



SLOVENSKI STANDARD
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Embalaža - Priporočila za vodenje bilance analize življenjskega kroga sistemov pakiranja

Packaging - Recommendations for conducting life-cycle inventory analysis of packaging systems

Verpackung - Empfehlungen für die Durchführung von Lebensweg-Sachbilanz-Erstellungen von Verpackungssystemen

Emballage - Recommandations relatives à l'inventaire de l'analyse du cycle de vie des systèmes d'emballage

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Packaging - Recommendations for conducting
life-cycle inventory analysis of packaging systems

Emballage - Recommandations
relatives à l'inventaire de l'analyse
du cycle de vie des systèmes
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Lebensweg-Sachbilanz-Erstellungen
von Verpackungs-Systemen

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This CEN REPORT has been prepared by Technical Committee CEN/TC 261 "Packaging" and has been approved by CEN on 1995-12-06.

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CEN

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Foreword

This document is a CEN Report for conducting life-cycle inventory analysis of packaging systems.

The CEN Working group, CEN/TC 261/SC 4/WG 1/TG 2, has been dealing with the aspects of life-cycle inventory analysis specific to packaging. This CEN report is the result of a series of meetings, discussions and written proposals of this Working Group.

The ISO/TC 207 meeting of November 1993 was one of the first meetings to initiate an ISO standard on life cycle assessment. The scope of the ISO work is to standardise in the field of life cycle assessment as a tool for environmental management of product and service systems.

The Society of Environmental Toxicology and Chemistry (SETAC) is a professional society that was founded in 1979 to provide a forum for individuals, scientists and institutions (authorities, industry and public interest groups) to help research and education in environmental problem solving. SETAC has held several workshops on life cycle assessment, and experts from all over the world have participated in these workshops.

SETAC has published a guideline document on life-cycle assessment, "Guidelines for Life-Cycle Assessment : A 'Code of Practice' " (Consoli, F et al., 1993), based on the considered opinion of 50 experts from 13 countries in a 4-day workshop held in Portugal in April 1993 (In the following text, the SETAC "Guidelines for Life-Cycle Assessment : A 'Code of Practice' " (Consoli, F et al., 1993) will be referred to as "The SETAC Code of Practice" to make it simple).

The members of TG2 have decided to adopt the SETAC 'Code of Practice' (see Annex A) as the base guideline document for this CEN report which focused on the clarification, where necessary, of aspects of life-cycle inventory analysis specific to packaging systems that were judged not to be adequately addressed by the SETAC Code of Practice. It should be emphasised that the purpose of this Code was never to serve as a quasi-authoritative scientific standard intended to supersede any international standard but more to represent the views of a body of experts brought together to discuss and propose 'best practice' guidelines for those working in the field. SETAC is a private organisation with no power in respect of writing standards. It is expected that the ISO work will be based on the principles in the SETAC 'Code of Practice'.

CEN/TC 261/SC 4/WG 1/TG 2 gratefully acknowledges the acceptance by SETAC of using Consoli F. et al. (1993) as the base guideline document and definitions on life-cycle specific terms from Fava, J.A. et al., Editors, (1991).

It has been decided to give this document the status of a CEN report. This report should be evaluated frequently according to the development in SETAC, ISO and the European Commission.

0 Introduction

0.1 Background

Packaging is one of the points of focus in the debate about solid waste arisings. One of the tools which has been used to indicate the environmental burdens of packaging systems is life-cycle inventory analysis (LCI). This has led to an increasing demand from the packaging industry, trade bodies and users for an authoritative set of guidelines for conducting life-cycle inventory analysis of packaging systems.

0.2 Restrictions

This CEN report deals with the goal definition, scope and life-cycle inventory analysis as defined by SETAC (see 1 and 2 of Figure A.1). Evaluation of the life-cycle inventory, i.e. life-cycle impact assessment, is not considered.

NOTE : Bibliographical references in annex C.

1 Scope

The scope of this CEN report is to establish a set of guidelines of best practice for undertaking those aspects of life-cycle inventory analysis specific to packaging systems.

In the field of life-cycle assessment (LCA) development and research are ongoing in various areas. The methodology of life-cycle assessment is under continuous progression. Hence, this CEN report, which contains basic advice on the methodology of life-cycle inventory analysis, only serves as a guide to conducting inventory analysis of the life-cycle of packaging systems.

2 Definitions

For the purposes of this CEN report, the following definitions apply :

This section defines the terms used in this report. It should be noted that the life-cycle inventory analysis specific terms are based on definitions given in the SETAC document, Fava et al., Editors (1991), while the packaging specific terms are based on definitions by CEN/TC 261/SC 4/WG 1 (Draft standard of May 1994) Packaging and the environment Terminology and in the EU Council Directive on Packaging and Packaging Waste (94/62/EC).

NOTE : The definitions based on the European draft standard can be changed when this document is finalised.

2.1 life-cycle assessment (LCA)

Process to evaluate the environmental burdens associated with a product, process, or activity by identifying and quantifying energy and material usage and environmental releases, to assess the impact of those energy and material uses and releases on the environment, and to evaluate and implement opportunities to effect environmental improvements. The assessment includes the entire life-cycle of the product, process, or activity, encompassing extracting and processing raw materials, manufacturing, transportation, and distribution, use/re-use/maintenance, recycling, and final disposal [Fava et al., Editors, 1991].

2.2 life-cycle inventory analysis (LCI)

Data-based process of quantifying energy and raw material requirements, air emissions, waterborne effluents, solid waste, and other environmental releases incurred throughout the life-cycle of a product, process, or activity [Fava et al., Editors, 1991].

2.3 packaging

All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non returnable' items used for the same purposes are also considered to constitute packaging.

NOTE : This definition (refers to Directive 94/62/EC).

2.4 sales packaging or primary packaging

Any packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase [Directive 94/62/EC].

2.5 grouped packaging or secondary packaging

Any packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics [Directive 94/62/EC].

2.6 transport packaging or tertiary packaging

Any packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packagings in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship and air containers [Directive 94/62/EC].

2.7 used packaging

Packaging or packaging material remaining after the removal of the product it contained [CEN/TC 261/SC4/WG1 N 17 E (Rev. 8), 1994 (WI 261 069)].

2.8 recovery

Any of the applicable operations.

NOTE : For further details see Directive 94/62/EC.

2.9 recycling

Reprocessing in a production process of the waste materials for the original purpose or for other purposes including composting but excluding energy recovery [CEN/TC 261/SC 4/WG 1 N 17 E (Rev. 8), 1994 (WI 261 069)].

2.10 disposal

Any of the applicable operations

NOTE 1 : For further details see Directive 94/62/EC.

NOTE 2: From a technical point of view disposal is the ultimate operation on packaging waste [CEN/TC 261/SC 4/WG1 N 17 E (Rev. 8), 1994 (WI 261 069)].

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2.11 packaging system

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System including the packaging, materials and processes involved in the life-cycle of a package including all supply and waste treatment processes. A packaging system includes the distribution system.

2.12 distribution system

Transport and handling system to deliver the products from the producers to the consumers. In some cases, where the packagings are returned by the consumer to the producer in a specific collection system and the packaging is reused or recovered, this collection system is included in the distribution system. The distribution system is an integral part of the packaging system.

2.13 functional unit of a packaging system

Measure of the performance that the packaging system delivers. This should be clearly defined, measurable, and relevant to input and output data. The choice of functional unit depends on the goal of the study, but in the study, the reasons for choice of functional unit should be carefully considered and stated.

NOTE : For a further explanation of functional unit, see annex B

3 Overall structure

This CEN report deals with goal definition and scope and life-cycle inventory analysis.

These are only parts of a life-cycle assessment. The basic principles of life-cycle assessment are described in Annex A.

4 Goal Definition and Scope

For the goal definition and scope, the basic principles in Consoli F. et al (1993) should be followed.

5 Life-cycle inventory analysis

The basic principles of a life-cycle inventory analysis are described by Consoli F. et al (1993) and should be followed.

5.1 System boundaries

System boundaries of life-cycle assessments are reported by Consoli F. et al (1993).

Additional remarks with special regard to packaging systems are :

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5.1.1 Boundary between the packaging and the product

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It is important to make a clear system boundary between the packaging and the packaged product. The packaged product (and aspects of processing thereof) is typically not included in the life-cycle inventory analysis of a packaging system.

However, some particular aspects of the packaged product should be considered when they are directly connected to the packaging. For an outline of the interrelations between the packaging and the packaged product, see Annex B, Functional Unit. A schematic drawing of a typical system boundary between the packaging and the packaged product is illustrated in figure 1.

EXAMPLE 1 :

A life-cycle inventory analysis of a packaging system includes transport of the packaged product and the packaging from the producer to the user. During this transport, both packaging and product are transported. When the product is not included in the system boundaries of the life-cycle inventory analysis, an allocation of the energy consumption and the emissions should be done. This means that a method for the determination of the share of the environmental burdens due to the packaging and the product should be laid down, in order to enable the calculation of the environmental burdens matching the packaging only. Specific characteristics of the packaging (e.g. the form, the strength and how stackable the packaging is) have influence on the transport, and this should be entirely allocated to the packaging. This means that the allocation rule should be carefully chosen and transport phases carefully analyzed. Rules for allocation are outlined in Consoli, F. et al. (1993).