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EUROPEAN STANDARD

EN 953

NORME EUROPÉENNE

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Descriptors: safety of machines, dangerous machines, accident prevention, safety devices, protection against mechanical hazards, hazards, design, materials, categories, safety, verification, information

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.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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FOREWORD

This European Standard 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of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

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).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 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.

As a Type - B2 standard it is intended to provide assistance in the production of Type - C standards which cover detailed aspects for specific groups of machines, and to provide guidance in the absence of an appropriate Type - C standard.

In accordance with the requirements laid down in EN 292-1 and EN 292-2 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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1 : 1991	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN 292-2 : 1991/A1 : 1995	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications
EN 294	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs
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
EN 811	Safety of machinery - Safety distances to prevent danger zones being reached by the lower limbs
EN 1050	Safety of machinery - Risk assessment
EN1070	Safety of machinery - Terminology
EN 1088	Safety of machinery - Interlocking devices associated with guards- Principles for design and selection
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 (IEC 204-1: 1992, modified)

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Additional information is given in Annex C.

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3 DEFINITIONS

For the purposes of this standard the following definitions apply according and in addition to the definitions given in EN 292-1 and ENV1070:

3.1 guard: Part of a machine specifically used to provide protection by means of a physical barrier. Depending on its construction, a guard may be called casing, cover, screen, door, enclosing guard, etc.

Note 1: A guard may act:

- alone: it is then only effective when it is closed;
- in conjunction with an interlocking device with or without guard locking; in this case, protection is ensured whatever the position of the guard. 1).

Note 2: "Closed" means "kept in place" for a fixed guard.

[3.22 of EN 292 - 1: 1991]

3.2 fixed guard: Guard kept in place (i.e. closed) :

- either permanently (by welding, etc.),
- or by means of fasteners (screws, nuts, etc.) making removal/opening impossible without using tools.

[3.22.1 of EN 292 -1: 1991]

3.2.1 enclosing guard: Guard which prevents access to the danger zone from all sides (see figure 1).

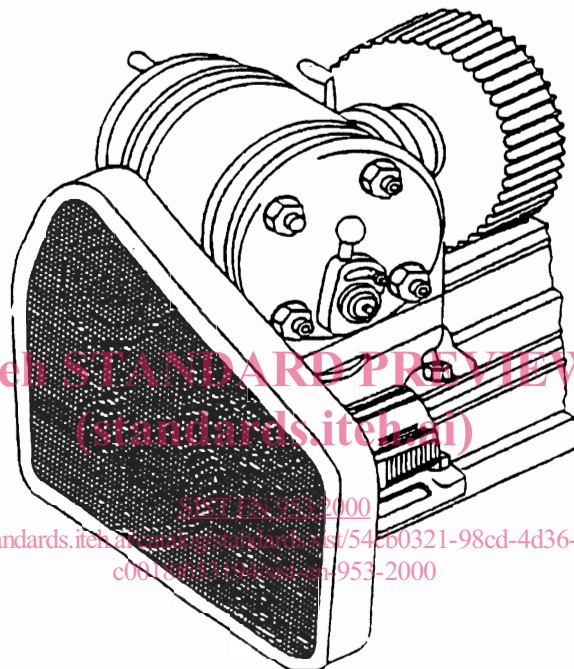


Figure 1: Example of an enclosing guard totally preventing access to transmission machinery

1) See also 3.5 of this standard

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).

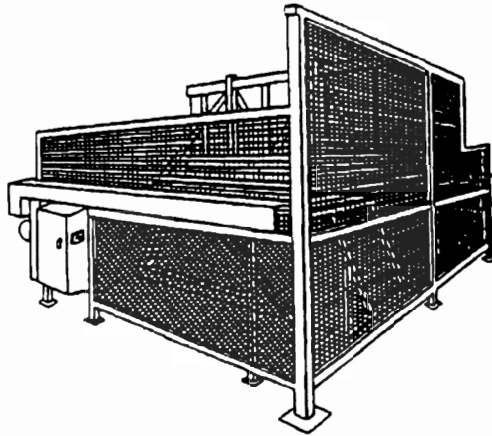


Figure 2: Example of a distance guard

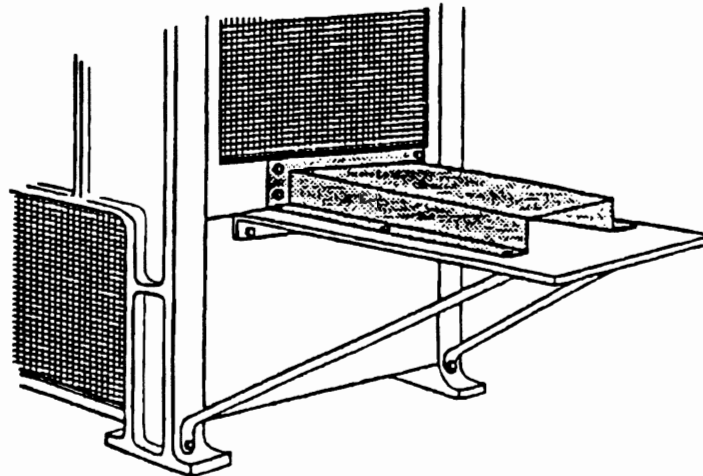


Figure 3: Example of a distance guard: tunnel guard providing protection at machine feed or discharge area

3.3 movable guard: Guard generally connected by mechanical means (e.g. hinges or slides) to the machine frame or an adjacent fixed element and which can be opened without the use of tools.

[3.22.2 of EN 292 - 1: 1991] (standards.iteh.ai)

3.3.1 power operated guard: Movable guard that is operated with the assistance of power from a source other than persons or gravity. <https://standards.iteh.ai/catalog/standards/sist/54cb0321-98cd-4d36-a135-c0018f653194/sist-en-953-2000>

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 (see figure 4)

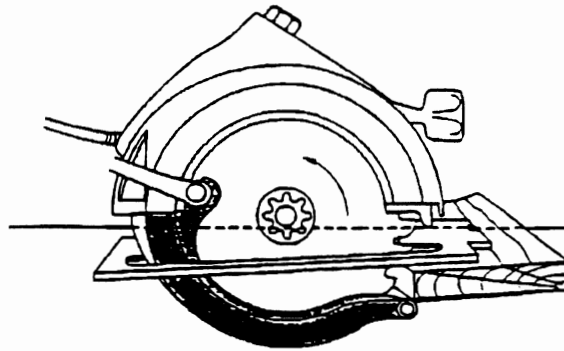


Figure 4: Example of a self closing guard

3.3.3 control guard: Guard associated with an interlocking device (with or without guard locking) see 3.23.1)2) so that:

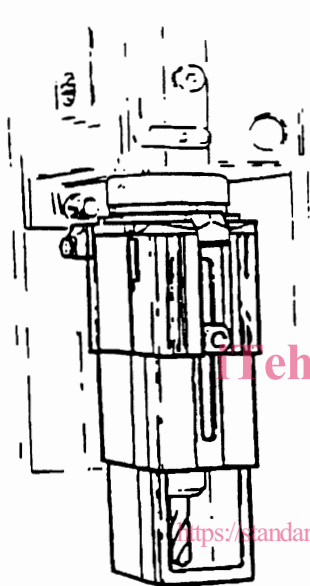
- the hazardous machine functions “covered” by the guard cannot operate until the guard is closed;
- closing the guard initiates operation of the hazardous machine function(s) [3.22.6 of EN292 - 1 : 1991]

NOTE: The use of control guards is subject to certain conditions, see 5.4.9 of this standard

3.4 adjustable guard: Fixed or movable guard which is adjustable as a whole or which incorporates adjustable part(s). The adjustment remains fixed during a particular operation.

[3.22.3 of En292-1: 1991)

(see also figure 5)



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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.

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

2) See also 3.5 of this standard

3.5 interlocking guard: Guard associated with an interlocking device (see 3.23.1)²⁾³⁾ so that:

- 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 instruction is given;
- when the guard is closed, the hazardous machine functions “covered” by the guard can operate, but the closure of the guard does not by itself initiate their operation. [3.22.4 of EN 292-1: 1991] (see also figures 6 and 7)

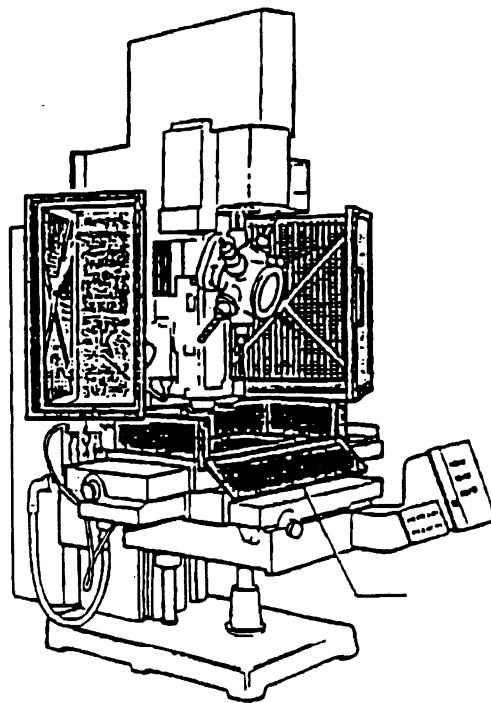


Fig 6. Example of interlocking hinged guards; these enclose the danger zone when closed.

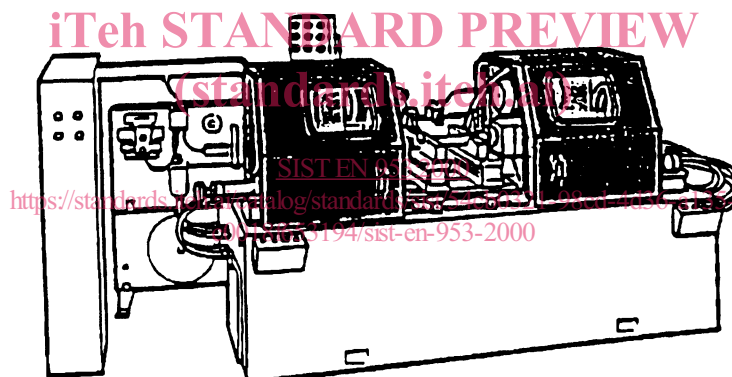


Figure 7: Example of interlocking sliding guards

2) Clause number refers to EN292-1

3) See also EN 1088