SLOVENSKI STANDARD
SIST EN 13431:2001

01-februar-2001

Embalaǵa - Zahteve za embalaǵo, primerno za energetsko predelavo, vključ no z določ itvijo spodnje kurilne vrednosti

Packaging - Requirements for packaging recoverable in the form of energy recovery, including specification of minimum inferior calorific value

Verpackung - Anforderungen an energetisch verwertbare Verpackung, einschließlich Definition eines Mindestheizwertes

Emballage - Exigences relatives aux emballages valorisables énergétiquement, incluant la spécification d'un pouvoir calorifique inférieur minimum

Ta slovenski standard je istoveten z: **EN 13431:2000**

ICS:

13.030.99	Drugi standardi v zvezi z odpadki	Other standards related to wastes
55.020	Pakiranje in distribucija blaga na splošno	Packaging and distribution of goods in general

SIST EN 13431:2001 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13431

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ICS 13.030.99; 55.020

English version

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This European Standard was approved by CEN on 4 June 2000.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 261 "Packaging", the secretariat of which is held by AFNOR.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex Z, which is an integral part of this standard.

This standard forms one of a series of standards and reports prepared under Mandate M 200 rev.3 given to CEN by the European Commission and the European Free Trade Association to support the European Council and Parliament Directive on Packaging and Packaging Waste [94/62/EC]. The procedure for applying this standard in conjunction with the other mandated standards and reports is specified in EN 13427.

This standard contains Annex A, which is normative and Annexes B, C and Z, which are informative

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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

Introduction

The Directive on Packaging and Packaging Waste (94/62/EC) defines requirements for packaging to be considered recoverable. This standard amplifies these requirements with respect to energy recovery. The European Standard EN 13427:2000 provides a framework within which this and four other standards may be used together to support a claim that a packaging is in compliance with the essential requirements for packaging to be placed on the market as required by the Directive.

This European Standard presents a framework for self-assessment to determine whether the requirements of this standard have been met. Its approach is similar to that of systems standards such as the EN ISO 9000 and EN ISO 14000 series.

The purpose of packaging is the containment, protection, handling, delivery and presentation of products. Energy recovery of used packaging is one of several recovery options within the overall life cycle of packaging. In order to save resources and minimise waste, the whole system in which the packaging takes part should be optimised. This includes prevention as well as reuse and recovery of packaging waste.

Since packaging waste used for energy recovery substitutes other fuels, total system optimisation includes production of heat and/or power. This standard defines and specifies the thermodynamic requirements for packaging to allow the incineration with energy recovery of packaging waste. Both packaging and recovery technologies are subject to continuous improvement.

Annex C sets out some of the more significant supporting regulations as well as conclusions reached during the preparation of the text. It is assumed that the heat generated during the incineration process shall be recovered as far as practicable, but it is outside the scope of this standard to take any standpoint on plant efficiency.

1 Scope

The scope of this European Standard is to specify the requirements for a packaging to be energy recoverable and to identify the necessary procedures for a supplier placing packaging on the market to claim conformity with these requirements.

This European Standard specifies the requirements for a packaging to be classified as recoverable in the form of energy and sets out procedures for assessment of conformity with those requirements. The scope is limited to what is under control of the supplier.

The procedure for applying this standard is contained in EN 13427:2000.

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.

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

EN 13427 :2000, *Packaging and the environment - Requirements for the use of European standards in the field of packaging and packaging waste).*

prEN ISO 1716 :1998 *Solid mineral fuels - Determination of gross calorific value by the bomb calorimetric method, and calculation of net calorific value.*

CR 13695-1 :2000, *Packaging – Requirements for measuring and verifying heavy metals and other dangerous substances present in packaging and their release into the environment – part 1 : Requirements for measuring and verifying the four heavy metals present in packaging and their release into the environment*

ISO 1171:1997, *Solid mineral fuels - Determination of ash content.*

ISO 1928 : 1995 ; *Solid mineral fuels – determination of gross calorificvalue by the bomb calorimetric method, and calculation of net calorific value*

3 Terms and definitions

For the purpose of this standard, relevant terms and definitions contained in EN 13193 :2000 together with the following terms and definitions apply :

3.1
net calorific value (inferior calorific value), Q_{net}
defined in ISO 1928:1995 and measured at constant volume

3.2
required energy, H_a
energy necessary to adiabatically heat the post combustion substances of a material and excess air from ambient temperature to a specified final temperature

3.3
calorific gain
the positive difference between the energy released on combustion of a material and H_a

3.4
minimum inferior calorific value $Q_{net, min}$
the fraction of the released energy sufficient to heat the post-combustion substances of a material or product from a specified ambient temperature to a specified adiabatic final temperature

4 Specification of Minimum Inferior Calorific Value

The minimum inferior calorific value, $Q_{net,min}$, is material specific. It depends on the temperature and other conditions required by the combustion process. In this standard it is identified as H_a and may be determined by the method described in Annex A.

This Annex specifies minimum inferior calorific value through the technical concept of calorific gain.

5 Requirements

5.1 The application of this standard to any particular packaging shall be as specified in EN 13427 :2000.

5.2 Packaging claimed to be suitable for recovery in the form of energy shall be combustible and capable of providing calorific gain. This shall be determined by the method specified in Annex A (normative).

5.3 Where quoted, the net calorific value of packaging claimed to be suitable for energy recovery shall be determined by the method specified in prEN ISO 1716 : 1998 and measured at constant volume.

5.4 The ash content, where required for the calculation of H_a, shall be determined by the method specified in ISO 1171:1997.

5.5 The sum of mercury, cadmium, lead and hexavalent chromium in packaging shall be determined by calculation, based on the documentary evidence of composition obtained from the suppliers of the raw materials, or experimentally determined as specified in CR 13695.1:2000.

5.6 Claims of conformity with this standard shall be supported by the following records as a minimum :

— composition by main materials with particular reference to whether it may be considered organic or inorganic (see clause 6) ;

— the calorific gain, when appropriate (see 6.2).

6 Provision of calorific gain

6.1 Organic materials

Packaging composed of more than 50 % (by weight) of organic materials, e.g. wood, cardboard, paper and other organic fibres, starch, plastics, provides calorific gain and shall be considered recoverable in the form of energy.

6.2 Inorganic materials

6.2.1 Packaging composed of more than 50 % (by weight) of inorganic material, e.g. ceramic, glass, clay, metals, may be declared recoverable in the form of energy when supported by calculation of the calorific gain as specified in Annex A.

6.2.2 Where relevant data is not available, net calorific value and ash content may be experimentally determined, see 5.3 and 5.4.

6.2.3 H_a may be calculated from the declaration of chemical composition obtained from the material supplier.

6.2.4 Thin gauge aluminium foil (typically up to 50 μm thick) shall be considered recoverable in the form of energy.

Annex A
(normative)

Determination of calorific gain

The determination of calorific gain is based on standard procedures for calculating the adiabatic final temperature in combustion chemistry and thermodynamics.

The net heat of combustion (net calorific value), Q_{net}, of a material is the amount of heat released when it burns and when all water remains in the gas phase. In order to be recoverable in the form of energy, packaging shall give a calorific gain in the energy recovery process. For the purpose of this standard, this is assumed to be fulfilled when Q_{net} exceeds the amount of required energy, H_a, to adiabatically raise the temperature of the post-combustion substances (including excess air) from ambient temperature to the specified final temperature. A calorific gain is obtained when equation (1) is fulfilled :

$$Q_{net} - H_a > 0 \qquad (1)$$

The net calorific value of a packaging consisting of different constituents can be calculated according to equation (2) :

$$Q_{net} = \sum_{i=1}^{n} f_i \, Q_{net,i} \qquad (2)$$

where

Q_{net} = net calorific value of the packaging ;

f_i = mass fraction of constituent "i" in the packaging ;

$Q_{net,i}$ = net calorific value of constituent "i" in the packaging.

Combustible packaging may contain non-combustible materials of inert or reactive nature, that may have a negative effect on calorific gain.

The minimum inferior calorific value specified as H_a can be determined by application of equations (3) and (4) :

$$Q_{net,min} \equiv H_a = \sum_{i=1}^{n} f_i \, H_{a,i} \qquad (3)$$

where

H_a = energy required to heat adiabatically combustion products, residues and excess air from T_o to T_a ;

$H_{a,i}$ = energy required to heat adiabatically combustion products, residues and excess air from T_o to T_a of constituent "i" of the packaging.

$$H_{a,i} = \sum_{j=1}^{m} g_j C_{pj} (T_a - T_o) \qquad (4)$$

where

g_j = ratio of combustion products and residues (flue gas and ashes) and excess air (j) resulting from the amount of constituent "i" in the packaging ;

C_{pj} = specific heat capacity of post combustion product "j" at constant pressure ;