



SLOVENSKI STANDARD
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Packaging - Rate of recycling - Definition and method of calculation

Verpackung - Recyclingrate - Definition und Berechnungsverfahren

Emballage - Taux de recyclage - Définition et méthode de calcul

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Ta slovenski standard je istoveten z: EN 13440:2003

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ICS:

13.030.50	Recikliranje	Recycling
55.020	Pakiranje in distribucija blaga na splošno	Packaging and distribution of goods in general

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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13440

May 2003

ICS 13.030.50; 55.040

English version

Packaging - Rate of recycling - Definition and method of calculation

Emballage - Taux de recyclage - Définition et méthode de calcul

Verpackung - Recyclingrate - Definition und Berechnungsverfahren

This European Standard was approved by CEN on 11 March 2003.

CEN 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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 13440:2003) has been prepared by Technical Committee CEN/TC 261 "Packaging", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This document provides a procedure for calculating the rate of material recycling to access compliance with the recycling targets as set in the packaging and packaging waste directive 94/62/EC. It also provides examples of other ratios of material usage which can be used as management tools.

This document contains annex A, which is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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EN 13440:2003 (E)**Introduction**

This European Standard considers the methodology of the calculation of the rate of recycling specifically related to packaging and packaging waste materials. It has been prepared by experts in the Working Group CEN/TC 261/SC 4/WG 3 "Material recovery".

Material recycling of used packaging should be seen within the overall life cycle of products and packaging. The purpose of packaging is the containment, protection, distribution and presentation of products including instructions as to their use. A major role is one of prevention of damage/wastage of the product contained in the packaging.

Following its functional role, the packaging waste is required to be suitable for recovery through at least one of the waste management option as described in EN 13427. One of this option is material recycling.

The Working Group WG 3 has produced EN 13437 which defines the recycling process for packaging in the form of a series of flow diagrams. This European Standard uses the general form of the flow diagram from that standard to make its proposals. The proposal is made within the context of the Packaging and Packaging Waste Directive 94/62/EC. Annex A shows how the principles may be used in a more general context.

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1 Scope

This European Standard establishes a methodology for the calculation of the rate of recycling of packaging and packaging material.

NOTE The packaging supply chain also uses other ratios in the management of their operations. The flow diagrams used in the methodology set out in this European Standard can be used in the evaluation of such other ratios and examples are given.

2 Normative References

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 13193:2000, *Packaging - Packaging and the environment – Terminology*.

EN 13437, *Packaging and material recycling - Criteria for recycling methods - Description of recycling processes and flow chart*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13193:2000 and the EU Directive "Packaging and Packaging Waste" 94/62/EC apply.

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4 Calculation of recycling rate

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4.1 Area of application

The method of calculation shall be applied to any group or sub-grouping of packaging and packaging materials for which data can be provided in the format of the flow chart - Figure 1.

NOTE 1 It will be found that the flow charts for the major material groupings e.g. aluminium, glass, paper and board, plastics, steel (plated and/or coated) and wood, are identical to that shown in Figure 1, in this respect.

NOTE 2 All forms of recycling should be included and are as defined in article 3 of the Directive (94/62/EC). This therefore includes organic recycling.

4.2 The calculation.

The ratio for the recycling rate of used packaging shall be calculated by the equation

$$r_m = \frac{\delta_1 + \delta_2}{\alpha + \beta - \gamma}$$

Where the elements of the equation are as specified in 5.2.

NOTE Annex A shows the use of the flow diagram for calculating other recycling rates and ratios often used in the analysis of packaging production use.

4.3 Rate of recycling

4.3.1 The rate of recycling shall be defined for stated geographic boundaries (NOTE 1) and unless otherwise specified by legislation (NOTE 2) shall include used packaging exported for recycling (for the principles of using

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input flows see 4.3.2), and excluding imported packaging waste which is recycled in the member state. The denominator shall be the total packaging consumed on the market.

NOTE 1 In relation to the directive, these boundaries are those of member states

NOTE 2 The treatment of material flow across boundaries may be determined by particular European Commission decisions.

4.3.2 The measurement points for determining the rate of recycling shall be based on inputs to particular processes defined in the flow chart – Figure 1.

NOTE The use of these points of measurement are found to provide the most practical way of obtaining reliable data and follows the principle established in the European Commission's decision on databases. [97/138/EC]

4.3.3 The rate of recycling shall be defined for a stated time period and the measurement of numerator and denominator shall be at coincident times.

NOTE This principle presumes a steady state for the flow of material through the processes defined in the flow chart. It should be noted that the effect on the calculated rate, arising from fluctuating flows and from long intervals between processes, are complex. The rate defined in 4.2 allows a simple adjustment for long delays

4.3.4 The rate of recycling shall be quoted in units of weight over the given time scale and shall exclude any flow of scrap in primary production processes (ex: production scrap, converting scrap and scrap from the processes fill/pack and distribution).

NOTE Examples of primary production processes are the production of glass bottles from a glass making furnace or the production of reels of paper from a paper making machine.

4.3.5 The denominator and the numerator of the rates defined shall include relevant recycling of reusable packaging at the end of life.

4.3.6 Only waste originating from packaging placed on the market may be considered for the calculation of these inputs, excluding any kind of production residues from the production of packaging or of packaging materials or from any other production process (Article 6 second alinea of the Decision 97/138/EC).

5 Principles for calculation of recycling rate

5.1 Generality

The general flow chart for the recycling process is reproduced in this standard as Figure 1 and annotated as described in this section. Referring to the principle given in 4.3.2, the numerator and denominator of the ratio are input-based flows to the relevant processes.

Numerator: Quantity of used packaging collected and supplied for recycling (see NOTE 1).

Denominator: Quantity of packaging placed on the market and used for the first time (see NOTES 2 and 3).

NOTE 1 With reference to 4.3.2) and 4.3.4), this is the input flow to the recycling process. In relation to collected packaging stored for a long period or exported particularly over long distances, further explanation or evidence of recycling might be expected for inclusion in the rate.

NOTE 2 The term "Used for the first time" covers both one-way packaging and new reusable packaging which is normally replacing reusable packaging whose use is no longer viable (for instance cracked glass bottles or broken wooden pallets).

NOTE 3 In particular circumstances significant proportions of packaging may be retained in the market or diverted to applications such that the packaging does not arrive in the waste stream either as packaging waste or as waste from other applications. In such events formal explanations should be made to the appropriate authority to support any adjustment in the values recorded in the calculation.

5.2 The rate of recycling equation

With reference to Figure 1 the ratio for the recycling rate of used packaging is:

$$r_m = \frac{\delta_1 + \delta_2}{\alpha + \beta - \gamma}$$

4.2 states the equation for calculating the recycling rate where the various components are defined as follows:

α = quantity of packaging put on the market for one way use;

β = quantity of reuseable packaging put on the market and used for the first time;

δ_1 = material for organic recycling (composting or biomethanisation);

δ_2 = material for material recycling;

γ = that part of used packaging which is not available for recycling due to other secondary uses. This is only part of the flow "j" defined in the overall flow charts for packaging and material recycling reference EN 13437 and thus excludes packaging waste not available for reasons such as litter and a lack of collection system.

NOTE Annex A shows the use of the flow diagram for calculating other recycling rates and ratios often used in the analysis of packaging production and use.

Flow diagram based on material flow detailed in EN 13437.

The sizes of flows do not correspond to the volumes of the flows.

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