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Varnost strojev - Varovalne naprave, občutljive na tlak - 2. del: Splošna načela načrtovanja in preskušanja robov in drogov, občutljivih na dotik (ISO/DIS 13856-2:2011)

Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO/DIS 13856-2:2011)

Sicherheit von Maschinen - Druckempfindliche Schutzeinrichtungen - Teil 2: Allgemeine Leitsätze für die Gestaltung und Prüfung von Schaltleisten und Schaltstangen (ISO/DIS 13856-2:2011)

Sécurité des machines - Dispositifs de protection sensibles à la pression - Partie 2: Principes généraux de conception et d'essai des bords et barres sensibles à la pression (ISO/DIS 13856-2:2011)

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13.110 Varnost strojev Safety of machinery

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English Version

**Safety of machinery - Pressure-sensitive protective devices -
Part 2: General principles for the design and testing of pressure-
sensitive edges and pressure-sensitive bars (ISO/DIS 13856-
2:2011)**

Sécurité des machines - Dispositifs de protection sensibles
à la pression - Partie 2: Principes généraux de conception
et d'essai des bords et barres sensibles à la pression
(ISO/DIS 13856-2:2011)

Sicherheit von Maschinen - Druckempfindliche
Schutzeinrichtungen - Teil 2: Allgemeine Leitsätze für die
Gestaltung und Prüfung von Schaltleisten und
Schaltstangen (ISO/DIS 13856-2:2011)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 114.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN ISO 13856-2:2011) has been prepared by Technical Committee ISO/TC 199 "Safety of machinery" in collaboration with Technical Committee CEN/TC 114 "Safety of machinery" the secretariat of which is held by DIN.

This document is currently submitted to the parallel Enquiry.

This document will supersede EN 1760-2:2001+A1:2009.

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).

Endorsement notice

The text of ISO/DIS 13856-2:2011 has been approved by CEN as a prEN ISO 13856-2:2011 without any modification.

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Safety of machinery — Pressure-sensitive protective devices —

Part 2:

General principles for the design and testing of pressure-sensitive edges and pressure-sensitive bars

Sécurité des machines — Dispositifs de protection sensibles à la pression —

Partie 2: Principes généraux de conception et d'essai des bords et barres sensibles à la pression

[Revision of first edition (ISO 13856-2:2005)]

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13856-2 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*, and by Technical Committee CEN/TC 114, *Safety of machinery* in collaboration.

ISO 13856 consists of the following parts, under the general title *Safety of machinery — Pressure-sensitive protective devices*:

- *Part 1: General principles for the design and testing of pressure-sensitive mats and pressure-sensitive floors*
- *Part 2: General principles for the design and testing of pressure-sensitive edges and pressure-sensitive bars*
- *Part 3: General principles for the design and testing of pressure-sensitive bumpers, plates, wires and similar devices*

Introduction

The structure of safety standards in the field of machinery is as follows:

- a) Type-A standards (basic safety standards) giving basic concepts, principles for design, and general aspects that can be applied to all machinery;
- b) Type-B standards (generic safety standards) dealing with one safety aspect or one type of safeguard that can be used across a wide range of machinery:
 - Type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);
 - Type-B2 standards on safeguards (e.g. two-hand controls, interlocking devices, pressure-sensitive devices, guards);
- c) Type-C standards (machine safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This document is a type-B standard as stated in ISO 12100.

The requirements of this document can be supplemented or modified by a type-C standard.

For machines which are covered by the scope of a type-C standard and which have been designed and built according to the requirements of that standard, the requirements of that type-C standard take precedence.

ISO/TC 199 has a mandate in this area to produce type-A and type-B standards, which will allow verification of conformity with the essential health and safety requirements (EHSRs) relating to the design and construction of machinery.

The safeguarding of machinery (see ISO 12100:2010, 3.21) can be achieved by many different means. These means include guards which prevent access to the hazard zone by means of a physical barrier (for example, interlocking guards according to ISO 14119 and fixed guards according to ISO 14120) and protective devices (for example, electro-sensitive protective equipment according to IEC 61496-1 and pressure-sensitive protective devices according to this part of ISO 13856).

Type-C standards makers and designers of machinery / installations should consider the best way to achieve the required level of safety taking into account the intended application and the results of the risk assessment (see ISO 12100).

The best solution can also be to combine several of these different means. The machinery/installation supplier and the user should examine together carefully the existing constraints before making their decision on the choice of safeguarding.

Pressure-sensitive edges and pressure-sensitive bars are safeguards of the "mechanically actuated trip device" type. General requirements for these safeguards (as well as other safeguards) are given in ISO 12100:2010, 6.3.1 and 6.3.2.

Pressure-sensitive edges and pressure-sensitive bars are used in a wide range of applications with different conditions of use relating, for example, to extremes of loading or electrical, physical and chemical environments. They are interfaced with machine controls to ensure that the machine reverts to a safe condition if the sensitive protective equipment is actuated.

Each type of application presents particular hazards. It is not the intention of this part of ISO 13856 to identify those hazards nor to recommend specific methods of application to particular machines. This is normally the aim of type-C standards.

Pressure-sensitive edges and pressure-sensitive bars can be fitted to a moving part of a machine at the point where a trapping, crushing or collision hazard can occur. They can also be fitted to a fixed part of a machine or an obstacle to prevent trapping or crushing hazards with a moving part of a machine. Pressure-sensitive edges and pressure-sensitive bars are designed, selected, installed and/or interfaced with the control system of the machine so that the force/pressure applied to a person or parts of the body do not exceed certain limits.

Pressure-sensitive edges, pressure-sensitive bars, pressure-sensitive bumpers and similar devices have many similarities. Table 1 summarises the differences which generally apply between the two types of pressure-sensitive protective devices covered by this part of ISO 13856 and pressure-sensitive bumpers (covered by part 3 of this International Standard) and gives guidance for their application.

Table 1 — Characteristic features of pressure-sensitive edges, pressure-sensitive bars and pressure-sensitive bumpers

cross section	pressure-sensitive edge	pressure-sensitive bar	pressure-sensitive bumper
	regular	regular	regular / irregular
length/width ratio	>1	any ratio	any ratio
effective sensing surface	deforms locally	moves as a whole	deforms locally and/or moves as a whole
body part(s) intended to be detected	finger	finger	—
	hand	hand	hand
	arm	arm	arm
	leg	leg	leg
	head	head	head
torso	torso	torso	

Safety of machinery — Pressure-sensitive protective devices —

Part 2:

General principles for the design and testing of pressure-sensitive edges and pressure-sensitive bars

1 Scope

This part of ISO 13856 establishes general principles and specifies requirements for the design and testing of pressure-sensitive edges and pressure-sensitive bars used as safeguards and not as actuating devices for normal operation. It is applicable to pressure-sensitive edges and pressure-sensitive bars, with or without an external reset facility, used to detect persons or body parts of them which can be exposed to a hazard such as moving parts.

This part of ISO 13856 is primarily aimed at safety and reliability rather than suitability. For the relationship between safety and reliability see ISO 13849-1:2006, 4.2.

This document is restricted to the functioning of pressure-sensitive edges and pressure-sensitive bars and does not specify the requirements for their application (e.g. dimensions with regard to a particular application). However, Clause 6 contains requirements for the information for use to be provided by the manufacturer.

This part of ISO 13856 does not apply to stopping devices according to IEC 60204-1 used only for normal operation, including emergency stopping, of machinery.

Additional requirements can be necessary, where pressure-sensitive edges or pressure-sensitive bars are used in locations accessible to elderly or disabled people or children.

NOTE Possibly not all tests given in this part of ISO 13856 for pressure-sensitive edges and pressure-sensitive bars can be carried out when they have been designed and built into the machinery by its manufacturer. In this case the tests should be carried out before the pressure-sensitive protective device is implemented in the machinery.

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.

ISO 4413, *Hydraulic fluid power – General rules and safety requirements for systems*

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

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

ISO 13849-1:2006, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

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

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*