



SLOVENSKI STANDARD
SIST EN 50689:2022

01-januar-2022

Varnost laserskih izdelkov - Posebne zahteve za laserske izdelke, namenjene potrošniku

Safety of laser products - Particular Requirements for Consumer Laser Products

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Ta slovenski standard je istoveten z: EN 50689:2021

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EUROPEAN STANDARD

EN 50689

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English Version

Safety of laser products - Particular Requirements for Consumer Laser Products

Sécurité des appareils à laser - Exigences particulières relatives aux appareils à laser destinés au grand public

Sicherheit von Laserprodukten - Besondere Anforderungen an Verbraucher-Laser-Produkte

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50689:2021) has been prepared by CLC/TC 76 “Optical radiation safety and laser equipment”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-09-27
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2024-09-27

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZZA and ZZB, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

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1 Scope

This document provides definitions and specifies the particular requirements for consumer products containing lasers. The objective of this document is to ensure that laser products available to consumers are safe. This document specifies requirements that are additional to those specified in EN 60825-1. Consumer laser products that are battery powered are included, as well as consumer laser products powered by other means.

The requirements of this document are intended to address only the laser radiation hazards to the eyes and skin. Other hazards are not included within its scope. Compliance with this document may not be sufficient to conform to the applicable performance and testing requirements of other applicable product safety standards.

The scope of this document does not include consumer laser products that are designed to project laser radiation in the wavelength range of 380 nm to 780 nm onto the retina, with an intended daily usage duration of potentially many hours (such as for virtual reality or augmented reality applications), because it is currently not possible to provide emission limits that preclude any potential adverse effects for day-long usage, day after day.

NOTE 1 The level of radiation permitted by Class 1 in the visible wavelength range results in an extremely bright image which will be dazzling and uncomfortable, and therefore such a high emission level, that reaches Class 1 limits, is not reasonably foreseeable for this type of device (see also New Work Item Proposal 76/660/NP for the project IEC/TS 60825-20).

The scope of this document does not include products intended for professional use (non-consumer (professional) laser products) and restrictions as specified in this document do not apply to non-consumer laser products. For non-consumer laser products, compliance with EN 60825-1 is sufficient to achieve the necessary level of safety.

This document also specifies which subgroups of lasers are permitted as consumer products. A restricted group of Class 3R laser products are included. The risk of injury is low enough to be accepted under reasonably foreseeable conditions of use (including foreseeable misuse) for compliance with the general product safety directive (GPSD) and low voltage directive (LVD) for consumer products.

Electric toys containing lasers, which are covered by EN 62115, are excluded from the scope of this document.

Class 1C consumer laser products are not in the scope of this document. For example, cosmetic and beauty care Class 1C laser products are covered by prEN IEC 60335-2-113:202X¹⁾.

NOTE 2 National requirements can be more restrictive than the requirements in 6.1 and 6.2.

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.

EN 60825-1:2014²⁾, *Safety of laser products - Part 1: Equipment classification and requirements*

EN 60825-1:2014/A11:2021, *Safety of laser products - Part 1: Equipment classification and requirements*

EN IEC 62115:2020³⁾, *Electric toys - Safety*

¹⁾ under preparation.

²⁾ Document impacted by AC:2017-06.

³⁾ Document impacted by A11:2020.

3 Terms and definitions

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

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

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

3.1

consumer laser product

product or assembly of components that constitutes or incorporates a laser or laser system and that is intended for consumers, or is likely to be used by consumers under reasonably foreseeable conditions even though it is not intended for them

Note 1 to entry: When a laser product is child appealing, it is by definition a consumer laser product.

3.2

consumer

individual member of the general public, purchasing or using products, property or services, for private purposes

Note 1 to entry: For the purpose of the requirements of this part of EN 50689, a consumer is assumed not to be a skilled person.

[SOURCE: IEC/IEEE 82079-1:2019, definition 3.10, modified]

3.3

child appealing consumer laser product

laser product that: <https://standards.iteh.ai/catalog/standards/sist/3d8e5fe9-a2ff-4dbe-a38d-438365c3f907/sist-en-50689-2022>

- resembles, by virtue of its form or design, anything that is commonly recognized as being appealing to, or intended for use by, children; or
- has any other feature or characteristic, necessary or not for the function of the product, that is likely to be appealing to children

A child appealing consumer laser product is a product that is attractive to children due to its characteristics such as function, movement, colour, characters, sounds, lights, shape, texture, size, smell or taste

EXAMPLE 1 laser products resembling: e.g. cartoon characters, toys, guns, watches, telephones, musical instruments, vehicles, human body or parts of the human body, animals, food or beverages

EXAMPLE 2 laser products playing notes (sounds), having flashing lights, moving parts or other entertaining features

Note 1 to entry: The simple emission of a visible laser beam as such does not make a laser product child appealing.

Note 2 to entry: "Child appealing" depends on a case-by-case assessment of the child appealing character of the product, taking into account the specific characteristics of the product in question (see "New Declaration of ADCO on Child Appealing Appliances, LVDWP/14/4, 15-06-2009).

Note 3 to entry: A normal telephone, mobile phone or tablet is not considered as child appealing; in contrast, a telephone, mobile phone or tablet that is designed to look like a cartoon character, is considered child appealing. Also, a product that resembles (but is not) a watch, telephone, musical instrument, etc. is considered as child appealing.

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3.4

laser pointer

laser product promoted and intended as a handheld laser either for entertainment purposes or for pointing out objects and/or locations

Note 1 to entry: Examples which are not considered as laser pointers are: gunsights, laser levelling devices and positioning aids, such as in laser distance measurement devices

4 Classification of consumer laser products

Laser products in the scope of this standard shall comply with EN 60825-1:2014 and EN 60825-1:2014/A11:2021, including classification, labelling and user instructions. As a general principle, the product shall be in the lowest feasible class commensurate with the intended function.

5 Child appealing consumer laser products

Child appealing consumer laser products that are not electric toys shall be Class 1 laser products. The classification, engineering, labelling and information for the user requirements of EN 60825-1:2014 and EN 60825-1:2014/A11:2021 apply.

Additionally, for child appealing consumer laser products, the accessible emission determined at the closest point of human access and the point of the highest accessible emission (worst case condition regarding the beam diameter), shall not exceed the maximum permissible exposure values for the skin as specified in EN 60825-1:2014 and EN 60825-1:2014/A11:2021, Table A.5. The accessible emission to be compared with the applicable value in Table A.5, given as irradiance or radiant exposure, is to be determined with a circular averaging aperture (limiting aperture) of 1 mm diameter and with a timebase of 10 s for wavelengths above 400 nm and a timebase of 1000 s for wavelengths less than and equal to 400 nm.

NOTE 1 These limits can be seen as dual limits, additional to the AEL of Class 1, to prevent a skin burn hazard or a corneal burn hazard; the limits are applied as emission limits to ensure product safety, they are not used as exposure limits.

NOTE 2 Electric toys are not in the scope of this document. Requirements for electric toys incorporating lasers are specified in EN 62115.

NOTE 3 A flowchart of the requirements of this clause and Clause 6 can be found in Annex A as a simplified summary.

A laser pointer of any class, other than Class 1, shall not be a child appealing consumer laser product.

The emission of a child appealing consumer laser product, determined at the closest point of human access or the worst-case position in the beam (smallest beam diameter) shall not exceed $0,001 \text{ W}\cdot\text{m}^{-2}$ in the wavelength range $180 \text{ nm} \leq \lambda < 315 \text{ nm}$.

Child appealing consumer laser products shall comply with all stated requirements. Child appealing consumer laser products that do not comply with all stated requirements are considered as unsafe.

Child appealing consumer laser products shall comply with the battery safety requirements from EN IEC 62115:2020.

6 All other consumer laser products

NOTE National laws or regulations can be more restrictive than the requirements in 6.1 and 6.2.

6.1 Generic requirements for consumer laser products

The classification, engineering, labelling and information for the user requirements of EN 60825-1:2014 and EN 60825-1:2014/A11:2021 apply.

Class 1, Class 2 and a subgroup of Class 3R are permitted as consumer laser products when they are not child appealing. Additional requirements for Class 3R consumer laser products are given in 6.2. Requirements for child appealing consumer laser products are given in Clause 5.

Consumer laser products that are not child appealing shall meet the following requirements:

- a) consumer laser products shall not be Class 1M, Class 2M, Class 3B or Class 4. Limitations for Class 3R consumer laser products are given in 6.2.;
- b) the accessible emission determined at the closest point of human access and the point of the highest accessible emission (worst case condition regarding the beam diameter) with a circular aperture stop with a diameter of 3,5 mm shall not exceed the AEL of Class 3B; and
- c) during any user maintenance, access to laser radiation in excess of the assigned laser class shall not be possible.

NOTE 1 Class 1C laser products are not in the scope of this document.

NOTE 2 A flowchart of the requirements of Clause 5 and Clause 6 can be found in Annex A as a simplified summary.

NOTE 3 Requirement c) is more restrictive than the requirements of EN 60825-1:2014 and EN 60825-1:2014/A11:2021, 6.2.1, where for maintenance of Class 1 and Class 2 laser products, human access to levels of laser radiation of Class 3R is permitted.

NOTE 4 It is noted that embedded Class 1 laser products that comply with EN 60825-1 where there is no human access to laser radiation during operation or maintenance (i.e. which are fully enclosed) will comply with all requirements of Clauses 4 to 6 of this document, so that no specific or additional compliance testing with respect to these requirements is necessary. This also applies to products that are classified as Class 1 products based on subclause 4.4 of EN 60825-1:2014 and EN 60825-1:2014/A11:2021 where the emission is classified under the EN 62471 series.

NOTE 5 It is noted that for the classification as Class 1 or Class 2 according to EN 60825-1, the accessible emission below 400 nm is not permitted to exceed the relevant AEL of Class 1.

6.2 Requirements for Class 3R consumer laser products

When the specific application of the consumer laser product requires a Class 3R laser product, the additional requirements a) to h) shall be met.

- a) the laser product shall not be a laser pointer;

NOTE 1 Laser pointers for which the accessible emission exceeds Class 2 are associated with a higher risk of causing temporary visual disturbance effects. When persons who are undertaking safety critical tasks, such as driving a vehicle, are exposed to the laser beam resulting in visual glare and visually disturbing effects, this can represent a severe risk. While glare and visually disturbing effects are also possible for lower power lasers, even Class 1 lasers emitting in the visible wavelength-range, the effect, for a given wavelength, will be more pronounced for power levels exceeding Class 2.

- b) a statement justifying the reason why a Class 3R product is required shall be given in the information to the user. This will include why a Class 1 or Class 2 consumer laser product is not adequate;

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- c) a deliberate action is required by the user prior to activation of the laser emission, avoiding unexpected exposure. A clear emission indication on the device shall be provided;

NOTE 2 This requirement is more restrictive than EN 60825-1:2014 and EN 60825-1:2014/A11:2021, 6.7.1.

NOTE 3 Examples of deliberate actions are: a long press activation button, double press action, key switch, or an unlock feature by sliding or twisting.

NOTE 4 Examples of emission indication include: a symbol on a LCD display, backlight LCD illumination, or a visible status LED.

- d) intrabeam viewing is not intended or necessary for the function of the product;
- e) the wavelength shall be within the range of $400 \text{ nm} \leq \lambda < 1250 \text{ nm}$. Additional emission in the wavelength range of 1250 nm to 1400 nm is not permitted. That is, if there is emission in both wavelength ranges, the product has to be Class 1 or Class 2.

NOTE 5 Any emission in the wavelength range below 400 nm or above 1400 nm is not additive with the above wavelength range and can be emitted additionally; the Class 1 AEL applies for these additional emissions.

- f) the AEL that is applied for classification shall be based on $C_6 = 1$, i.e. EN 60825-1:2014 and EN 60825-1:2014/A11:2021, Table 6, using the simplified, default method in EN 60825-1:2014 and EN 60825-1:2014/A11:2021, 5.4.1;
- g) for the wavelength range of 400 nm to 700 nm in case of continuous wave emission (i.e. no pulse duration less than 0,25 s) or pulsed accessible emission, the peak power of the continuous wave emission or pulses shall not exceed 5 mW as defined by the AEL of Class 3R for emission duration t equal to 0,25 s; and
- h) for the wavelength range of 700 nm to 1250 nm in case of continuous wave emission or, pulsed accessible emission, the peak power of the pulses shall not exceed $2 \times C_4 \times C_7$ mW as defined by the AEL of Class 3R for emission duration of t equal to 100 s.

If one or more of the requirements 6.2 a) to 6.2 h) is not met, then the product shall not be a consumer laser product.

NOTE 6 If the accessible emission, the information to the user and the emission controls comply with the above requirements 6.2 a) to 6.2 h), according to the state of science and technology, the risk is considered low enough for the product to be made available on the market as a consumer product.

NOTE 7 A flowchart of the requirements of Clause 5 and Clause 6 can be found in Annex A as a simplified summary.

7 User information and labelling

7.1 General

The requirements of this Clause 7 apply additionally to the requirements of EN 60825-1:2014 and EN 60825-1:2014/A11:2021, Clause 7 (labelling) and Clause 8 (information for the user, purchasing and servicing information).

A statement of compliance with EN 50689 shall be included in the information for the user. The information for the user shall describe the product's intended use as a consumer laser product.

The following additional wording shall be on the explanatory label (EN 60825-1:2014 and EN 60825-1:2014/A11:2021, Clause 7) to show that the laser product is a consumer laser product that is compliant with EN 50689:2021. This wording can also be added to the respective alternative labels given in EN 60825-1:2014 and EN 60825-1:2014/A11:2021. The required reference to EN 50689:2021