SLOVENSKI STANDARD
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Povezovalni trakovi – Vodilo za izbiro in uporabo povezovalnih trakov

Tensional strapping - Guide to selection and use of tensional strapping

Umreifungsbänder - Auswahl und Anwendung

Feuillards de cerclage - Guide pour la sélection et l'utilisation des feuillards de cerclage

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Tensional strapping - Guide to selection and use of tensional strapping

Cerclages sous tension - Guide pour la sélection et l'utilisation de cerclages sous tension

Umreifungsbänder - Auswahl und Anwendung

This European Standard was approved by CEN on 21 April 2003.

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

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Foreword

This document (EN 13891:2003) 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of an identical text or by endorsement, at the latest by December 2003, and conflicting national standards shall be withdrawn at the latest by December 2003.

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.

1 Scope

This European Standard gives guidance on the selection and use of steel and non-metallic tensional strapping. The term steel strapping covers flat band strapping. Non-metallic strapping covers weftless strapping and extruded thermoplastic strapping.

NOTE 1 EN 13246 specifies the breaking strength and dimensional tolerances of steel strapping and gives guidance on surface finishes of steel strapping.

NOTE 2 EN13394 specifies the dimensional tolerances and tensile properties of non-metallic tensional strapping and weftless (textile) strapping and gives guidance on surface finishes available.

2 General

2.1 Applications

Tensional strapping is applied to packages by semi-automatic, automatic. or automated equipment (see clause 4) and tied or sealed while under tension. It may be applied to wooden boxes or crates, solid and corrugated fibreboard packaging cases, bundles, bales, palletized and unitised loads, to manufacturing processes, and as a safety factor in internal handling, e.g. temporary banding.

2.2 Purpose

Many of the recommendations set out in other Sections of this European Standard provide for the use of tensional strapping, applied correctly, as an integral part of the container or package. Some reasons for this are as follows:

a) it reinforces and strengthens packages, protecting them against the hazards of transportation, thus assisting and ensuring safe arrival at destination;

b) it allows economies to be effected in load constructions and on other packaging materials;

c) it renders the contents of the packages less liable to pilferage;

d) it may be used as a method of closure or of reinforcing the closure.

In addition, certain conditions experienced in handling and transit require the use of strapping as an additional safeguard, e.g. load restraint.

2.3 Lifting and lashing

Only certain grades of tensional steel strapping are designed to be used for mechanical lifting purposes (see EN 13247). Other grades of tensional steel strapping should not be used for lifting purposes.

NOTE Non-metallic strapping should not be used for lifting purposes.

2.4 Choice of strapping

In determining the size, number and type of straps to be used, consideration should be given to the shape, size and distribution of mass of the package or load, the material from which it is made, and the handling, storage and transport conditions likely to be encountered.

NOTE EN 13246 specifies tensional steel strapping.
EN 13394 specifies non-metallic tensional strapping.

3 Types of equipment

3.1 For use with steel and non-metallic strapping

The types of equipment for use with steel and non-metallic tensional strapping are listed in Table 1. There is a full range of options with various degrees of mechanisation with additional options, if required.

The advice and guidance of manufacturers are offered freely in evaluating the requirements of a given strapping application and recommending suitable systems. Within the types of equipment set out in Table 1 there are obviously special features designed for specialised applications as well as secondary factors which will enhance standard equipment. Suppliers will provide the detailed information upon which a choice can be made.

Table 1 — Types of equipment for use with steel and non-metallic strapping

Hand operated
Power assisted, portable
Fully powered, portable
Semi-automatic machines
Automatic machines
Semi-automatic pack compression
Automatic pack compression
Custom automatic machines
Note Suppliers should be consulted to advise on the suitability of strapping to meet the requirements of specific application equipment.

3.2 For use with semi-automatic, automatic and automated types of strapping

The types of equipment recommended for use with semi-automatic, automatic and automated types of strapping equipment are classified as follows.

a) Semi-automatic: Machinery, generally static, which does not have a strap chute for feeding strapping around the article to be strapped. Feeding is by hand, the machine operator placing the leading end of a strap into the mechanism so that the remaining operations of the cycle, i.e. tensioning, sealing and cutting off, can be completed automatically.

b) Automatic: Machinery with a fixed track for feeding the strapping. All operations of the complete strapping cycle are carried out on activation of the start control.

c) Automated: Automatic machinery with additional electronic or other controls and a powered method of presenting packs to the strapping machine. An automated system could be capable, without the presence of an operator, of controlling the input flow of packs, strapping them at the correct points for the requisite number of straps to be applied (at predetermined positions), activating the strapping machine and ejecting the strapped pack. Automation is a control system of variable sophistication, according to the requirements of the user and the strapping application.

4 Methods of joining under tension

4.1 Description

4.1.1 Sealing (separate seal)

The two ends of the strapping are brought together and secured by a seal, clip or fastener.

4.1.2 Seal-less joint

The two ends of the strapping are brought together and joined by a method using cutting and interlocking.

4.1.3 Welding

The two ends of the strapping are fused together by the application of heat.

4.1.4 Friction welding

The two ends of the strapping are welded together by means of pressure and heat generated by rubbing one against the other.

4.1.5 Ultrasonic welding

The two ends of the strapping are joined together by means of ultrasonic welding.

4.1.6 Buckling

The two ends of the strapping are brought together and held by buckles of metal or plastics.

5 Strength of joint

Figures currently available for seal strengths vary considerably depending upon the type of seal, the type of tensional strapping and the dimensions of the strap. These figures, ranging from 50 % to 100 % of the strength of the parent strap, are not considered to be meaningful in terms of performance under service conditions because of the varying ability of the strap to absorb impact forces. Hence, the type of joint employed will depend more upon the desired method of application and the preferred strap.

In general, the joint strength should be not less than 50 % of the strength of the parent strap for non-metallic strapping and not less than 65 % for metallic strapping.

For tensional steel strapping used for lifting and lashing (EN 13247) the joint strength should not be less than 90% of the minimum break strength of the strapping.

6 Physical properties and usage characteristics

6.1 Properties

The following properties of tensional strapping will have a bearing on the choice for a particular application:

a) Tensile strength and elongation;

b) Conformability;

c) Resistance to deterioration.

6.2 Tensile strength and elongation

Data on the tensile strength of the various types of tensional steel strapping are given in EN 13246. For non-metallic tensional strapping, data on tensile strength and elongation are given in EN 13394.

NOTE Tensional steel strapping covers a range of grades and treatments, many of which are used for specialised and specific applications. The various strap qualities, dimensions and production methods employed will affect elongation as will the gauge length used to measure that elongation. For these reasons it is impracticable to provide a specific table of typical elongation values and it is, therefore, recommended that interested parties contact a reputable supplier to establish the characteristics of a particular product.

6.3 Conformability

The ability of strapping to conform to the contours of the package is a function of the flexibility and extensibility of the strapping.

6.4 Resistance to deterioration

6.4.1 General

The basic properties of the strapping may be modified by the conditions to which it is exposed. The effects of exposure to moisture, ultraviolet rays (sunlight), extremes of temperature, mycological attack and corrosive atmospheres are discussed in 6.4.2 to 6.4.6.

6.4.2 Moisture

Steel strapping is unaffected by moisture in the short term but corrosion may result from the prolonged exposure of certain finishes (see 6.4.6).

The performance of polypropylene and polyester strapping is not affected by moisture.

6.4.3 Ultraviolet radiation

Polypropylene strapping is liable to degradation by ultraviolet radiation, but more resistant types are available. Steel and polyester strapping is resistant to ultraviolet radiation.

6.4.4 Extremes of temperature

The operating range for the various types of strapping is as follows:

a) steel strapping is from – 50 ºC to + 600 ºC;

b) polyester strapping is from – 50 ºC to + 90 ºC;

c) polypropylene strapping is from – 30 ºC to + 60 ºC.

NOTE The physical properties of all types of tensional strapping can change with temperature. Suppliers should be consulted to advise on the application and use of strapping at the extremes of the temperatures stated above.

6.4.5 Mycological attack

Steel and thermoplastics strapping are inherently resistant to mycological attack.

6.4.6 Corrosion

Steel strapping can be affected by prolonged exposure to moisture vapour or industrially polluted or marine atmospheres. Corrosion can also occur due to interaction between the strapping and the package. The effect of corrosion can be reduced by a suitable finish. Corrosive atmospheres do not affect non-metallic strapping.

7 Application

7.1 General

All straps should normally be applied at right angles to the edges of packages. Strapping should be applied sufficiently tightly to ensure that it performs its function efficiently during the life of the package, but not so tightly as to damage the package or its contents, or lead to breakage of the strapping. Edge protectors, pads, etc., should be interposed between the strapping and the package to protect edges and/or finishes where risk of damage is involved. Such devices may also be used when strapping relatively incompressible packages, e.g. steel drums, to ensure greater friction between strapping and containers, and thus preventing movement of the strapping. Non-metallic strapping is applied with an initial extension sufficient to compensate for the elasticity, which is a feature of this type of material. This will also give additional stability to the package. Where practicable, bridging. i.e. a portion of strapping not in contact with the package, should be avoided. Whenever possible steel strapping should be applied to wooden boxes immediately before despatch, and this is particularly advisable if the timber has a high moisture content.

7.2 Examples of the use of strapping

The following are examples of the use of strapping:

a) strapping and securing wooden boxes, cases and crates, and solid and corrugated fibreboard packagings(see Figures l (a), l (b) and l (c));

b) securing collapsible and returnable packagings, the life of which can thus be lengthened. It is often unnecessary to secure the lids by means other than strapping (see Figure l (c));

c) unitizing: this involves securing a number of individual articles or packages in one unit (see Figures 2 and 3);

d) palletizing of suitable commodities (see Figures 4, 5, 6, and 7);

e) baling and bundling of suitable commodities (see Figures 8 to 11);

f) internal strapping: when packing individual units, tensional strapping enables ancillary parts to be secured firmly to the interior of the transit container. Where no transit container is used such parts can be strapped directly to the major component;

g) freight security: strapping may be used for securing loads to vehicles or freight container transit.

8 Choice of tensional strapping

In selecting the type of strapping to be used, factors relating to the package given in 2.4 need to be considered together with the properties and applications of the various types of strapping outlined in clause 7. Other factors to be taken into consideration are as follows:

a) the degree of mechanisation required in the strapping system;

b) strapping rate required to meet output;

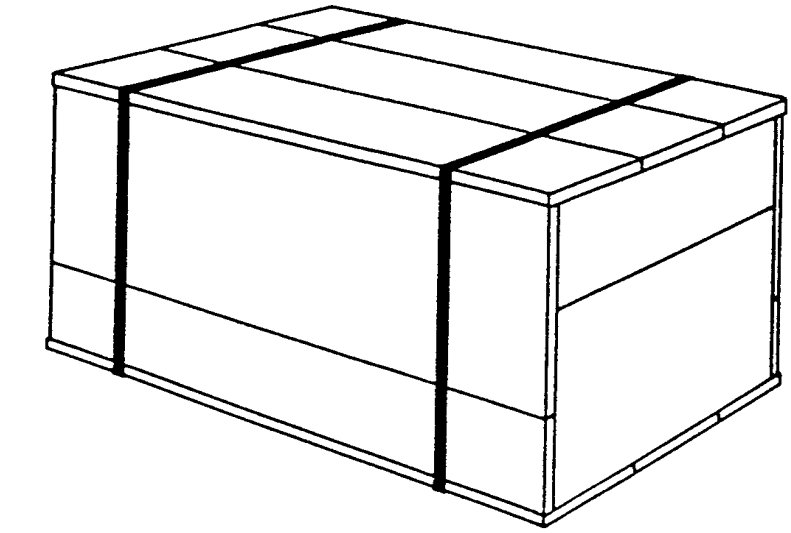
c) power sources available for strapping appliances;

d) number and location of strapping points proposed;

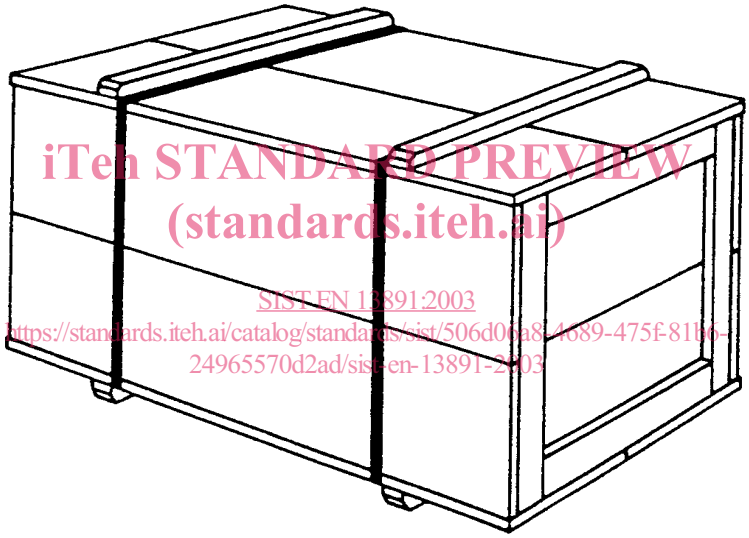
e) mobility requirements, if any, of the strapping system;

f) operating costs;

g) the nature of the pack and its resistance or otherwise to dimensional change through expansion, contraction, settlement, bruising, etc.



(a)



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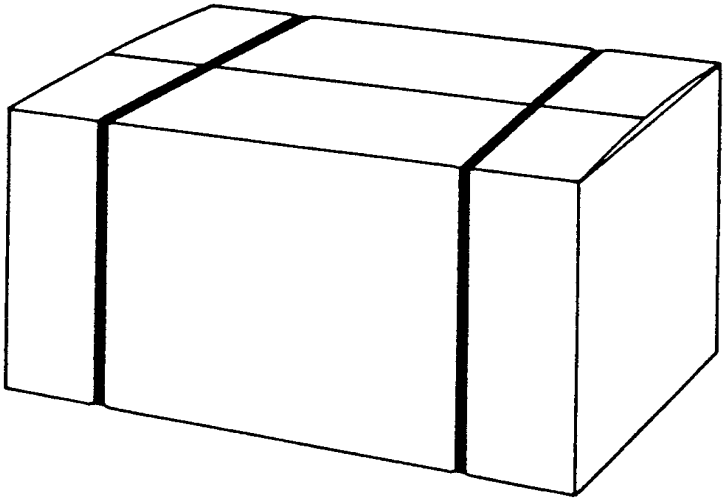

(c)

Figure 1 — Strapping of wooden boxes and cases and solid corrugated fibreboard packing cases