



EUROPEAN STANDARD

**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**

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Environmental Engineering (EE), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI EN Approval Procedure.

The present document is part 5 of a multi-part deliverable covering Environmental Engineering (EE); Assessment of material efficiency of ICT network infrastructure goods (circular economy), as identified below:

Part 2: "Server and data storage product secure data deletion functionality";

Part 3: "Server and data storage product availability of firmware and of security updates to firmware";

Part 5: "Server and data storage product disassembly and disassembly instruction".

NOTE: Part 1 and Part 4 have been cancelled as their intended content is already covered by other standards.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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Introduction

The present document contains methods to assess the ability to disassemble certain key parts of servers and data storage products and the provision of information on these disassembly operations. The present document places a special emphasis on aspects relevant to the circular economy, such as fostering durability and reparability, in particular by third parties (such as spare parts repairers and maintenance).

1 Scope

The present document specifies methods to measure the ability of the following products to be disassembled:

- 1) servers;
- 2) data storage equipment.

The present document covers:

- i) The ability to disassemble, with particular regard to assessing that joining, fastening or sealing techniques do not prevent the disassembly for repair or reuse purposes.
- ii) The provision of instructions on the disassembly operations, including the type of operation, the type and number of fastening technique(s) to be unlocked and the tool(s) required.

The following products are out of scope of the present document:

- servers intended for embedded applications;
- servers classified as small-scale servers in terms of Regulation (EU) No 617/2013 [i.4];
- servers with more than four processor sockets;
- server appliances;
- large servers;
- fully fault tolerant servers;
- network servers;
- small data storage products;
- large data storage products.

The decision whether a product should be repaired, reused or upgraded, is out of scope. It is dependent on a range of factors including the various environmental aspects and other relevant considerations, such as safety and health, technical requirements for functionality, quality and performance of the server or storage product.

NOTE: See Directive 2009/125/EC [i.1].

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.

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

Not applicable.

2.2 Informative references

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

- [i.1] [Commission Regulation \(EU\) 2019/424 of 15 March 2019 laying down ecodesign requirements for servers and data storage products pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation \(EU\) No 617/2013.](#)
- [i.2] [Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products \(recast\).](#)
- [i.3] [EN 45554: "General method for the assessment of the ability to repair, reuse and upgrade energy-related products", produced by CEN.](#)
- [i.4] [Commission Regulation \(EU\) No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers.](#)
- [i.5] [Commission Regulation \(EU\) 2021/341 of 23 February 2021 amending Regulations \(EU\) 2019/424, \(EU\) 2019/1781, \(EU\) 2019/2019, \(EU\) 2019/2020, \(EU\) 2019/2021, \(EU\) 2019/2022, \(EU\) 2019/2023 and \(EU\) 2019/2024 with regard to ecodesign requirements for servers and data storage products, electric motors and variable speed drives, refrigerating appliances, light sources and separate control gears, electronic displays, household dishwashers, household washing machines and household washer-dryers and refrigerating appliances with a direct sales function \(Text with EEA relevance\) C/2021/923.](#)
- [i.6] [Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation \(EU\) No 2019/1020.](#)
- [i.7] [EN 45557:2020: "General method for assessing the proportion of recycled material content in energy-related products", produced by CENELEC.](#)
- [i.8] [European Commission Notice 2016/C 272/01 The 'Blue Guide' on the implementation of EU products rules 2016.](#)
- [i.9] [Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres \(recast\) Text with EEA relevance.](#)
- [i.10] [Council Directive 93/42/EEC of 14 June 1993 concerning medical devices.](#)
- [i.11] [Council Directive 90/385/EEC of 20 June 1990 on the approximation of the laws of the Member States relating to active implantable medical devices.](#)
- [i.12] [Directive 98/79/EC of the European Parliament and of the Council of 27 October 1998 on in vitro diagnostic medical devices.](#)
- [i.13] [Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments \(recast\).](#)
- [i.14] [Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits \(recast\) Text with EEA relevance.](#)

[i.15] [Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety \(Text with EEA relevance\).](#)

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

battery: any source of electrical energy generated by direct conversion of chemical energy and consisting of one or more non-rechargeable or rechargeable battery cells or of groups of them

NOTE: See Proposal for a Regulation [i.6].

chassis: enclosure that contains shared resources for the operation of blade servers, blade storage, and other blade form-factor devices

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

data storage product: fully-functional storage system that supplies data storage services to clients and devices attached directly or through a network

NOTE 1: See Commission Regulation (EU) 2019/424 [i.1].

NOTE 2 Parts and subsystems that are an integral part of the data storage product architecture (e.g. to provide internal communications between controllers and disks) are considered to be part of the data storage product. In contrast, parts that are normally associated with a storage environment at the data centre level (e.g. devices required for operation of an external storage area network) are not considered to be part of the data storage product. A data storage product may be composed of integrated storage controllers, data storage devices, embedded network elements, software, and other devices.

data storage device: device providing non-volatile data storage, with the exception of aggregating storage elements such as subsystems of redundant arrays of independent disks, robotic tape libraries, filers, and file servers and storage devices which are not directly accessible by end-user application programs, and are instead employed as a form of internal cache

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

disassembly: process whereby a product is taken apart in such a way that it can subsequently be reassembled and made operational

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

expansion card: internal part connected by an edge connection over a common/standard interface such as Peripheral Component Interconnect Express providing additional functionality

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

graphic card: expansion card containing one or more graphics processing units with a local memory controller interface and local graphics-specific memory

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

manufacturer: any natural or legal person who manufactures a product or has a product designed or manufactured, and places it on the market under his own name or trademark

NOTE: See Commission Notice [i.8] (p. 28).

memory: part of a server or a data storage product external to the processor in which information is stored for immediate use by the processor, expressed in gigabyte (GB)

NOTE: See Commission Regulation (EU) 2021/341 [i.5].

motherboard: main circuit board of a server or a data storage product

NOTE 1: The motherboard includes connectors for attaching additional boards and typically includes the following components: processor, memory, BIOS, and expansion slots.

NOTE 2: See Commission Regulation (EU) 2021/341 [i.5].

NOTE 3: Remanufacturing and repair of PCBAs may be difficult in practice. Surface mounted resistors, capacitors, etc. may be damaged by the heat required to unsolder processors. The entire motherboard has to be heated to be able to remove the targeted processors.

next level sub-assembly: Sub-assembly comprising up to three of the key parts b) to d) listed in clause 4.1.

part: hardware constituent (of a product) intended to be incorporated into products and which do not function individually, i.e. without being a constituent of a product with function(s) for end-users

NOTE: See EN 45557:2020 [i.7], section 3.1 and Directive 2009/125/EC [i.1], Article 2 point 2.

processor: logic circuitry that responds to and processes the basic instructions that drive a server or a data storage product

NOTE 1: The processor is the CPU of the server. A typical CPU is a physical package to be installed on the server motherboard via a socket or direct solder attachment. The CPU package may include one or more processor cores.

NOTE 2: See Commission Regulation (EU) 2021/341 [i.5].

Power Supply Unit (PSU): device that converts Alternate Current (AC) or Direct Current (DC) input power to one or more DC power outputs for the purpose of powering a server or a data storage product

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

server: computing product that provides services and manages networked resources for client devices, such as desktop computers, notebook computers, desktop thin clients, internet protocol telephones, smartphones, tablets, telecommunication, automated systems or other servers, primarily accessed via network connections, and not through direct user input devices, such as a keyboard or a mouse and with the following characteristics:

- a) it is designed to support server Operating Systems (OS) and/or hypervisors, and targeted to run user-installed enterprise applications;
- b) it supports error-correcting code and/or buffered memory (including both buffered dual in-line memory modules and buffered on board configurations);
- c) all processors have access to shared system memory and are independently visible to a single OS or hypervisor.

NOTE: See Commission Regulation (EU) 2019/424 [i.1].

3.2 Symbols

Void.

3.3 Abbreviations

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

AC	Alternate Current
AIMDD	Active Implantable Medical Devices
ATEX	ATmosphere EXplosible
BIOS	Basic Input Output Systems
CPU	Central Processing Unit
DC	Direct Current
GB	GigaByte

ICT	Information & Communication Technology
IVDMD	In Vitro Diagnostic Medical Devices
MDD	Medical Devices
OS	Operating System
PCBA	Printed Circuit Board Assembly
PSU	Power Supply Unit
SoC	Systems-on-a-Chip

4 Assessment of ability to disassemble

4.1 Scope of the assessment

The core intent of the present document is to demonstrate the ability to disassemble based on criteria laid down in the present document. The disassembly is limited to the following key parts which shall be included in the assessment, when present:

- a) data storage devices;
- b) memory;
- c) processor (CPU);
- d) motherboard;
- e) expansion card/graphic card;
- f) PSU;
- g) chassis;
- h) batteries.

It shall be ensured and demonstrated that the server and data storage product can be disassembled to access the above parts irrespective of the joining, sealing and fastening techniques used, for purposes of repair or reuse.

NOTE 1: See Commission Regulation (EU) 2019/424 [i.1].

The availability of guideline instructions for disassembly to access the above parts for repair or reuse purposes shall be ensured (see Table 1, class B and clause 4.2).

Furthermore, information availability is subject to registration if requested by the manufacturer, their authorized representatives and importers.

NOTE 2: See Directive 2009/125/EC [i.1].

Table 1 classifies to whom the information shall be made available.

Table 1: Classification of information availability for servers and data storage products by target groups

Category	Class
Publicly available: A disassembly process, for which the relevant information is available to all interested parties.	A
Available to independent repair service providers/operators: A disassembly process, for which the relevant information is not publicly available as described above (class A), but is available to any self-employed professional, as well as any legally established organization, providing repair services.	B
NOTE: This includes third parties dealing with maintenance, repair, reuse, recycling and upgrading of servers (including brokers, spare parts repairers, spare parts manufacturers, their authorized representatives and importers, recyclers and third-party maintenance) upon registration by the interested third party on a website (see clause 4.2.1).	

NOTE: See EN 45554 [i.3], Table A.11.

4.2 Provision of instructions on disassembly operations

4.2.1 Instruction content and availability

The availability of guideline instructions for disassembly to access the parts listed in clause 4.1 for repair or reuse purposes of the products in scope shall be ensured in the form of a user manual on a free access website of the manufacturer, importer or authorized representative. The instructions shall be made available to third parties dealing with maintenance, repair, reuse, recycling and upgrading of servers (including brokers, spare parts repairers, spare parts providers, recyclers and third-party maintenance) upon registration by the interested third party on a website.

The instructions may include:

- a disassembly map or exploded view;
- information on how to access professional repair (internet webpages, addresses, contact details).

NOTE 1: Installation manuals could serve as purpose for disassembly/assembly instructions.

For each necessary operation and part the instructions shall contain:

- the type of disassembly operation,
- the type and number of fastening technique(s) to be unlocked
- the exact tools needed to unlock any fastening technique as deployed.

NOTE 2: Visual representation of the procedure to be followed should be added to the instruction to clarify the operation.

These instructions shall be provided upon request to third parties dealing with maintenance, repair, reuse, recycling and upgrading of servers (including brokers, spare parts repairers, spare parts manufacturers, their authorized representatives and importers, recyclers and third-party maintenance) upon registration by the interested third party on a website provided.

In the case of servers, if a product model is part of a server product family, the product information shall be reported either for the product model or, alternatively, for the low-end and high-end configurations of the server product family.

4.3 Ensuring joining, fastening and sealing techniques do not prevent disassembly for repair or reuse purposes

As shown in Table 2, joining, fastening and sealing techniques can be categorized into three groups.

Table 2: Classification of joining, fastening and sealing techniques for servers and data storage products

Category	Class
Reusable technique/system: An original joining, fastening or sealing technique/system that can be completely reused.	A
Semi-reusable technique/system: An original joining, fastening or sealing technique/system where elements of the fastening system that need to be replaced are supplied with the new part (specified in clause 4.1) for the repair.	B
Removable technique/system: An original joining, fastening or sealing technique/system that cannot be reused, but can be removed without causing damage or leaving residue which precludes reassembly of the product for the repair or reuse operation or reuse of the removed part.	C

NOTE 1: See Commission Regulation (EU) 2019/424 [i.1] and EN 45554 [i.3], Table A.1.

Joining, fastening or sealing techniques involved in the disassembly/assembly of the parts in scope of this assessment (clause 4.1) shall be either reusable, semi-reusable or removable in order not to prevent the disassembly for repair or reuse purposes of the parts.

As shown in Table 3, the tools necessary for disassembly can be categorized into three groups.

Table 3: Classification of tools for servers and data storage products

Category	Class
Feasible with basic tools: A disassembly process, which can be carried out without the use of any tools, or with a tool or set of tools that is supplied with the product or spare part, or with basic tools as listed in EN 45554 [i.3], Table A.3.	A
Feasible with other commercially available tools: A disassembly process, which cannot be carried out with basic tools as defined above (class A), but can be carried out without the use of any proprietary tools.	B
Feasible with proprietary tools: A disassembly process, which can be carried out only with one or more proprietary tools. These are tools that are not available for purchase by the general public or for which any applicable patents are not available to license under fair, reasonable, and non-discriminatory terms.	C

NOTE 2: See EN 45554 [i.3], Table A.2.

Annex A (informative): Identified considerations for servers and storage products

A.1 Scope

The following servers or data storage products being addressed by other Directives - having special demands on reliability of disassembled products - needs special consideration when applying this present document:

Those which:

- are subject to Directive 2014/34/EU. Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX) [i.9];
- are subject to Council Directive 93/42/EEC Medical Devices (MDD) [i.10];
- are subject to Directive 90/385/EEC Active Implantable Medical Devices (AIMDD) [i.11];
- are subject to Directive 98/79/EC In Vitro Diagnostic Medical Devices (IVDMD) [i.12];
- are subject to Directive 2014/32/EU Measuring Instruments [i.13].

NOTE: See Commission Regulation (EU) No 617/2013 [i.5].

A.2 Future proofness and Next-level subassembly

The framework directive 2009/125/EC [i.2] provides for the following considerations.

Where a part cannot be repaired or re-used without:

- a) significant negative impact on the functionality of the product, from the perspective of the user; or
- b) adverse effects to health, safety and the environment; or
- c) adversely affecting health, safety or the environment; or
- d) significant negative impact on consumers in particular as regards the affordability and the life cycle cost of the product.

The manufacturer may either:

- a) provide for repair and re-use in an alternative manner than described in the present document.

EXAMPLE: Microsystems packaging concepts such as Systems-on-Chip (SoC) integrate e.g. the memory and the processor in one Integrated Circuit. SoC disassembly is not practical. Therefore categorical requirements of disassembly of memories and processors - which are using SoC technology - is very challenging.

Seen in the light of this trend, if the part cannot be repaired and reused, without the adverse effects listed above, disassembly should allow the repair and reuse of the next-level sub-assembly the part is affixed to, or in which it is integrated.

The disassembly operations should demonstrate that each key part - or next-level sub-assembly - can be removed and replaced such that the product can be restored to normal operating state, including meeting product safety and product quality requirements.

- b) Or where (a) is not practical or possible, not provide for the repair.

A.3 Traceability

Traceability of repairers is important for manufacturers.

The product traceability may be ensured including the identity of the repairer as appropriate. The information may be made available from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model free of charge by manufacturers, their authorized representatives and importers.

After Repair/Refurbish a product may:

- a) be a new product in which case a natural or legal person different from the original manufacturer becomes the manufacturer with the corresponding obligations;
- b) not be a new product. In which case the original manufacturer remains the manufacturer. The manufacturer should be permitted means to confirm the repair process and materials are sufficient to ensure the product continues to meet compliance requirements.

For these reasons traceability of repairers is important for manufacturers.

A.4 Registration of repairers

In the case of Class B (Table 1) information availability target group, manufacturers - or their authorized representatives and importers - may request the third party to qualify that it is dealing with maintenance, repair, reuse, recycling and upgrading of servers.

The manufacturer's, importer's or authorized representative's website may indicate the process for professional repairers to register for access to information; to accept such a request, the manufacturers, importers or authorized representatives may require the professional repairer to demonstrate that:

- i) the professional repairer has the technical competence to repair servers and data storage products and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, should be accepted as proof of compliance with this point;
- ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State.

The registration to access the website may contain confidentiality clauses.

Manufacturers - or their authorized representatives and importers - are able to reject the application based e.g. on the following conditions:

- If the third party is on the counterfeit watchlist, or if the third party is located in a country under embargo or if the third party has been convicted of counterfeiting in the past.
- If the third party is a direct competitor.

The third party rejected need to be informed of the reasons for rejection.

Moreover, manufacturers should not be required to divulge trade secrets.

A.5 Exemptions

During the development of the next standard the following exemptions may be discussed:

- 1) Joining, fastening and sealing techniques intended to provide for compliance to Directive 2014/35/EU [i.14] (Low Voltage Directive) or Directive 2001/95/EC [i.15] (General Product Safety Directive).

2) Cases in which there would be:

- a) significant negative impact on the functionality of the product, from the perspective of the user;
- b) adverse effect on health, safety and the environment;
- c) significant negative impact on consumers in particular as regards the affordability and the life cycle cost of the product;
- d) significant negative impact on industry's competitiveness;
- e) the consequence of imposing proprietary technology on manufacturers; and
- f) Directive 2009/125 [i.2] (Article 15, Paragraph 5).

The manufacturer - or their authorized representatives and importers - should provide evidence to support exemptions 1 or 2.

History

Document history			
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