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EUROPEAN STANDARD

**EN 953:1997+A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

## Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards

Sécurité des machines - Protecteurs - Prescriptions générales pour la conception et la construction des protecteurs fixes et mobiles

Sicherheit von Maschinen - Trennende Schutzeinrichtungen - Allgemeine Anforderungen an Gestaltung und Bau von feststehenden und beweglichen trennenden Schutzeinrichtungen

This European Standard was approved by CEN on 26 March 1997 and includes Amendment 1 approved by CEN on 8 February 2009.

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 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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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**EN 953:1997+A1:2009 (E)****Foreword**

This document (EN 953:1997+A1:2009) has been prepared by 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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-02-08.

This European Standard supersedes EN 953:1997.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A_1}$   $\boxed{A_1}$ .

This European Standard 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).

$\boxed{A_1}$  For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document.  $\boxed{A_1}$

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, 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. [SIST EN 953:2000+A1:2009](https://standards.iteh.ai/catalog/standards/sist/682c4d29-2729-49f2-aa51-bf76ead163d3/sist-en-953-2000a1-2009)

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## Introduction

This European Standard specifies general principles for the design and construction of guards, both fixed and movable. It is intended for use by manufacturers, designers, standards makers and other interested parties.

**A1** This document is a type B standard as stated in EN ISO 12100-1.

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

NOTE For machines which are covered by the scope of a type C standard and which have been designed and built according to the provisions of that standard, the provisions of that type C standard take precedence over the provisions of this type B standard. **A1**

In accordance with the requirements laid down in **A1** EN ISO 12100-1 **A1** and **A1** EN ISO 12100-2 **A1** the machine designer shall identify the hazards present at a machine, carry out a risk assessment and reduce risk by design before considering safeguarding techniques.

## 1 Scope

This European Standard specifies general requirements for the design and construction of guards provided primarily to protect persons from mechanical hazards.

The standard applies primarily to machines which are manufactured after the date of issue of this standard.

Attention is drawn to the use of guards to minimise exposure to non-mechanical hazards.

The requirements are applicable if fixed and movable guards are used. The standard does not cover those parts of guards which actuate interlocking devices. These are covered in EN 1088.

This standard does not provide requirements for special systems relating specifically to mobility and ability to lift loads like rollover protective structures (ROPS) and falling-object protective structures (FOPS).

## 2 Normative references

**A1** The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. **A1**

**A1** *deleted text* **A1**

EN 349, *Safety of machinery – Minimum gaps to avoid crushing of parts of the human body*

EN 626-1, *Safety of machinery – Reduction of risks to health from hazardous substances emitted by machinery – Part 1: Principles and specifications for machinery manufacturers*

**A1** *deleted text* **A1**

EN 1088, *Safety of machinery – Interlocking devices associated with guards – Principles for design and selection*

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EN 1127-1, *Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology*

EN 1672-2, *Food processing machinery – Basic concepts – Part 2: Hygiene requirements*

EN 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements* <sup>(A1)</sup> (IEC 60204-1:2005, modified) <sup>(A1)</sup>

<sup>(A1)</sup> EN ISO 12100-1:2003, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology* (ISO 12100-1:2003) <sup>(A1)</sup>

<sup>(A1)</sup> EN ISO 12100-2:2003, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles* (ISO 12100-2:2003) <sup>(A1)</sup>

<sup>(A1)</sup> EN ISO 13857, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs* (ISO 13857:2008) <sup>(A1)</sup>

<sup>(A1)</sup> EN ISO 14121-1, *Safety of machinery – Risk assessment – Part 1: Principles* (ISO 14121-1:2007) <sup>(A1)</sup>

Additional information is given in <sup>(A1)</sup> the Bibliography <sup>(A1)</sup>.

**3 Definitions**

<sup>(A1)</sup> For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply. <sup>(A1)</sup>

**3.1****guard**

<sup>(A1)</sup> physical barrier, designed as part of the machine to provide protection

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NOTE 1 A guard may act:

- alone; it is then only effective when it is "closed" for a movable guard or "securely held in place" for a fixed guard;
- in conjunction with an interlocking device with or without guard locking; in this case, protection is ensured whatever the position of the guard.

NOTE 2 Depending on its design, a guard may be called e.g. casing, shield, cover, screen, door, enclosing guard.

NOTE 3 See EN ISO 12100-2:2003, 5.3.2 and EN ISO 12100-2:2003/prA1:2008, 5.3.2.4 for types of guards and their requirements.

[EN ISO 12100-1:2003, 3.25] <sup>(A1)</sup>

**3.2****fixed guard**

<sup>(A1)</sup> guard affixed in such a manner (e.g. by screws, nuts, welding) that it can only be opened or removed by the use of tools or destruction of the affixing means

[EN ISO 12100-1:2003, 3.25.1] <sup>(A1)</sup>

**3.2.1****enclosing guard**

guard which prevents access to the danger zone from all sides (see figure 1)



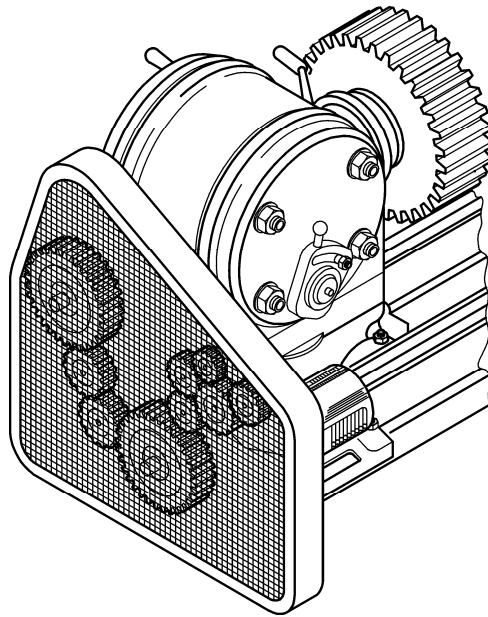


Figure 1 — Example of an enclosing guard totally preventing access to transmission machinery

### 3.2.2

#### distance guard

guard which does not completely enclose a danger zone, but which prevents or reduces access by virtue of its dimensions and its distance from the danger zone, e.g. perimeter fence or tunnel guard (see figures 2 and 3)

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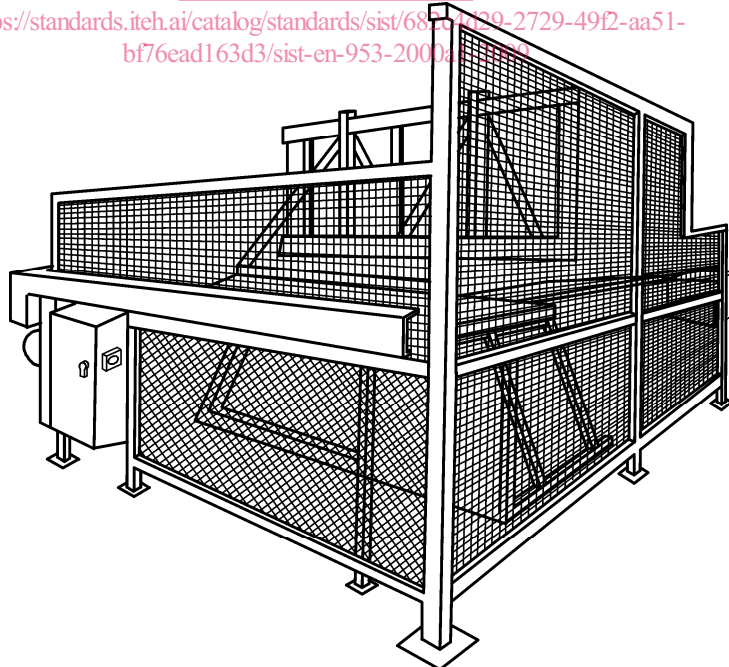


Figure 2 — Example of a distance guard

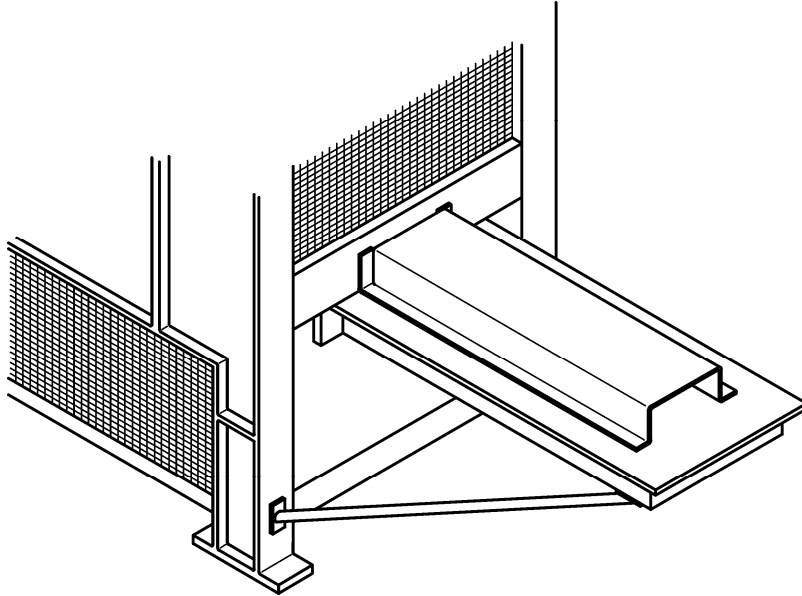


Figure 3 — Example of a distance guard: tunnel guard providing protection at machine feed or discharge area

### 3.3 movable guard

**A1** guard which can be opened without the use of tools

[EN ISO 12100-1:2003, 3.25.2] **A1**

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#### 3.3.1 power operated guard

movable guard that is operated with the assistance of power from a source other than persons or gravity

#### 3.3.2 self closing guard

movable guard operated by a machine element (e.g. moving table) or by the workpiece or a part of the machining jig, so that it allows the workpiece (and the jig) to pass and then automatically returns (by means of gravity, a spring, other external power, etc.) to the closed position as soon as the workpiece has vacated the opening through which it has been allowed to pass **A1** *deleted text* **A1**

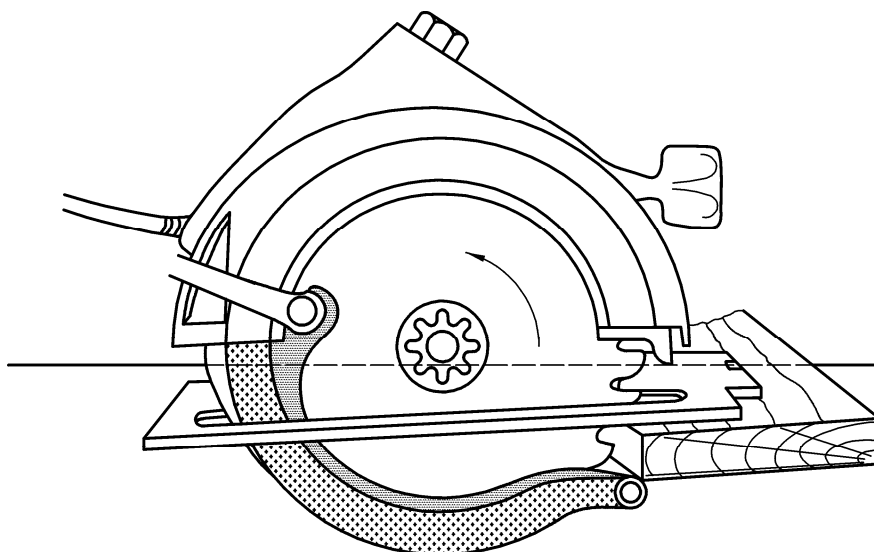


Figure 4 — Example of a self closing guard

### 3.3.3

#### control guard

**A1** special form of an interlocking guard which, once it has reached its closed position, gives a command to initiate the hazardous machine function(s) without the use of a separate start control

NOTE EN ISO 12100-2:2003, 5.3.2.5, gives detailed provisions regarding the conditions of use.

[EN ISO 12100-1:2003, 3.25.6] **A1**

### 3.4

#### adjustable guard

**A1** fixed or movable guard which is adjustable as a whole or which incorporates adjustable part(s)

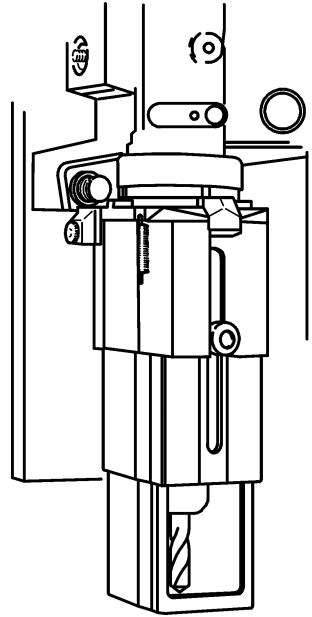
[EN ISO 12100-1:2003, 3.25.3 and EN ISO 12100-1:2003/prA1:2008] **A1**

#### **A1** 3.4.1

##### manually adjustable guard

adjustable guard where the adjustment is made manually and the adjustment remains fixed during a particular operation

NOTE See also Figure 5. **A1**



The guard is telescopic to provide ready adjustment to the surface of the workpiece. It is attached to a hinge to permit access to the spindle for drill changing.

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Figure 5 — Example of an adjustable guard for a radial or pedestal drilling machine

### **A1** 3.4.2

#### **automatically adjustable guard**

adjustable guard where the adjustment is made automatically during a particular operation

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NOTE A self closing guard can also be an automatically adjustable guard. **A1**

### 3.5

#### **interlocking guard**

**A1** guard associated with an interlocking device so that, together with the control system of the machine, the following functions are performed:

- the hazardous machine functions "covered" by the guard cannot operate until the guard is closed;
- if the guard is opened while hazardous machine functions are operating, a stop command is given;
- when the guard is closed, the hazardous machine functions "covered" by the guard can operate. The closure of the guard does not by itself start the hazardous machine functions

NOTE ISO 14119 gives detailed provisions.

[EN ISO 12100-1:2003, 3.25.4]

(See also Figure 6 and Figure 7 and EN 1088.) **A1**