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Pakirne naprave - Varnost pakirnih naprav - 6. del: Zavijalni stroji

Safety of packaging machines - Part 6: Pallet wrapping machines

Sicherheit von Verpackungsmaschinen - Teil 6: Paletteneinschlagmaschinen

Sécurité des machines d'emballage - Partie 6 : Machines d'emballage de palettes

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Safety of packaging machines - Part 6: Pallet wrapping machines

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Sicherheit von Verpackungsmaschinen - Teil 6: Paletteneinschlagmaschinen

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 415-6:2006+A1:2009) has been prepared by Technical Committee CEN/TC 146 “Packaging machines - Safety”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by April 2010, and conflicting national standards shall be withdrawn at the latest by April 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2009-09-07.

This document supersedes EN 415-6:2006.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] ⟨A1⟩.

This document 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).

[A1] For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1]

Other standards produced by this Technical Committee are:

EN 415, Safety of packaging machines;

Part 1: Terminology and classification of packaging machines and associated equipment

Part 2: Pre-formed rigid container packaging machines

Part 3: Form, fill and seal machines

Part 4: Palletizers and depalletizers

Part 5: Wrapping machines

Part 7: Group and secondary packaging machines

Part 8: Strapping machines

[A1] Part 9: Noise measurement methods for packaging machines, packaging lines and associated equipment, grade of accuracy 2 and 3 ⟨A1]

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Introduction

Pallet wrapping machines are used extensively in Europe, in an increasingly wide range of industries. They contain several significant hazards and have the potential to cause serious injury.

Pallet wrapping machines fulfil the following major tasks:

— securing of palletised or unpalletised loads to prevent them collapsing and displacing during transport, handling, storage;

— pooling of loads and parts to form loads suitable for transport;

— protection against external influences;

— conditional protection against theft.

This document is a type C standard as defined in the Introduction of EN ISO 12100-1:2003.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this standard.

When provisions of this type C standard are different from those, which are stated in type A or B standards, the provisions of this type C standard take precedence.

1 Scope

This standard applies to the following groups of machines:

— pallet banding machines;

— stretch film pallet wrapping machines;

— stretch film hood application machines;

— mobile stretch film wrapping machines;

— semi automatic self driving stretch film wrapping machines;

— shrink film pallet wrapping machines;

— shrink film hood application machines;

— film removing machines;

— shrinking systems;

— sleeve wrapping machines for product greater than 400 mm in one direction;

— product centralising machines.

The individual machines are described in 3.2.

This standard deals with safety requirements for machine design, construction, installation, commissioning, operation, adjustment, maintenance and cleaning of pallet wrapping machines.

The extents to which hazards, hazardous situations and events are covered are indicated in Clause 4.

Exclusions

This standard is not applicable to the following machines:

— machines that were manufactured before the date of publication of this document by CEN;

— pallet strapping machines and destrapping machines. These machines are within the scope of prEN 415-8

— conveying systems that connect packaging machines with each other, but includes conveying systems that are part of the machines;

This standard does not consider the following hazards:

— the use of pallet wrapping machines in potentially explosive atmospheres;

— the health, safety or hygiene hazards associated with the products that may be handled by the machines, but does include general advice on this subject;

— hazards that may be associated with electromagnetic emissions from pallet wrapping machines;

— hazards that may be associated with decommissioning pallet wrapping machines.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 294:1992, *Safety of machinery — Safety distance to prevent danger zones being reached by the upper limbs*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 415-1:2000, *Packaging machines safety — Part 1: Terminology and classification of packaging machines and associated equipment*

EN 418, *Safety of machinery — Emergency stop equipment, functional aspects - Principles for design*

EN 563, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit values for hot surfaces*

EN 574:1996, *Safety of machinery — Two-hand control devices — Functional aspects — Principles for design*

EN 614-1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 619, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 626-1, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

EN 626-2, *Safety of machinery — reduction of risk to health from hazardous substances emitted by machinery — Part 2: Methodology leading to verification procedures*

EN 811, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

EN 894-1, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-2, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 953:1997, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 954-1:1996, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design*

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components - Hydraulics*

EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components - Pneumatics*

EN 999, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts of the human body*

EN 1005-3, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1037, *Safety of machinery — Prevention of unexpected start-up*

EN 1050, *Safety of machinery — Principles for risk assessment*

EN 1088:1995, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1672-2:2005, *Food processing machinery — Basic concepts — Part 2: Hygiene requirements*

EN 1760-1, *Safety of machinery — Pressure sensitive protective devices — Part 1: General principles for the design and testing of pressure sensitive mats and pressure sensitive floors*

EN 1760-2, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars*

EN 13478, *Safety of machinery — Fire prevention and protection*

EN 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 61310-1:1995, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995)*

EN 61310-3, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators (IEC 61310-3:1999)*

EN 61496-1:2004, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

EN 61508-1*, Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 1: General requirements (IEC 61508-1:1998 + Corrigendum 1999)*

EN 61508-2*, Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems (IEC 61508-2:2000)*

EN 61508-3*, Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements*

EN 62061:2005, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

EN ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)*

EN ISO 3746:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:1995)*

EN ISO 3747:2000, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Comparison method for use in situ (ISO 3747:2000)*

EN ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning (ISO 9614-2:1996)*

EN ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)*

EN ISO 11202, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method in situ (ISO 11202:1995)*

EN ISO 11204:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental corrections (ISO 11204:1995)*

EN ISO 12001:1996, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code (ISO 12001:1996)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

EN ISO 14122-2, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

EN ISO 14122-4, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)*

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*

IEC 61496-3, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR) (IEC 61496-3:2001)*

3 Terms and definitions

For the purposes of this document the terms and definitions given in Clause 3 of EN ISO 12100-1:2003, and EN 415-1:2000 and the following apply.

3.1 Definition of terms

3.1.1
product
article or articles, with or without pallet, that are handled in the pallet wrapping machine

3.1.2
pack
assembly of product and packaging materials produced by a pallet wrapping machine

3.1.3
packaging material
material used to secure a product, e.g. stretch film

3.1.4
flexible packaging material
relatively thin paper, plastic film or flexible laminate

3.1.5
stretch film
flexible elastic plastic film which can be pulled tightly around a product to form an envelope. It may stick to itself on contact or require heat sealing

3.1.6
stretch wrapping
wrapping process in which the stretch film is stretched and wrapped around the product and sealed under tension

3.1.7
thermoplastic film, shrink film
plastic film which shrinks when heated

3.1.8
film reel, packaging material reel
continuous sheet of paper, plastic film, metal foil or flexible laminate wound on a cylindrical core

3.1.9
film clamp
device to hold the film at the product for the first wrap. Also called film fixture

3.1.10
manual operation
machine functions or modes where the only power source is directly applied manual effort

3.1.11
top sheet
piece of packaging material which is applied to the top of the product e.g. to achieve water and dust protection

3.2 Description of pallet wrapping machines

3.2.1 General

Pallet wrapping machines are machines listed in Clause 1 that secure product for transport and other purposes e.g. by applying packaging material or shrinking shrink film. Many of the machines deal with palletised products, therefore they are called, e.g.: pallet shrink wrapping machine, pallet shrink oven (see 3.12.3 of EN 415-1:2000). In many cases, however, machines can function without a pallet or with an alternative form of support for the pack.

3.2.2 Spiral stretch wrapping machines

3.2.2.1 General

The stretching method uses film webs that are wound around product according to a given winding pattern (e.g. single or cross bracing). The number of the bottom windings or bottom edge windings or the degree of overlapping of the film webs can be variably adjusted.

Stretch film wrapping machines wind a stretch film spirally around product, thus resulting in an envelope with horizontal and vertical tension forces.

Pallet stretch wrapping machines include:

- Automatic stretch film wrapping machines: The machine is loaded and unloaded automatically by a conveyor. The application of the stretch film, stretching and cutting of the stretch film are done automatically.

- Semiautomatic stretch film wrapping machines: One or more of the following are done manually: loading or unloading of the machine, application or cutting of the stretch film. The wrapping movement is done automatically.

- Manual stretch film wrapping machines: Like semiautomatic stretch film wrapping machines, but additionally the movement of the lifting mechanism is done manually.

The following types of stretch film wrapping machines exist.

3.2.2.2 Rotary table machine

Product, which is positioned on a table that rotates, is wrapped. When used, vertically moveable film carriage and pre-stretching device are fitted to a column. The functional principle of a rotary table machine is shown in Figure 1. On manual rotary machine the vertical movement of the film carriage is done by an operator (see Figure 2 . An example of a fully automatic rotary table machine is shown in Figure 3.

The principle components are rotating table and film reel

Optional assemblies: conveyors, film clamp, film knife, film sealing device, hold-down plate, pre-stretching unit on the film reel assembly, top sheet feeder.

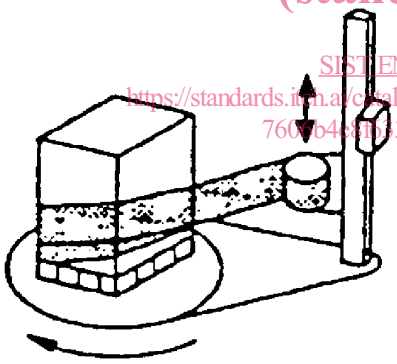

Figure 1 — Principle of rotary table machine

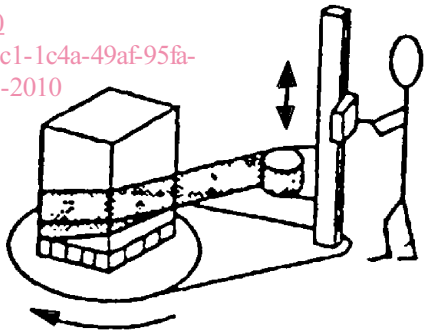

Figure 2 — Manual rotary table machine