SLOVENSKI STANDARD
oSIST prEN 15061:2020

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Varnost strojev - Varnostne zahteve za linijske stroje in opremo za obdelavo (kovinskih) trakov

Safety of machinery - Safety requirements for strip processing line machinery and equipment

Sicherheit von Maschinen - Sicherheitsanforderungen an Bandbehandlungsanlagen und Einrichtungen

Sécurité des machines - Prescription de sécurité pour machines et installations de traitement des bandes

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ICS:

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

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ICS

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Safety of machinery - Safety requirements for strip processing line machinery and equipment

Sécurité des machines - Prescription de sécurité pour machines et installations de traitement des bandes

Sicherheit von Maschinen - Sicherheitsanforderungen an Bandbehandlungsanlagen und Einrichtungen

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 15061:2019) has been prepared by Technical Committee CEN/TC 322 “Equipment for making and shaping 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 strip processing lines 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 defines the general safety requirements of strip processing lines.

This document applies to:

Strip processing lines for treating metal strip, from

— coil take-over-point of the entry section (terminal equipment, see 3.2) through the

— process (processing and terminal equipment, see 3.3 and 3.2) up to the

— coil take-over-point of the exit section or interface to other lines (terminal equipment), see Figure 1.

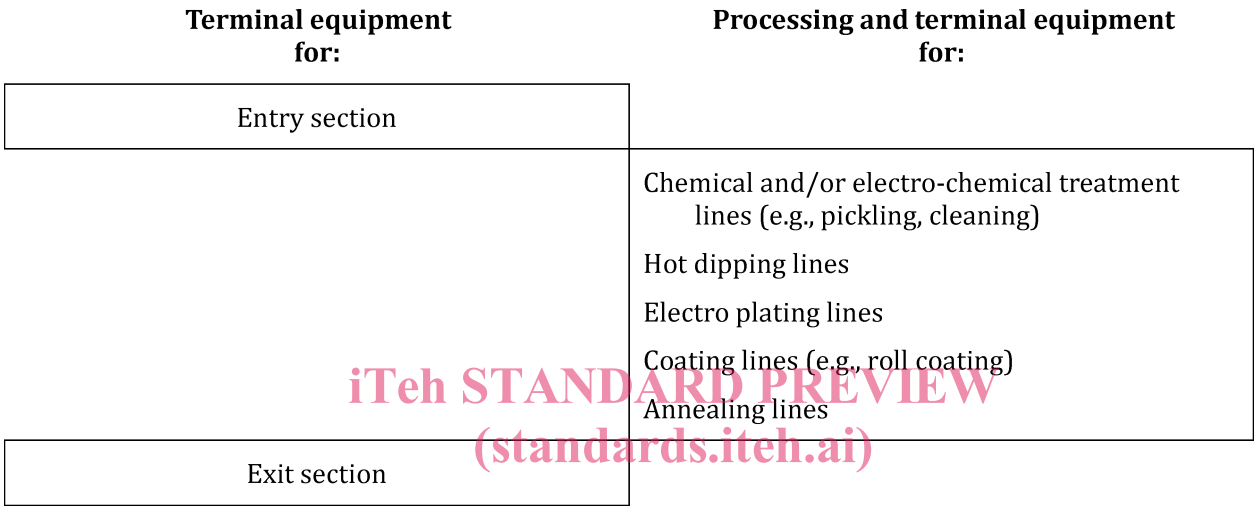

Figure 1 — Terminal and processing equipment

NOTE 1 The aforementioned processes can also occur in combination.

If the aforementioned processes will be combined with processes which are not covered by the scope of this standard, this standard can be used as a guideline.

NOTE 2 Thermo process equipment integrated in strip processing lines is covered by the EN 746 series. For dryers and ovens, in which flammable substances are released, EN 1539 applies.

This document does not cover:

— thermo process equipment, e.g. in accordance with the EN 746 series;

— dryers and ovens in accordance with EN 1539;

— coil transporting system before coil take-over-point at the entry section and after coil take-over-point at the exit section, e.g. hook conveyors, overhead cranes, fork lift and railway trucks and other vehicles;

— acid regeneration plants;

— regeneration plants which are not integral part of the strip processing line;

— storage equipment for coils;

— rolling mill stands (i.e. skin pass and reduction stands) according to EN 15094;

— rollshop equipment;

— separate process technology (e.g. compressed air system, treatment of water and treatment of rolling lubricant);

— separate cleaning system for exhaust air;

— firefighting systems.

NOTE 3 Protection of persons in case of using asphyxiant gases used in firefighting system is covered by this document, see Annex C.

This document deals with foreseeable significant hazards, hazardous situations and events relevant to strip processing lines, when used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer. It provides the requirements to be met by the manufacturer to ensure the safety of persons and property during transport, commissioning, use, de-commissioning and maintenance periods, as well as in the event of foreseeable failures or malfunctions that can occur in the equipment.

For modernization, this document (C-type standard) can be applied for the part to be modernized.

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 689, *Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy*

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

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 12094-1, *Fixed firefighting systems - Components for gas extinguishing systems - Part 1: Requirements and test methods for electrical automatic control and delay devices*

EN 12198-1, *Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery - Part 1: General principles*

EN 12198-2, *Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery - Part 2: Radiation emission measurement procedure*

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 13480-1, *Metallic industrial piping - Part 1: General*

EN 13480-2, *Metallic industrial piping - Part 2: Materials*

EN 13480-3, *Metallic industrial piping - Part 3: Design and calculation*[1]

EN 13480-4, *Metallic industrial piping - Part 4: Fabrication and installation*

EN 13480-5, *Metallic industrial piping - Part 5: Inspection and testing*

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

CLC/TR 60079-32-1:2018, *Explosive atmospheres - Part 32-1: Electrostatic hazards, guidance*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005)*

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

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

EN 61496-2, *Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2)*

EN 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)*

EN 61800-5-2:2017, *Adjustable speed electrical power drive systems - Part 5-2: Safety requirements – Functional (IEC 61800-5-2)*

EN 62598:2013, *Nuclear instrumentation - Constructional requirements and classification of radiometric gauges (IEC 62598)*

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

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

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 11064-4, *Ergonomic design of control centres - Part 4: Layout and dimensions of workstations (ISO 11064-4)*

EN ISO 11064-5, *Ergonomic design of control centres - Part 5: Displays and controls (ISO 11064-5)*

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

EN ISO 11064-7, *Ergonomic design of control centres - Part 7: Principles for the evaluation of control centres (ISO 11064-7)*

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

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

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 13855:2010, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

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

EN ISO 14118:2018, *Safety of machinery - Prevention of unexpected start-up (ISO 14118:2017)*

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

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 14122-1, *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)*

EN ISO 15004-1, *Ophthalmic instruments - Fundamental requirements and test methods - Part 1: General requirements applicable to all ophthalmic instruments (ISO 15004-1)*

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

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/

Note 1 to entry: Definitions used in EN and ISO standards referred to in this document are also valid for this document.

3.1
strip processing line
assembly of equipment for treating metal strip (surface treatment and/or to change the metal properties) in which single machines (as described in 3.2 and 3.3) are linked by strip transport facilities and/or the strip itself, including ancillary equipment

3.2
terminal equipment
equipment for moving, guiding, connecting, dividing and trimming the metal strip, coil handling equipment and related ancillary equipment like hydraulic and pneumatic equipment and systems

3.3
processing equipment
equipment for surface treatment and/or modifying the metal strip properties

3.4
safety layout
graphic overview of the strip processing line with the arrangement of specific safety-related elements and areas

Note 1 to entry: 5.2.5 specifies the safety related elements to be shown on the safety layout.

3.5
hazard zone
danger zone
any space within and/or around machinery in which a person can be exposed to a hazard

[EN ISO 12100:2010, 3.11]

3.6
take-over-point(s)
point(s) where the strip processing line is connected to incoming/outgoing material (coils), media, electricity (e.g. power supply and communication like input/output parameters)

Note 1 to entry: For example, coil take-over-point: Point where overhead cranes or other transport systems deposit or remove coils

3.7
main route(s)
marked traffic route

3.8
safeguard(ing)
guard or protective device

[EN ISO 12100:2010, 3.26]

3.9
trained person(nel)
skilled person with system knowledge, background knowledge, experience and/or ability to perform a specific task and are aware of the hazards related to their duties

3.10
authorized person(nel)
trained person who is instructed by the user to perform a specific task on a specific equipment

Note 1 to entry: An unauthorized person does not have the required qualification and is not adequately equipped, e.g. PPE.

3.11
maintenance
combination of service, inspection, reconditioning and functional test of the equipment

Note 1 to entry: The purpose is to preserve the working condition or returning to this condition so that the strip processing line can perform the required function (including safety requirements)

3.11.1
service
measure to maintain the nominal condition

Note 1 to entry: The nominal condition can be maintained in general without dismantling/disassembling major parts of the equipment, e.g. by cleaning and lubrication of the work equipment as well as addition or replacement of agents or by replacing tools (e.g. rolls, knives)

3.11.2
inspection
measure to observe and assess the current condition as well as fault finding

Note 1 to entry: Measures, e.g. measuring, testing, diagnostics including the determination of the causes of wear or damage and the derivation of the necessary consequences for the continued use

Note 2 to entry: 3.11.2 does not cover "strip inspection", see 3.14

3.11.3
reconditioning
foreseeable measure(s) to return to the nominal condition

Note 1 to entry: Foreseeable measures to replace worn parts or parts having expired the foreseen lifetime (could require dismantling/disassembling). These parts should meet manufacturers' specification

3.11.4
functional test
checking the functionality of the exchanged or repaired parts

Note 1 to entry: It is maybe required to carry out adjustment work, e.g. test runs, verifying safety functions.

3.12
repair
not foreseeable measure(s) to return to the nominal condition

Note 1 to entry: Measure to replace damaged parts, requires in general dismantling/disassembling. These parts should meet manufacturers' specification.

3.13
strip
metal strip in the production process, supplied and removed as coil

3.14
strip inspection
observe and assess the current condition of the material

3.15
cobbling
strip leaving its intended path

Note 1 to entry: Colliding with e.g. parts of the equipment is possible.

3.16
pulpit
enclosed room in which the control desk and monitoring facilities for a machine or equipment are located, used as a permanent workstation

3.17
control stand
free standing control desk (usually situated adjacent to the machine or equipment), used as a temporary workstation.

3.18
portable control device
control device which can be used in different places (e.g. control pendant, enabling button, radio control)

3.19
enabling (control) device
additional manually actuated device used in conjunction with a start control which, when continuously actuated, permits machine function

[EN ISO 12100:2010, 3.28.2]

3.20
hold-to-run control device
control device which initiates and maintains machine functions only as long as the control device is actuated

[EN ISO 12100:2010, 3.28.3]

3.21
control mode(s)
single machines or groups of linked machines of strip processing lines can function under different control modes:

Note 1 to entry: This document distinguishes between control mode(s) and operating mode(s) because there is neither a common understanding nor a definition in EN ISO 12100 and EN 60204-1. The operating modes (see 3.22) corresponds to the "control mode" of EN ISO 12100, 6.2.11.9.

Note 2 to entry: For examples, see Figure D.1.

3.21.1
manual control mode(s)
3.21.1.1
hold-to-run control
every function is initiated by an operator by means of a button or equivalent device according EN ISO 12100:2010, 3.28.3

Note 1 to entry: to entry: Release of the button/device stops the function (e.g. movement) immediately

3.21.1.2
single function
functions are started and/or stopped by an operator

3.21.2
semi-automatic control
sequence of functions released once by an operator

Note 1 to entry: The released sequence is automatically stopped at its end. For the initiation of another sequence, a new command by the operator is required.