



**SLOVENSKI STANDARD**  
**SIST EN 14656:2007**  
**01-januar-2007**

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**Varnost strojev - Varnostne zahteve za stiskalnice za iztiskanje jekla in nekovinskih materialov**

Safety of machinery - Safety requirements for extrusion presses for steel and non-ferrous metals

Sicherheit von Maschinen - Sicherheitsanforderungen an Strangpressen für Stahl und NE-Metalle

**iTeh STANDARD PREVIEW**

Sécurité des machines - Exigences de sécurité pour presses à filer l'acier et les métaux non ferreux

[SIST EN 14656:2007](https://standards.iteh.ai/catalog/standards/sist/9f2d7e1d-190a-4893-ac48-7551875382af/sist-en-14656-2007)

**Ta slovenski standard je istoveten z: EN 14656:2006**

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**ICS:**

13.110	Varnost strojev	Safety of machinery
25.120.10	Kovaški stroji. Stiskalnice. Škarje	Forging equipment. Presses. Shears

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**en**

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ICS 25.120.10

English Version

## Safety of machinery - Safety requirements for extrusion presses for steel and non-ferrous metals

Sécurité des machines - Exigences de sécurité pour  
presses à filer l'acier et les métaux non ferreux

Sicherheit von Maschinen - Sicherheitsanforderungen an  
Strangpressen für Stahl und NE-Metalle

This European Standard was approved by CEN on 4 September 2006.

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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 Central Secretariat has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 14656:2006) has been prepared by Technical Committee CEN/TC 322 “Equipment 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of an identical text or by endorsement, at the latest by April 2007, and conflicting national standards shall be withdrawn at the latest by April 2007.

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, 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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## Introduction

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

The equipment concerned and the extent to which hazards and 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 preventative measure is given in the text, 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.

This European Standard assumes that the equipment is operated and maintained by trained personnel.

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## 1 Scope

This European Standard applies to:

- extrusion presses from the exit side of the heater through associated handling, cooling and quenching equipment including, e.g. the puller, the hot saw, the run-out table, the stretcher, the cold saw, cold saw table and/or coiler when incorporated into the equipment, to a point where the extruded product is passed to associated finishing equipment.

It specifies the health and safety requirements at all stages in the life of the equipment, its design, ordering, construction, use and disposal.

This European Standard specifies requirements to be met by the manufacturer to ensure the health and safety of persons during construction, transport, commissioning, operation, maintenance and de-commissioning, as well as in the event of foreseeable faults as malfunctions which may occur in the equipment.

This European Standard deals with all significant hazards, hazardous situations and events relevant to extrusion presses when they are used as intended and under conditions which are reasonably foreseeable by the manufacturer (see Clause 4).

This European Standard is not applicable to extrusion presses which are manufactured before the date of its publication as EN.

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

EN 563<sup>1)</sup>, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit values for hot surfaces*

EN 614-1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

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 811, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

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*

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<sup>1)</sup> Will be superseded by prEN ISO 14732-2.

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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 954-1<sup>2)</sup>, *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, *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 1050, *Safety of machinery — Principles for risk assessment*

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

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

EN 1591-1, *Flanges and their joints — Design rules for gasketed circular flange connections — Part 1: Calculation method*

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

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 13480-1, *Metallic industrial piping — Part 1: General*

EN 13480-2:2002, *Metallic industrial piping — Part 2: Materials*

EN 13480-3:2002, *Metallic industrial piping — Part 3: Design and calculation*

EN 13480-4:2002, *Metallic industrial piping — Part 4: Fabrication and installation*

EN 13480-5:2002, *Metallic industrial piping — Part 5: Inspection and testing*

EN 60073:2002, *Basic and safety principles for man-machine interface, marking and identification — Coding principles for indicators and actuators (IEC 60073:2002)*

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

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<sup>2)</sup> Will be superseded by prEN ISO 13849-1.

EN 60825-1, *Safety of laser products — Part 1: Equipment classification, requirements and user's guide (IEC 60528-1:1993)*

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, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2005)*

EN ISO 3744, *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 3746, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:1995)*

EN ISO 3747, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Comparison method for use in situ (ISO 3747:2000)*

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 9614-1, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points (ISO 9614-1:1993)*

EN ISO 9614-2, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning (ISO 9614-2:1996)*

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

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 11203:1995, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level (ISO 11203:1995)*

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 14122-1, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of a 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)*

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

### **3 Terms and definitions**

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

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

#### **3.1 manufacturer**

body responsible for the final installation and commissioning of equipment within the scope of this European Standard and which issues the declaration of conformity

#### **3.2 foreseeable risk**

hazardous event which may occur during installation, commissioning, operation, maintenance and de-commissioning of the equipment

#### **3.3 maintenance**

maintenance, inspection, servicing, repair, lubrication, adjustment and replacement of the equipment in accordance with the manufacturer's instructions

#### **3.4 equipment**

extrusion press, ancillary machinery as well as tools and devices used during the operation, maintenance and other activities associated with the extrusion process

#### **3.5 operators' areas**

areas where the operators have to be present to control all activities associated with the extrusion process

#### **3.6 site inspection**

any inspection carried out in order to gather information relevant to the design and construction of the equipment

### **4 List of significant hazards**

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

This assessment then formed the basis for determining:

- a) the safety features which shall be incorporated into the equipment and
- b) any special instructions which shall be communicated to the user.

The significant hazards and hazardous situations are defined in 5.2, columns 1 and 2 of Table 1 and Annex A, Table A.1.

In addition it is important for the manufacturer to carry out an individual risk assessment according EN 1050 to identify any other significant hazard of the machine/equipment. Significant hazards identified in this individual risk assessment but not dealt with in this European Standard shall be reduced by applying the principles of EN ISO 12100-2.

The manufacturer shall establish at the contract stage all hazards which may arise from any foreseeable cause in which the equipment may be used, and the appropriate preventative measures.

The repeated reference to "operating/maintenance instruction" in Table 1 is an instruction to the manufacturer to give details of the information that shall be included in the information for use manual (see 7.5) which shall be supplied with the equipment and which shall be available at all times to the operator(s) and maintenance personnel of the equipment.

## 5 Safety requirements and/or measures

### 5.1 General

#### 5.1.1 Introduction

Extrusion presses for steel and non-ferrous metals shall comply with the safety requirements and/or measures of Clause 5.

This clause specifies and explains the preventative measures given in Table 1 and it also describes additional safety features, procedures and techniques which shall be considered by the designer and the manufacturer of the equipment.

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#### 5.1.2 Site inspections

The manufacturer shall undertake sufficient site inspections to establish all safety requirements of the equipment design with regard to

- a) accessibility, according to the requirements of 5.1.10 and EN ISO 14122-2,
- b) maintenance and clearance gaps for cleaning, according to the requirements of EN 294, EN 349, EN 811, EN 953 and EN 1088,
- c) movement of machinery and materials, according to the requirements of EN 999,
- d) safe operation, according to the requirements of 5.2,
- e) health and safety at the workplace, according to the requirements of EN 294, EN 811, EN 953 and
- f) prevention of emissions hazardous to health at the workplace (e.g. noise, vibration, pollution).

#### 5.1.3 Structural assembly

The manufacturer shall undertake and record design calculations to show that the structural assembly of the equipment, e.g. materials, auxiliaries, services and potential foundation block ground loadings, are adequate for safety functions under intended use.

**NOTE** It remains the responsibility of the user to ensure the grounding is suitable to withstand the forces generated by the equipment based on the information supplied by the manufacturer.

#### **5.1.4 Safety layout**

A safety layout showing all plant-related safety devices and their position in the plant shall be provided by the manufacturer and shall describe:

- a) isolators,
- b) emergency stops, according to the requirements of EN 418,
- c) escape routes (if necessary, e.g., for large plants),
- d) other safety marking, according to the requirements of EN ISO 7731 and EN 842,
- e) guards (generic terms), according to the requirements of EN 294, EN 811, EN 953 and EN ISO 14122-2 and
- f) fire precautions (if applicable).

#### **5.1.5 Safety devices**

Safety devices which require regular monitoring, e.g., fixed guards, interlocked guards, light beams, proximity devices and emergency stops, shall be accessible for inspection and maintenance and protected against damage under foreseeable conditions. In particular, they shall be selected, constructed and be sufficiently robust to operate reliably.

#### **5.1.6 Railings**

Railings shall not be used as the sole measure for safeguarding danger zones. They are intended to prevent slips, trips and falls.

#### **5.1.7 Discharge of fluids**

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The manufacturer shall give instructions for discharge of fluids in case of maintenance of the fluid systems or due to a leakage. These instructions shall include information for sealed surfaces (e.g. foundation), drains and the fluid that will be discharged.

#### **5.1.8 Personal protective equipment (PPE)**

The manufacturer shall give information in the instruction handbook (see 7.5) on the required type of personal protective equipment needed to safeguard personnel from any risks remaining after applying the safety measures.

#### **5.1.9 Warning devices and safety signs**

Warning devices and safety signs are additions to the design requirements to reduce hazards. Warning devices and safety signs according to EN 61310-1 and EN 61310-2 shall be used.

Appropriate signs shall be in accordance with ISO 7000.

Danger signals shall be in accordance with EN ISO 7731 and/or EN 842 and/or EN 981.

Warning signs shall be affixed so that they are visible from outside the danger zone.

The manufacturer shall not rely upon warning devices and safety signs alone to reduce hazards in case of significant risks.

### 5.1.10 Access

The manufacturer shall take account of the following:

- a) access to the plant shall be controlled in such a way that unintentional entry into any danger zone shall not be possible, considering EN ISO 12100-2 and EN 953;
- b) access to control desks, pulpits, underground areas, inspection and service floors shall be protected against heat radiation, jets of high pressure fluids and designed to withstand moving materials and tools (if any), according to EN 294, EN 811, EN ISO 14122-1, EN ISO 14122-2, EN ISO 14122-3 and EN ISO 14122-4;
- c) surfaces for walking or standing shall be so designed, that risks of slipping caused by scale, oil and/or lubricant are minimised;
- d) the relevant category for controls for access to equipment during operation or maintenance shall be selected from B.2 and consider the requirements of EN 1037;
- e) areas of the equipment which are entered regularly due to maintenance reasons shall be easily accessible and considering a).

### 5.1.11 Electrical equipment

Electrical equipment shall meet the requirements of EN 60204-1. In particular the manufacturer shall construct and install all electrical equipment so that it is capable of withstanding all hazards, including those from heat, vibration, wet conditions, identified in the risk assessment required at the design stage and taking into account the requirement set out in Annex B.

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### 5.1.12 Safety control system

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Each safety control shall be selected in accordance with the severity of the risk as described in EN 954-1. The function of each safety control shall be considered in combination with other elements of the safety control system and shall be selected so as it does not reduce the safety level of any other component of the control system.

For the hazards listed in Table 1 where an electrical control system is involved a risk assessment shall be carried out according to EN 954-1.

### 5.1.13 Guards

Guards shall be provided to prevent access to a danger zone. They shall be selected as appropriate for the degree and frequency of access to be permitted, e.g. an enclosing guard or distance guard, fixed or movable with interlock. This selection shall be made according to EN 953. Interlock systems shall meet the requirements of EN 1088.

The requirements of the guards shall conform to Clause 5 of EN 953:1997 and to EN 294, EN 349, EN 811.

### 5.1.14 Surface temperatures

Surfaces, which are intended to be touched with bare hands, shall have temperatures not exceeding the burn threshold for the contact time and material as specified in EN 563.

### 5.1.15 Operators' visibility

A good operators' visibility to the operating process shall be provided. Where it is not possible to prevent access to hazardous areas which are not naturally visible from the operator's position, e.g. the die during break-through of the profile, devices shall be provided