

# ANSI / ISO 12100-1:2007

AMERICAN NATIONAL ADOPTION  
of an INTERNATIONAL STANDARD

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

**Part 1:  
Basic terminology, methodology**

Secretariat and Accredited Standards Developer:

**AMT – The Association For Manufacturing Technology**  
7901 Westpark Drive  
McLean, VA 22102

**Approved: 22 February 2007**

**by The American National Standards Institute**



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Published by: AMT – The Association For Manufacturing Technology  
7901 Westpark Drive, McLean, VA 22102–4206, USA  
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## Foreword

This American National Standard is an “identical” American national adoption of ISO 12100-1:2003 and differs from the original standard only in reordering clause 3 definitions in alphabetical order, and in editorial revisions needed to make this adoption read as an ‘Americanized’ version.

This standard has been nationally adopted and approved through the auspices of the ANSI B11 Accredited Standards Committee which has as one of its Subcommittees, the U.S. Technical Advisory Group to ISO/TC 199 under which the original ISO standard was developed and approved.

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. Neither ISO, ANSI nor AMT shall be held responsible for identifying any or all such patent rights. ISO 12100-1:2003 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*. That edition canceled and replaced ISO/TR 12100-1:1992, which had been technically revised. ANSI / ISO 12100-1:2007 is an identical national adoption of ISO 12100-1:2003 by the B11 Accredited Standards Committee, after recommendation by the B11.TC199 Subcommittee (which also functions primarily as the U.S. Technical Advisory Group to ISO Technical Committee 199 under which this ISO standard was developed, adopted and approved).

This standard results from the revision of EN 292:1991 / ISO/TR 12100:1992, carried out by a Special Working Group composed of experts from ISO, CEN, IEC and CENELEC. ANSI / 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 ANSI / 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 writers. 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 have the following structure:

- **Type-A standards** (basis standards) give basic concepts, principles for design, and general aspects that can be applied to machinery;
- **Type-B standards** (generic safety standards) deal with one or more safety aspects or one or more types of safeguards that can be used across a wide range of machinery:
  - Type-B1 standards are on particular safety aspects (e.g., safety distances, surface temperature, noise);
  - Type-B2 standards are on safeguards (e.g., two-hand controls, interlocking devices, pressure sensitive devices, guards);
- **Type-C standards** (machinery safety standards) deal 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-B standards, such as ANSI B11.GSR and ANSI B11.19. When a type-C standard deviates from one or more provisions dealt with by this standard or by a type-B standard, the type-C standard takes precedence. ISO/IEC Guide 51 has been taken into account as far as practicable at the time of drafting of this standard.

# Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology

## 1 Scope

This standard defines basic terminology and methodology used in achieving safety of machinery. The provisions stated in this standard are intended for the designer. This standard does not deal with damage to domestic animals, property or the environment.

## 2 Normative references

The following referenced document is indispensable for the application of this document. For other references in this standard other than the one below, see the Bibliography.

ANSI / ISO 12100-2:2007, *Safety of machinery – Basic concepts, general principles for design – Part 2 Technical principles.*

## 3 Terms and definitions

For the purposes of ANSI / ISO 12100-1 and -2, the following terms and definitions apply.

**3.1 active opto-electronic protective device (AOPD):** device whose sensing function is performed by opto-electronic emitting and receiving elements that detect the interruption of optical radiation generated within the device by an opaque object present in the specified detection zone.

NOTE: IEC 61496-2 gives detailed provisions.

**3.2 adequate risk reduction:** risk reduction at least in accordance with the legal requirements under consideration of the current state of the art.

NOTE: Criteria for determining when adequate risk reduction is achieved are given in 5.5.

**3.3 adjustable guard:** fixed or movable guard which is adjustable as a whole, or which incorporates an adjustable part(s). The adjustment remains fixed during a particular operation.

**3.4 common cause failures:** failures of different items resulting from a single event, where these failures are not consequences of each other.

NOTE: Common cause failures should not be confused with common mode failures. [IEV 191-04-23]

**3.5 common mode failures:** failures of items characterized by the same fault mode.

NOTE: Common mode failures should not be confused with common cause failures, as the common mode failures may result from different causes. [IEV 191-04-24]

**3.6 comparative emission data:** set of emission values of similar machines collected for the purpose of comparison.

NOTE: For further information on noise comparison, see ISO 11689.

**3.7 emergency operation:** all actions and functions intended to end or avert an emergency situation.

**3.8 emergency situation:** hazardous situation needing to be urgently ended or averted.

NOTE: An emergency situation may arise:

- during normal operation of the machine (e.g., due to human interaction, or resulting from external influences);
- as a consequence of a malfunction or a failure of any part of the machine.