



**SLOVENSKI STANDARD**  
**SIST EN 15061:2008+A1:2009**  
**01-januar-2009**

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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 - Prescriptions de sécurité pour machines et installations de traitement des bandes

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EUROPEAN STANDARD

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

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

Sicherheit von Maschinen - Sicherheitsanforderungen an Bandbehandlungsanlagen und Einrichtungen

This European Standard was approved by CEN on 23 September 2007 and includes Amendment 1 approved by CEN on 23 October 2008.

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.

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## Contents

Page

Foreword.....	6
Introduction .....	7
1 Scope .....	8
2 Normative references .....	9
3 Terms and definitions .....	12
4 List of significant hazards .....	14
5 Safety requirements and/or measures .....	14
5.1 General design requirements .....	14
5.1.1 Introduction .....	14
5.1.2 Structural assembly .....	15
5.1.3 Safety layout.....	15
5.1.4 Access to the line .....	16
5.1.5 Guards .....	17
5.1.6 Guard-rail.....	17
5.1.7 Safety signs and warning devices .....	17
5.1.8 Safety-related control systems .....	18
5.1.9 Personal protective equipment (PPE) .....	18
5.1.10 Electrical equipment.....	18
5.1.11 Hydraulic, pneumatic, cooling and lubrication systems .....	18
5.1.12 Fluid systems carrying or containing fluids .....	18
5.1.13 Material to be discharged to drains .....	18
5.1.14 Ergonomic principles .....	19
5.1.15 Surface temperatures and heat radiation.....	19
5.1.16 Fire protection.....	19
5.1.17 Vibrations .....	19
5.1.18 Maintenance on equipment containing dangerous substances.....	19
5.1.19 Linked equipment .....	20
5.2 List of significant hazards, hazardous situations, safety requirements and/or measures for terminal equipment.....	20
5.2.1 General.....	22
5.2.2 Hydraulic and pneumatic equipment.....	23
5.2.3 Bridges, crossovers, guides.....	25
5.2.4 Pulpits .....	25
5.2.5 Coil transport and handling equipment.....	26
5.2.6 Uncoiling equipment .....	27



5.2.7	Shears and scrap/samples handling equipment.....	28
5.2.8	Strip guiding and conveying equipment.....	29
5.2.9	Strip accumulators .....	30
5.2.10	Side trimming machines .....	31
5.2.11	Strip inspection stands.....	32
5.2.12	Coiling equipment .....	33
5.2.13	Strip connecting system.....	34
5.2.14	Oiling system .....	35
5.2.15	Measuring devices and display units .....	36
5.2.16	Marking devices for strip.....	37
5.3	List of significant hazards, hazardous situations, safety requirements and/or measures for processing equipment .....	38
5.3.1	General .....	39
5.3.2	Hydraulic and pneumatic equipment .....	40
5.3.3	Bridges, crossovers, guides .....	42
5.3.4	Pulpits.....	42
5.3.5	Pickling .....	43
5.3.6	Pre-treatment .....	46
5.3.7	Hot dipping.....	49
5.3.8	Electro plating.....	56
5.3.9	Tension leveller, scale breaker.....	58
5.3.10	Organic coating by roll coater .....	59
5.3.11	Chemical post-treatment section (Activation, Phosphatizing, Chromatizing, Roll coating) .....	60
5.4	Special safety requirements or measures .....	64
5.4.1	General .....	64
5.4.2	Hold-to-run control device.....	64
5.4.3	Mechanical restraint devices .....	64
5.4.4	Access to the strip for inspection .....	64
5.5	Noise reduction as a safety requirement.....	65
5.5.1	Noise reduction at source by design .....	65
5.5.2	Noise reduction by protective measures .....	65
5.5.3	Noise reduction by information .....	65
5.5.4	Noise sources and examples of noise reduction measures .....	65
6	Verification of the safety requirements and/or measures .....	67
7	Information for use .....	68
7.1	General .....	68
7.2	Safety signs and warning devices.....	68
7.3	Minimum marking.....	68
7.4	Instruction handbook.....	68
7.4.1	General .....	68

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## EN 15061:2007+A1:2008 (E)

7.4.2	Identifying information .....	69
7.4.3	Detailed information/instructions .....	69
7.4.4	Operation .....	70
7.5	Maintenance manual .....	71
Annex A	(normative) Safety requirements and/or measures for electrical equipment .....	72
Annex B	(normative) Noise test code .....	76
Annex C	(informative) Example for manufacturer's safety instructions for maintenance at strip processing lines.....	80
Annex D	(informative) Exemplary solutions .....	82
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC .....	88
Annex ZB	(informative)  Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC  .....	89
Bibliography	.....	90

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## Figures

Figure D.1 — Examples for automatic modes of operation (3.13).....	82
Figure D.2 — Movable platform (see 5.3.7.1.1).....	83
Figure D.3 — Example for protected walkways.....	83
Figure D.4 — Example for protected walkways.....	84
Figure D.5 — Example for protected inspection stand (horizontal).....	84
Figure D.6 — Example for an inspection stand protected by a door with guard locking and roofing (5.2.11) .....	85
Figure D.7 — Example of a plating section.....	85
Figure D.8 — Diagrammatic view of an electrolytic plating plant .....	86
Figure D.9 — Example of flange cover.....	86
Figure D.10 — Example of reversed rotation in case of cleaning the coater rolls (5.3.10, 5.3.11.2).....	87

## Tables

Table 1 — List of significant hazards, hazardous situations, safety requirements and/or measures for terminal equipment .....	22
Table 2 — List of significant hazards, hazardous situations, safety requirements and/or measures for processing equipment .....	39
Table 3 — Noise sources of strip processing lines and exemplary noise reduction measures .....	67
Table A.1 — Stop functions.....	74
Table B.1 — Example of declared dual-number noise emission values for work stations and specified measuring points .....	79

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**EN 15061:2007+A1:2008 (E)****Foreword**

This document (EN 15061:2007+A1:2008) has been prepared by Technical Committee CEN/TC 322 "Equipments for making and shaping of metals - Safety requirements", the secretariat of which is held by DIN.

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 May 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2008-10-23.

This document supersedes EN 15061:2007.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A_1}$   $\boxed{A_1}$ .

$\boxed{A_1}$  This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document.  $\boxed{A_1}$

This standard was elaborated by CEN/TC 322/WG4 comprising experts from the following countries: Austria, Germany, Italy, The Netherlands and Sweden.

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.

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 United Kingdom.



## Introduction

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

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European 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 over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

Where for clarity an example of a preventive measure is given in this standard, 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.

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## EN 15061:2007+A1:2008 (E)

## 1 Scope

This European Standard defines the health and safety requirements of strip processing lines (see 3.1).

This European Standard deals with all significant hazards, hazardous situations and events relevant for strip processing line machinery and equipment, when used as intended and under conditions foreseen by the manufacturer, but also includes foreseeable faults and malfunctions in case of misuse.

This European Standard specifies the requirements to ensure the safety of persons which are to be considered and met during the design, assembly, transport, commissioning, operation, maintenance and decommissioning of the equipment.

### This European Standard applies to:

Strip processing lines for treating metal strip: from take-over point (see 3.6) 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 take-over point of the exit section or interface to other lines (terminal equipment).

<u>Terminal equipment for:</u>	<u>Processing and terminal equipment for:</u>	<u>Terminal equipment for:</u>
Entry section	<ul style="list-style-type: none"> <li>— Pickling (5.3.5) <sup>(1)</sup></li> <li>— Pre-treatment (5.3.6) <sup>(1)</sup></li> <li>— Hot dipping (5.3.7) <sup>(1)</sup></li> <li>— Electro plating (5.3.8) <sup>(1)</sup></li> <li>— Tension levelling/scale breaking (5.3.9) <sup>(1)</sup></li> <li>— Organic coating by roll coater (5.3.10) <sup>(1)</sup></li> <li>— Chemical post-treating (5.3.11) <sup>(1)</sup></li> <li>— Annealing <sup>(1), (2)</sup></li> </ul> <p><sup>(1)</sup> it may include also terminal equipment according to 5.2</p> <p><sup>(2)</sup> for annealing lines the requirement for related processing equipment (5.3.5 to 5.3.11) is covered by this standard. The requirements for the furnace of annealing lines are covered by EN 746-1, EN 746-2 and EN 746-3</p>	Exit section

### This European Standard does not cover:

- Furnaces in accordance with EN 746-1, EN 746-2 and EN 746-3;
- Dryers and ovens in accordance with EN 1539;
- Coil transporting system before take-over-point at the entry section and after take-over-point at the exit section, e. g., hook conveyors, overhead cranes, fork lift and railway trucks and other vehicles;
- Storage equipment for coils;
- Rolling mill stands (i. e., skin pass and reduction stands) according to prEN 15094;

— Rollshop equipment.

If applicable, the safety requirements of those standards mentioned above should be considered.

This European Standard is not applicable to strip processing line machinery and equipment, which are manufactured before the date of publication of this standard by CEN.

## 2 Normative references

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

**A1** *deleted text* **A1**

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

EN 614-1:2006, *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 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 689, *Workplace atmospheres — Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy*

**A1** *deleted text* **A1**

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

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

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

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

**EN 15061:2007+A1:2008 (E)**

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

EN 1032, *Mechanical vibration - Testing of mobile machinery in order to determine the vibration emission value*

EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up*

EN 1050<sup>1)</sup>, *Safety of machinery — Principles for risk assessment*

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

EN 1127-1, *Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology*

EN 1248, *Foundry Machinery — Safety requirements for abrasive blasting equipment*

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

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 1837, *Safety of machinery — Integral lighting of machines*

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 12198-3; *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 13478, *Safety of machinery — Fire prevention and protection*

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<sup>2</sup>*

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

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

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

prEN 60825-1, *Safety of laser products — Part 1: Equipment classification and requirements*

EN 60825-4, *Safety of laser products - Part 4: Laser guards (IEC 60825-4:2006)*

<sup>1)</sup> Will be replaced by prEN ISO 14121-1.

<sup>2)</sup> Attention, see 5.1.11

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

EN 61310-2, *Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking (IEC 61310-2:1995)*

EN 61496-1<sup>3)</sup>, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

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

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

EN ISO 7731, *Ergonomics - Danger signals for public and work areas - Auditory danger signals (ISO 7731:2003)*

EN ISO 10218-1, *Robots for industrial environments - Safety requirements - Part 1: Robot (ISO 10218-1:2006)*

EN ISO 11064-1, *Ergonomic design of control centres - Part 1: Principles for the design of control centres (ISO 11064-1:2000)*

EN ISO 11064-2, *Ergonomic design of control centres - Part 2: Principles for the arrangement of control suites (ISO 11064-2:2000)*

EN ISO 11064-3, *Ergonomic design of control centres - Part 3: Control room layout (ISO 11064-3:1999)*

EN ISO 11064-4, *Ergonomic design of control centres - Part 4: Layout and dimensions of workstations (ISO 11064-4:2004)*

prEN ISO 11064-5, *Ergonomic design of control centres -- Part 5: Displays and controls (ISO/DIS 11064-5:2006)*

EN ISO 11064-6, *Ergonomic design of control centres - Part 6: Environmental requirements for control centres (ISO 11064-6:2005)*

EN ISO 11064-7, *Ergonomic design of control centres - Part 7: Principles for the evaluation of control centres (ISO 11064-7:2006)*

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

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

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<sup>3)</sup> To be amended by EN 61496-1/prA1 (2006-06).

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EN ISO 13849-1:2006, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850:2006, *Safety of machinery - Emergency stop - Principles for design (ISO 13850:2006)*

**A1** EN ISO 13857:2008, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)* **A1**

EN ISO 14122-1, *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)*

EN ISO 15004-1, *Ophthalmic instruments - Fundamental requirements and test methods - Part 1: General requirements applicable to all ophthalmic instruments (ISO 15004-1:2006)*

ISO 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs in workplaces and public areas*

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

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

CLC/R 044-001:1999, *Safety of machinery — Guidance and recommendations for the avoidance of hazards due to static electricity*

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**3 Terms and definitions**

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

**NOTE** Definitions used in EN and ISO standards referred to in this document are also valid for this document.

- 3.1 strip processing line**  
interconnection of equipment described in 3.2 and 3.3 in which several machines or stages are linked
- 3.2 terminal equipment**  
equipment for moving, guiding, connecting, dividing and trimming the metal strip, coil handling equipment and related auxiliary equipment like hydraulic and pneumatic equipment
- 3.3 processing equipment**  
equipment for treating the surface and/or modifying the product properties
- 3.4 plating section**  
various number of electroplating cells in the process section of an electro processing line

NOTE E. g., see Figure D.7.

### 3.5

#### **safety layout**

description of line-related equipment with safety functions which should ensure safe operation of the strip processing line, avoiding hazards or hazardous situations for, e. g., unauthorized access

### 3.6

#### **take-over point**

point where overhead cranes or other transport systems deposit or remove coils

### 3.7

#### **product**

metal strip being processed

### 3.8

#### **coil**

metal strip wound to a roll

### 3.9

#### **cobbling**

product leaving its intended path

### 3.10

#### **pulpit**

room, in which control desks and monitoring facilities for a machine or equipment are located

### 3.11

#### **control stand**

free standing control desk placed adjacent to machine or equipment

### 3.12

#### **maintenance**

service, inspection and repair of all machinery and equipment of the strip processing line

NOTE For details, see EN 13306.

### 3.13

#### **modes of operation**

machinery and equipment of strip processing lines, i. e., single machines or groups of interconnected parts, can function under different modes of operation (see Figure D.1)

##### **a) manual mode**

mode of operation in which every single function of the equipment is controlled by an operator by means of a hold-to-run control or equivalent device (3.26 of EN ISO 12100-1:2003)

##### **b) semi-automatic mode**

mode of operation of the machinery consisting of a series of automatic sequences (summary of functions) into which the whole working cycle is subdivided: at the end of each sequence, started by the operator and then controlled by a programmable electronic system, the operation is automatically stopped, and a new command of the operator is needed to initiate the next sequence

##### **c) automatic mode**

mode of operation in which the process, e. g., a cycle of successive or parallel sequences, once initiated by the operator, is totally controlled by a programmable electronic system: repetition of the working cycle of the machinery takes place without any operator intervention required, as long as the running conditions are met

### 3.14

#### **trained personnel**

persons with the knowledge of systems, background, experience and ability to operate and/or maintain the equipment in the indented use and proper operation of the machinery/equipment

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