



SLOVENSKI STANDARD
oSIST prEN ISO 6909:2024
01-januar-2024

Varnost obdelovalnih strojev - Zavore stiskalnic (ISO/DIS 6909:2023)

Machine tools Safety - Press brakes (ISO/DIS 6909:2023)

Werkzeugmaschinen-Sicherheit - Gesenkbiegepressen (ISO/DIS 6909:2023)

Sécurité des machines outils - Presses plieuses (ISO/DIS 6909:2023)

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25.080.01	Stroji na splošno	Machine tools in general

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Machine tools Safety — Press brakes

Sécurité des machines outils — Presses plieuses

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 39, *Machine-tools*, Subcommittee SC 10, *Safety*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document is a type C standard as stated in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

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Machine tools Safety — Press brakes

1 Scope

This document specifies technical safety requirements and measures to be adopted by persons undertaking the design, manufacture and supply of press brakes which are intended to work cold metal or material partly of cold metal but which can be used in the same way to work other sheet materials (e.g. cardboard, plastic, rubber, leather, etc.) and also referred to as machines.

NOTE 1 The design of a machine includes the study of the machine itself, taking into account all phases of the “life” of the machine mentioned in ISO 12100:2010, 5.4, and the drafting of the instructions related to all the above phases.

This document covers the following types of machines (see [Annex J](#)):

- Hydraulic press brakes;
- Hydraulic servo-drive press brakes;
- Screw servo-drive press brakes;
- Belt-spring servo-drive press brakes.

The requirements in this document take account of intended use, as defined in ISO 12100:2010, 3.23, as well as reasonably foreseeable misuse, as defined in ISO 12100:2010, 3.24. This document presumes access to the press brake from all directions, deals with all significant hazards during the various phases of the life of the machine described in [Clause 4](#), and specifies the safety measures for both the operator and other exposed persons.

NOTE 2 All significant hazards means those identified or associated with press brakes at the time of the publication of this document.

This document applies to press brakes which can function independently or in combination (e.g. two machines in tandem or more) and can also be used as a guide for the design of press brakes which are intended to be integrated in a manufacturing system.

This document deals with the significant hazards, hazardous situations and events relevant to press brakes and ancillary devices (see [Clause 4](#)). This document specifies the safety requirements for press brakes defined in this clause.

This document does not cover press brakes which transmit energy to impart beam motion by using pneumatic means or mechanical clutch or press brakes that use combination of technologies (e.g. combined hydraulic and screw servo-drive press brake or combined hydraulic servo-drive and screw servo-drive press brake).

This document does not cover machines whose principal designed purpose is:

- a) sheet folding by rotary action;
- b) tube and pipe bending by rotary action;
- c) roll bending.

This document does not cover hazards related to the use of press brakes in explosive atmospheres.

This document is not applicable to press brakes which are manufactured before the date of its publication.

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This document does not cover the safety aspect of equipment for automatic loading and unloading where provided. Guidance on how to take into account additional automatic loading and unloading equipment can be found in ISO 11161:2007.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

ISO 3746:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane*

ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

ISO 9355-1:1999, *Ergonomic requirements for the design of displays and control actuators — Part 1: Human interactions with displays and control actuators*

ISO 9355-2:1999, *Ergonomic requirements for the design of displays and control actuators — Part 2: Displays*

ISO 9355-3:1999, *Ergonomic requirements for the design of displays and control actuators — Part 3: Control actuators*

ISO 11202:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13732-1:2006, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13851:2019, *Safety of machinery — Two-hand control devices — Functional aspects and design principles*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14118:2017, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14122-1:2016, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means and general requirements of access*

ISO 14122-2:2016, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*

ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*

ISO 14738:2002, *Safety of machinery — Anthropometric requirements for the design of workstations at machinery*

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

ISO/TS 15066:2016, *Robots and robotic devices — Collaborative robots*

IEC 60204-1:2016, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60825-1:2014, *Safety of laser products — Part 1: Equipment classification and requirements*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices*

IEC 61310-2:2007, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking*

IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and test*

IEC 61496-2:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*

IEC 61496-3:2018, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*

IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 1: General requirements*

IEC 61508-2:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*

IEC 61508-3:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements*

IEC 61800-5-2:2016, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional*

IEC 62061:2021, *Safety of machinery — Functional safety of safety-related control systems*

EN 1005-1:2001+A1:2008, *Safety of machinery — Human physical performance — Terms and definition*

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EN 1005-2:2003+A1:2008, *Safety of machinery — Human physical performance — Manual handling of machinery and component parts of machinery*

EN 1005-3:2002+A1:2008, *Safety of machinery — Human physical performance — Recommended force limits for machinery operation*

EN 1005-4:2005+A1:2008, *Safety of machinery — Human physical performance — Evaluation of working postures and movements in relation to machinery*

EN 1837:2020, *Safety of machinery — Integral lighting of machines*

EN 50370-1:2005, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 1: Emission*

EN 50370-2:2003, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 2: Immunity*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in in ISO 12100:2010 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

press brake

machine designed or intended to transmit energy to the moving part of the *tools* (3.13) principally for the purpose of bending between (narrow forming tools along straight lines

3.2

up-stroking press brake

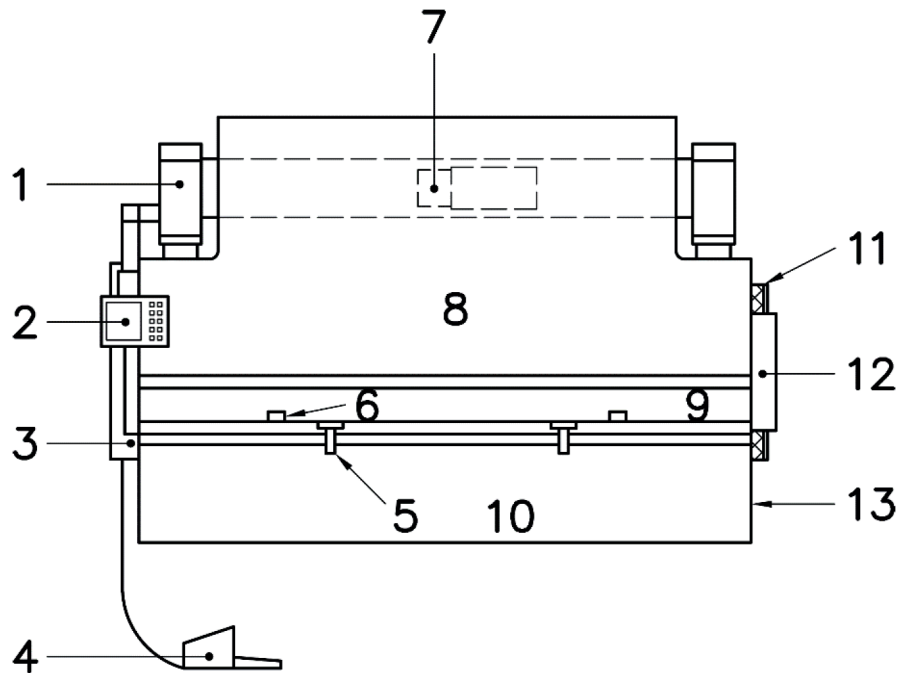
press brake (3.1) in which the lower *tool* (3.13) moves upwards during the closing stroke

Note 1 to entry: The movement is reciprocal to a down-stroking press, see [Figure 1](#).

3.3

down-stroking press brake

press brake (3.1) in which the upper *tool* (3.13) moves downwards during the closing stroke

**Key**

1	press cylinder	6	backgauge (3.53)	11	side safeguard
2	control panel	7	hydraulic system	12	light curtain (3.17)
3	electrical switch gear cabinet	8	beam (3.14)	13	frame
4	foot pedal	9	tools (3.13)		
5	workpiece support	10	bed		

Figure 1 — Example of a down-stroking hydraulic press brake

3.4 hydraulic press brake

press brake (3.1) utilising hydraulic power to impart movement of the *beam* (3.14) whose characteristics are dependent on hydraulic valve(s)

Note 1 to entry: The hydraulic valve(s) includes servo-valve(s) and proportional control valve(s).

Note 2 to entry: Examples of characteristics are the speed, the pressure, the direction.

Note 3 to entry: Example of a *down-stroking* (3.3) *hydraulic press brake* (3.4), see [Figure 1](#)

3.5 hydraulic servo-drive press brake

press brake (3.1) utilising hydraulic power to impart movement of the *beam* (3.14) whose characteristics are directly dependent on *servo-pump(s)* (3.31)

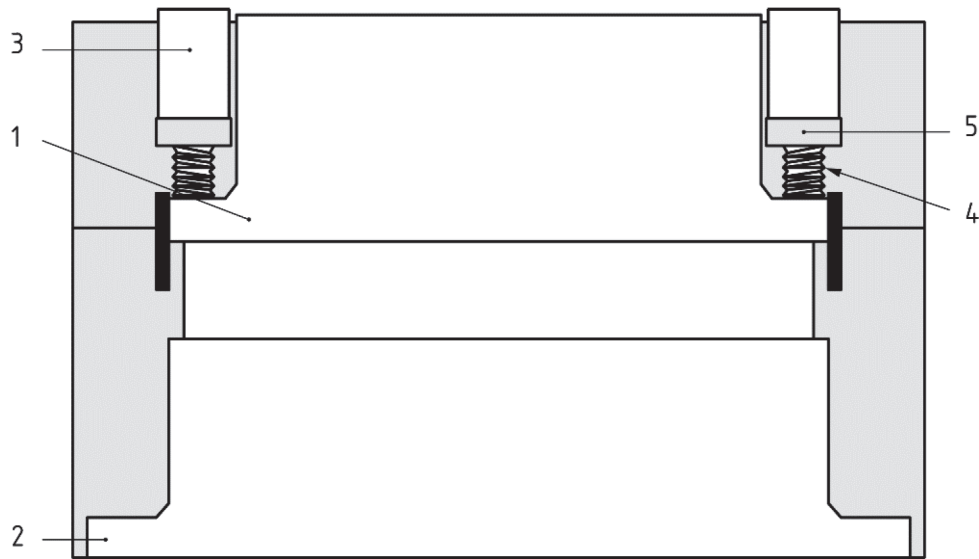
Note 1 to entry: Examples of characteristics are speed, pressure, direction.

3.6 screw servo-drive press brake

press brake (3.1) utilising servo-motor(s) and screw(s) to impart movement of the *beam* (3.14).

Note 1 to entry: The characteristics of movements (e.g. speed, force, direction) are directly dependent on servo-motor(s)

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**Key**

- | | | | |
|---|----------------------|---|------------------|
| 1 | down-stroking beam | 4 | right side screw |
| 2 | bed | 5 | right side brake |
| 3 | left side servomotor | | |

Figure 2 — Example of a down-stroking screw servo-drive press brake

3.7 belt-spring servo-drive press brake
press brake (3.1) utilising servo-motor(s), belt(s), pulley(s) and spring(s) to impart movement of the *beam* (3.14).

Note 1 to entry: The characteristics of movements (e.g. speed, force, direction) are directly dependent on servo-motor(s)

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