
**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*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 14120:2002

[https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-
b666b8b15d9c/iso-14120-2002](https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002)



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 14120:2002

<https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002>

© ISO 2002

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Risk assessment.....	9
5 Principal requirements for the design and construction of guards.....	9
6 Selection of types of guards	15
7 Additional design and construction considerations	18
8 Verification of the safety requirements for guards	19
9 Information for use	20
Annex A (normative) Guidelines to assist in the selection of guards against hazards generated by moving parts	22
Annex B (normative) Guidelines for the selection of guards according to the number and location of hazards	24
Annex C (informative) Relationship between International Standards referenced in clause 2 and corresponding European Standards	25
Bibliography	26

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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 14120 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

Annexes A and B form a normative part of this International Standard. Annex C is for information only.

ITIH STANDARD PREVIEW
(standards.iteh.ai)

ISO 14120:2002

<https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002>

Introduction

This International 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 ISO/TR 12100-1:1992 and ISO/TR 12100-2:1992, 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.

This International Standard has been prepared to be a harmonized standard in the sense of the Machinery Directive of the European Union and associated regulations of the European Free Trade association (EFTA). This International Standard is based on EN 953:1997, published by the European Committee for Standardisation (CEN).

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 14120:2002](https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002)

<https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 14120:2002

<https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002>

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

1 Scope

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

This International Standard applies primarily to machines which will be manufactured after it is published.

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

The requirements are applicable if fixed and movable guards are used. This International Standard does not cover those parts of guards which actuate interlocking devices. These are covered in ISO 14119.

This International Standard does not provide requirements for special systems relating specifically to mobility or to the ability to lift loads such as rollover protective structures (ROPS) and falling-object protective structures (FOPS).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/TR 12100-1:1992, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

ISO/TR 12100-2:1992, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications*

ISO 13852, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

ISO 13853, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

ISO 13854, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

ISO 14119, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14121, *Safety of machinery — Principles of risk assessment*

ISO 14123-1, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

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

prEN 1005-3:—¹⁾, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 292-2:1991/A1:1995, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications*

EN 1070, *Safety of machinery — Terminology*

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*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO/TR 12100-1 and EN 1070 and the following apply.

3.1 guard

part of a machine specifically used to provide protection by means of a physical barrier

NOTE 1 Depending on its construction, a guard may be called casing, cover, screen, door, enclosing guard, etc.

NOTE 2 A guard may act:

— alone, in which case it is only effective when it is closed;

— in conjunction with an interlocking device with or without guard locking, in which case protection is ensured whatever the position of the guard (see also 3.5).

NOTE 3 “Closed” means “kept in place” for a fixed guard.

[ISO/TR 12100-1:1992, 3.22]

3.2 fixed guard

guard kept in place, that is closed, either permanently (by welding, etc.), or by means of fasteners (screws, nuts, etc.) making removal/opening impossible without using tools

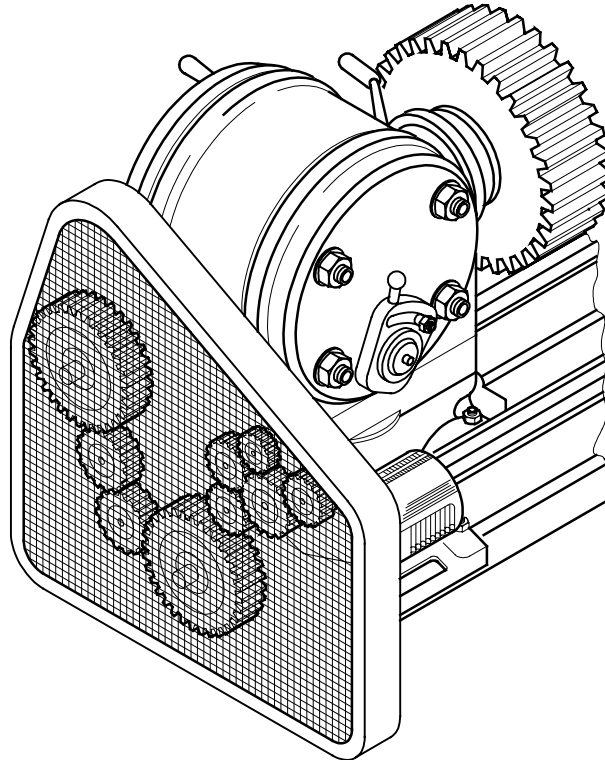
[ISO/TR 12100-1:1992, 3.22.1]

3.2.1 enclosing guard

guard which prevents access to the danger zone from all sides

See Figure 1.

1) To be published.



iTeh STANDARD PREVIEW

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, for example perimeter fence or tunnel guard

See Figures 2 and 3.

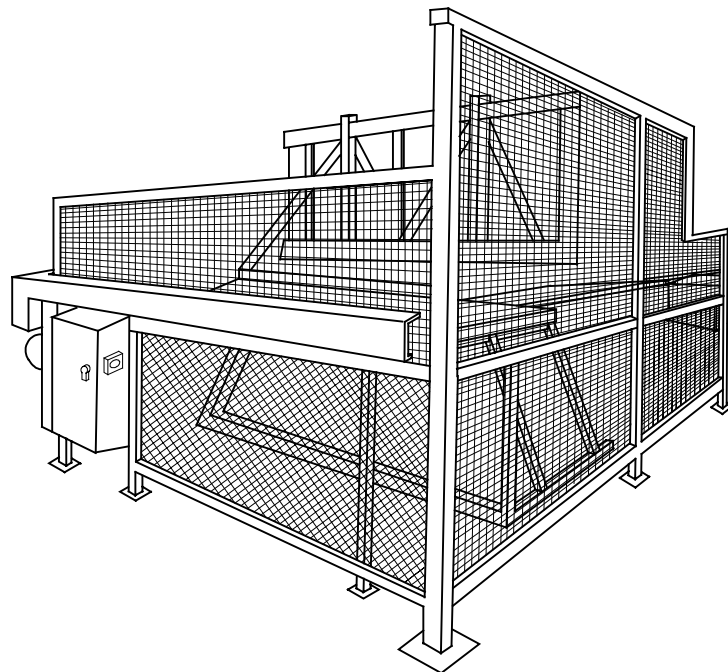


Figure 2 — Example of a distance guard

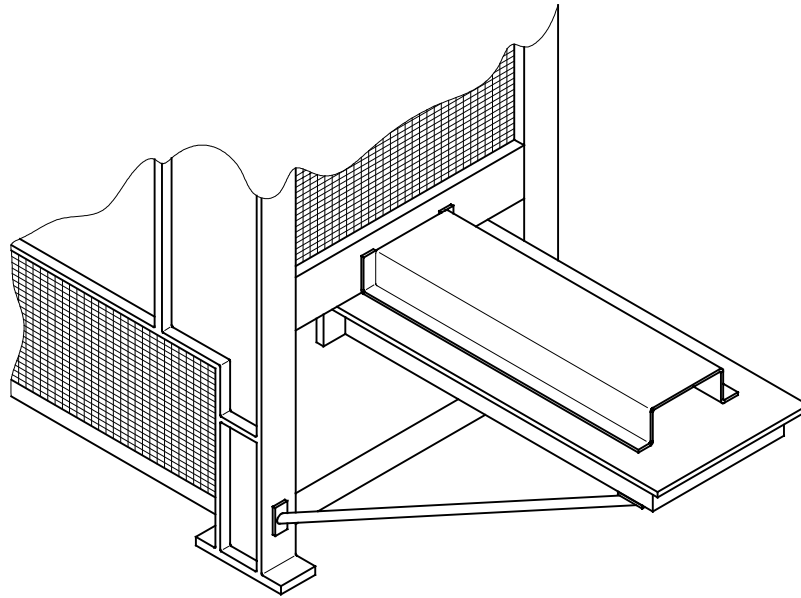


Figure 3 — Example of a distance guard: tunnel guard providing protection at machine feed or discharge area

**3.3
movable guard**

guard generally connected by mechanical means, for example with hinges or slides, to the machine frame or an adjacent fixed element and which can be opened without the use of tools

[ISO/TR 12100-1:1992, 3.22.2]

ISO 14120:2002
<https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b15d9c/iso-14120-2002>

**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 (for example a 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.

**3.3.3
control guard**

guard associated with an interlocking device²⁾ 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)

[ISO/TR 12100-1:1992, 3.22.6]

NOTE The use of control guards is subject to certain conditions (see 5.4.9).

2) See ISO/TR 12100-1:1992, 3.23.1.

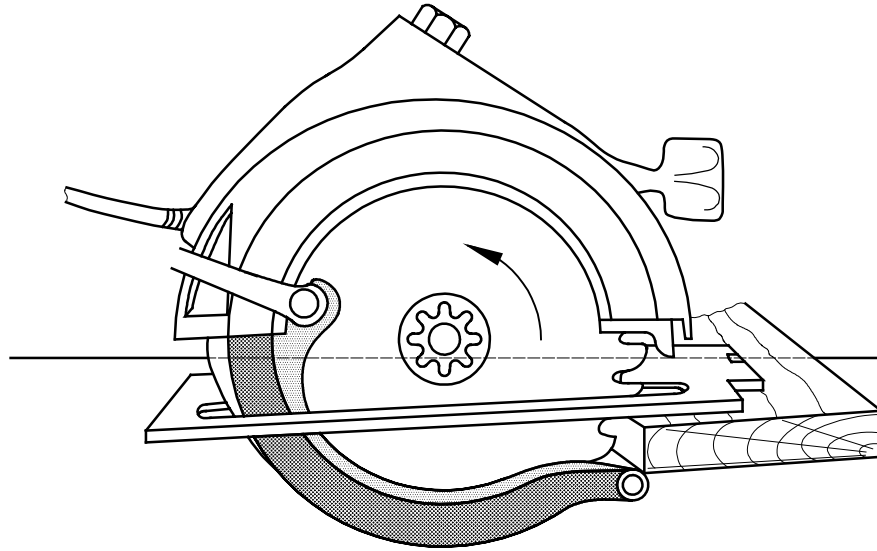


Figure 4 — Example of a self-closing guard

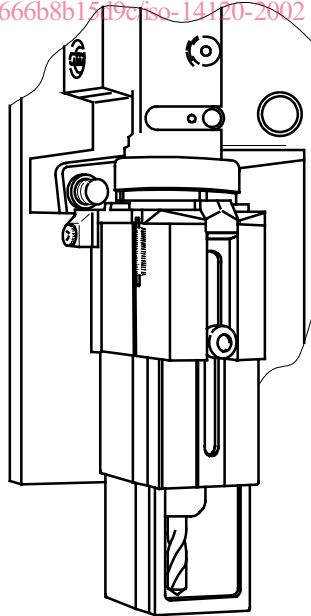
3.4 adjustable guard

fixed or movable guard which is adjustable as a whole or which incorporates adjustable parts. The adjustment remains fixed during a particular operation

[ISO/TR 12100-1:1992, 3.22.3]

See Figure 5.

ISO 14120:2002
<https://standards.iteh.ai/catalog/standards/sist/5543c8a8-5657-4373-8a96-b666b8b1519c/iso-14120-2002>



NOTE The guard is telescopic to provide ready adjustment to the surface of the workpiece, and 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

**3.5
interlocking guard**

guard associated with an interlocking device²⁾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

[ISO/TR 12100-1:1992, 3.22.4]

See Figures 6 and 7.

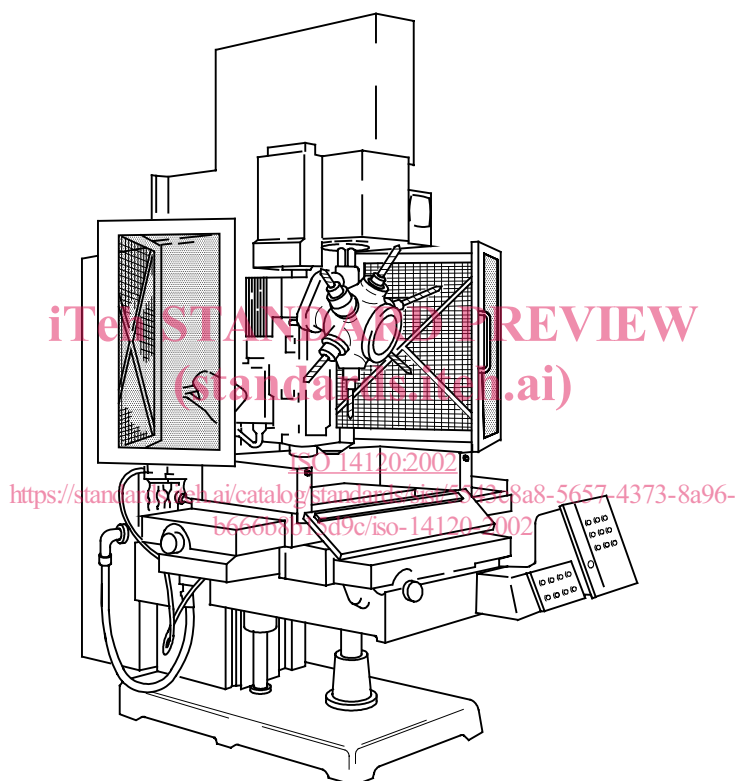


Figure 6 — Example of interlocking hinged guards; these enclose the danger zone when closed

3) See also ISO 14119.