



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 12254:2010

**Screens for laser working places -
Safety requirements and testing**

Abschirmungen an Laserarbeitsplätzen -
Sicherheitstechnische Anforderungen
und Prüfung

Écrans pour postes de travail au laser -
Exigences et essais de sécurité

03/2010



National Foreword

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Screens for laser working places - Safety requirements and testing

Écrans pour postes de travail au laser - Exigences et essais de sécurité

Abschirmungen an Laserarbeitsplätzen - Sicherheitstechnische Anforderungen und Prüfung

This European Standard was approved by CEN on 20 February 2010.

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Foreword

This document (EN 12254:2010) has been prepared by Technical Committee CEN/TC 85 “Eye protective equipment”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

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

This document supersedes EN 12254:1998+A2:2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies functional requirements and a product labelling applicable to temporary and permanent passive guards (in the following called screens) for protection against laser radiation. This standard includes test methods for testing functional performance and the specification of the user documentation to be supplied with the product. The screens are designed to protect the user from:

- unintentional exposure to direct and/or diffuse laser radiation;
- a time limited exposure to laser radiation, based on the functional requirements determined by risk assessment.

This European Standard applies to supervised screens for installations in working places at which laser radiation up to a maximum mean power of 100 W or single pulse energy of 30 J occurs within the spectral range between 180 nm (0,18 μm) and 10^6 nm (1 000 μm).

This European Standard applies to the protection against laser radiation only. This standard does not apply to other hazards including hazards from secondary radiation that can arise during, for example, material processing.

This European Standard gives guidance on how to select such screens.

Laser enclosures and housings that are supplied as part of the laser product or are supplied to be fitted to a laser system to form a laser product (according to EN 60825-1) are not considered to be within the scope of the standard.

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.

EN 165:2005, *Personal eye-protection — Vocabulary*

EN 166:2001, *Personal eye-protection — Specifications*

EN 168:2001, *Personal eye-protection — Non-optical test methods*

EN 1598:1997, *Health and safety in welding and allied processes — Transparent welding curtains, strips and screens for arc welding processes*

EN 1598:1997/A1:2001, *Health and safety in welding and allied processes — Transparent welding curtains, strips and screens for arc welding processes*

EN 60825-1:2007, *Safety of laser products — Part 1: Equipment classification and requirements (IEC 60825-1:2007)*

EN 60825-4:2006, *Safety of laser products — Part 4: Laser guards (IEC 60825-4:2006)*

IEC 60050-845:1987, *International Electrotechnical Vocabulary — Chapter 845: Lighting*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 165:2005, EN 60825-1:2007, EN 60825-4:2006 and IEC 60050-845:1987 apply.

4 Requirements

4.1 Spectral transmittance

The relationship between spectral transmittance at the laser wavelength and resistance to laser radiation is based on the maximum permissible exposure (MPE) shown in EN 60825-1. To simplify product specification, tests are conducted for laser test conditions described in Table 1. The laser test conditions are referred to by the symbols D, I, R and M.

Table 1 — Duration of test applicable to screens for laser working places

Test condition (corresponding laser designation)	Pulse duration s	Number of pulses
D (continuous wave (CW) laser)	100	1
I (pulsed laser)	10^{-6} to 10^{-2}	1 000
R (Giant pulsed laser)	10^{-9} to 10^{-6}	1 000
M (Mode-coupled pulsed laser)	$\leq 10^{-9}$	100 000
NOTE The listed pulse durations are values of typical lasers. A laser with a pulse length in this range of values is recommended for testing. Total exposure time for each test should be about 100 s.		

4.2 Resistance to laser radiation

The screens shall not lose their protective properties and shall stay within the scale number under effect of laser radiation with the power and energy density as specified in Table 2 including induced transmission (reversible bleaching).

4.3 Stability to UV radiation

When exposed to ultraviolet radiation in accordance with 5.4.1, the spectral transmittance at the laser wavelengths shall not exceed the maximum permissible spectral transmittance of the corresponding scale number.

4.4 Stability to elevated temperature

After exposure to elevated temperature in accordance with 5.4.2, the requirements of 4.1 to 4.2 shall be met.

4.5 Mechanical strength

Flexible screens shall withstand for 10 s a tensile stress of 15 N/mm^2 when tested according to 5.5.1. After this test, no sample shall be torn.

Inflexible screens shall be robust in accordance to 7.1.4.2 of EN 166:2001.

Fixing systems of screens shall be designed so that they remain attached to the screens or to the machinery when the screens are removed.