i.15] but just recycled material.

NOTE 2: Total mass may be the total mass of the product, but this is not always the case.

remanufacturing: industrial process which produces a product from used products or used parts where at least one change is made which influences the safety, original performance, purpose or type of the product [i.15]

NOTE 1: The product created by the remanufacturing process may be considered a new product when placing on the market. Refer to the EU Blue Guide [i.14], [i.15] and [3] for additional information.

NOTE 2: Refurbishing is a similar concept to remanufacturing except that it does not involve changes influencing safety, original performance, purpose or type of the product. It is not covered by EN 45553 [2] or TR 45550 [i.15].

repair: process of returning a faulty product to a condition where it can fulfil its intended use [i.15]

reuse: process by which a product or its parts, having reached the end of their first use, are used for the same purpose for which they were conceived [i.15]

NOTE: Reuse after second or subsequent usage is also considered as reuse, but normal, regular or sporadic use is not considered as reuse [i.15].

reused component: component which is used again with or without alteration is considered a reused component [i.15]

upgrade: process of enhancing the functionality, performance, capacity or aesthetics of a product [i.15]

NOTE 1: Upgrade may involve changes to the software, firmware and/or hardware [i.15].

NOTE 2: Refer to the "Blue Guide" [i.14] for conditions under which a product is considered as a new product when placing it on the market after upgrading it.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CE	Circular Economy
CEN	Committee for European Normalization
COM	European Commission
CRM	Critical Raw Material
EEE	Electric and Electronical Equipment
EN	European Norm
EoL	End of Life
ErP	Energy related Products
EU	European Union
ICT	Information and Communication Technology
IEC	International Electrotechnical Commission
KPI	Key Performance Indicator
LAN	Local Area Network
MCD	Material Content Declaration
RC	Recycled Content
RRU	Repair Reuse Upgrade
TC-EE	Technical Committee Environmental Engineering
TR	Technical Report

4 Introduction of Circular Economy concepts

Circular Economy (CE) is a philosophy which covers both the full lifecycle of goods and business models. In general CE is about closing the loop between different lifecycles through design that enables greater recycling and reuse in order to use raw materials, goods and waste in a more efficient way, and to increase energy performance. Thus CE is associated with strategies to keep goods out of landfill and incineration. CE deals with both environmental and economic aspects. In an ideal CE, all waste generated would be reused as raw material in production processes. It is clear that discarded goods represent a valuable source of raw materials. However, in practice trade-offs have to be made with parameters such as reliability and cost, see ETSI TR 103 476 [i.1].

5 Special ICT network infrastructure goods considerations compared to general EN 45552 to EN 45559 standards

5.0 General

In this clause, the different material efficiency standards EN 45552 [1] to EN 45559 [8] will be analysed as far as their immediate applicability to ICT network infrastructure goods.

5.1 EN 45552

For the assessment of the durability of ICT network infrastructure goods, EN 45552 [1] shall not be directly applied. The reason is that EN 45552 [1] is too generic to be applied directly to any ICT network infrastructure goods and therefore product-specific standards are needed.

In particular the impact of software on durability is not addressed in detail while it could have a substantial impact on durability of ICT network infrastructure goods.

EN 45552 [1] describes the reliability and durability aspects. For reliability assessment of ICT network infrastructure goods, the principles of EN IEC 62308 [i.9] shall apply but with reference to the environmental conditions defined in ETSI EN 300 019-1 [i.10] and ETSI EN 300 019-2 [i.11].

Durability aspects defined in EN 45552 [1] are not specific to ICT network infrastructure goods and therefore these are not directly applicable. Durability assessment requirements for ICT network infrastructure goods shall be defined taking into account:

1) Environmental and operating conditions defined in ETSI EN 300 019-1 series [i.10].
2) Stress conditions defined in ETSI EN 300 019-2 series [i.11].
3) Failure modelling taking into account the redundant functions.

5.2 EN 45553

EN 45553 [2] contains a general method to assess the ability of energy-related products to be remanufactured.

However, there is insufficient guidance specific to assess the ability to remanufacture of ICT network infrastructure goods in EN 45553 [2]. Therefore EN 45553 [2] shall not be directly applied to ICT network infrastructure goods. The remanufacturability assessment of ICT network infrastructure goods needs special consideration.

Still, the processing and steps described in EN 45553 [2], clause 5 are applicable to ICT network infrastructure goods with the following considerations:

- The product attribute of EN 45553 [2], Table 1 "Accessibility of parts" may be less relevant to ICT network infrastructure goods that have limited access to some hardware parts for security reasons.

5.3 EN 45554

The assessment of the ability of ICT network infrastructure goods to be Repaired, Reused and Upgraded (RRU) is highly product-specific, so EN 45554 [3] may only be used as guidance for product-specific standardization activities. EN 45554 [3] shall not be directly applied to ICT network infrastructure goods.

NOTE: Product-specific RRU standardization, ETSI EN 303 800-2 [i.3], ETSI EN 303 800-3 [i.4] and ETSI EN 303 800-5 [i.5], summarized in ETSI EN 303 800-1 [i.2], is underway for server and data storage products.