



# SLOVENSKI STANDARD SIST EN 1010-1:2005

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Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 1: Common requirements

Sicherheit von Maschinen - Sicherheitsanforderungen an Konstruktion und Bau von Druck- und Papierverarbeitungsmaschinen Teil 1: Gemeinsame Anforderungen

Sécurité des machines - Prescriptions de sécurité pour la conception et la construction de machines d'impression et de transformation du papier - Partie 1: Prescriptions communes

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**ICS:**

37.100.10	Reprodukcijska oprema	Reproduction equipment
85.100	Oprema za papirno industrijo	Equipment for the paper industry

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English version

Safety of machinery - Safety requirements for the design and  
construction of printing and paper converting machines - Part 1:  
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Sicherheit von Maschinen - Sicherheitsanforderungen an  
Konstruktion und Bau von Druck- und  
Papierverarbeitungsmaschinen - Teil 1: Gemeinsame  
Anforderungen

This European Standard was approved by CEN on 7 June 2004.

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## **Foreword**

This document (EN 1010-1:2004) has been prepared by Technical Committee CEN/TC 198 "Printing and paper machinery - Safety", 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of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005

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 and ZB, which is an integral part of this document.

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

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## Introduction

This European Standard is a type C standard as stated in EN 1070:1998.

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

For machines that have been designed and built according to the provisions of this C standard, the following stipulation applies: 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.

This document consists of the following parts:

- Part 1 Common requirements
- Part 2 Printing and varnishing machines including pre-press machinery
- Part 3 Cutting machines
- Part 4 Bookbinding, paper converting and finishing machines
- Part 5 Machines for the production of corrugated board and machines for the conversion of flat and corrugated board.

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## 1 Scope

### 1.1 This document applies to

- printing machines for printing on paper and similar materials, including screen printing presses; equipment used in the preparation of the printing process and additional equipment on printing machines are also considered to be printing machines. This standard also covers machinery used for the handling of paper, products, printing formes and inks (before and after the printing process) as well as machinery for cleaning printing formes and checking the print quality (auxiliary printing machinery).
- paper converting machines, i. e. machines to process, convert or finish paper, board and similar materials which are processed, converted or finished in a similar manner.

NOTE Similar substrates are, for example, board, corrugated board, plastic film, aluminium foil, sheet metal and photographic paper.

**1.2** This document deals with all common significant hazards relevant to printing and paper converting machinery when they are used as intended and under the conditions foreseen by the manufacturer (see clause 4). This part of the standard defines the common safety requirements for all kinds of printing and paper converting machines and related common devices and shall be used in connection with another part of the EN 1010 series. The specific requirements specified in Part 2 and following parts of EN 1010 take precedence over the respective requirements in EN 1010-1.

NOTE In addition, where a machine is not covered by a specific part of this standard, Part 1 of EN 1010 may be used to establish the approach for dealing with the relevant risks.

**1.3** This document is not applicable to printing and paper converting machines which are manufactured before the date of publication of this document by CEN.

**1.4** This document does not apply to:

- winder-slitters and sheeters in paper finishing (sheeters with unwinders) (see EN 1034-1:2000, EN 1034-3:2000, prEN 1034-5:2001);
- office-type collating machines equipped with friction feeders;
- mail processing machines;
- machines used for filling packages (such as machines for shaping, filling, and closing the package),
- textile printing presses

## **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 distances 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 418:1992, *Safety of machinery — Emergency stop equipment, functional aspects — Principles for design.*

EN 563:1994, *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 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 999:1998, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts for the human body.*

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

EN 1050:1996, *Safety of machinery — Principles for risk assessment.*

EN 1070:1998, *Safety of machinery — Terminology.*

EN 1088:1995, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection.*

EN 1127-1:1997, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology.*

EN 1760-1:1997:1997, *Safety of machinery — Pressure sensitive devices — Part 1: General principles for the design and testing of pressure sensitive mats and pressure sensitive floors.*



EN 1760-2:2001, *Safety of machinery — Pressure sensitive devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars.*

EN 12198-1:2000, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 1: General principles.*

EN 12626:1997, *Safety of machinery — Laser processing machines — Safety requirements.*

EN 13023:2003, *Noise measurement methods for printing, paper converting, paper making machines and auxiliary equipment - Accuracy categories 2 and 3.*

EN 13463-1:2001, *Non-electrical equipment for potentially explosive atmospheres — Part 1: Basic method and requirements.*

EN 13463-5:2003, *Non-electrical equipment intended for use in potentially explosive atmospheres - Part 5: Protection by constructional safety "c".*

EN ISO 4871:19986 *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996).*

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 machines and industrial plants — Part 1: Choice of a fixed means of access between two levels (ISO 14122-1:2001).*

EN ISO 14122-2:2001, *Safety of machinery — Means of permanent access to machines and industrial plants — Part 2: Working platforms and gangways (ISO 14122-2:2001).*

EN ISO 14122-3:2001, *Safety of machinery — Means of permanent access to machines and industrial plants — Part 3: Stairways, stepladders and guard-rails (ISO 14122-3:2001).*

EN ISO 14122-4:1996, *Safety of machinery — Means of permanent access to machines and industrial plants — Part 4: Fixed ladders (ISO 14122-4:2004).*

EN 50014:1999, *Electrical apparatus for potentially explosive atmospheres — General requirement.*

EN 50015:1998, *Electrical apparatus for potentially explosive atmospheres — Oil immersion "o".*

EN 50016:1995, *Electrical apparatus for potentially explosive atmospheres — Pressurized apparatus "p".*

EN 50017:1998, *Electrical apparatus for potentially explosive atmospheres — Powder filling "q".*

EN 50018:2000, *Electrical apparatus for potentially explosive atmospheres — Flameproof enclosures "d".*

EN 50019:2000, *Electrical apparatus for potentially explosive atmospheres — Increased safety "e".*

EN 50020:1994, *Electrical apparatus for potentially explosive atmospheres — Intrinsic safety "i".*

EN 50039:1980, *Electrical apparatus for potentially explosive atmospheres — Intrinsic safety "i".*

EN 50281-1-2:1999, *Electrical apparatus for use in the presence of combustible dust — Part 1-2: Electrical apparatus protected by enclosures; selection, installation and maintenance.*

## EN 1010-1:2004 (E)

EN 60079-14:1998, *Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines)*.

EN 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

EN 60825-1:1994, *Safety of laser products — Part 1: Equipment classification, requirements and user's guide*.

EN 61000-6-2:2001 *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards; Immunity for industrial environment*.

EN 61010-1:2001, *Safety requirements for electrical equipment for measurement, control and laboratory use — Part 1: General requirements (IEC 61010-1:2001)*.

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

EN 61310-2:1995, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking*.

EN 61496-1:1997, *Safety of machinery — Electrosensitive protective equipment — Part 1: General requirements and tests*.

IEC 61496-2:1997, *Safety of machinery — Electrosensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices*.

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

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For the purposes of this European Standard, the terms and definitions given in EN 1070:1998 and the following apply.

#### 3.1

##### **danger points**

danger points are defined locations in the danger zone of machines where persons can be injured by movements of

- parts of machines;
- tools of machines or parts of tools;
- workpieces or parts of workpieces or
- materials being processed.

NOTE Danger points can exist, for example, on gear, chain and worm drives, V-belt, flat belt, cord and rope drives, pulling and supporting elements on continuous conveyors, spoke wheels and fly wheels, shafts and shaft ends, rollers, slides, push rods and similar parts, tools and clamping devices.

Particular points of danger are:

- crushing and shearing points;
- trapping points;

- inrunning nips;
- cutting, punching and impact points.

### 3.2

#### **inrunning nips**

nips caused by rotating rollers, cylinders, rolls or drums creating the hazard for parts of the body or the whole body to be drawn in. The risks exist between:

- a) two counter-rotating rollers, powered or non-powered;
- b) one rotating roller and an adjacent fixed part of the machine;
- c) rollers rotating and conveyer belts in the same direction, but with different peripheral speeds or surface properties (friction);
- d) guide roller and driving belt, conveyor belt and possibly the web (see Figure 1).

Inrunning nips also exist on non-powered riding rollers (guide rollers) which are driven by the movement of the web. This hazard may depend on a number of factors, e.g. type and strength of material, wrapping angle, web speed, inertia.

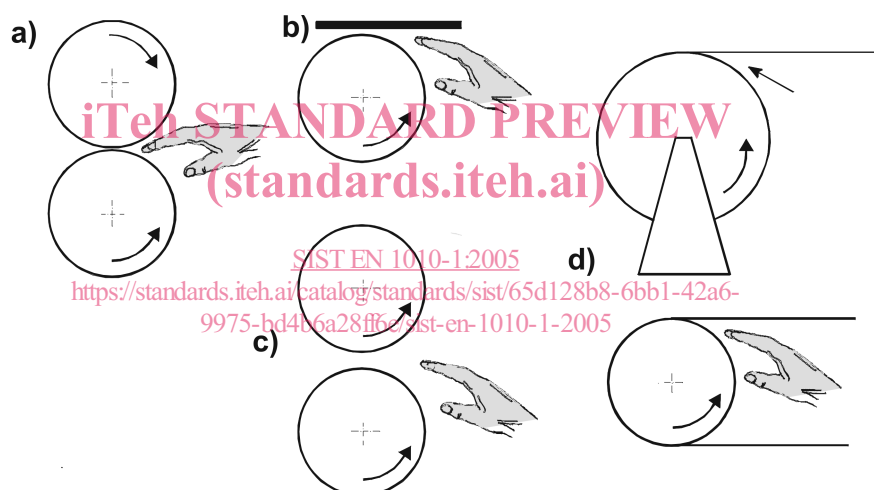


Figure 1 — Examples of inrunning nips

### 3.3

#### **integrated pile lifting and lowering devices**

devices integrated into sheet and blank feeders or deliveries for lifting and lowering the sheet pile

### 3.4

#### **format size**

maximum size of blanks (maximum length times maximum width) that can be printed or converted by the machine

### 3.5

#### **routine and regular access**

access to a danger point required for production reasons after each tool closing movement

### 3.6

#### **web-type materials**

webs of paper, board, foil or similar material which is to be handled or processed

**3.7**

**reel unwinding devices**

those parts of a machine used for unwinding web-type material for processing

**3.8**

**reel rewinding devices**

those parts of a machine used for rewinding the processed web-type material

**3.9**

**separating elements**

elements on feeders of sheets or blanks or similar materials which separate the individual sheets, blanks etc.

**3.10**

**raised workplaces**

workplaces that are at least 0,5 m above the reference plane

**3.11**

**infrequently used access**

access to workplaces which are used for adjustments, make-ready and maintenance operations, but which are not used for production purposes

**3.12**

**smooth cylinders/rollers**

rotationally symmetric smooth bodies (cylinders or rollers) without indentations and with no sharp or cutting edges

**3.13**

**residual pile monitoring**

sensing devices monitoring the residual pile in the feeder. The machine is stopped before the last blank is fed so that the blank safeguards the separating elements of the feeder

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**3.14**

**ESPD**

electro-sensitive protective device

**3.15**

**hold-to-run control device**

control device where the actuator automatically returns to the start position when released and where machine operation is started and maintained only as long as the actuator is held depressed

**3.16**

**accessible danger zones**

areas provided with guards or ESPDs, for example, for safeguarding which allow whole-body access

**4 List of significant hazards**

**4.1** This clause contains all the significant hazards, as far as they are dealt with in this standard, identified by the risk assessment significant to this type of machinery and which require action to eliminate or reduce the risk. When carrying out the risk assessment, the machine designer will have to check whether the list of hazards in Table 1 is complete and applicable with respect to the particular machine.

**4.2** It is of great importance that the users of this standard, i. e. the designer, manufacturer or supplier, take into account the following principal aspects in accordance with EN 1050:1996:

- the intended use of the machine including setting-up (make-ready), cleaning and maintenance, including foreseeable misuse;

- identification of the significant hazards.

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Table 1 — Significant hazards, danger zones, safety measures

Significant hazards	Danger zone	Safety measures: reference to clauses in		
		this standard	EN ISO 12100-1: 2003	EN 1050: 1996 Annex A
Mechanical hazards crushing shearing cutting or severing entanglement drawing-in trapping impacts	Production area: – between rollers, cylinders, drums – short linear movements – wheels for floor travel – revolving handwheels – crushing hazards with parts of building – guards – accessible danger zone – make-ready, cleaning, maintenance operations and trouble shooting (hold-to-run) – safe threading of web-type material – impact hazards in passageways, access ways – stationary knives – rotary tools – transport of hazardous tools – on feeding and delivery units (pile lifting and lowering devices) – unwinding and rewinding units for web-type material	5.2.1.1, 5.2.1.2 5.2.1.3 5.2.1.4 5.2.1.5 5.2.1.6 5.2.2 5.2.3.1 5.2.3.2, 5.2.3.3, 5.2.3.4 5.2.3.5 5.2.12.1.4 5.3.1 5.3.2 5.3.3 5.3.4.3 to 5.3.4.10 5.3.5	4.2.1	1
Mechanical hazards generated by: Mass and stability, Mass and velocity	– stability – movable machines – feeding units, delivery units	5.2.13.1 5.2.13.2 5.3.4.1, 5.3.4.2, 5.3.4.11, 7.2.5	4.2	1
Slipping, tripping, falling	Work platforms, access stairs, passageways, steps, floor coverings	5.2.12	4.2.3	19
Electrical hazards Direct or indirect contact Thermal radiation (burns)	– electrical equipment (equipment made live under electrical fault conditions) – supply disconnection device, stop category – rectifier drives – degree of protection – measuring devices	5.2.5.1, 5.2.5.7 5.2.5.2, 5.2.5.3 5.2.5.4 5.2.5.5 5.2.5.8	4.3	2
Thermal hazards Burns due to possible contact	Hot machine parts	5.2.14, 7.2.4	4.4	3
Hazards generated by noise Hearing damage Interference with speech communication Accidents due to interference with the perception of acoustic signals Stress	All machines	5.2.15, 7.2.4	4.5	4
Hazards generated by radiation UV-radiation, laser	Machines with laser and UV-light	5.2.16, 7	4.7	6

Table 1 (concluded)

Significant hazards	Danger zone	Safety measures: reference to clauses in		
		this standard	EN ISO 12100-1: 2003	EN 1050: 1996 Annex A
Hazards from explosion	– machinery using flammable liquids or dusts	5.2.4, 7.2.4	4.8	7.2
Hazards generated by neglect of ergonomic principles in machine design	– design of actuators and displays – safety access, workplaces, catwalks, passageways	5.2.7 Annex B 5.2.12.1.1, 5.2.12.1.3,	4.9	8
Unhealthy body postures		5.2.12.1.4, 5.2.12.1.5		
Unsuitable construction, place or identification of actuators	– footsteps, handles – balance of weight – avoidance of irritating reflection	5.2.12.2 5.2.2.5 5.2.2.6		
Failure, malfunction of control system	– machinery with safety circuits	5.2.6 5.2.8 to 5.2.11		10
Faults or failures in safety circuits malfunction of software	– conductor identification – separation of chucking cones	5.2.5.6 5.3.5.4		
External effects on electrical devices	immunity to electromagnetic disturbances	5.2.17		10.3

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## 5 Safety requirements and/or protective measures

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### 5.1 General

Machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN ISO 12100 for hazards relevant but not significant, which are not dealt with by this document (e. g. sharp edges of the machine frame).

### 5.2 Requirements common to printing and paper converting machines

#### 5.2.1 Safeguarding of danger points

**5.2.1.1** Inrunning nips on cylinders, rollers, drums, rolls and similar parts shall be safeguarded by guards or by applying the safety distances specified in EN 349:1993.

On guide rollers, the safety distance specified for the arm is considered to be sufficient where risk assessment has determined that whole-body or head access cannot be expected.

Guards shall be designed as follows:

- a) as guards without openings or with openings for feeding the material (for example sheets, blanks, webs, work pieces). The safety distances shall be established in relation to the width of the opening in accordance with EN 294:1992 (see Figure 2).

These guards shall be interlocked with the dangerous movements in accordance with 5.2.2 or they shall be fixed to the machine. When the interlocking guard is open, one of the measures set out in 5.2.3 shall become effective.