SLOVENSKI STANDARD
SIST EN 12044:2005

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Footwear, leather and imitation leather goods manufacturing machines - Cutting and punching machines - Safety requirements

Footwear, leather and imitation leather goods manufacturing machines - Cutting and punching machines - Safety requirements

Maschinen zur Herstellung von Schuhen, Leder- und Kunstlederwaren - Stanzmaschinen - Sicherheitsanforderungen

Machines de fabrication de chaussures et articles en cuir et en matériaux similaires - Machines de coupe et de poinconnage - Prescriptions de sécurité

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59.140.40	Stroji in oprema za proizvodnjo usnja in krzna	Machines and equipment for leather and fur production
61.060	Obuvala	Footwear

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English Version

Footwear, leather and imitation leather goods manufacturing machines - Cutting and punching machines - Safety requirements

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This European Standard was approved by CEN on 17 June 2005.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard (EN 12044:2005) has been prepared by Technical Committee CEN/TC 201 “Leather and imitation leather goods and footwear manufacturing machinery - 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of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

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 European 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, 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 United Kingdom.

0 Introduction

This European Standard is a type C standard as stated in EN ISO 12100-1.

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.

This European Standard contains safety requirements for cutting and punching machines. It is aimed at designers, manufacturers, suppliers and importers.

1 Scope

1.1 This European Standard specifies safety requirements for design and operation of the machines defined in 1.2.

It takes account of intended use, foreseeable misuse, component and system failure.

1.2 This European Standard applies for cutting and punching machines used in the manufacture of footwear, leather and imitation leather goods and other related components. This European Standard applies to the following cutting and punching machines:

— swing arm cutting presses with manual or powered swing arm;

— manual and automatic travelling head cutting presses with powered travelling head;

— manual and automatic beam cutting presses;

— punching and perforating presses;

— C-frame cutting presses.

1.3 This European Standard is not applicable to:

— mechanical presses;

— presses intended for working cold metal;

— fastening, riveting, stitching, stapling, bending or folding machines;

— guillotines, shears and similar machines;

— shoe and leather presses as described in EN 12203.

1.4 This European Standard deals with all significant hazards, hazardous situations and events relevant to the footwear, leather and imitation leather goods manufacturing machinery, when it is used as intended and under the conditions foreseen by the manufacturer (see Clause 4) and is intended for operation in applications by trained persons.

1.5 This European Standard deals with material feeding and handling devices, when attached to the machine.

1.6 This European Standard is not applicable to the machines which are manufactured before the date of publication of this European 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.

EN 294:1992, *Safety of machinery – Safety distance 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 547-1:1996, *Safety of machinery – Human body measurements – Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 547-2:1996, *Safety of machinery – Human body measurements – Part 2: Principles for determining the dimensions required for access openings*

EN 574:1996, *Safety of machinery – Two-hand controls devices – Functional aspects – Principles for design*

EN 894-1:1997, *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 894-2:1997, *Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 2: Displays*

EN 894-3:2000, *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 954-1:1996, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

EN 981:1996, *Safety of machinery – System of auditory and visual danger and information signals*

EN 982:1996, *Safety of machinery – Safety requirements for fluid power systems and their components – Hydraulics*

EN 983:1996, *Safety of machinery – Safety requirements for fluid power systems and their 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 1005-3:2002, *Safety of machinery – Human physical performance – Part 3: Recommended force limits for machinery operation*

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

EN 1837:1999 *Safety of machinery – Integral lighting of machines*

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)*

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 12545:2000, *Footwear, leather and imitation leather goods manufacturing machines – Noise test code – Common requirements*

EN ISO 14122-2:2001, *Safety of machinery – Permanent means of access to machinery – Part 2: Working platforms and walkways (ISO 14122-2:2001)*

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 60529:1989)*

EN 60947-4-1, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters (IEC 60947-4-1:2000)*

EN 60947-5-1: *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements; Electro-mechanical control circuit devices (IEC 60947-5-1:2003*

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

prEN 61496-2:2004, *Safety of machinery – Electro-sensitive protective equipment – Part 2: Particular requirements of equipment using active opto-electronic protective devices (AOPDs)*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 12100-1:2003 apply. Additional definitions specifically needed for this European Standard are added below.

3.1
automatic cutting press
machine where the tool repeats continuously or intermittently all functions without manual intervention between each cycle (see also Figures 11 and 12)

3.2
beam cutting press
machine in which the striking surface is attached to the beam which moves vertically and is supported at either end (see also Figure 5)

NOTE In this type of machine the striking surface and the cutting surface are of approximately equal surface area.

3.3
beam cutting press with articulated die carrier not attached to the beam
beam cutting press equipped with an all-round movable cutting die support arm as well as a pivoted die support with centering and clamping device for chucking single cavity cutting dies (see also Figure 8)

3.4
beam cutting press with receding head
beam cutting press where the beam at the top of its stroke is also capable of horizontal movement in order to clear the cutting surface (see also Figure 6)

3.5
c-frame cutting press
machine having a striking surface and a cutting surface contained within a 'C' frame, which is capable of vertical powered movement only (see also Figure 10)

3.6
cutting pad
machine part which provides the surface on which cutting takes place

3.7
cutting press
machine designed to transmit energy to a cutting tool for the purpose of cutting or punching material. When the machine can execute a cycle of consecutive cuts without the need for additional operator commands, it is defined as an "automatic cutting press"

3.8
cutting surface
total area available against which the tool can act when cutting

3.9
cutting tool
tool consisting of a blade or a die with one or two edges pre-shaped or a punch through which the press transmits energy for cutting

3.10
feed system

equipment which can be part of a machine and which mechanically assists the presentation of material to be cut at the press working area (see 3.13). This can include:

— tray feeder (a powered or manually operated table used as a cutting surface in a beam or punching press) See 3.22;

— power driven feed rollers - usually on the feed side;

— reciprocating clamping arrangements, for example: the gripper system.

3.11
material support area
flat surface outside the cutting area where the material is supported to be visually inspected to let the operator optimise the cut position

3.12
press head
part of the machine carrying the striking element, or moving directly vertically during the cutting, carrying the striking surface

3.13
press working area
zone of a machine between the striking surface and material supporting area, including the cutting tool, where the cutting and punching operations take place

3.14
punching and perforating press
machine in which the striking surface, supported under a stationary cutting surface by a ring frame, is capable of vertical powered movement only (see also Figure 9)

NOTE The striking surface and the cutting surface are of approximately equal surface area.

3.15
recurring access
access between striking plate and cutting pad between each normal working cycle

3.17
striking element
part of the press head in motion during cutting or punching

3.18
striking element return
return of the striking element to its rest position

3.19
striking surface
part of the press head in contact with the tool during cutting

3.20
swing arm cutting press
machine having a stationary lower cutting surface corresponding to the total available working area and an arm, containing the moving striking surface, able to swing in an arc horizontally over the cutting surface

This includes two possible versions, namely:

— manual swing arm (see also Figure 2);

— powered swing arm (see also Figure 3).

3.21
travelling head cutting press
machine having a stationary lower cutting surface corresponding to the total available working area and a smaller upper striking surface, mounted on a movable head, able to move horizontally across the cutting table (see also Figure 4)

3.22
tray feeder
movable table used as a cutting surface in a beam or punching press (see also Figure 7)

3.23
working cycle
all the machine movements needed to make a single cut or punch

4 List of significant hazards

4.1 This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this European Standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

The significant hazards of cutting and punching machines are outlined in 4.3 to 4.8.

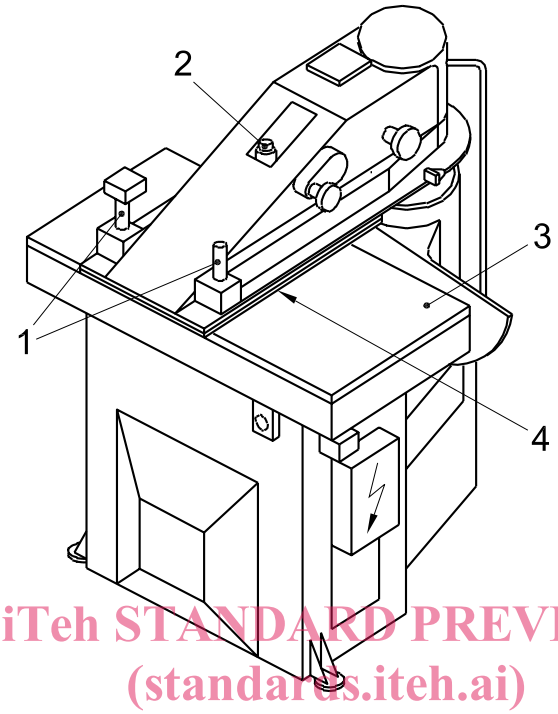
4.2 The danger zones that may lead to mechanical hazards are illustrated in Figures 2 to 13. The lay-out of the machine is informative only. The list of significant hazards is based upon EN 1050. Before using this European Standard it is important to carry out a risk assessment of shoe repair machines to check that its significant hazards are identified in this clause.

Table 1 — List of significant hazards

	Danger zone	Source of hazard	Type of hazard	Machine with hazard; see Figure
4.3	**Mechanical hazards**			
4.3.1	The zone between striking and cutting surface (marked T in figures)	The closing stroke of the striking surface onto the cutting surface	Crushing	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
4.3.2	The zone of press head movements (marked S1 in figures) and the clearance between head and side frame (marked S2 in figures)	The moving press head	Impact	3, 4, 6, 11, 12
			Drawing-in and trapping	3, 4
			Crushing	3, 4, 11, 12
			Abrasion	2, 3, 4
4.3.3	The zone of press head movement (marked S1 in figures)	The falling die	Impact	6
4.3.4	The zone between striking surface or cutting surface and tool (marked L in figures)	The closing movement of: - the striking surface onto the tool or - the tool onto the cutting surface	Cutting or severing	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
			Crushing	2, 3, 4, 5, 6, 7, 9, 10
			Shearing	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
4.3.5	The drawing-in zone for rotating and pinching parts	Transmission machinery and feeding systems	Entanglement Drawing-in and trapping Crushing	4, 5, 6, 9, 11, 12, 13
4.4	**Electrical hazard**			
	Electrical contact, direct or indirect caused by: - Component failure - Insulation failure - Incorrect design, installation or component specification of electrical equipment		Electric shock, burns	
4.5	**Noise**			
	Noise generated by: - action of the tool on the material or component being worked - hydraulic unit - pneumatic exhausts - press head movements		Hearing loss, interference with speech communication and acoustic signals, physiological disorders	

Table 1 — List of significant hazards *(continued)*

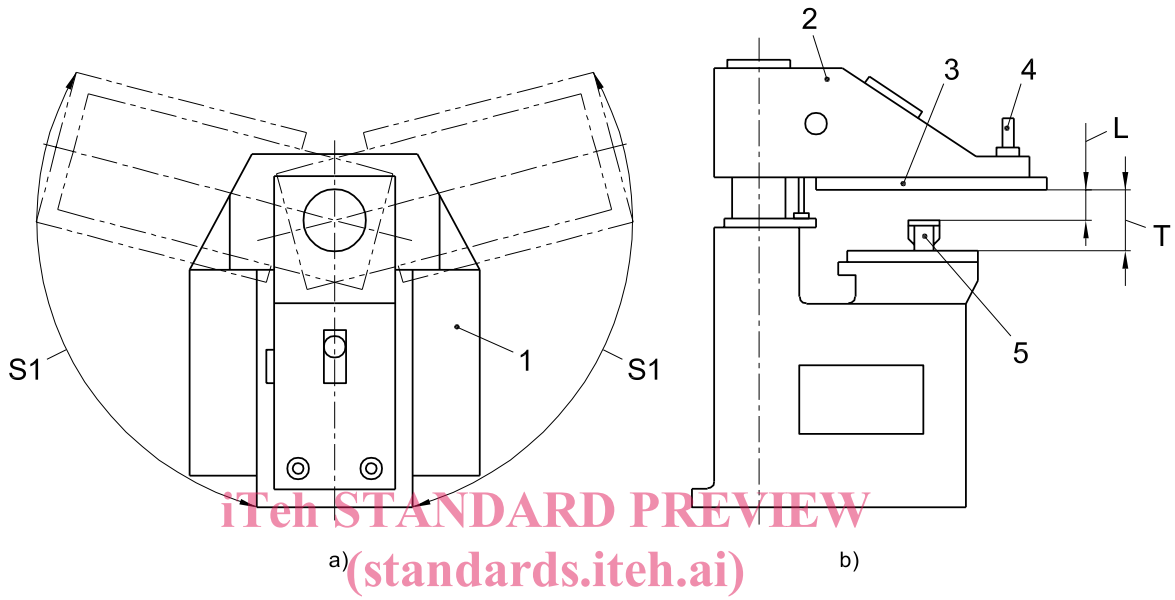
	Danger zone	**Source of hazard**	**Type of hazard**	**Machine with hazard; see Figure**
4.6	**Functional disorder**			
	Fault in energy supply (irregularity, failure, unexpected reconnection)		Hazards generated by inadvertent movement and/or process start up	
	Failure of control system (malfunction of safety devices and machine controls)		All possible hazards generated by unexpected dangerous movement (unexpected start or closing movement)	
	Errors of fitting		Unexpected dangerous movement	
4.7	**High pressure fluid**			
	High pressure fluid ejection or ejection of a burst component part due to failure of hydraulic unit (broken hoses, fittings and tubes)		Burns and injury from hot oil or tubing in pressure	
4.8	**Neglecting ergonomic principles**			
	Excessive efforts during loading/unloading		Musculo-skeletal injury/repetitive strain injury	
	Incompatibility of machine design (in the working area) with human anatomy		Musculo-skeletal injury/repetitive strain injury	
	Bad working posture		Fatigue	
	Poor control, lay-out and graphics		Fatigue (psychological stress)	
	Poor lighting		Fatigue of eyes	



Key

1 control unit
2 swing arm
3 cutting surface
4 striking surface

Figure 1 — Swing arm cutting press



Key

a) TOP VIEW
b) SIDE VIEW
1 cutting surface
2 swing arm
3 striking surface
4 control device
5 tool
zone L
zone S1
zone T

Figure 2 — Danger zones for manual arm cutting press