

SLOVENSKI STANDARD SIST EN 415-6:2007+A1:2010

01-februar-2010

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

Ta slovenski standard je istoveten z: EN 415-6:2006+A1:2009

SIST EN 415-6:2007+A1:2010

https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010

ICS:

55.200 Pakirni stroji Packaging machinery

SIST EN 415-6:2007+A1:2010 en.fr

SIST EN 415-6:2007+A1:2010

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 415-6:2007+A1:2010</u> https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010 **EUROPEAN STANDARD**

EN 415-6:2006+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2009

ICS 55.200

Supersedes EN 415-6:2006

English Version

Safety of packaging machines - Part 6: Pallet wrapping machines

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

Sicherheit von Verpackungsmaschinen - Teil 6: Paletteneinschlagmaschinen

This European Standard was approved by CEN on 4 September 2006 and includes Amendment 1 approved by CEN on 7 September 2009.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

<u>SIST EN 415-6:2007+A1:2010</u> https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents		Page
Forew	ord	6
Introd	uction	7
1	Scope	8
2	Normative references	
		_
3 3.1	Terms and definitions Definition of terms	
3.1	Description of pallet wrapping machines	
4 4.1	List of hazards on pallet wrapping machines	
4.2	General pallet wrapping machine hazards	
4.3	Specific hazards on pallet wrapping machines excluding shrinking systems and auxiliar	
	machines	
4.4	Specific hazards on pallet shrinking systems	
4.5	Auxiliary machines	
5	Safety requirements and measures for pallet wrapping machines	40
5.1	General A.	40
5.2 5.3	General requirements for pallet wrapping machines	40 53
5.4	Safety requirements for shrinking systems	59
5.5	Auxiliary machines SIST EN 413-62007+A1:2010	
6	Verification of safety requirements and measures s/sist/2ccf31c1-1c4a-49af-95fa-	
6.1	General 7606b4c8f633/sist-en-415-6-2007a1-2010	64
6.2	Visual inspections with the machine stopped	65
6.3	Measurements with the machine stopped	
6.4 6.5	Visual inspections with the machine running	
6.6	Measurements with the machine running Verification procedures	
	·	
7 7.1	Information for use	
7.1 7.2	Signals and warning signs	
7.3	Instruction handbook	
Annov	A (normative) Noise test code for pallet wrapping machines - grade of accuracy 2 and 3	71
A.1	Scope	71
A.2	Definitions	
A.3	Determination of the emission sound pressure level at work station	
A.4	Determination of the sound power level	
A.5 A.6	Installation and mounting conditions Operating conditions	
A.7	Measurement uncertainties	
A.8	Information to be recorded	
A.9	Information to be reported	76
A.10	Declaration and verification of noise emission values	77
Annex	B (normative) Methods of safeguarding large apertures	79
B.1	Interlocked guards with guard locking	79
B.2	Fixed and interlocked guards with ESPE	
B.3	Positioning of ESPE	82

Annex C (normative) ESPE-Muting	84
Annex D (informative) List of possibly helpful standards for gas equipment	86
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC	87
Annex ZB (informative) A Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	88
Bibliography	89

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 415-6:2007+A1:2010 https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010

Figures

Figure 1 — Principle of rotary table machine	13
Figure 2 — Manual rotary table machine	13
Figure 3 — Automatic rotary table machine	14
Figure 4 — Semiautomatic rotary arm machine	15
Figure 5 — Fully automatic rotary arm machine	16
Figure 6 — Ring machine – Principle of operation	17
Figure 7 — Semi automatic self driving pallet stretch wrapping machine	17
Figure 8 — Mobile pallet stretch wrapping machine	18
Figure 9 — Curtain stretching machine – Principle of operation	18
Figure 10 — Hood stretching machine	19
Figure 11 — Spiral pallet wrapping machine	21
Figure 12 — Vertical hood application machine II en STANDARD PREVIEW	22
Figure 13 — Parachute hood application machine	23
Figure 14 — Shrinking frame	24
Figure 15 — Chamber shrinking oven with electric heating device v2cc01cl-1c4a-49af-95fa	25
Figure 16 — Continuous shrinking oven using thermal combustion heating	26
Figure 17 — Shrinking column using thermal combustion	27
Figure 18 — Product centralizing machine	28
Figure 19 — Semiautomatic or manual rotary table machines: crushing, shearing and drawir location	ng-in hazard 34
Figure 20 — Warning sign "Caution, hot surface"	47
Figure 21 — Semiautomatic or manual rotary table machines with apertures in the table	55
Figure 22 — Methods for safeguarding of film rollers	56
Figure B.1 — Interlocked guards with guard locking	79
Figure B.2 — Example of a combination of fixed and interlocked guards and ESPE	80
Figure B.3 — Dynamic cell positioning	82
Figure B.4 — Positioning of ESPE	83
Figure C.1 — Positioning of muting ESPE	85

Tables

Table 1 —Degree of protection for dusty environments	45
Table 2 — Degree of protection for different cleaning methods using water	45
Table 3 — Verification procedures for safety requirements identified in 5.2 and 5.3	67
Table 3 (continued)	68
Table A.1 — Specification of K ₃ (based on K ₂)	72
Table A.2 — Typical workstations for the determination of the emission sound pressure level an conditions for all noise emission measurements	
Table A.3 — Expected standard deviations of reproducibility σ_R	76
Table A.4 — Uncertainties expected	77
Table A.5 — Example of a noise emission declaration (The values in this table are examples)	78

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 415-6:2007+A1:2010</u> https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010

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 [A] .

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).

A) For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. (A1) (standards.iteh.ai)

Other standards produced by this Technical Committee are:

EN 415, Safety of packaging machines, ards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010

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

A Part 9: Noise measurement methods for packaging machines, packaging lines and associated equipment, grade of accuracy 2 and 3 (41)

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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. Item. a1)

<u>SIST EN 415-6:2007+A1:2010</u> https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-7606b4e8f633/sist-en-415-6-2007a1-2010

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.
 (standards.iteh.ai)

The individual machines are described in 3.2. $\underline{\rm SIST\;EN\;415\text{-}6:2007+A1:2010}$

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 PREVIEW

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 1/2ccf31c1-1c4a-49af-95fa-

7606b4e8f633/sist-en-415-6-2007a1-2010
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) // modified // modified) // sist-en-415-6-2007a1-2010

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) ards.iteh.ai)

EN ISO 14122-3, Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001) 3-6:2007+A1:2010 https://standards.iteh.avcatalog/standards/sist/2ccf31c1-1c4a-49af-95fa-

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

(standards.iteh.ai)

iTeh STANDARD PREVIEW

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

3.1.10

SIST EN 415-6:2007+A1:2010

manual operation

https://standards.iteh.ai/catalog/standards/sist/2ccf31c1-1c4a-49af-95fa-

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.

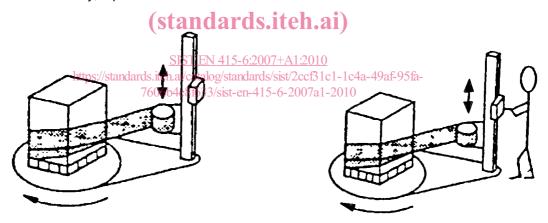


Figure 1 — Principle of rotary table machine

Figure 2 — Manual rotary table machine