SLOVENSKI STANDARD
oSIST prEN 17449:2020

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Varnost strojev - Varnostne zahteve za zaključne črte na kovinskem traku

Safety of machinery - Safety requirements to finishing lines for metal strip

Sicherheit von Maschinen - Sicherheitsanforderungen an Adjustageanlagen für Metallband

Sécurité des machines - Prescriptions de sécurité pour les lignes de finition pour bandes métalliques

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13.110	Varnost strojev	Safety of machinery
77.180	Oprema za metalurško industrijo	Equipment for the metallurgical industry

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Safety of machinery - Safety requirements to finishing lines for metal strip

Sécurité des machines - Prescriptions de sécurité pour les lignes de finition pour bandes métalliques

Sicherheit von Maschinen - Sicherheitsanforderungen an Adjustageanlagen für Metallband

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 322.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 17449:2019) has been prepared by Technical Committee CEN/TC 322 “Equipment for making and shaping of metals”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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).

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

Introduction

This European Standard is a type C standard as stated in EN ISO 12100:2010.

This document is not applicable to finishing lines for metal strip (according to the scope) manufactured before the date of its publication.

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

Where for clarity an example of a preventative measure is given, this should not be considered as the only possible solution. Any other solution leading to the same risk reduction is permissible if an equivalent level of safety is achieved.

When requirements of this type-C standard are different from those which are stated in type-A or -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 is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine and/or plant 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 and/or plant users/employers (small, medium and large enterprises);

— service providers, e.g. for maintenance (small, medium and large enterprises).

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

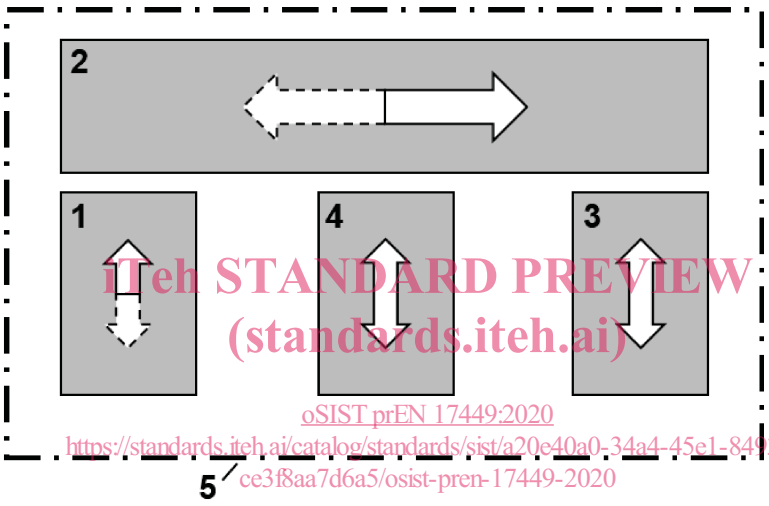
1 Scope

This document specifies the general safety requirements for finishing lines for metal strip, hereafter referred as finishing line(s), as defined in 3.1.

This document deals with significant hazards, hazardous situations and events relevant for finishing lines when used as intended and under conditions foreseen by the manufacturer. This document provides the requirements to be met by the manufacturer to ensure the safety of persons and property during transport, commissioning, operation and de-commissioning, as well as in the event of foreseeable failures or malfunctions that can occur in the equipment (see Clauses 4 and 5).

This document is applicable to:

Plant (machinery, equipment, devices) for the customer-specific processing of metal strip/metal foil (starting material: hot rolled or cold rolled strip as coil) from the material feeding (1) via the finishing process (2) until the material removal (3) (see exemplary layout in Figure 1).



Key

1 supply or removal of material (as coil) or tools (e.g. spool/sleeve)
2 finishing process (e.g. cutting, trimming, punching, straightening, laminating, inspecting, rewinding)
3 removal or supply of material (e.g. as coil, slit strip, stack) respectively pallet feed
4 changing devices (e.g. levelling rolls, knife shaft, cutting tools)
5 border of the finishing line

Figure 1 — Exemplary layout of a finishing line for metal strip

Examples of finishing lines and their machinery/equipment covered by the scope of this standard are listed below:

— finishing lines, e.g.:

— slitting line (see Figure 2);

— cut-to-length line (see Figure 3);

— feeding line (see Figure 4);

— blanking line;

— trimming line;

- rounding machines;
- strip edge machining lines;
- inspection lines;
- rewinding lines, separator lines, doubler lines;
- strip-supply lines (e.g. for presses or roll forming lines);
- interlinked machinery/equipment which can be part of a finishing line, e.g.:
  - coil conveying (e.g. feeding in, threading, pushing-in, guiding and transporting);
  - stretching, bending, levelling machine;
  - marking machine;
  - recoiler and uncoiler;
  - shears;
  - punching machine;
  - coil and sleeve handling device;
  - welding machine;
  - oiling machine;
  - scrap chopper, scrap coiler, scrap conveyor;
  - changing device;
  - stacking device;
  - coil transport device (associated with the line);
  - measuring systems and devices;
  - fluid systems.

The following machinery may be part of or linked to a finishing line but are not covered by this document:

- packaging lines (EN 415);
- roll forming lines;
- machines for painting and laminating;
- embossing machine;
- saws;
- plate shear (plate as raw material) (EN 13985);

— equipment for applying (removing) media to (from) the material surface;

— coil transport devices outside the boundaries of the line (e.g. supply from the storage);

— presses (EN 692 and EN 693);

— milling machines (EN 13128);

— machinery using laser (EN ISO 11553) for strip processing (e.g. welding, cutting);

— punching machines (as stand-alone machine);

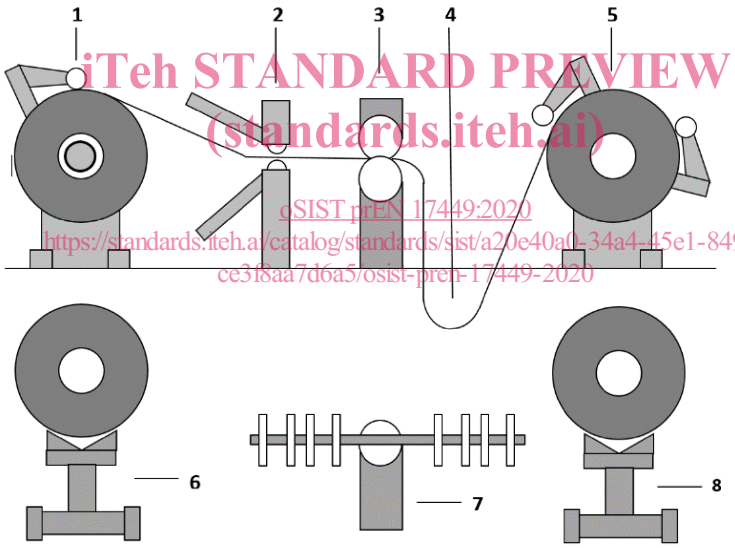
— cranes;

— robots (EN ISO 10218);

— separate media systems (e.g. compressed air system, exhaust system);

— storage equipment.

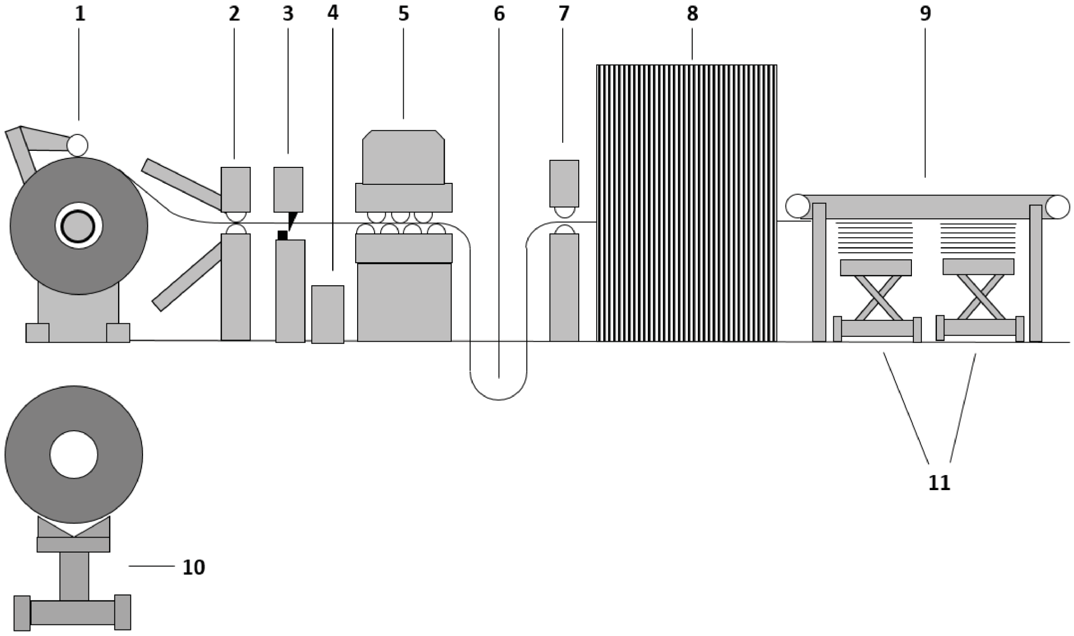
For modernization, this document can be applied for the parts to be modernized.



Key

1	uncoiler	5	recoiler
2	peeler	6	coil car
3	circular knife cutter	7	knife changing device
4	loop	8	coil car

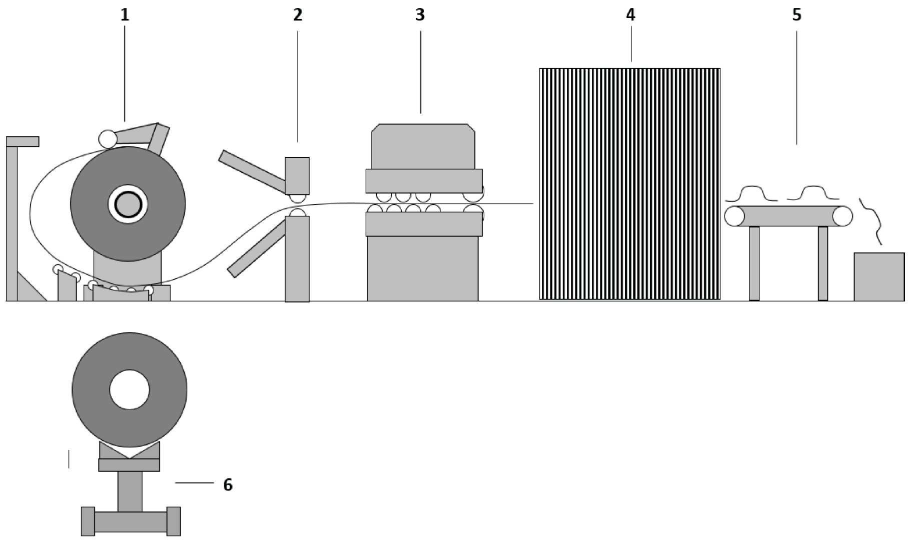
Figure 2 — Exemplary layout of a slitting line



Key

1	uncoiler	7	feeder
2	peeler	8	shear (covered by the scope) or press, laser (not covered by the scope)
3	shear	9	stacker
4	scrap box	10	coil car
5	straightener	11	stacker car
6	loop		

Figure 3 — Exemplary layout of a cut-to-length line



Key

1	uncoiler	4	shear (covered by the scope) or press, laser (not covered by the scope)
2	peeler	5	conveyor belt
3	straightener	6	coil car

Figure 4 — Exemplary layout of a feeding line

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 614-1:2006+A1:2009, *Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles*

EN 614-2, *Safety of machinery - Ergonomic design principles - Part 2: Interactions between the design of machinery and work tasks*

EN 842, *Safety of machinery - Visual danger signals - General requirements, design and testing*

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,

EN 981, *Safety of machinery - System of auditory and visual danger and information signals*

EN 1299, *Mechanical vibration and shock - Vibration isolation of machines - Information for the application of source isolation*

EN 12198-3, *Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery - Part 3: Reduction of radiation by attenuation or screening*

EN 12254, *Screens for laser working places - Safety requirements and testing*

EN 12464-1, *Light and lighting - Lighting of work places - Part 1: Indoor work places*

EN 13861, *Safety of machinery - Guidance for the application of ergonomics standards in the design of machinery*

EN 14253, *Mechanical vibration – Measurement and calculation of occupational exposure to whole-body vibration with reference to health – Practical guidance*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1)*

EN 60447, *Basic and safety principles for man-machine interface, marking and identification - Actuating principles (IEC 60447)*

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

EN 60825-4, *Safety of laser products - Part 4: Laser guards (IEC 60825-4)*

EN 61310 (all parts), *Safety of machinery - Indication, marking and actuation (IEC 61310)*

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

EN ISO 361, *Basic ionizing radiation symbol (ISO 361)*

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

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

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 7010, *Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010)*

EN ISO 7731, *Ergonomics - Danger signals for public and work areas - Auditory danger signals (ISO 7731)*

EN ISO 11064-1, *Ergonomic design of control centres - Part 1: Principles for the design of control centres (ISO 11064-1)*

EN ISO 11064-2, *Ergonomic design of control centres - Part 2: Principles for the arrangement of control suites (ISO 11064-2)*

EN ISO 11064-3, *Ergonomic design of control centres - Part 3: Control room layout (ISO 11064-3)*

EN ISO 11064-6, *Ergonomic design of control centres - Part 6: Environmental requirements for control centres (ISO 11064-6)*

EN ISO 11202, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202)*

EN ISO 11553 (all parts), *Safety of machinery - Laser processing machines*

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

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

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

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

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 13855, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855)*

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

EN ISO 14118, *Safety of machinery - Prevention of unexpected start-up (ISO 14118)*

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

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

EN ISO 14122-1, *Safety of machinery - Permanent means of access to machinery - Part 1: Choice of fixed means and general requirements of access (ISO 14122-1)*

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

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

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

EN ISO 14123-1, *Safety of machinery - Reduction of risks to health resulting from hazardous substances emitted by machinery - Part 1: Principles and specifications for machinery manufacturers (ISO 14123-1)*

EN ISO 14123-2, *Safety of machinery - Reduction of risks to health resulting from hazardous substances emitted by machinery - Part 2: Methodology leading to verification procedures (ISO 14123-2)*

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

ISO 6183, *Fire protection equipment - Carbon dioxide extinguishing systems for use on premises - Design and installation*

3 Terms and definitions

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

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

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

3.1
finishing line
machinery used for the customer-specific manufacture of metal strip or metal foil by one of the following lines, their combination or, in addition, a combination with machinery which is not covered by this standard (e.g. presses, milling machines, lasers):

3.1.1
slitting line
machinery to cut the strip into minimum two defined strip widths by longitudinal separation

3.1.2
cut-to-length line
machinery to cut the strip into defined strip lengths by cross-sectional separation

3.1.3
feeding line
machinery to prepare and/or feed the strip to subsequent processing

3.1.4
trimming line
machinery to cut the strip to a defined strip width and/or to increase strip edge quality by longitudinal separation (e.g. side/edge trimming shear)

3.1.5
rounding machine
machinery for removing a burr

3.1.6
strip edge machining line
machinery for machining or shaping the strip edge, e.g. after trimming or rounding

3.1.7
inspection line
machinery for the visual, manual or automatic detection of the material condition (e. g surface, edge, dimension, flatness, pores)

3.1.8
recoiling line
machinery for rewinding the strip (e.g. changing top to bottom side, spool changing)

3.1.9
separator line
machinery for separating layers of multi-layer strips, e.g. aluminium foil