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Safety of packaging machines - Part 7: Cartoning and case packing machines

Sicherheit von Verpackungsmaschinen - Teil 7: Kartonier- und Faltkistenpackmaschinen

Sécurité des machines d'emballage - Partie 7 : Machines de cartonnage et d'emballage carton

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Sécurité des machines d'emballage - Partie 7 :
Machines de cartonnage et d'emballage carton

Sicherheit von Verpackungsmaschinen - Teil 7:
Kartonier- und Faltkistenpackmaschinen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 146.

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

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European foreword

This document (prEN 415-7:2022) has been prepared by Technical Committee CEN/TC 146 “Packaging machines - Safety”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 415-7:2006+A1:2008.

In comparison with the previous edition, the following technical modifications have been made:

- Scope now includes cartoning machines;
- Safety requirements have been rewritten so they are in line with EN 415-10:2014;
- Normative references have been changed to reflect the many changes that have been made to B1 and B2 standards.

Other Parts of EN 415, *Safety of packaging machines*, include:

- 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; fill and seal machines
- Part 4: Palletizers and depalletizers
- Part 5: Wrapping machines
- Part 6: Pallet wrapping machines
- Part 8: Strapping machines
- Part 9: Noise measurement methods for packaging machines, packaging lines and auxiliary equipment, grade of accuracy 2 and 3
- Part 10: General requirements

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s) / Regulation(s).

For the relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Introduction

Cartoning and case packing machines are used extensively in Europe, in an increasingly wide range of industries. They contain many hazards and have the potential to cause serious injury.

This document is a type-C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in Clause 1.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

This document makes several references to EN 415-10:2014, but where requirements of this document are different from those which are stated in EN 415-10:2014, the requirements of this document take precedence over the requirements of EN 415-10:2014.

Combined function machines

Where a machine covered by EN 415-7 incorporates a mechanism described by another standard in the EN 415 series, that mechanism shall comply with the requirements of the relevant standard.

Example 1: In the case of a palletizer which incorporates case packing mechanisms, the palletizing mechanisms should comply with EN 415-4:1997 and the case packing mechanisms should comply with EN 415-7.

Example 2: In the case of a cartoner which incorporates thermoform fill and seal mechanisms, the cartoning mechanisms should comply with EN 415-7 and the thermoform fill and seal mechanisms should comply with EN 415-3.

1 Scope

This document establishes safety requirements for the main types of cartoners, case packing machines and crate loading and unloading machines.

This document covers the safety requirements for machine design, construction and all phases of life of the machines including installation, commissioning, operation, adjustment, maintenance and cleaning.

This part of EN 415 applies to machines manufactured after the date of issue of this document.

Exclusions

This document does not apply to mandrel carton form, fill and seal machines.

NOTE Mandrel carton form, fill and seal machines are covered by EN 415-3:2021.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 415-1:2014, *Safety of packaging machines - Part 1: Terminology and classification of packaging machines and associated equipment*

EN 415-4:1997, *Safety of packaging machines - Part 4: Palletisers and depalletisers*

EN 415-9:2009, *Safety of packaging machines - Part 9: Noise measurement methods for packaging machines, packaging lines and associated equipment, grade of accuracy 2 and 3*

EN 415-10:2014, *Safety of packaging machines - Part 10: General Requirements*

EN 1005-2:2003+A1:2008, *Safety of machinery - Human physical performance - Part 2: Manual handling of machinery and component parts of machinery*

EN 1672-2:2020, *Food processing machinery - Basic concepts - Part 2: Hygiene and cleanability requirements*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power - General rules and safety requirements for systems and their components (ISO 4414:2010)*

EN ISO 7010:2020, *Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010:2019, Corrected version 2020-06)*

EN ISO 10218-1:2011, *Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots (ISO 10218-1:2011)*

EN ISO 10218-2:2011, *Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration (ISO 10218-2:2011)*

EN ISO 11688-1:2009, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*

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EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13732-1:2008, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13854:2019, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13857:2019, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

EN ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

EN ISO 14122-2:2016, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2016)*

EN ISO 14122-3:2016, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

EN ISO 14159:2008, *Safety of machinery - Hygiene requirements for the design of machinery (ISO 14159:2002)*

EN ISO 14738:—¹, *Safety of machinery — Anthropometric requirements for the design of workstations for industries and services*

EN ISO 20607:2019, *Safety of machinery - Instruction handbook - General drafting principles (ISO 20607:2019)*

EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

EN 60825-1:2014, *Safety of laser products - Part 1: Equipment classification and requirements*

EN 60825-4:2006², *Safety of laser products— Part 4: Laser guards*

EN 61496-1:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests*

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 3864-2:2016, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*

¹ Under preparation. Stage at time of publication: prEN ISO 14738:2020.

² As amended by EN 60825-4:2006/A1:2008 and EN 60825 4:2006/A2:2011.

ISO 3864-3:2012, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 415-1:2014, EN 415-10:2014 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 Definition of terms

3.1.1

adjustable linked guard

guard which is linked to a moveable function part and a fixed machine part so that it is adjusted by a positive mechanical action

Note 1 to entry: Examples of moveable function parts are the adjustable side of a carton magazine or a guide rail on a conveyor.

3.1.2

carton

container that is made from cartonboard

Note 1 to entry: It is usually delivered to the user in the form of a carton blank or a folded and side seam glued skillet.

3.1.3

carton blank

case blank

individual carton in the flat after cutting and creasing and with the strippings removed

3.1.4

carton tray

tray made from cartonboard

3.1.5

cartonboard

paper board generally 0,25 mm to 1,0 mm thick and pliable enough so that it can be folded along score lines without cracking the material

3.1.6

case

container, made from corrugated board

3.1.7

change parts

machine parts designed to handle a specific product, packaging material or pack size that need to be changed when the machine is set up to handle a different product, packaging material or pack size

prEN 415-7:2022 (E)**3.1.8****change part guard**

fixed or interlocking guard which has been made to suit one product or pack size and must be changed every time the product or pack size is changed

3.1.9**cold adhesive**

adhesive that is liquid at room temperature

3.1.10**corrugated board**

material comprising one or more sheets of fluted paper stuck between flat sheets of paper

3.1.11**crate**

container for a group of products, e.g. bottles that can be made from plastic, wood or metal

3.1.12**hot melt adhesive**

adhesive that is solid at room temperature and which is melted so that it can be applied

3.1.13**lock end carton****tongue and slit carton**

carton provided with tongues which on closing engage with slits in the opposite flap to close the carton

3.1.14**magazine**

mechanical assembly designed to hold stacks of cartons, carton blanks, cases, case blanks, leaflets, labels or stackable containers

3.1.15**mandrel**

mechanical assembly around which a flexible package or carton is formed

3.1.16**manually adjustable guard**

guard with one or more moveable parts which are adjusted by a manual intervention

Note 1 to entry: The adjustable part(s) remain in position while a particular product or package size is being handled.

3.1.17**pack****package**

assembly of product and packaging materials produced by a packaging machine

3.1.18**packaging material**

material used to make a package

EXAMPLES carton board, corrugated board

3.1.19**pre-gummed tape**

tape usually made from paper, which is coated with an adhesive that forms a bond when water and pressure is applied

3.1.20**product**

substance, article or articles (including packs or packages) that are handled in the packaging machine

3.1.21**self-adhesive tape**

tape usually made from a thin plastic film, which is coated with an adhesive that requires only pressure to form a bond

3.1.22**side seam**

longitudinal seal which is made on the carton blank or case blank before being handled in the packaging machine

3.1.23**skillet**

side seam glued carton blank

Note 1 to entry: Carton skillets are used in typical horizontal end load cartoners and vertical cartoners.

3.1.24**staple**

U-shaped metal closure that is forced through a material and then bent over to form a seal

3.1.25**soil**

any unwanted matter, including product residues, micro-organisms, residual detergent or disinfecting agents

[SOURCE: EN 1672-2:2020]

3.1.26**tray**

open topped container

Note 1 to entry: typically made from cartonboard, corrugated board or plastic.

3.1.27**trip guard**

interlocking guard which is designed to move easily when touched

3.1.28**wraparound case**

package made by folding corrugated board or cartonboard around a product or group of products

3.1.29**wraparound lid**

cover made by folding carton board or corrugated board around a package

prEN 415-7:2022 (E)**3.1.30****wraparound sleeve**

package with two open ends made by folding cartonboard or corrugated board around a product or group of products before sealing

3.1.31**wraparound tray**

tray made by folding cartonboard or corrugated board around a product or group of products before sealing

Note 1 to entry: The tray can be pre-made or cut on the machine from a reel of packaging material.

3.2 Definitions of machines

Definitions 3.2.1 to 3.2.12 refer to stand-alone machines, but they can also apply to mechanisms in a machine which combines two or more packaging functions.

EXAMPLE 1 a machine incorporating a case erector, a product loading mechanism and a wraparound lidding mechanism

EXAMPLE 2 a machine incorporating a case erector, a robot product loader and an automatic case taper

The figures in this clause illustrate the function of a typical machine of the type described, but machines that work in slightly different ways are also covered by this document. Most of the machines in the scope of this document may run either intermittently or continuously.

3.2.1**carton or tray erector**

packaging machine that erects cartons or trays, usually from carton blanks

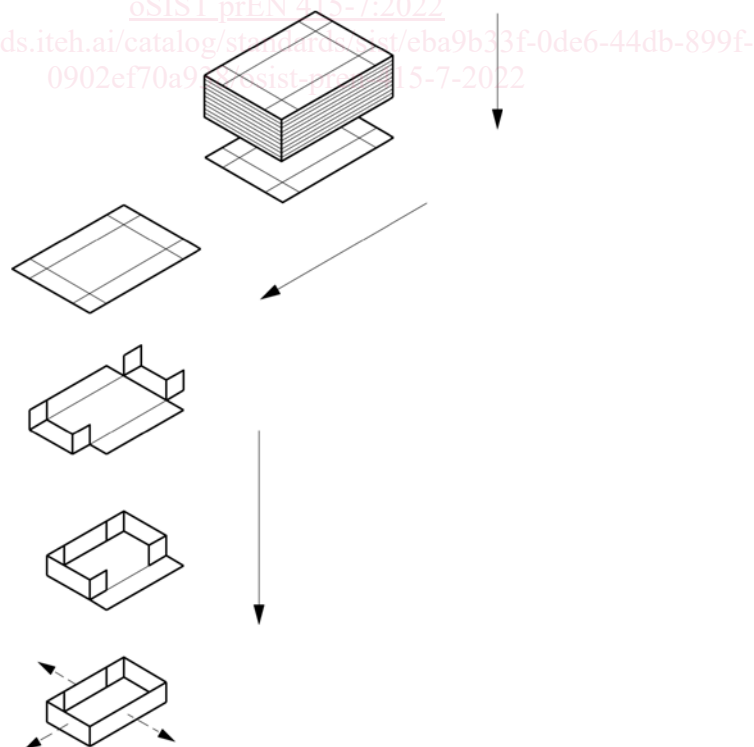


Figure 1 — Diagram showing the principle of operation of a typical carton or tray erector

3.2.2

case erector

packaging machine that erects side seamed cases, usually made from corrugated board

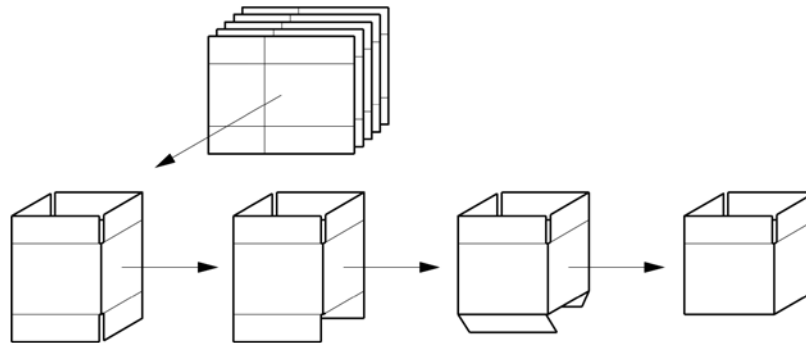


Figure 2 — Diagram showing the principle of operation of a typical case erector

3.2.3

skillet erecting machine

machine which erects pre-glued cartonboard skillets and secures them by engaging pre-cut tabs and slots, by applying adhesive or by applying heat to pre-coated board

3.2.4

place packer or unpacker

crate loader or unloader

packaging machine that grips products or groups of products and places them vertically into a crate or package or removes them from a crate or package

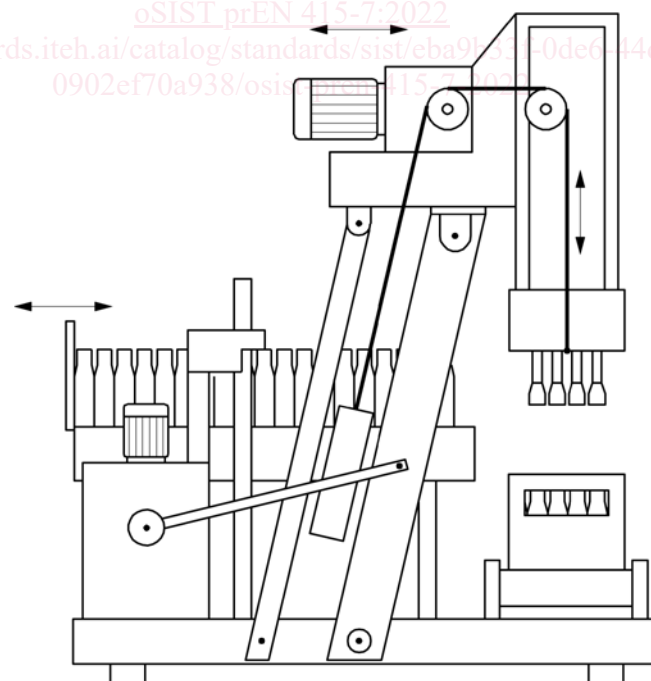


Figure 3 — Diagram showing the principle of operation of a typical crate loader or unloader

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3.2.5

robot loader or unloader

packaging machine incorporating an industrial robot that grips products or groups of products and places them vertically into a package or removes them from a package

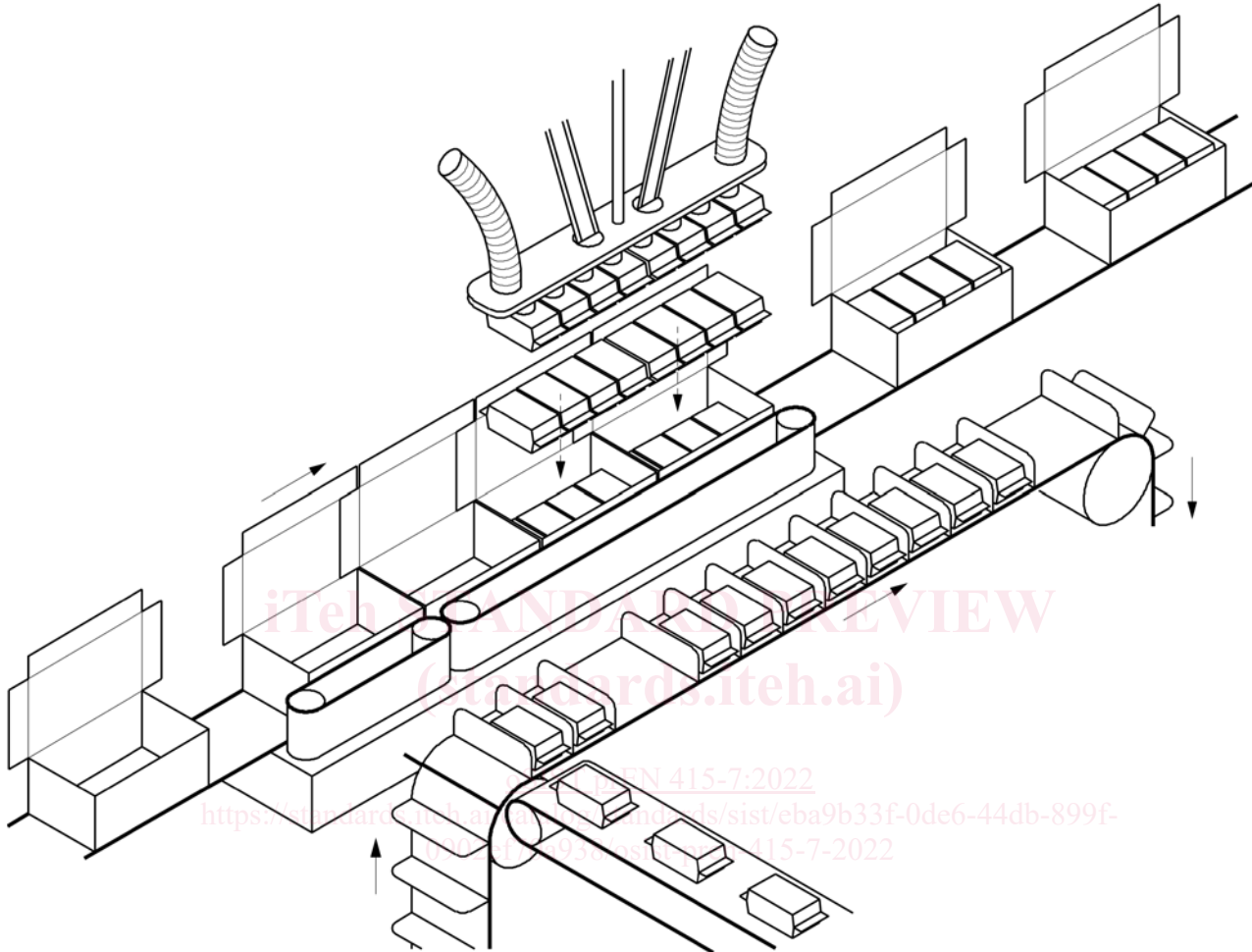


Figure 4 — Diagram showing the principle of operation of a typical robot loader or unloader

3.2.6

horizontal case loader

packaging machine that loads a product or group of products horizontally into a package, usually a pre-erected case

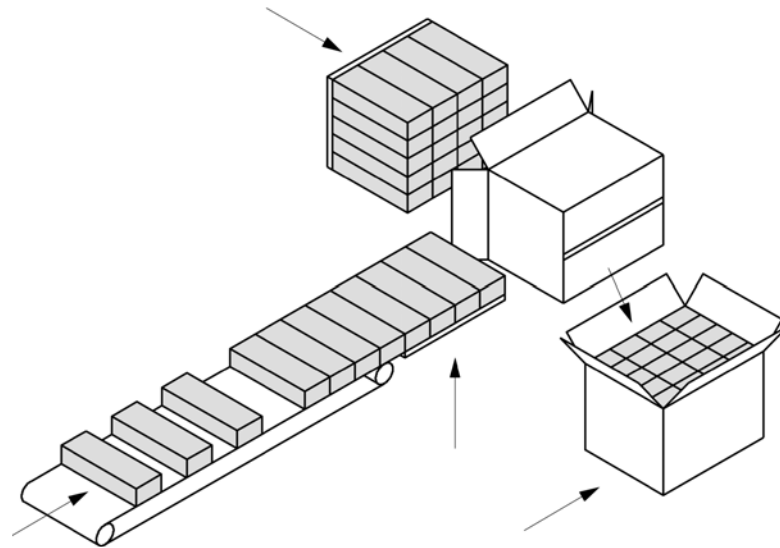


Figure 5 — Diagram showing the principle of operation of a typical horizontal case loader

3.2.7

case taper

packaging machine that seals cases with self-adhesive tape or pre-gummed paper tape

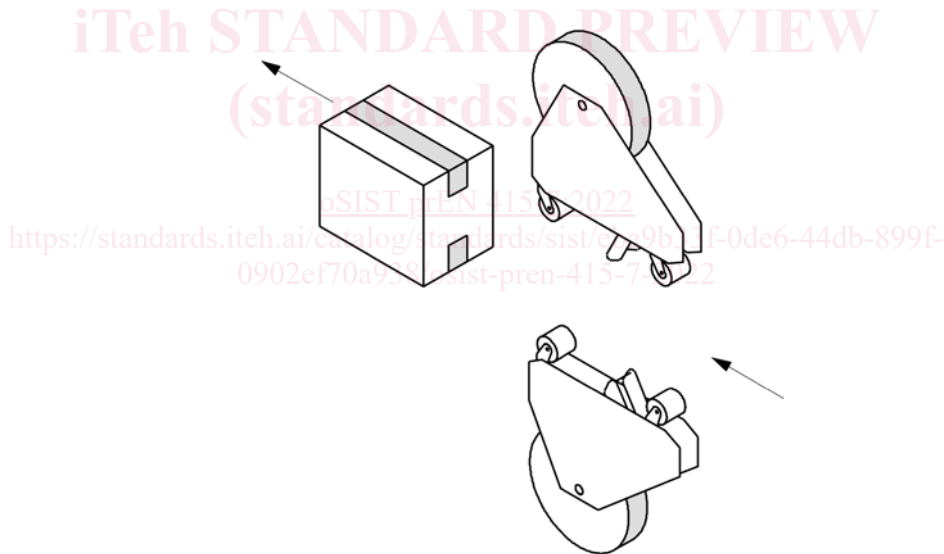


Figure 6 — Diagram showing the principle of operation of a typical case taper

Note 1 to entry: This document identifies four types of case taper: see 3.2.7.1 to 3.2.7.4.

3.2.7.1

semi-automatic case taper with manual size change

case taper, which applies tape to a case which has been folded and presented to the machine by hand; the machine can be size changed manually

3.2.7.2

semi-automatic case taper with automatic size change

case taper, which applies tape to a case which has been folded and presented to the machine by hand; the machine adjusts automatically to the width and height of the case