



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 11553-2:2025**  
**01-marec-2025**

**Nadomešča:**  
**SIST EN ISO 11553-2:2009**

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**Varnost strojev - Laserski obdelovalni stroji - 2. del: Varnostne zahteve za ročne ali ročno upravljane laserske obdelovalne naprave (ISO/DIS 11553-2:2025)**

Safety of machinery - Laser processing machines - Part 2: Safety requirements for hand-held or hand-operated laser processing machines (ISO/DIS 11553-2:2025)

Sicherheit von Maschinen - Laserbearbeitungsmaschinen - Teil 2: Sicherheitsanforderungen an handgeführte Laserbearbeitungsgeräte (ISO 11553-2:20xx)

Sécurité des machines - Machines à laser - Partie 2: Exigences de sécurité pour machines de traitement laser portatives ou à commande manuelle (ISO/DIS 11553-2:2025)

**Ta slovenski standard je istoveten z: prEN ISO 11553-2**

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**ICS:**

|        |                                  |                                  |
|--------|----------------------------------|----------------------------------|
| 13.110 | Varnost strojev                  | Safety of machinery              |
| 31.260 | Optoelektronika, laserska oprema | Optoelectronics. Laser equipment |

**oSIST prEN ISO 11553-2:2025**                      **en,fr,de**





# DRAFT International Standard

## ISO/DIS 11553-2

### Safety of machinery — Laser processing machines —

#### Part 2: Safety requirements for hand-held or hand-operated laser processing machines

*Sécurité des machines — Machines à laser —*

*Partie 2: Exigences de sécurité pour machines de traitement laser  
portatives ou à commande manuelle*

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This document is circulated as received from the committee secretariat.

**ISO/CEN PARALLEL PROCESSING**

Reference number  
ISO/DIS 11553-2:2025(en)

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 172, Optics and photonics, Subcommittee SC 9, Laser and electro-optical systems in collaboration with IEC/TC 76, Optical radiation safety and laser equipment.

This second edition cancels and replaces the first edition (ISO/IEC 11553-2:2007), which has been technically revised with the following main changes:

- a) Several terms and definitions were modified or newly added;
- b) the covered hazards as well as the requirements concerning the hazards were added in more detail;
- c) [Table 1](#) was newly added in [Clause 6](#), and the previous [Annex A](#) was deleted;
- d) Several subclause headings were modified and several technical requirements were amended;
- e) Some of the lists were renumbered;
- f) Previous [Annex B](#) was modified and was renumbered as the new [Annex A](#);
- g) New [Annex B](#), [Annex C](#) and [Annex D](#) were added.
- h) [Annex E](#) was modified;
- i) new [Annex F](#) and [Annex G](#) were added.

A list of all parts in the ISO 11553 series can be found on the ISO website/IEC website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).



## ISO/DIS 11553-2:2025(en)

### Introduction

This document is a type-C standard as stated in ISO 12100:2010.

This document is of relevance particularly for the following stakeholder groups representing the market players with regard to machinery safety:

- a) hand-held or hand-operated laser processing machines (HLMs) manufacturers (small, medium and large enterprises); including manufacturers of sub/part machines such as devices or devices assembly related to laser radiation, as well as system integrators (small, medium, and large enterprises);

NOTE Devices or device assemblies are including but not limited to: guiding; shaping, delivery, protective, locking, control, enabling, limiting, impeding, switching, exhaust, stop, loading/feeding, scanning and warning devices.

- b) health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- c) machine users/employers (small, medium and large enterprises);
- d) machine users/employees (e.g., trade unions, organizations for people with special needs);
- e) service providers, e.g., for maintenance (small, medium and large enterprise);
- f) consumers (in case of machinery intended for use by consumers).
- g) bystanders

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The purpose of this document is to prevent injuries to persons:

- h) by listing potential hazards generated by hand-held or hand-operated laser processing machines;
- i) by describing the risk assessment procedure for all relevant hazards;
- j) by specifying safety measures and verification procedures necessary for reducing the risk caused by specific hazardous conditions;
- k) by providing references to pertinent standards;
- l) by specifying the information which is to be supplied to the user so that they can establish proper procedures and precautions at the workplace.



# Safety of machinery — Laser processing machines —

## Part 2:

# Safety requirements for hand-held or hand-operated laser processing machines

## 1 Scope

This document specifies the requirements for hand-held or hand-operated laser processing machines (HLM) and their components as well as assemblies. HLM is the machine in which laser radiation is generated, where the laser provides sufficient energy/power to cause a phase transition in a part of the workpiece and where the laser output or workpiece to be processed is guided manually or hand-held during the laser process.

HLM includes the laser device, beam-guiding device (e.g., mirror, fibre, lenses), beam-shaping device (e.g., telescope, focusing), and controls. The laser assembly as an integral part of the HLM or only the laser processing head is hand-held or hand-operated during the laser process.

This document does not apply:

- to laser processing machines which are remotely controlled by a manual controller (hand-operated controller), such as joy sticks, keyboard, etc., without touching a workpiece or a part mechanically connected with the laser processing head by using the hand(s) of the operator (user).
- to laser processing machines without a drive system which may not belong to machinery. And the laser processing apparatus without moving parts, which may not be considered as machinery in “Type C standard”.

NOTE “hand-operated laser processing machine” is synonymous with “hand-guided laser processing machine” in this document. Hand-operated laser processing machines often use manual force reduction means such as wheels, supports, etc., for manual positioning of the laser processing heads or the workpieces.

It is applicable to HLMs using laser radiation to process materials.

The purpose of this document is to draw attention to the hazards related to HLMs and to prevent personal injury. Depending on the application and the location/operating conditions of HLMs, a number of different significant hazards can arise. This document describes both the areas of hazards analysis and risk assessment as well as protective measures.

Requirements dealing with noise as a hazard are covered by ISO 11553-3.

This document deals with the specific hazards resulting from laser radiation arising in HLMs, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

This document does not apply to laser products or equipment manufactured solely or expressly for applications which are excluded from the scope of ISO 11553-1:2020. This document is not applicable for HLMs which have been manufactured before the date of publication of this standard.

HLMs include the following types:

- a) HLMs which are designed as all in-one laser assembly including the beam delivery/forming(shaping) system and optional features such as gas nozzles, material (e.g., powder, wire) feed system;

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- b) HLMs where the relevant devices are connected by a beam guidance system (e.g., optical fibre) and power/control cables to an external laser assembly device and which includes only the beam delivery/forming(shaping) system and optional features such as gas nozzles, material (e.g., powder, wire) feed system;
- c) laser processing machines where the workpiece is manually moved under/relative to the laser beam (see informative [Annex A](#)).

The intended use of HLMs covers both:

- d) movement of the laser processing head (beam shaping device) by hand to move laser beam(s) over or relative to elements or workpieces to be processed, and
- e) movement of elements or workpieces by hand to be processed under/relatively to stationary laser beams as shielded.

Laser processing machines, where laser processing is performed with hand-held or hand-operated workpieces outside the fixed (neither hand-held nor hand-operated by the operator or user) laser processing machines are out of the scope of this document. Such a fixed laser processing machine is to be covered by ISO 11553-1.

HLMs are intended for the industrial use and can be only operated by trained and authorized personnel in indoor and/or outdoor environments/locations (e.g., cleaning of facades, statues).

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 (all parts), *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 6385:2016, *Ergonomics principles in the design of work systems*

ISO 11145:2018, *Optics and photonics — Lasers and laser-related equipment — Vocabulary and symbols*

ISO/IEC 11553-1:2020, *Safety of machinery — Laser processing machines — Part 1: General safety requirements*

ISO/IEC 11553-3:2013, *Safety of machinery — Laser processing machines - Part 3: Noise reduction and noise measurement methods for laser processing machines and hand-held processing devices and associated auxiliary equipment (accuracy grade 2)*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13732-1:2006, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14118:2017, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119:2024, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

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ISO 20607:2019, *Safety of machinery — Instruction handbook — General drafting principles*

ISO 26800:2011, *Ergonomics — General approach, principles and concepts*

IEC 60204-1:2016, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60364 (series), *Low-voltage electrical installations*

IEC 60364-7-704:2017, *Low-voltage electrical installations - Part 7-704: Requirements for special installations or locations - Construction and demolition site installations*

IEC 60529:1989+AMD1:1999, *CSV, Degrees of protection provided by enclosures (IP Code)*

IEC 60825-1:2014, *Safety of laser products — Part 1: Equipment classification and requirements*

IEC 60825-4:2020, *Safety of laser products — Part 4: Laser guards*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*

IEC 61000-6-3:2020, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments*

IEC 61000-6-4:2018, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

IEC 61000-6-7:2014, *Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*

IEC 62061:2021, *Safety of machinery — Functional safety of safety-related control systems*

EN 379:2003+A1:2009, *Personal eye-protection - Automatic welding filters*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in in ISO 11145, ISO 11553-1, ISO 12100, IEC 60825-1, IEC 60825-4 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **confined space**

working area surrounded on all sides, or for the most part, by solid walls where they, on account of their confinement or containment of materials, preparation or equipment, augment or can augment particular hazards that considerably exceed the hazard potential normally prevailing at workplaces

#### 3.2

##### **disposal unit**

equipment that captures and removes effluents and/or chemical pollutants (e.g., fumes, gases) and/or by products during laser material processing passing these on for filtration

EXAMPLE Capture devices, pipes, filtration systems, ventilation systems.

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### 3.3

#### hazard area

#### danger zone

any space within and/or around machinery in which a person can be exposed to a hazard

Note 1 to entry: There may be several hazard areas (danger zones) on the same workplace depending on the types of hazards and relevant safety control measures against the hazards.

Note 2 to entry: For “laser hazard area”, see [3.6](#).

Note 3 to entry: Hazard area (danger zone) is not synonymous to “laser hazard area” and “nominal ocular hazard area (NOHA)”.

[SOURCE: ISO 12100:2010, 3.11, modified, Note 1 to entry, Note 2 to entry and Note 3 to entry added]

### 3.4

#### hand-held or hand operated laser processing machine

#### HLM

machine in which laser radiation is generated, together with essential additional facilities (e.g., cooling, power and gas supply) that are necessary to operate the laser, where the laser provides sufficient energy/power to melt, evaporate or cause a phase transition in a part of the workpiece and where the laser beam or workpiece to be processed is guided manually or hand-held during the laser process

Note 1 to entry: The HLM is synonymous with “laser unit”, see, [3.10](#).

Note 2 to entry: Generally, HLM can be divided in two representative types (Type 1 and Type 2) (see [Annex A](#)):

- Type 1: Machine equipped with a fixed laser assembly, where the workpiece is manually guided or manually positioned relative to the laser processing head (beam shaping device),
- Type 2: Machines equipped with a hand-held or hand-guided laser head (HLH) where the laser processing head is connected to a remotely located (i.e. external) laser device via a beam delivery system (e.g. fibre optical cable) or where the laser source is integral part of the hand-held device.

### 3.5

#### hand-held or hand-guided laser head (HLH)

component, which is hand-held or hand guided and contains the laser output/aperture

Note 1 to entry: The HLH can be equipped via an optical fibre with an external laser source or contain the laser system itself, which can be positioned or guided on the work piece surface or in a certain distance to the workpiece. Usually HLM comprises a housing/enclosure with optical elements for beam guidance and shaping, the operating elements, controls and indication elements (e.g., warning LED).

Note 2 to entry: The HLH can further comprise nozzle, feeder (gas/wire/powder), feed drive support, sensors/controls for contact or distance to workpiece, capturing device for fume and gas emissions.

Note 3 to entry: Depending on the equipment, the HLH can also be connected with feeding devices for wire, gas, cooling water, etc.

### 3.6

#### laser hazard area

area in which the laser radiation exposure of the eye and/or the skin exceeds the respective maximum permissible exposure values (MPEs), including the possibility of accidental misdirection of the laser beam

Note 1 to entry: To avoid ambiguities, information whether the laser hazard area is based on the eye or the skin MPEs should be added.

Note 2 to entry: See [3.11](#) for nominal ocular hazard area.

[SOURCE: IEC 60825-1:2014, 3.47, modified, Note 2 to entry added]