



# SLOVENSKI STANDARD

## SIST EN 1114-3:2001

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### Rubber and plastics machines - Extruders and extrusion lines - Part 3: Safety requirements for haul-offs

Rubber and plastics machines - Extruders and extrusion lines - Part 3: Safety requirements for haul-offs

Gummi- und Kunststoffmaschinen - Extruder und Extrusionsanlagen - Teil 3: Sicherheitsanforderungen für Abzüge

Machines pour le caoutchouc et les matières plastiques - Extrudeuses et lignes d'extrusion - Partie 3: Prescriptions de sécurité pour les extracteurs

**Ta slovenski standard je istoveten z: EN 1114-3:2001**

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#### **ICS:**

83.200	Oprema za gumarsko industrijo in industrijo polimernih materialov	Equipment for the rubber and plastics industries
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1114-3**

January 2001

ICS 83.200

English version

## Rubber and plastics machines - Extruders and extrusion lines - Part 3: Safety requirements for haul-offs

Machines pour le caoutchouc et les matières plastiques -  
Extrudeuses et lignes d'extrusion - Partie 3: Prescriptions  
de sécurité pour les extracteurs

Gummi- und Kunststoffmaschinen - Extruder und  
Extrusionsanlagen - Teil 3: Sicherheitsanforderungen für  
Abzüge

This European Standard was approved by CEN on 28 December 2000.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 145 "Rubber and plastics machines - Safety", the secretariat of which is held by UNI.

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 July 2001, and conflicting national standards shall be withdrawn at the latest by July 2001.

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.

This is the third in a series of standards on the safety of extruders and extrusion lines.

Part 1 deals with extruders.

Part 2 deals with die face pelletisers.

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.

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## Introduction

This document is a type C standard as stated in EN 1070.

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

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.

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## 1 Scope

This European Standard contains the safety requirements for the design and construction of haul-offs used in extrusion lines for processing plastics and rubber for the hazards identified in clause 4. The following kinds of haul-offs are covered:

- caterpillar haul-offs;
- belt haul-offs;
- capstan haul-offs;
- belt capstan haul-offs;
- roller haul-offs.

The machine begins at the material inlet opening and ends at the material outlet.

Cutting units which are integrated with or attached to the haul-off are not covered.

Take-off devices used at film or sheet lines are not covered.

Chemical, toxicological and fire hazards which could occur for example in continuous vulcanisation plants due to the materials processed are not dealt with.

Unwinding and winding machines are not subject to this standard. They are being dealt with in a separate standard being produced by another working group of CEN/TC 145.

This document is not applicable to haul-offs which are manufactured before the date of publication by CEN of this document.

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**2 Normative references**

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at 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 (including amendments).

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 418:1992	Safety of Machinery - Emergency stop equipment, functional aspects - Principles for design
EN 563:1994	Safety of Machinery - Temperatures of touchable surfaces - Ergonomic 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 811:1996	Safety of Machinery - Safety distances to prevent danger zones being reached by the lower limbs
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 982:1996	Safety requirements for fluid power systems and components - hydraulics
EN 983:1996	Safety requirements for fluid power systems and components - pneumatics
EN 999:1998	Safety of machinery - The positioning of protective equipment in respect of approach speeds of parts of the human body
EN 1037:1995	Safety of machinery - Prevention of unexpected start-up
EN 1070	Safety of machinery - Terminology
EN 1088:1995	Safety of Machinery - Interlocking devices associated with guards - Principles for design and selection

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prEN 1760-2:1996	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 60204-1:1997	Safety of Machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:1997)
EN 60529:1991	Degrees of protection provided by enclosures (IP-Code) (IEC:1989)
EN ISO 3744:1995	Acoustics; Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)
EN ISO 4871:1996	Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)
EN ISO 9614	Acoustics - Determination of sound power levels of noise sources using sound intensity
EN ISO 11201:1995	Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at the work station and at other specified positions - Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)
EN ISO 11204:1995	Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at the work station and at other specified positions - Method requiring environmental corrections (ISO 11204:1995)
EN ISO 11688-1:1998	Acoustics - Recommended practice for the design of low-noise machinery and equipment; Part 1: Planning (ISO/TR 11688-1:1995)

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### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1070 and the following terms and definitions apply:

#### 3.1

##### **haul-off**

a powered device used in extrusion lines to continuously haul off products such as cable, cable core, profiles, pipes or tape. It operates by pulling the product by means of friction between the product and the moving gripping elements.

#### 3.2

##### **caterpillar haul-off**

a device comprising two or more sets of linked elements equipped with gripping segments or lugs; one or more are driven. Grip is achieved when the elements are closed together by pressing the product between them (see figure 1).

#### 3.3

##### **belt haul-off**

a device comprising two counter-rotating belts set in line one above the other; one or both is driven. Grip is achieved when the belts are closed together by pressing the product between both belts (see figure 2).

#### 3.4

##### **capstan haul-off**

a device comprising one or more drums or wheels at least one of which is driven. Grip is achieved by the tension of the product, e.g. cables, flexible hoses, wrapped one or more times around the drum(s) or wheel(s) (see figure 3).

#### 3.5

##### **belt capstan haul-off**

a device comprising a wheel and a belt which covers at least partially the circumference of the wheel. The wheel, the belt or both are driven. Grip is achieved by pressing the product between the belt and the wheel (see figure 4).

#### 3.6

##### **roller haul-off**

a device comprising one or more sets of counter-rotating rolls set in line one above the other; one roller or both of each set is driven. Grip is achieved by pressing the product between the rollers (see figure 5).

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## 4 List of significant hazards

### 4.1 Mechanical Hazards

Mechanical Hazards are:

- a crushing
- b cutting and severing
- c shearing
- d drawing in or trapping
- e falling/uncontrolled descent due to gravity

These hazards are principally due to:

- the rotating parts of the drive and power transmission systems (a,b,c,d)
- the rotating drive rollers or wheel(s) or drum(s) with or without product (a, b, c, d)
- the moving parts of the conveying elements, such as caterpillars, belts, pressure rollers, return rollers, etc. with or without product (a,b,c,d,)
- the moving parts of the conveying element mountings during opening and closing (a, e)
- movement of the product through feed openings in guards (a,d)
- movement of the machine for changes of location (a)

**Table 1: Cross references of the mechanical hazards to the danger zones**

Danger zone	Cause of the hazard(s)	Hazards <sup>1)</sup>				
		a	b	c	d	e
Feeding zone	rotating drive rollers or wheel(s) or drum(s) with or without product	x	x	x	x	
	moving parts of the conveying elements, such as caterpillars, belts, back-up roller, deflection rollers, etc. with or without product	x	x	x	x	
	moving parts of the conveying element mountings during opening and closing	x				x
	movement of the product through feed openings in guards	x			x	
Conveying zone	rotating drive rollers or wheel(s) or drum(s) with or without product	x	x	x	x	
	moving parts of the conveying elements, such as caterpillars, belts, pressure rollers, return rollers, etc. with or without product	x	x	x	x	
	moving parts of the conveying element mountings during opening and closing	x				x

<sup>1)</sup> a = crushing hazards, b = cutting and severing hazards, c = shearing hazards, d = drawing in or trapping hazards, e = falling/uncontrolled descent due to gravity

**Table 1: Cross references of the mechanical hazards to the danger zones  
(Continuation)**

Danger zone	Cause of the hazard(s)	Hazards <sup>1)</sup>				
		a	b	c	d	e
Drive and power transmission zone	rotating parts of the drive and power transmission systems	x	x	x	x	
Discharge Zone	rotating drive rollers or wheel(s) or drum(s) with or without product	x	x	x	x	
	moving parts of the conveying elements, such as caterpillars, belts, pressure rollers, return rollers, etc. with or without product	x	x	x	x	
	moving parts of the conveying element mountings during opening and closing	x				x
Movement of the wheels	movement of the machine for changes of location	x				

<sup>1)</sup> a = crushing hazards, b = cutting and severing hazards, c = shearing hazards, d = drawing in or trapping hazards, e = falling/uncontrolled descent due to gravity

Figures 1 to 5 show examples of haul-offs with danger zones.

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