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**Safety of machinery — Basic concepts,  
general principles for design —**

**Part 2:  
Technical principles**

*Sécurité des machines — Notions fondamentales, principes généraux  
de conception —*

*Partie 2: Principes techniques*



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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

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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 12100-2 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

This edition cancels and replaces ISO/TR 12100-2:1992, which has been technically revised.

ISO 12100 consists of the following parts, under the general title *Safety of machinery — Basic concepts, general principles for design*:

- *Part 1: Basic terminology, methodology*, expressing the basic overall methodology to be followed when designing machinery and when producing safety standards for machinery, together with the basic terminology related to the philosophy underlying this work;
- *Part 2: Technical principles*, giving advice on how this philosophy can be applied using available techniques.

## Introduction

The primary purpose of ISO 12100 is to provide designers with an overall framework and guidance to enable them to produce machines that are safe for their intended use. It also provides a strategy for standard makers.

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

This 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 all 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 (e.g. safety distances, surface temperature, noise);
  - type-B2 standards on safeguards (e.g. 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 standard is a type-A standard.

The subject of numerous clauses or subclauses of this standard is also dealt with, in a more detailed manner, in other type-A or B standards.

When a type-C standard deviates from one or more provisions dealt with by Part 2 of this standard or by a type-B standard, the type-C standard takes precedence.

It is recommended that this standard be incorporated in training courses and manuals to convey basic terminology and general design methods to designers.



# Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles

## 1 Scope

This standard defines technical principles to help designers in achieving safety in the design of machinery.

ISO 12100-2 is intended to be used together with ISO 12100-1 when considering the solution to a specific problem. The two parts of ISO 12100 can be used independently of other documents or as a basis for the preparation of other type-A standards or type-B or -C standards.

This standard does not deal with damage to domestic animals, property or the environment.

## 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 60204-1:1997, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*.

ISO 12100-1:2003, *Safety of machinery – Basic concepts, general principles for design – Basic terminology, methodology*.

## 3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 12100-1:2003 apply.

## 4 Inherently safe design measures

### 4.1 General

Inherently safe design measures are the first and most important step in the risk reduction process because protective measures inherent to the characteristics of the machine are likely to remain effective, whereas experience has shown that even well-designed safeguarding may fail or be violated and information for use may not be followed.

Inherently safe design measures are achieved by avoiding hazards or reducing risks by a suitable choice of design features of the machine itself and/or interaction between the exposed persons and the machine.

**NOTE** Clause 5 gives safeguarding and complementary measures to achieve the risk reduction objectives where inherently safe design measures are not sufficient (see 3-step method in ISO 12100-1:2003, clause 5).