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**Safety of machinery — Laser processing  
machines —**

Part 1:  
**General safety requirements**

*Sécurité des machines — Machines à laser —  
Partie 1: Prescriptions générales de sécurité*

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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 11553-1 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 9, *Electro-optical systems*, in collaboration with IEC/TC 76, *Optical radiation safety and laser equipment*.

This first edition of ISO 11553-1 cancels and replaces ISO 11553:1996, which has been technically revised.

ISO 11553 consists of the following parts, under the general title *Safety of machinery — Laser processing machines*:

- *Part 1: General safety requirements*
- *Part 2: Safety requirements for hand-held laser processing devices*

## Introduction

The Machinery Safety Directive issued by the Council of the EEC outlines essential and mandatory requirements that must be met in order to ensure that machinery is safe. In response, CEN/CENELEC initiated a programme to produce safety standards for machines and their applications. This part of ISO 11553 is one in that series.

It has been prepared as a harmonized standard to provide a means of conforming with the essential safety requirements of the Machinery Directive and associated EFTA Regulations.

This document is a type B standard as stated in ISO 12100-1. The provisions of this document may be supplemented or modified by a type C standard.

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

It is applicable to machines using laser radiation to process materials. The purpose of this part of ISO 11553 is to prevent injuries to persons by

- listing potential hazards generated by machines containing lasers,
- specifying safety measures and verifications necessary for reducing the risk caused by specific hazardous conditions,
- providing references to pertinent standards, and
- specifying the information which is to be supplied to the users so that they can establish proper procedures and precautions.

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# Safety of machinery — Laser processing machines —

## Part 1: General safety requirements

### 1 Scope

This part of ISO 11553 describes hazards generated by laser processing machines, as defined in 3.2, and specifies the safety requirements relating to radiation hazards and hazards generated by materials and substances. It also specifies the information to be supplied by the manufacturers of such equipment.

Requirements dealing with noise as a hazard from laser processing machines are not included in this part of ISO 11553. They will be included in a subsequent amendment.

This part of ISO 11553 is not applicable to laser products, or equipment containing such products, which are manufactured solely and expressly for the following applications:

- photolithography;
- stereolithography;
- holography;
- medical applications (per IEC 60601-2-22);
- data storage.

### 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.

ISO 3864:1984, *Safety colours and safety signs*

ISO 11252:2004, *Lasers and laser-related equipment — Laser device — Minimum requirements for documentation*

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

ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

ISO 13849-1:1999, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 14118:2000, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119:1998, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

IEC 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60825-1:2001, *Safety of laser products — Part 1: Equipment classification, requirements and user's guide*

IEC 60825-4:1997, *Safety of laser products — Part 4: Laser guards*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100-1 and IEC 60825-1 and the following apply.

#### 3.1 machine

assembly of linked parts or components, at least one of which moves, with the appropriate actuators, control and power circuits, joined together for a specific application, in particular for the processing, treatment, moving or packaging of a material

[ISO 12100-1]

#### 3.2 laser processing machine

machine in which (an) embedded laser(s) provide(s) sufficient energy/power to melt, evaporate, or cause a phase transition in at least a part of the workpiece, and which has the functional and safety completeness to be ready-to-use

#### 3.3 location with controlled access

location where the hazard is inaccessible except to authorized persons who have received adequate training in laser safety and servicing of the system involved

NOTE See Table 1.

#### 3.4 location with restricted access

location where the hazard is inaccessible to the public but may be accessible to other observers or other untrained personnel who are kept from being exposed to the hazards of laser processing by barriers or other methods

NOTE See Table 1.

#### 3.5 location with unrestricted and uncontrolled access

location where access is not limited or controlled

NOTE See Table 1.

Table 1 — Description of locations

Location	Controlled	Restricted	Unrestricted and uncontrolled
People	Authorized and trained in laser safety	Personnel untrained in laser safety but not the public	All, including the public