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**Safety of machinery - Safety requirements for the design and construction of paper making and finishing machines - Part 1: Common requirements**

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

Sicherheit von Maschinen - Sicherheitstechnische Anforderungen für Konstruktion und Bau von Maschinen der Papierherstellung und Ausrüstung - Teil 1: Gemeinsame Anforderungen

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Sécurité des machines - Prescriptions de sécurité pour la conception et la construction de machines de fabrication et de finition du papier - Partie 1: Prescriptions communes

**Ta slovenski standard je istoveten z: EN 1034-1:2000**

**ICS:**

13.110	Varnost strojev	Safety of machinery
21.020	Značilnosti in načrtovanje strojev, aparatov, opreme	Characteristics and design of machines, apparatus, equipment
85.100	Oprema za papirno industrijo	Equipment for the paper industry

**SIST EN 1034-1:2000****en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1034-1**

April 2000

ICS 85.100

English version

**Safety of machinery - Safety requirements for the design and construction of paper making and finishing machines - Part 1: Common requirements**

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This European Standard was approved by CEN on 17 September 1999.

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

**Central Secretariat: rue de Stassart, 36 B-1050 Brussels**

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## Foreword

This European Standard 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of an identical text or by endorsement, at the latest by October 2000, and conflicting national standards shall be withdrawn at the latest by October 2000.

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 EU Directive(s).

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

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

This Standard is part 1 of a standard for the technical safety requirements for the design and construction of paper making and finishing machines which consists of the following parts:

- Part 1: Common requirements
- Part 2: Barking drums
- Part 3: Winders and slitters, plying machines
- Part 4: Pulpers and their feeding facilities
- Part 5: Sheeters
- Part 6: Calanders
- Part 7: Paper making machines

CEN/TC 198 intends to prepare further parts to cover the paper making and finishing machines listed in annex A.

## 0 Introduction

This European Standard is a C type standard as stated in ENV 1070:1993. The standard consists of a number of parts which are listed in annex A. The extent to which hazards are covered is indicated in the scope of this standard.

## 1 Scope

1.1 This standard applies to paper making and paper finishing machines. It contains definitions and requirements which apply to all paper making and paper finishing machines listed in annex A and shall be used in connection with the specific part applicable for the respective machine listed in annex A. Specific parts can contain additional requirements or deviations from prEN 1034-1 in which case the specific stipulations take precedence over the specification made in prEN 1034-1. The standard deals with the hazards listed in 4.

1.2 This standard does not apply to machines used in paper converting. See EN 1010-1 to EN 1010-5.

1.3 This standard applies to machines produced after..... (date of CEN approval).

**2 Normative references**

This European Standard incorporates dated or undated provisions from other publications. These normative references are cited in the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1:1991	Safety of machinery - Basic concepts - General principles for design - Part 1: Basic terminology, methodology
EN 292-2:1991/ A1:1995	Safety of machinery - Basic concepts - General principles for design - Part 2: Technical principles and specifications
EN 294:1992	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs
EN 349	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
EN 418	Safety of machinery - Emergency stop equipment - Functional aspects
EN 457	Safety of machinery - Auditory danger signals - General requirements, design and testing (ISO 7731:1986 modified)
EN 547-1	Safety of machinery - Human body measurements - Part 1: Principles for determining the dimensions required for openings for whole body access into machinery
EN 547-2	Safety of machinery - Human body measurements - Part 2: Principles for determining the dimensions required for access openings
EN 547-3	Safety of machinery - Human body measurements - Part 3: Anthropometric data
EN 563	Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces
EN 614-1	Safety of machinery - Ergonomics design principles - Part 1: Terminology and general principles
EN 614-2	Safety of machinery - Ergonomics design principles - Part 2: Interaction between the design of machinery and tasks
EN 626-1	Safety of machinery - Reduction of risk to health from hazardous substances emitted by machinery - Part 1: Principles and specifications for machinery manufacturers <a href="https://standards.iteh.ai/catalog/standards/sist/c4887814-a074-4c06-b21f-7c78d69f3177/sist-en-1034-1-2000">https://standards.iteh.ai/catalog/standards/sist/c4887814-a074-4c06-b21f-7c78d69f3177/sist-en-1034-1-2000</a>
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 811:1996	Safety of machinery - Safety distances to prevent danger zones being reached by the lower limbs
EN 894-1	Safety of machinery - Ergonomic 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 - Ergonomic requirements for the design of displays and control actuators - Part 2: Displays



EN 894-3	Safety of machinery - Ergonomic 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 954-1	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design
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 1005-2	Safety of machinery - Human physical performance - Part 2: Manual handling of objects associated to machinery
EN 1005-3	Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation
EN 1010-1	Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 1: Common requirements
EN 1010-2	Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 2: Printing and varnishing machines including pre-press machinery
EN 1010-3	Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 3: Cutting machines
EN 1010-4	Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 4: Bookbinding, Paper Converting and Paper Finishing Machines
EN 1010-5	Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 5: Machines for the production of corrugated board and machines for the conversion of flat and corrugated board
EN 1037:1995	Safety of machinery - Prevention of unexpected start-up
EN 1050	Safety of machinery - Principles for risk assessment
ENV 1070:1993	Safety of machinery - Terminology
EN 1088	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
EN 1127-1	Explosives atmospheres - Explosion protection - Part 1: Basic concepts and methodology
EN 1760-1	Safety of machinery - Pressure-sensitive protective devices - Part 1: General principles for the design and testing of pressure sensitive mats and pressure sensitive floors
prEN 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
prEN 1837	Safety of machinery - Integral lighting of machines

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- prEN ISO 11688-1 Acoustics - Recommended practice for the design of low-noise machinery and equipment
- prEN 12198-1 Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery - Part 1: General Principles
- prEN 12437-1 Safety of machinery - Permanent means of access to machines and industrial plants - Part 1: Choice of a fixed means of access between two levels
- prEN 12437-2 Safety of machinery - Permanent means of access to machines and industrial plants - Part 2: Working platforms and gangways
- prEN 12437-3 Safety of machinery - Permanent means of access to machines and industrial plants - Part 3: Stairways, stepladders and guard-rails
- prEN 12437-4 Safety of machinery - Permanent means of access to machines and industrial plants - Part 4: Fixed ladders
- prEN 13023 Noise measurement methods for printing, paper converting, paper making and finishing machines - Accuracy class 2 and 3
- EN 60204-1:1992 Safety of machinery - Electrical equipment - Part 1: General requirements
- EN 60529 Degrees of protection provided by enclosures (IP code)
- EN 60825-1 Safety of laser products - Part 1: Equipment classification, requirements and user's guide
- EN 61496-1 Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests
- EN 61496-2 Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for systems using active opto-electronic protective devices

### 3 Definitions

For the purpose of this standard, the definitions given in EN 292-1:1991, ENV 1070:1993 and the following definitions apply:

**3.1 Paper making and finishing machines:** machines with which pulp or paper fibres are obtained, processed, joined together to form and also to finish paper, board, tissue and fibreboard.

**3.2 Paper converting machines:** see EN 1010.

**3.3 Machine section:** functional unit of a paper making machine such as wire section, press section, dryer section, smoothing unit, coater, winding unit.

**3.4 Crawl speed:** the lowest practicable speed, no greater than 0,25 m/s (15 m/min). It can differ for various types of machines and is then referred to under the sections describing specific machine types.

**3.5 Running machine:** machine operating at a speed higher than crawl speed.

**3.6 Hold-to-run control:** operation of the machine by means of a device as defined in 3.23.3 of EN 292-1:1991.

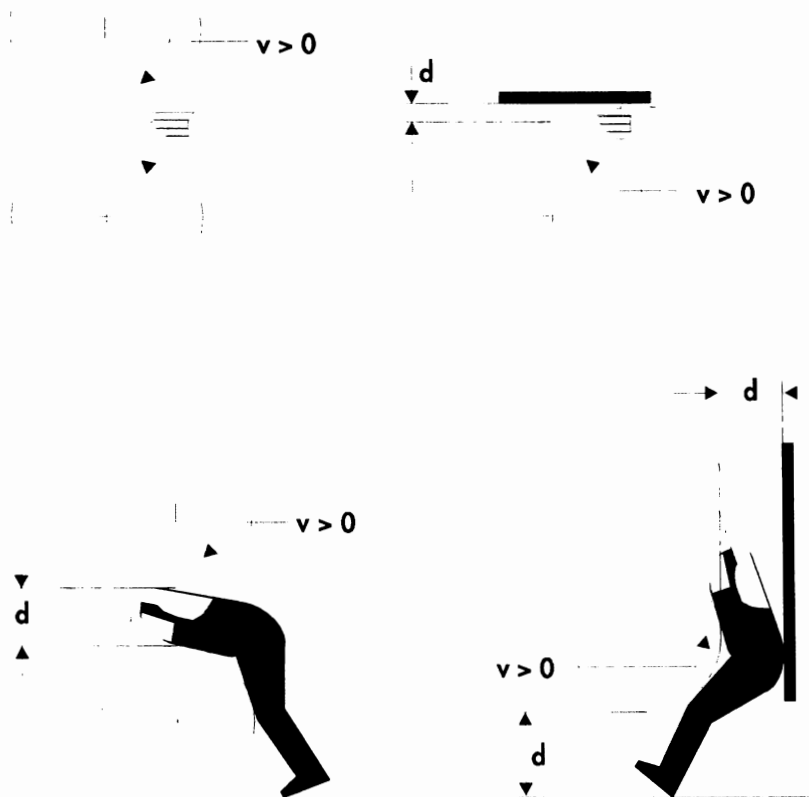
### 3.7 Inrunning nips and wrapping points

**3.7.1 Inrunning nip:** danger point caused by rotating roll, cylinder or roller nips where persons, parts of the body or clothing can be drawn in. Such nips arise between



- a) counterrotating part;
- b) a rotating part and an adjacent fixed part;
- c) parts rotating in the same direction, but with different peripheral speeds and surface properties,

if adequate safety distances are not maintained. Examples of inrunning nips are illustrated in figure 1.



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NOTE: Prevention of drawing-in hazard if  $d > 500$  mm or  $d > 120$  mm depending on the conditions defined in 5.4.1.

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Figure 1: Examples of inrunning nips

**3.7.2 Wrapping point:** danger point where moving materials, such as felts or screens and wires, aprons or ropes or strong board webs, are fed onto moving parts, such as rolls, cylinders or discs, which can draw in persons, parts of the body or clothing if adequate safety distances are not maintained. Examples of wrapping points are given in figure 2.

**3.8 Paper:** generic term for paper and board, tissue.

**3.9 Broke:** scraps of paper, paper breaks and paper with imperfections.

**3.10 Fence-type enclosure:** type of guard preventing access to a danger point with a minimum height of 1,4 m and a clearance between floor and lower edge of the fence of 0,4 m maximum. This definition does not relate to fall-off protections.

3.11 **Nip bar**: type of guard arranged directly on the nip of a pair of rollers or some other nip. For examples of nip bars see figure 3.

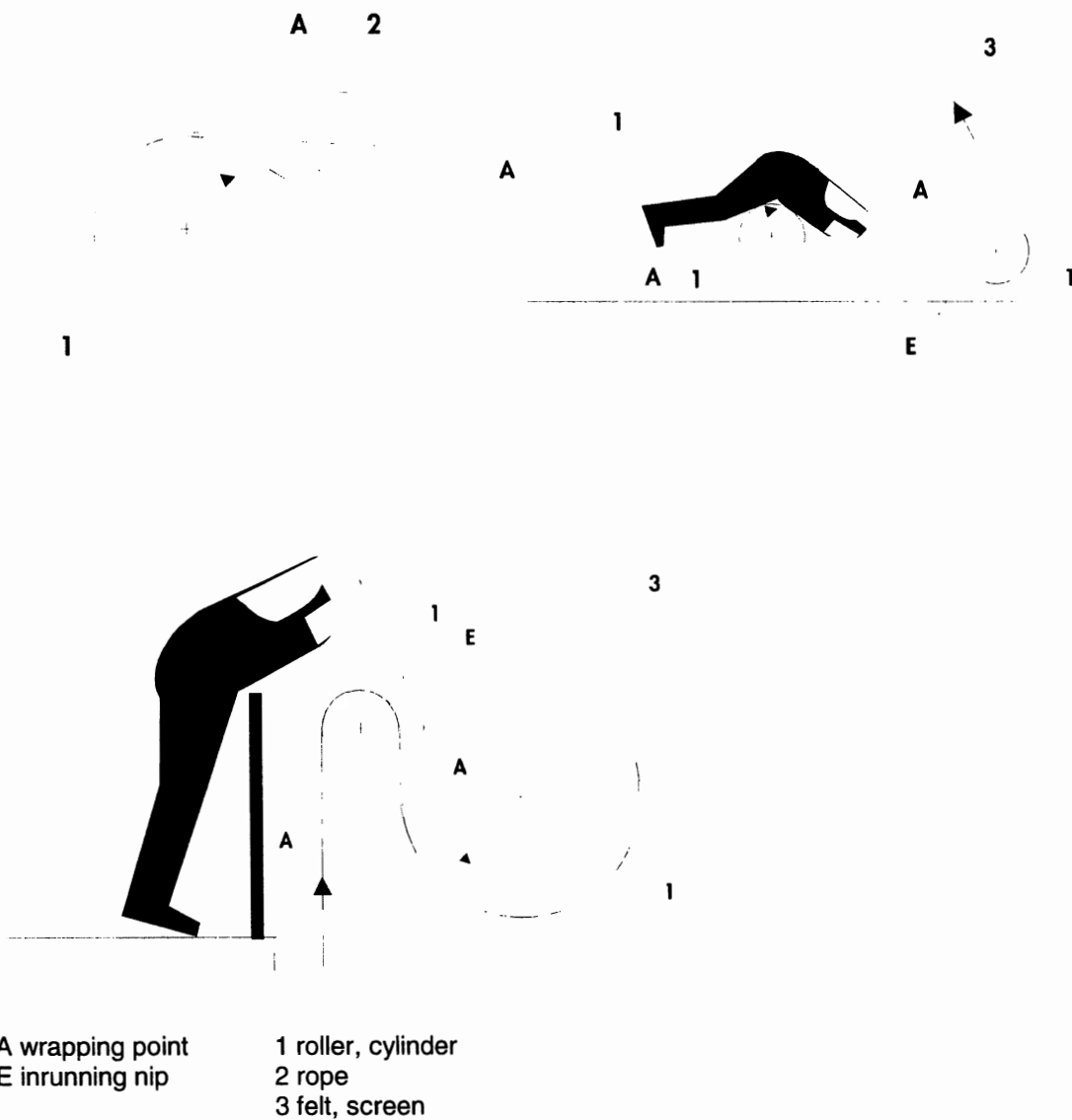


Figure 2: Examples of wrapping points  
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**4 List of significant hazards**

This contains all the significant hazards, as far as they are dealt with in this standard, identified by risk assessment in accordance with EN 1050 as significant for this type of machinery and which require action to eliminate or reduce the risk. A list of significant hazards is given in table 1.

**Table 1: List of significant hazards**

Hazards	prEN 1034-1	EN 1050 Annex A
<b>Mechanical hazards</b>		1
Crushing hazard	5.1; 5.3	1.3.1
Shearing hazard	5.1	1.3.2
Cutting or severing hazard	5.1; 5.11; 5.12	1.3.3
Entanglement hazard	5.2	1.3.4
Drawing-in or trapping hazard	5.1; 5.4	1.3.5
Impact hazard	5.1	1.3.6
Stabbing or puncture hazard	5.1; 5.12	1.3.7
Friction or abrasion hazard	5.1	1.3.8
High-pressure fluid ejection hazard	5.24	1.3.9
Ejection of parts (parts of machines or processed material/workpieces)	5.2	1.1.4
Loss of stability (of machines or machine parts)	7	1.1.3
Slip, trip and fall hazards in relationship with machines (because of their mechanical nature)	5.5	19
<b>Electrical hazards, for example</b>		2
Electrical contact (direct or indirect)	5.23; 5.8	2.1 to 2.3
Electrostatic phenomena	5.23	2.4
Thermal radiation or other phenomena such as ejection of molten particles, and chemical effects from short-circuits, overloads etc.	5.8; 5.23	2.5
External influences on electrical equipment	5.23	10.3
<b>Thermal hazards resulting in:</b>		3
Burns and scalds, by a possible contact of persons, by flames or explosions and also by the radiation of heat sources	5.13; 5.17	3.1
Health-damaging effects by hot or cold work environment	5.22	3.2
<b>Hazards generated by noise, resulting in</b>		4
Hearing loss (deafness), other physiological disorders (e.g. loss of balance, loss of awareness)	5.15	4.1
Interferences with speech communication, acoustic signals	5.15	4.2
<b>Hazards generated by radiation, especially:</b>		6
Electric arcs	5.8; 5.23	2.3
Lasers	5.21	6.5
Ionizing radiation	5.20	6.4
<b>Hazards generated by materials and substances processed, used or exhausted by machines, for example</b>		7
Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	5.16	7.1

(continued)

Table 1 (concluded)

Hazards	PrEN 1034-1	EN 1050 Annex A
Fire or explosion hazards	5.13; 5.18; 5.19; 5.23	7.2
<b>Hazards generated by neglecting ergonomic principles in machine caused for example by:</b>		8
Unhealthy postures or excessive efforts	5.22	8.1
Inadequate consideration of human hand-arm or foot-leg anatomy	5.22	8.2
Neglected use of personal protection equipment	5.8; 5.9; 5.15; 7	8.3
Inadequate area lighting	5.18	8.4
Mental overload or underload, stress etc.	5.22	8.5
Human error	7	8.6
<b>Hazard combinations</b>	5. 6	9
<b>Hazards caused by failure of energy supply, breaking down of machines parts and other functional disorders, for example</b>		10
Failure of energy supply (of energy and/or control circuits)	5.8	10.2
Unexpected ejection of machine parts or fluids	5.24	
Failure, malfunction of control system (unexpected start up, unexpected overrun)	5.14	10.1
Errors of fitting	7	
Overturn, unexpected loss of machine stability	5.14	14
<b>Hazards caused by missing and/or incorrectly positioned safety related measures/means, for example:</b>		
All kinds of guards	5.1; 5.2	
All kinds of safety related (protection) devices	5.1; 5.14	
Start-up and braking devices	5.14	8.7
Safety signs and signals	5.21	8.8
All kinds of information or warning devices	5.6	8.8
Energy supply disconnecting devices	5.8	13
Emergency devices	5.1.3; 5.7; 5.18; 5.19	
Feeding/removal means of workpieces	5.10	
Essential equipment and accessories for safe adjusting and/or maintaining	5.5; 5.9	
Equipment evacuating gases etc.	5.13; 5.16	7.1

## 5 Safety requirements and/or measures SIST EN 1034-1:2000

Machinery shall comply with the safety requirements and/or measures of this clause. <https://standards.iteh.ai/catalog/standards/sist/c4887814-a074-4c06-b21f-7c78d09b1777/sist-en-1034-1-2000>

In addition, the machine shall be designed according to the principles of EN 292 for hazards relevant but not significant which are not dealt with by this standard.

When required, further specification will be given in the machine-specific parts as listed in annex A of this standard.