BS EN ISO 12100:2010
Incorporating corrigendum January 2011

BSI Standards Publication

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

National foreword

This British Standard is the UK implementation of EN ISO 12100:2010. It supersedes BS EN ISO 12100-1:2003+A1:2009, BS EN ISO 12100-2:2003+A1:2009 and BS EN ISO 14121-1:2007 which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/3, Safeguarding of machinery.

A list of organizations represented on this committee can be obtained on request to its secretary.

This standard was formed by combining the latest versions of ISO 12100-1:2003, ISO 12100-2:2003 and ISO 14121-1:2007 without introducing technical changes. Although efforts were made to maintain a balance between the emphases of these individual standards, some compromises have been made. For example, whereas Clause 4 of ISO 12100-1 included requirements and supplementary information for hazard identification, ISO 12100 has adopted the approach of ISO 14121-1 by separating the requirements (see Subclause 5.4) from supplementary information (see informative Annex B). This compromise in no way indicates that the identification of hazards has been given a reduced prominence, as it remains a vital stage in the process of designing safe machinery.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2010.

Amendments issued since publication

Date	Text affected
31 January 2011	Correction to pagination

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 12100

November 2010

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Supersedes EN ISO 12100-1:2003, EN ISO 12100-2:2003, EN ISO 14121-1:2007

English Version

Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)

Sécurité des machines - Principes généraux de conception - Appréciation du risque et réduction du risque (ISO 12100:2010)

Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobewertung und Risikominderung (ISO 12100:2010)

This European Standard was approved by CEN on 9 October 2010.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, 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.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 12100:2010: E

Foreword

This document (EN ISO 12100:2010) 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 May 2011, and conflicting national standards shall be withdrawn at the latest by November 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 ISO 12100-1:2003, EN ISO 12100-2:2003, EN ISO 14121-1:2007.

This second edition cancels and replaces ISO 12100-1:2003, ISO 12100-1:2003/Amd. 1: 2009, ISO 12100-2:2003, ISO 12100-2:2003/Amd. 1: 2009 and ISO 14121-1:2007 of which it constitutes a consolidation without technical changes. Documentation (e.g. risk assessment, type-C standards) based on these replaced documents need not be updated or revised.

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, Bulgaria, Croatia, 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 the United Kingdom.

Endorsement notice

The text of ISO 12100:2010 has been approved by CEN as a EN ISO 12100:2010 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EC 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 confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

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

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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 12100 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

This first edition of ISO 12100 cancels and replaces ISO 12100-1:2003, ISO 12100-2:2003 and ISO 14121-1:2007, of which it constitutes a consolidation without technical change. It also incorporates the Amendments ISO 12100-1:2003/Amd.1:2009 and ISO 12100-2:2003/Amd.1:2009. Documentation (e.g. risk assessment, type-C standards) based on these replaced documents need not be updated or revised.

Introduction

The primary purpose of this International Standard is to provide designers with an overall framework and guidance for decisions during the development of machinery to enable them to design machines that are safe for their intended use. It also provides a strategy for standards developers and will assist in the preparation of consistent and appropriate type-B and type-C standards.

The concept of safety of machinery considers the ability of a machine to perform its intended function(s) during its life cycle where risk has been adequately reduced.

This International Standard is the basis for a set of standards which has the following structure:

— **type-A standards** (basic safety standards) giving basic concepts, principles for design and general aspects that can be applied to machinery;

— **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 (for example, safety distances, surface temperature, noise);

  — type-B2 standards on safeguards (for example, two-hand controls, interlocking devices, pressure-sensitive devices, guards);

— **type-C standards** (machine safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This International Standard is a type-A standard.

When a type-C standard deviates from one or more technical provisions dealt with by this International Standard or by a type-B standard, the type-C standard takes precedence.

It is desirable that this International Standard be referred to in training courses and manuals to convey basic terminology and general design methods to designers.

ISO/IEC Guide 51 has been taken into account as far as practicable at the time of drafting of this International Standard.

INTERNATIONAL STANDARD **ISO 12100:2010(E)**

Safety of machinery — General principles for design — Risk assessment and risk reduction

1 Scope

This International Standard specifies basic terminology, principles and a methodology for achieving safety in the design of machinery. It specifies principles of risk assessment and risk reduction to help designers in achieving this objective. These principles are based on knowledge and experience of the design, use, incidents, accidents and risks associated with machinery. Procedures are described for identifying hazards and estimating and evaluating risks during relevant phases of the machine life cycle, and for the elimination of hazards or the provision of sufficient risk reduction. Guidance is given on the documentation and verification of the risk assessment and risk reduction process.

This International Standard is also intended to be used as a basis for the preparation of type-B or type-C safety standards.

It does not deal with risk and/or damage to domestic animals, property or the environment.

NOTE 1 Annex B gives, in separate tables, examples of hazards, hazardous situations and hazardous events, in order to clarify these concepts and assist the designer in the process of hazard identification.

NOTE 2 The practical use of a number of methods for each stage of risk assessment is described in ISO/TR 14121-2.

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.

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
machinery
machine
assembly, fitted with or intended to be fitted with a drive system consisting of linked parts or components, at least one of which moves, and which are joined together for a specific application

NOTE 1 The term “machinery” also covers an assembly of machines which, in order to achieve the same end, are arranged and controlled so that they function as an integral whole.

NOTE 2 Annex A provides a general schematic representation of a machine.