Packaging Waste

March 2005

CONSUMER COUNCIL
Austrian Standards Institute

Introduction

The prevention of waste in general and the prevention of packaging waste in particular has been a political goal for many years. As early as 1975 the European Directive on Waste (75/442/EEC) declared the prevention of waste as a first priority of waste management. The European Directive on Packaging and Packaging waste (94/62/EC) adopted in 1994 stipulated: "Packaging shall be so manufactured that the packaging volume and weight be limited to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packed product and for the consumer." However, the Packaging Directive does not establish any detailed rules or guidance for the implementation of this provision. Hence, it is not surprising that it had little effect in practice.

In 1996 the European Commission mandated the European standardisation organisation CEN to elaborate various standards which were intended to complement the Packaging Directive and to provide the missing detailed specifications for prevention, reuse, recycling, composting and energy recovery. Due to a number of shortcomings these standards were objected by some Member States and the Commission judged that only the standard dealing with composting was in compliance with the Packaging Directive and the mandate. Another mandate was given in 2002. The revised standards were adopted in 2004 and were subject to harsh criticism from consumer and environmental organisations (ANEC-ECOS position paper on revised packaging standards prepared under the second standardisation mandate M317, January 2005) because the new standards were not significantly different from the old ones.

The standard dealing with prevention (EN13428: Requirements specific to manufacturing and composition – prevention by source reduction) offers no measurable criteria nor incentive to companies to reduce excessive packaging. In addition, the standard allows for the use of substances that are harmful for the environment. A description of the major elements of this standard and a critical review of its contents can be found in Annex 1 of this documentation.

The Consumer Council at the Austrian Standards Institute commissioned a study to review the prevention standard and to develop an alternative approach including a clear-cut quantitative criterion. In fact, this study built upon the results of an earlier study financed by the Austrian Ministry of Environment which was carried out in 1999 (CEN Standards Related to Packaging and Packaging Waste, Technical Office Hauer). The method suggested in the first study was further refined and tested in practice by evaluating about 70 different packages. The study (Part 1: Quantitative criteria for the prevention of packaging – an alternative to the European standard EN 13428, Part 2: Collection of examples, Technical Office Hauer) can be obtained from the Consumer Council.

This brochure contains a selection of the packages contained in the study report. It focuses on typical cases of waste packages and gives possible packaging alternatives which would be in conformity to the proposed limits. The quantitative criterion is based on a packaging surface to product volume ratio. Special provisions exist for certain types of products and packages falling below a certain minimum area are exempted. A summary of the approach is given in Annex 2.

The aim of this brochure is to promote the establishment of clear-cut and enforceable rules for the prevention of superfluous packaging.

Dr. Franz Fiala
Consumer Council
Austrian Standards Institute

tel: 0043 1 21300 709
fax: 0043 1 21300 328
e-mail: franz.fiala@on-norm.at
web: http://www.verbraucherrat.at

Content

Product: Drive-in nut M4, 20 pieces

Company: LUX-Tools

Description

Dimensions: h = 11,5 cm , w = 7,5 cm , d = 3 cm (cuboid: H = 8,5 cm, w = 6 cm, d = 3 cm)
Product volume: 20,6 cm^3
Packaging surface: 220,7 cm^2
Packaging volume: 153 cm^3

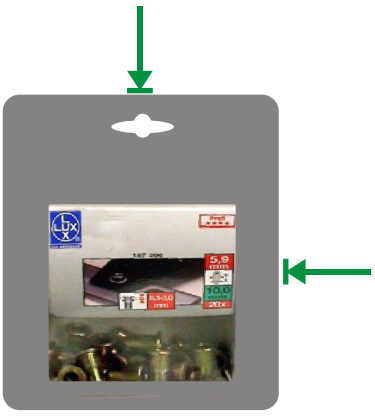
20 pieces of nuts loosely poured

Possible Packaging

A reduction of the cuboid to 5 cm x 5 cm x 2 cm and a reduction of the two-dimensional surface to 8 cm x 7 cm would result in a total surface of about 120 cm^2 and would be in accordance with the proposed exception rule for small packages.

Existing packaging

Recommended alternative packaging



Product: Cross-over covers for skirting boards, 2 pieces

Company: Parador, Living systems

Description

Dimensions: h = 8 cm , w = 12 cm , d = 3,5 cm
Product volume: 55 cm^3
Packaging surface: 332 cm^2
Packaging volume: 336 cm^3

2 pieces of covers loosely poured

Possible Packaging

A reduction of the cardboard cuboid packaging to 7 cm x 5 cm x 3 cm would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging

Product: Gypsum plaster screws 3,9 x 25 mm, 200 pieces

Company: Parador, Living systems

Description

Dimensions: h = 15,5 cm , w = 8 cm , d = 4,5 cm (cuboid: h = 13 cm, w = 8 cm, d = 4,5 cm)
Product volume: 180 cm^3
Packaging surface: 413,5 cm^2
Packaging volume: 468 cm^3

200 pieces of screws loosely poured

Possible Packaging

A reduction of the cardboard box height from 13 cm to 9 cm would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging

Product: Day and night cream

Company: Juvena of Switzerland

Description

Dimensions: h =7,4 cm , w = 19 cm , d = 19 cm
Product volume: 61,82 cm^3
Packaging surface: 1.284,4 cm^2
Packaging volume: 2.671,4 cm^3

Day and night cream in containers, capsules in a glass tube

Possible Packaging

An elimination of the large gift cardboard box together with a slight adjustment at the area/volume ratio of the cream containers would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging

Product: Eau de toilette vaporisation natural spray

Company: Ulric de Varens

Description

	Cardboard packaging	Gift packaging
Dimensions:	h = 14,5 cm , w = 11 cm , d = 3,5 cm	h = 19,5 cm, w = 21 cm, d = 3,8 cm
Product volume:	112 cm^3	140 cm^3
Packaging surface:	497,5 cm^2	1.126,8 cm^2
Packaging volume:	539 cm^3	1.556 cm^3

Eau de toilette in glass bottle covered by plastics parts and, in case of the gift packaging, a key fob.
Metering device is classified as part of the product

Possible Packaging

The bottle alone without the additional plastic wrapping of the bottle would be in accordance with the proposed limit. In addition, the surface/volume ratio of the glass bottle could be improved.

Existing packaging

Recommended alternative packaging

Product: After shave

Company: Mexx Star Perfume

Description

Dimensions: h = 12,3 cm , w = 7,2 cm , d = 7,2 cm
Product volume: 75 cm^3
Packaging surface: 457,9 cm^2
Packaging volume: 637,6 cm^3

After Shave in a glass bottle

Possible Packaging

The glass bottle alone would be would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging

Product: Detergents

Company: Calgonit

Description

Dimensions: h = 29 cm , w = 18,5 cm , d = 9,2 cm
Product volume: 2000 cm^3
Packaging surface: 1.947 cm^2
Packaging volume: 3.600 cm^3

Powder, loosely poured

Possible Packaging

An increase of the content from 2.000 ml to 2.625 ml (+32%) would be in accordance with the proposed limit. Alternatively, the size of the container could be reduced.

Existing packaging

Recommended alternative packaging

Product: Adapter for headset

Company: MLine

Description

Dimensions: h = 20 cm , w = 10 cm , d = 3 cm (cuboid: h = 9,3 cm, w = 6 cm, d = 3 cm)
Product volume: 3,4 cm^3
Packaging surface: 344,1 cm^2
Packaging volume: 167,4 cm^3

1 piece of adapter loosely poured

Possible Packaging

A reduction of the transparent cuboid to 6 cm x 3 cm x 3 cm (90 cm^2) and a reduction of the two-dimensional surface to 8 cm x 8 cm would result in a surface of about 130 cm^2 and would be in accordance with the proposed exception rule for small packaging.

Existing packaging

Recommended alternative packaging

Product: Parallel cable matcher NC6502

Company: Hewlett-Packard Co.

Description

Dimensions: h = 22,2 cm , w = 15,3 cm , d = 5,8 cm
Product volume: 242,95 cm^3
Packaging surface: 1.114,32 cm^2
Packaging volume: 1.970 cm^3

Printer plug and operation instructions

Possible Packaging

A reduction of the cardboard box to 18 cm x 12 cm x 3,5 cm would be in accordance with the proposed special provisions for this type of product. However, bigger savings could be achieved by using a smaller booklet.

Existing packaging

Recommended alternative packaging

Product: Nougat praline with chocolate "Ildefonso"

Company: Manner

Description

	Small packaging	Big packaging
Dimensions:	h = 10,4 cm, w = 10,4 cm, d = 1,9 cm	h = 18 cm , w = 18 cm , d = 2,6 cm
Product volume:	156,8cm^3	147 cm^3
Packaging surface:	295,3 cm^2	835,2 cm^2
Packaging volume:	205,5 cm^3	842,40 cm^3

Nougat cubes (16 and 15 pieces)

Possible Packaging

Whilst the smaller packaging is in accordance with the proposed limit, the big package is not. However, even the small package could be reduced by arranging the nougat cubes in serveral layers resulting in a more cubic shape.

Existing packaging

Recommended alternative packaging

Product: Sweets, Echinacea, 30 g (33 pieces)

Company: Bretti´s Naturkost KG

Description

Dimensions: h = 11,4 cm , w = 9,1 cm , d = 2,1 cm
Product volume: 63 cm^3
Packaging surface: 293,58 cm^2
Packaging volume: 217,8 cm^3

Not counted number of sweets loosely poured

Possible Packaging

A reduction of the cardboard cuboid to 7,5 cm x 2,1 cm x 6 cm would be in accordance with the proposed limit. Alternatively the content could be increased by 150% using the same package.

Existing packaging

Recommended alternative packaging

Product: Pralines filled with chocolate, 170 g (16 pieces)

Company: Productos J. Jiménez, S.L.

Description

Dimensions: h = 21 cm , w = 21 cm , d = 8,9 cm
Product volume: 360 cm^3
Packaging surface: 1.629,6 cm^2
Packaging volume: 3.924,9 cm^3

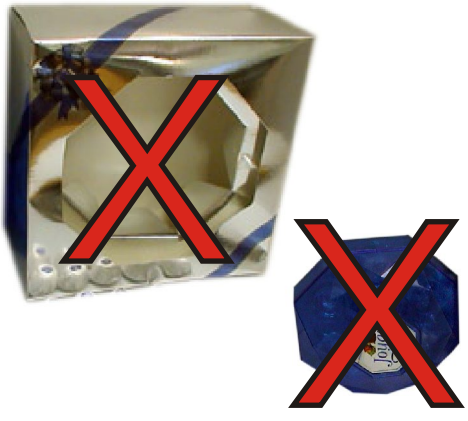
Sweets, orderly arranged

Possible Packaging

A cuboid with the dimensions 13 cm x 7 cm x 6 cm (sweets in 2 layers arranged) would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging



Product: CD recording software

Company: Roxio, digital media company

Description

Dimensions: h = 25,5 cm, w = 40 cm, d = 6,5 cm
Product volume: 680,4 cm^3
Packaging surface: 2.891,5 cm^2
Packaging volume: 6.630 cm^3

CD-software + booklet + CDs for recording

Possible Packaging

An elimination of the transparent part of the package and the reduction of the cardboard to
22 cm x 16 cm x 4 cm would be in accordance with the proposed special provisions for this type of product.

Existing packaging

Recommended alternative packaging

Product: Foto Edition Software

Company: Microsoft

Description

Dimensions: h = 24,3 cm , w = 20 cm , d = 6 cm
Product volume: 101,3 cm^3
Packaging surface: 1.503,6 cm^2
Packaging volume: 2.916 cm^3

4 CDs (software) + booklet

Possible Packaging

A reduction of the cardboard cuboid to 22 cm x 24 cm x 1 cm would be in accordance with the proposed special provisions for this type of product. However, much bigger savings could be adviced by using a smaller booklet.

Existing packaging	Recommended alternative packaging
	

Product: Partition Magic Software

Company: Power Quest

Description

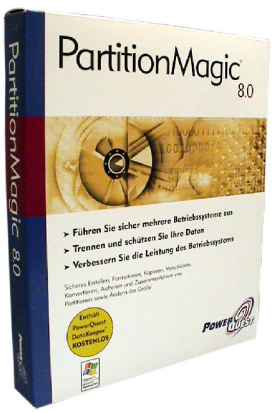
	Partition Magic	Drive Image
Dimensions:	h = 24 cm, w = 20 cm, d = 3 cm	h=23cm , w=17,8cm , d=0,5 cm
Product volume:	137,2 cm^3	137,2 cm^3
Packaging surface:	1.224 cm^2	859,60 cm^2
Packaging volume:	1.440 cm^3	~ 200 cm^3

CD + booklet

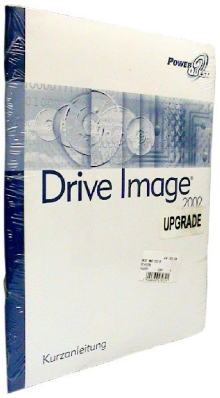
Possible Packaging

Whilst the package of *Drive Image* (= recommended package) is in accordance with the special provisions for this type of product the package for *Partition Magic* is not.

Existing packaging



Recommended alternative packaging



Product: Toy front line truck

Company: Mattel

Description

Dimensions: h = 15 cm , w = 10,5 cm , d = 5 cm (cuboid: h = 9 cm, w = 8 cm, d = 5 cm)
Product volume: 51,75 cm^3
Packaging surface: 399,5 cm^2
Packaging volume: 360 cm^3

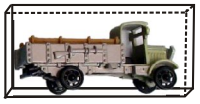
Lorry

Possible Packaging

A cuboid with the dimensions 8 cm x 3,5 cm x 3 cm would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging



Product: Toy "Robot Wars Minibots"

Company: Robot Wars

Description

Dimensions: h = 18 cm , w = 21 cm , d = 9 cm
Product volume: 81 cm^3
Packaging surface: 719,58 cm^2
Packaging volume: 871,40 cm^3

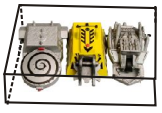
3 toy vehicles

Possible Packaging

A cuboid with the dimensions 10 cm x 5 cm x 3 cm results would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging



Product: Lego

Company: Lego System

Description

Dimensions: h = 14,3 cm , w = 9,7 cm , d = 3,9 cm
Product volume: 99 cm^3
Packaging surface: 464,6 cm^2
Packaging volume: 541 cm^3

Several different items

Possible Packaging

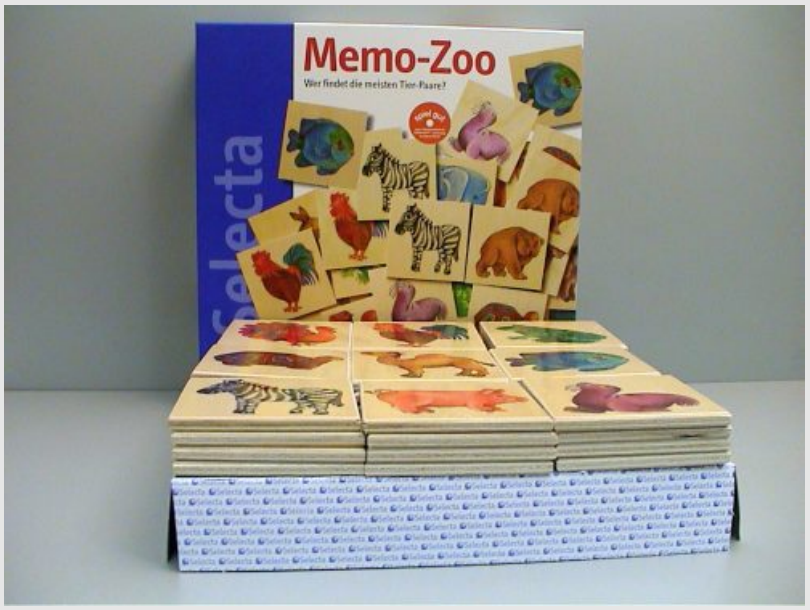
A reduction of the cardboard cuboid to 8 cm x 6 cm x 3 cm would be in accordance with the proposed limit.

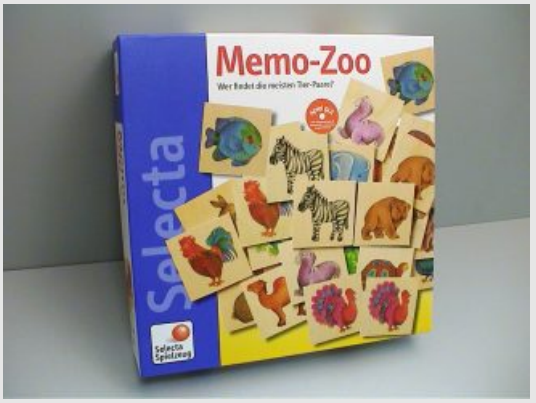
Existing packaging

Recommended alternative packaging

Product: Memory game "Memo-zoo"

Company: Selecta Toys





Description

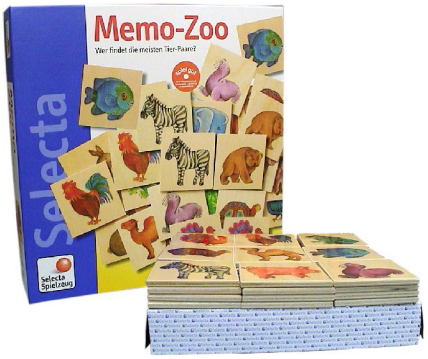
Dimensions: h = 5,4 cm , w = 20 cm , d = 20 cm
Product volume: 731,65 cm^3
Packaging surface: 1.232 cm^2
Packaging volume: 2.160 cm^3

36 elements, orderly arranged

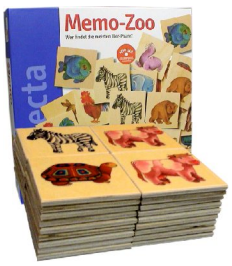
Possible Packaging

An elimination of the double base and another arrangement of the elements as shown would enable a package which is in accordance with the proposed limit.

Existing packaging



Recommended alternative packaging



Product: "Duplo" elements

Company: LEGO

Description

Dimensions: h = 28,5 cm , w = 19 cm , d = 7 cm
Product volume: 755,8 cm^3
Packaging surface: 1.748 cm^2
Packaging volume: 3.790 cm^3

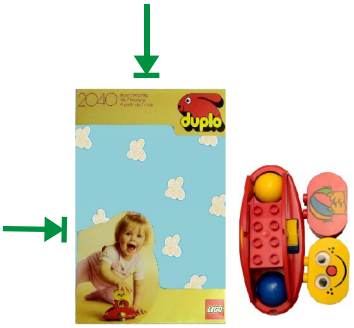
3 elements

Possible Packaging

A cuboid with the dimensions 17,5 cm x 11 cm x 8 cm would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging



Product: Fertilizer rods 20 pieces

Company: Auchan

Description

Dimensions: h =24,5 cm , w = 14,5 cm , d = 0,6 cm (cuboids: h = 3,5 cm, w = 5,2 cm, d = 0,6 cm)
Product volume: 36 cm^3
Packaging surface: 615,41 cm^2
Packaging volume: 43,7 cm^3

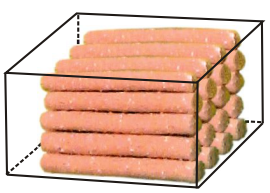
20 pieces of fertilizer orderly arranged

Possible Packaging

An elimination of the two-dimensional surface and also the arrangement of the fertilizer rods in 5 layers with 4 pieces each arranged in a cardboard with the dimensions 6 cm x 4 cm x 4 cm would be in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging



Product: Flower fairy, hand painted

Company: Flower fairies

Description

Dimensions: h =65 cm , w = 50 cm , d = 8 cm (cuboid: h = 17 cm, w = 11 cm, d = 8 cm)
Product volume: 722,25 cm^3 (doll + rack + booklet)
Packaging surface: 4.646,76 cm^2
Packaging volume: 1.496 cm^3 (box for doll + rack)

A dol, a rackl and a booklet

Possible Packaging

An elimination of the two-dimensional surface and the attachment of the doll with rack directly on the booklet would enable a package which is in accordance with the proposed limit.

Existing packaging

Recommended alternative packaging

Annex 1 - EN 13428:2004

Contents of the standard:

The standard EN 13428:2004 "Packaging - Requirements specific to manufacturing and composition - Prevention by source reduction" lays down provisions for the most economical use of packaging materials. The standard is based on an assessment of the packages and provides instructions for its implementation. Basically, this procedure resembles that of the standard series ISO 9000 and ISO 14000.

The individual or organization placing a packaging on the market should be able to demonstrate that the criteria specified for the packaging are complied with using a minimum of packaging weight or packaging volume while safeguarding

- functionality of the entire distribution chain;
- safety and hygiene for products and consumers;
- acceptance by consumers.

”Prevention by source reduction” is defined as follows:

Process for the achievement of a minimum adequate weight and/or volume for identical requirements, of primary, secondary and/or tertiary packaging, when performance and user acceptability remain unchanged and/or adequate, thereby minimizing the impact on the environment.

The required performance criteria for packaging that basically are of equal importance are:

- product protection;
- packaging manufacturing process;
- packing/filling process;
- logistics (including transport, warehousing and handling);
- product presentation and marketing;
- consumer/user acceptance;
- information;
- safety;
- legislation;
- other issues.

The assessment should state for each relevant criterion whether this is a so-called ”critical area”, which means that no reduction of the packaging weight and/or packaging volume is possible under this criterion. If no critical area has been identified, it is assumed that there may be potential for further reduction at source.

The priority ranking of the performance criteria and the evaluation of a criterion as ”critical area” shall be the task of the individual or organization placing the packaging on the market.

Critical review of the standard (excluding the treatment hazarous substances):

All performance criteria listed above are given priority over the reduction of packaging weight and/or packaging volume. Under the assessment procedure it is determined whether these requirements could have been achieved with a reduced resource input.The requirements concerning packaging primarily identified by the individuals or organizations placing the packaging on the market are not questioned at all. For this reason, reduction at source ranks below all (even subjective) performance criteria in the hierarchy of priorities.

For example, the criteria of marketing and product presentation, too, are ranked above source reduction. Thus, it would be possible to place excessive packaging on the market, without infringing the standard, by emphasizing the subjective importance of product presentation.

The procedures taken from the standard series EN ISO 9000 ff and EN ISO 14000 are unsuitable for achieving verifiable results towards packaging reduction. These standard series were developed to document processes and, if necessary, identify weak points of such processes. However, in the present case it is less important to ascertain which process was used to develop a specific packaging than to render transparent in how far a packaging corresponds to the requirements of the EU Packaging Directive for minimum material input. However, a clear-cut quantifyable criterion for packaging prevention is not contained in the standard. This is a serious omission. Hence, the standard will not lead to significant packaging savings in practice.

Annex 2 The proposed approach for packaging reduction (short summary)

Basic concept:

A limit value is defined for the ratio between the packaging surface and product volume. This ratio is calculated according to the following formula (1):

$$\frac{\sqrt[2]{surface\,of\ \ packaging\,[cm^2]}}{\sqrt[3]{volume\,of\ \ packed\ goods\,[cm^3]}}$$

The suggested limit of 3,2 for this ratio has been empirically established based on an assessment of a number of packages for a variety of different products. The limit is considered to be “reasonable“ and constitutes the line between acceptable and non-acceptable (see examples below).

The reason for using the above formula is:

- to cover 2-dimensional packaging components
- to encourage suitable geometric shapes of packaging

A simple volume product to volume packaging ratio would ignore these aspects.

Example 1: Energy saving lamp

The energy saving lamp is offered in 2 different types of packaging. For the blister pack on the left a value of 3,96 can be calculated using the above formula. This means that the package would have exceeded the proposed limit value of 3,2 and would therefore have failed due to the large 2-dimensional component. By contrast, the cardboard box on the right gives a value of 2,64 which would be in conformity to the proposed limit.

Example 2: Chocolate bananas

Both packages contain 24 chocolate bananas, but in different arrangements: 2 layers in case of the left package and 4 layers in case of the right one. Whilst the left package achieves a value of 3,26 and fails the criterion narrowly, the right package passes with a value of 2,59.
Packaging saving: about 40%

Special provisions:

a) Small packages

Packages with a surface area of up to 150 cm² are exempted from complying with the limit value.
This ensures the handling and identification of very small products, particularly for self-service markets.

b) Flat or lengthy solid products

The limit given above does not work for flat or lengthy solid products. Even for optimised packages the limit would be exceeded. For this type of product a slightly different approach was chosen. The ratio of the product surface to product volume of the product is determined according to the formula (2):

$$\frac{\sqrt[2]{surface\ of\ the\ packed\ good\ \ [cm^2]}}{\sqrt[3]{volume\ of\ the\ packed\ good\ \ [cm^3]}}$$

If this ratio exceeds a value of 2,8 (which is the case for lengthy or flat products) an individual limit value for this package is calculated and used instead of the 3,2 value given above. This is done by multiplying the result of the calculation using formula (2) by a factor of 1,15.

In other words: formula (2) can be seen as a special case of formula (1). It represents the ideal or minimum packaging where the surface of the good and the surface of the packaging are identical. This ideal ratio may be exceeded by 15%.

Example 3: Fluorescent lamp

The calculation of the packaging surface to product volume ratio according to formula (1) gives a value of 3,94 which is above the permissible value of 3,2. However, the product surface to product volume ratio according to formula (2) gives a value of 3,84 which exceeds the value of 2,8. Hence, an individual limit is calculated: 3,84 x 1.15 = 4,42. As this latter value is higher than the value of 3,94 calculated using formula (1) the package is acceptable.

For further details including the methods for the determination of volumes and areas the reader is referred to the study report.

Exceptions

The proposed limit value can be exceeded if justified in case of:

- Products with special protection requirements (e.g. fragile electronic appliances or glassware, hazardous substances);
- Legal provisions;
- The need to ensure the safety of the consumer and the carrier.