Irish Standard
I.S. EN ISO 13856-2:2013

Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2:2013)

I.S. EN ISO 13856-2:2013

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces:
EN 1760-2:2001+A1:2009

This document is based on:	*Published:*
EN ISO 13856-2:2013	26 April, 2013
EN 1760-2:2001+A1:2009	1 April, 2009

This document was published under the authority of the NSAI and comes into effect on:
26 April, 2013

ICS number:
13.110

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Údarás um Chaighdeáin Náisiúnta na hÉireann

I.S. EN ISO 13856-2:2013

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 13856-2

April 2013

ICS 13.110

Supersedes EN 1760-2:2001+A1:2009

English Version

Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2:2013)

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 13856-2:2013)

Sicherheit von Maschinen - Druckempfindliche Schutzeinrichtungen - Teil 2: Allgemeine Leitsätze für die Gestaltung und Prüfung von Schaltleisten und Schaltstangen (ISO 13856-2:2013)

This European Standard was approved by CEN on 1 March 2013.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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Ref. No. EN ISO 13856-2:2013: E

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Foreword

This document (EN ISO 13856-2:2013) 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 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 October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.

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

This document supersedes 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.

For relationship with EU Directive, 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, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 13856-2:2013 has been approved by CEN as EN ISO 13856-2:2013 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive Machinery 2006/42/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 2006/42/EC

Clause(s)/sub-clause(s) of this European Standard	Essential Requirements (ERs) of Directive 2006/42/EC	Qualifying remarks/Notes
Clause 4	Annex I, 1.2	Control systems
	Annex I, 1.3	Protection against mechanical hazards
	Annex I, 1.4	Required characteristics of (guards and) protection devices
	Annex I, 1.5	Risks due to other hazards
	Annex I, 1.6	Maintenance
Clauses 5 and 6	Annex I, 1.7	Information

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

I.S. EN ISO 13856-2:2013

INTERNATIONAL STANDARD

ISO 13856-2

Second edition
2013-04-15

Safety of machinery — Pressure-sensitive protective devices —

Part 2: General principles for 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

Reference number
ISO 13856-2:2013(E)

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Published in Switzerland

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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.

This second edition cancels and replaces the first edition (ISO 13856-2:2005), which has been technically revised.

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

— *Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors*

— *Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars*

— Part 3: *General principles for 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-B2 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.

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 or fixed guards according to ISO 14120) and protective devices (for example, electro-sensitive protective equipment according to IEC 61496-1 or 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 required solution can also be to combine several of these different means. The machinery/installation supplier and the user examine together carefully the existing hazards and 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 others) 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.

This part of ISO 13856 is restricted to the design of pressure-sensitive edges and pressure-sensitive bars so that they can be used when the risk assessment carried out by the machine manufacturer and/or relevant type-C standard, when available, shows this to be appropriate.

Pressure-sensitive edges and pressure-sensitive bars can be fitted to a fixed or moving part of a machine or an obstacle to prevent trapping or crushing hazards from another 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 summarizes 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 ISO 13856-3 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 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.

This part of ISO 13856 is applicable to pressure-sensitive edges and pressure-sensitive bars, with or without an external reset facility, used to detect persons or body parts that can be exposed to hazards such as those caused by the moving parts of machines.

It is not applicable to

— determining the suitability of a pressure-sensitive edge or pressure-sensitive bar for a particular safeguarding application,

— selection of an appropriate performance level for safety-related parts of control systems (SRP/CSs) other than to give minimum values,

— dimensioning or configuring of the effective sensing area of pressure-sensitive edges or pressure-sensitive bars in relation to any particular application,

— stopping devices according to IEC 60204-1 used only for normal operation, including emergency stopping of machinery.

Requirements for the information to be provided by the manufacturer are given to assist in the selection of a suitable pressure-sensitive edge or pressure-sensitive bar and its application.

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.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 and their components*

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*