

SLOVENSKI STANDARD
oSIST prEN 45555:2018
01-november-2018

Splošne metode za ocenjevanje možnosti za recikliranje proizvodov, vezanih na energijo

General methods for assessing the recyclability and recoverability of energy related products

Allgemeines Verfahren zur Bewertung der Rezyklierbarkeit und Wiederverwertbarkeit energieverbrauchsrelevanter Produkte

Méthodes générales pour l'évaluation de la recyclabilité et de la valorisabilité des produits liés à l'énergie

Ta slovenski standard je istoveten z: prEN 45555

ICS:

13.020.20	Okoljska ekonomija. Trajnostnost	Environmental economics. Sustainability
-----------	-------------------------------------	--

oSIST prEN 45555:2018

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 45555

August 2018

ICS 13.020.20

English version

**General methods for assessing the recyclability and
recoverability of energy related products**

Allgemeines Verfahren zur Bewertung der
Rezyklierbarkeit und Wiederverwertbarkeit
energieverbrauchsrelevanter Produkte

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/CLC/JTC 10.

If this draft becomes a European Standard, CEN and 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.

This draft European Standard was established by CEN and CENELEC in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN and CENELEC members are the national standards bodies and national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation. Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



Contents	Page
European foreword	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions.....	5
4 General assessment procedure.....	8
5 End-of-life treatment scenario.....	10
6 Design related criteria affecting recyclability and recoverability.....	13
7 Assessment of the recyclability and recoverability of an energy-related product.....	14
8 Assessment of the recyclability and recoverability of critical raw materials.....	20
9 Reporting recyclability and recoverability aspects	20
Annex A (informative) Relationship with environmental impacts of recycling and recovery.....	22
Bibliography	23

SIST EN 45555:2020

<https://standards.iteh.ai/catalog/standards/sist/638398a4-5cd6-48b6-b87f-301716c41db0/sist-en-45555-2020>

European foreword

This document (prEN 45555:2018) has been prepared by Technical Committee CEN/CLC/JTC 10 "Energy-related products – Material Efficiency Aspects for Ecodesign", the secretariat of which is held by NEC.

This document is currently submitted to the CEN Enquiry.

The dual logo CEN-CENELEC standardization deliverables, in the numerical range of 45550 – 45559, have been developed under standardization request M/543 of the European Commission and are intended to potentially apply to any product within the scope of the Directive 2009/125/EC concerning energy-related products (ErP).

Topics covered in the above standardization request are linked to the following material efficiency aspects:

- a) Extending product lifetime
- b) Ability to re-use components or recycle materials from products at end-of-life
- c) Use of re-used components and/or recycled materials in products

These standards are general in nature and describe or define fundamental principles, concepts, terminology or technical characteristics. They can be cited together with other product or product-group standards, e.g. developed by product technical committees.

This document is intended to be used by technical committees when producing horizontal, generic, and product-specific or product-group standards.

SIST EN 45555:2020

<https://standards.iteh.ai/catalog/standards/sist/638398a4-5cd6-48b6-b87f-301716c41db0/sist-en-45555-2020>

Introduction

To close the loop to a circular economy, amongst other measures, an efficient handling of waste is paramount. Recovering materials and energy can reduce environmental impacts over the lifecycle, including reduced extraction of natural resources and associated emissions of primary material production. To judge the recycling potential of an ErP in terms of how easy it is to recycle/recover materials from the product or to what degree a product can undergo recycling/recovery, the concepts of recyclability and recoverability are introduced/used.

NOTE The waste hierarchy, introduced in Directive 2008/98/EC, ranks different waste management principles (from highest to lowest priority): prevention, preparing for re-use, recycling, recovery, disposal.

Once an ErP has reached its end-of-life (EoL) and has become waste, the ErP can be either prepared for re-use, recycled and/or recovered. This document elaborates on the product characteristics which are relevant for recyclability and recoverability of a whole ErP. Focus is therefore on abilities of the product itself and not on recycling and recovery processes. However, the availability and efficiencies of state-of-the-art recycling and recovery processes are taken into account to determine the recyclability/recoverability rate of an ErP. The outcome of the recyclability and recoverability assessment may be affected by for instance technological changes over time or from the location, where the actual end-of-life process is operated. For the assessment of the recyclability/recoverability of an ErP, it is assumed that the whole ErP undergoes the respective EoL treatment process. It is assumed that no re-use takes place in this assessment. In order to be able to compare recyclability and recoverability rates of different products, one EoL treatment scenario needs to be used. Selection of the EoL treatment scenarios should be done by the user of this document.

This document describes how an end-of-life (EoL) treatment scenario has to be chosen (Clause 5) by the user of this document. Based on this scenario, the recyclability/recoverability rate of an ErP can be assessed. While Clause 6 describes design related considerations to set criteria for the recyclability and recoverability assessment of an ErP, subclause 7.1 presents the general considerations for quantifying the recyclability/recoverability. A detailed recyclability/recoverability assessment (see subclause 7.2) and a simplified recyclability/recoverability assessment (see subclause 7.3) are described in Clause 7. Further considerations on the assessment of the recyclability and recoverability of critical raw materials are given in Clause 8. Provisions on the communication of the result of the recyclability/recoverability assessment are shown in Clause 9.

1 Scope

This document provides a general methodology for:

- Assessing the recyclability of energy-related products;
- Assessing the recoverability of energy-related products;
- Assessing the ability to access or remove certain components, assemblies, materials or substances from products to facilitate their extraction at the end-of-life for ease of treatment, recycling and other recovery operations;
- Assessing the recyclability of critical raw materials from energy-related products.

This document defines generic methods and parameters which are applicable for the development of product-specific standards in order to calculate product-specific recyclability and recoverability rates. This document cannot be applied directly to a product-group because a correct assessment can only be done in a product-specific way. This document defines a series of parameters which may be considered to calculate product-specific recyclability and recoverability indices.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 45558:—,¹ *General method to declare the use of critical raw materials in energy-related products*

EN 45559:—², *Methods for providing information relating to material efficiency aspects of energy-related products*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE See CLC/prTR 455501 for additional definitions.

3.1

end-of-life treatment

operation of any kind by which an end-of-life product that has become waste is recovered or disposed

3.2

end-of-life treatment scenario

description of a process flow resulting from end-of-life treatment including the data needed to calculate recyclability and recoverability rates

¹ Under preparation. Stage at time of publication: prEN 45558

² Under preparation. Stage at time of publication: prEN 45559

prEN 45555:2018 (E)**3.3****energy recovery**

production of useful energy through direct and controlled combustion or other processing of waste

[SOURCE: IEC 62635:2012, modified Note 1 to entry deleted]

3.4**material recovery**

recovery operation of any kind, excluding energy recovery and the reprocessing into materials which are to be used as fuel

[SOURCE: EN 50625-1:2014, 3.23, modified formatting and sentence structure]

3.5**recovery**

operation of any kind, the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy

Note 1 to entry: Recovery operations include material recovery and energy recovery

[SOURCE: Directive 2008/98/EC, modified: addition of Note 1 to entry]

3.6**recoverability**

ability of a waste product to be recovered

[SOURCE: IEC 62635:2012, modified “based on actual practices” deleted]

3.7**recoverability rate**

ratio of the sum of recoverable products, product parts, materials mass to total waste product mass reprocessed

[SOURCE: IEC 62635:2012, modified “the sum of” added]

3.8**recycling**

recovery operation of any kind, by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes

Note 2 to entry: It includes organic recycling but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations

[SOURCE: Directive 2008/98/EC, modified: moved second sentence of definition to Note 1 to entry]

3.9**recyclability**

ability of a product to be recycled at end-of-life

[SOURCE: IEC 62635:2012, modified “based on actual practices” replaced by “at end-of-life”]

3.10**waste**

substance or object of any kind, which the holder discards or intends or is required to discard

[SOURCE: Directive 2008/98/EC]

3.11**hazardous waste**

waste which displays one or more of the hazardous properties listed in Annex III of Directive 2008/98/EC

[SOURCE: Directive 2008/98/EC]

3.12**removal**

manual, mechanical, chemical or metallurgic handling with the result that hazardous substances, mixtures and components are contained in an identifiable stream or are an identifiable part of a stream within the treatment process

Note 3 to entry: A substance, mixture or component is identifiable if it can be monitored to verify environmentally safe treatment.

[SOURCE: Directive 2012/19/EU, modified: moved second sentence of definition to Note 1 to entry]

3.13**disposal**

operation of any kind, which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy

[SOURCE: Directive 2008/98/EC, modified: second sentence deleted]

3.14**collection**

gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a treatment facility

[SOURCE: Directive 2008/98/EC]

3.15**part**

hardware or software constituent of a product

[SOURCE: EN 45554³ definition 3.2]

³ Under preparation. Stage at time of publication: prEN 45554

4 General assessment procedure

Recyclability and recoverability of a product is a combination of:

- the design characteristics of the product such as the structure, material composition, size, weight;
- the techniques, combination or sequence of techniques used to recycle or recover a given waste stream.

The recyclability and recoverability assessment of an ErP shall thus be based on an end-of-life treatment scenario defined according to Clause 5 on a product or product-group specific basis.

While recycling of ErPs aims at closing the circular economy loop, trade-offs might arise between different material efficiency related topics. In general, different material efficiency aspects like for instance weight, durability, reparability, re-usability, need to be balanced in order to optimize the environmental benefit (balancing between different material efficiency choices is quoted in: DIN SPEC 59, CEN Guide 4, ISO Guide 64). Further explanation on the relationship with environmental impacts of recycling and recovery, including environmental benefits, are displayed in the informative Annex A.

Based on product structure and material content, a generic end-of-life treatment scenario for the product-group shall be specified. The end-of-life treatment scenario shall consider state of the art treatment and recycling methods. Based on input limitations of the specified treatment and recycling methods, criteria at product or product-group level shall be defined in order to assess a products compatibility with the specified treatment and recycling methods. Criteria could for example include the ability to remove parts from a product due to the treatment relating reasons or due to the legal requirement. Against these criteria, recyclability/recoverability of individual products can be assessed. Figure 1 describes this process as well as the connection of the steps and different parts of this document.

SIST EN 45555:2020

<https://standards.iteh.ai/catalog/standards/sist/638398a4-5cd6-48b6-b87f-301716c41db0/sist-en-45555-2020>

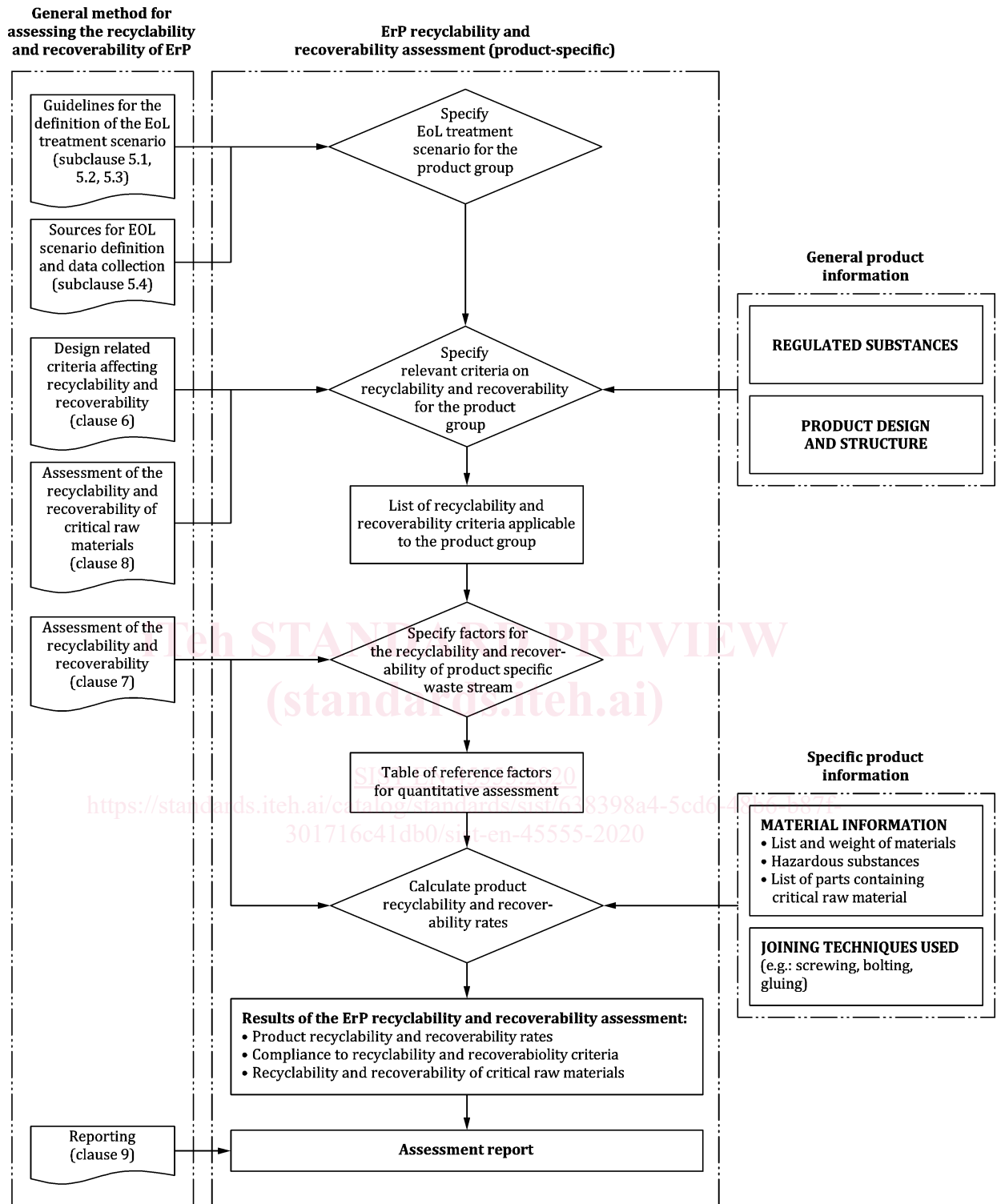


Figure 1 — Flowchart on assessing the recyclability/recoverability of an ErP