

SLOVENSKI STANDARD SIST EN 12254:1999/A1:2003 01-januar-2003

Zasloni pri delu z laserji - Varovalne zahteve in preskušanje

Screens for laser working places - Safety requirements and testing

Abschirmungen an Laserarbeitsplätzen - Sicherheitstechnische Anforderungen und Prüfung

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

(standards.iteh.ai) Ta slovenski standard je istoveten z: EN 12254:1998/A1:2002

SIST EN 12254:1999/A1:2003

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<u>ICS:</u>

13.280 13.340.20 31.260

SIST EN 12254:1999/A1:2003

en

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EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 12254:1998/A1

September 2002

ICS 13.280; 13.340.20; 31.260

English version

Screens for laser working places - Safety requirements and testing

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

Abschirmungen an Laserarbeitsplätzen -Sicherheitstechnische Anforderungen und Prüfung

This amendment A1 modifies the European Standard EN 12254:1998; it was approved by CEN on 1 August 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 12254:1998/A1:2002 E

Foreword

This document EN 12254:1998/A1:2002 has been prepared by Technical Committee CEN /TC 85 "Eye-protective equipment", the secretariat of which is held by AFNOR.

This Amendment to the European Standard EN 12254:1998 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2003, and conflicting national standards shall be withdrawn at the latest by March 2003.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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5.2 Stability to laser radiation

	Maximum spectral trans- mittance at the laser wavelength	Mean power (<i>E</i>) and single pulse energy density (<i>H</i>) for testing protective properties and resistance to laser radiation in the wavelength range										
		180 nm to 315 nm			> 315 nm to 1050 nm	> 1050 nm to 1400 nm	> 315 nm to 1400 nm		> 1400 nm to 10 ⁶ nm			
		For test condition/pulse duration in s (see Table 1)										
Scale number	τ (λ)	D	I, R	М	D	D	I, R	М	D	I, R	М	
		> 0,25	> 10 ⁻⁹ to 0,25	≤ 10 ⁻⁹	> 5·10 ⁻³	> 2·10 ⁻³	> 10 ⁻⁹ to 0,01	≤ 10 ⁻⁹	> 0,1	> 10 ⁻⁹ to 0,1	≤ 10 ⁻⁹	
		E _D	H _{I, R}	E_{M}	E _D	E _D	H _{I, R}	H _M	E _D	H _{I, R}	E _M	
		W/m ²	J/m ²	W/m ²	W/m ²	W/m ²	J/m ²	J/m ²	W/m ²	J/m ²	W/m ²	
A1	10 ⁻¹	0,01	3∙10 ²	3·10 ¹¹	10	2,5·10 ²	0,05	0,0015	10 ⁴	10 ³	10 ¹²	
A2	10 ⁻²	0,1	3∙10 ³	3·10 ¹²	10 ²	2,5·10 ³	0,5	0,015	10 ⁵	10 ⁴	10 ¹³	
A3	10 ⁻³	1	3·10 ⁴	3∙10 ¹³	10 ³	2,5 · 10 ⁴	5	0,15	10 ⁶	10 ⁵	10 ¹⁴	
A4	10 ⁴	10	3 10 ⁵	3.1014	DA1RD	P 2,5·10 ⁵	50	1,5	10 ⁷	10 ⁶	10 ¹⁵	
A5	10 ⁻⁵	10 ²	3·10 ⁶	3.10 ¹⁵	10 ⁵	2,5.106	5∙10 ²	15	10 ⁸	10 ⁷	10 ¹⁶	
A6	10 ⁻⁶	10 ³	3·10 ⁷	3∙10 ¹⁶	10 ⁶	2,5·10 ⁷	5∙10 ³	1,5·10 ²	10 ⁹	10 ⁸	10 ¹⁷	
A7	10 ⁻⁷	10 ⁴	3∙10 ⁸	<u>31901EN</u>	1225407999/A	1:22,55 10 ⁸	5·10 ⁴	1,5·10 ³	10 ¹⁰	10 ⁹	10 ¹⁸	
A8	10 ⁻⁸	https://sta 10 ⁵	indards ite 3.109 38e6	h.avcatalog 3.10 ¹⁸ f70a082d/s	standards/sist/ ist-en-12254-	6655e01-8162 992,510 999-a1-2003	-4449-62 5·10 ⁵	^{4d-} 1,5·10 ⁴	10 ¹¹	10 ¹⁰	10 ¹⁹	
A9	10 ⁻⁹	10 ⁶	3·10 ¹⁰	3∙10 ¹⁹	10 ⁹	2,5·10 ¹⁰	5.10 ⁶	1,5·10 ⁵	10 ¹²	10 ¹¹	10 ²⁰	
A10	10 ⁻¹⁰	10 ⁷	3·10 ¹¹	3·10 ²⁰	10 ¹⁰	2,5·10 ¹¹	5·10 ⁷	1,5·10 ⁶	10 ¹³	10 ¹²	10 ²¹	

Table 2 — Scale numbers of screens for laser working places (maximum spectral transmittance and resistance to laser radiation)

Replace the second paragraph of section 5.2 by the following:

The diameter d_{63} of the laser beam during this test shall be ≥ 0.5 mm for pulse durations < 1 ns.

The diameter d_{63} of the laser beam during this test shall be $\geq 2 \text{ mm}$ in all other cases. A beam diameter d_{65} between 0,5 mm and 2,0 mm may be used if the irradiance E(d) or radiant exposure H(d) used at a diameter d is increased compared to the nominal value E_n or H_n , respectively by the factor given by the following formula:

$$E(d) / E_n = a_0 + a_1 \cdot e^{-d/a_2}$$
 or $H(d) / H_n = a_0 + a_1 \cdot e^{-d/a_2}$

where the constants are in the case of filters consisting of

- glass or containing glass

 $a_0 = 0,769, a_1 = 18,29, a_2 = 0,4778.$

- plastics

 $a_0 = 1$ $a_1 = 5,66$, $a_2 = 0,4498$

In the case of rectangular beams, the dimensions specified apply to the shortest side of the rectangle.

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NOTE: The number of decimals of the coefficients was chosen to give a smooth transition at a 2 mm beam diameter. It should not be interpreted as a requirement for measurement accuracy.

New 5.5

5.5 Mechanical strength

5.5.1 Flexible Screens

5.5.1.1 Testing machine

The tensile testing machine shall be power-driven and capable of maintaining the appropriate rate of grip separation as specified in clause 5.5.1.3. The testing machine shall be equipped with the following devices.

— Grips for holding the test sample, one being fixed and the other movable.

The grips shall be self-aligning in that they are attached to the machine in such a way that they move freely into alignment as soon as any load is applied so that the long axis of the test sample coincides with the direction of pull through the centre line of the grip assembly. The test sample shall be held in such a way that slip relative to the grip is prevented as far as possible and this shall preferably be effected with the type of grip which maintains or increases pressure on the test sample as the force applied to the test sample increases. The clamping system shall not cause premature fracture at the grips.

 Load indicator incorporating a suitable load-indicating mechanism capable of showing the total tensile load carried by the test sample when held by the grips.

5.5.1.2 Test samples **iTeh STANDARD PREVIEW**

Test samples 7 to 9 (10 mm wide and 150 mm long) are cut from the screen.

Test samples 10 to 12 (10 mm wide and 150 mm long) are cut from the screen, the longer dimension being perpendicular to the longer dimension of samples 7 to 9 when cutting them from the screen.

38e6f70a082d/sist-en-12254-1999-a1-2003 Determine the mean width and mean thickness of the test samples.

Gauge marks $(50,0 \pm 0,5)$ mm apart shall be marked on the centre portion of the test samples using ink or other medium that does not affect the material being tested. Gauge marks shall not be punched, scratched or impressed upon the lest samples.

Before testing for resistance to tear the 6 samples shall be tested according to 5.3 for resistance to UV radiation. During this testing, at least the zone between the gauge marks shall be irradiated.

5.5.1.3 Procedure

Mount the test sample in the grips of the testing machine so that the axial alignment coincides with the direction of pull. Tighten the grips uniformly and firmly to prevent the sample from slipping, but not to the extent that the test sample is damaged.

Clamp the test sample so that the distance between the grips of the testing machine is (100 ± 1) mm and the gauge marks are centrally disposed between the grips.

Separate the grips of the testing machine with a speed of (250 ± 25) mm/min until a tensile stress of $(15,0 \pm 1,5)$ N/mm² is reached. 10 s after the maximum tensile stress has been reached, it is noted if any of the samples did tear.

Some materials have a very high elongation which may bring them outside the stretching capacity of the testing machine. In such cases it is permissible to reduce the initial distance between the grips to (50 ± 0.5) mm. The test with reduced distance shall be performed with a new sample.

7 Information supplied by the manufacturer

replace

A note that this assessment should be based on the power/energy density averaged over a circular area of 0,75 mm diameter (1 mm2);

by

 A note that this assessment should be based on the power/energy density averaged over a circular area of 2 mm diameter;

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A.1 Limiting values

Replace figure A.1 by the following:



- 1 Irradiance / W/m²
- 2 Exposure duration /s

Figure A.1 — Comparison of the MPE values of EN 60825-1:2001 with the values in Table A.1

B.1 General

Table B.1 — Scale numbers and use of the screens for protection against accidental irradiation

NOTE The numbers in this table are the same as in Table 2.

Scale number	Maximum spectral trans- mittance at the laser wavelength	Utilisation up to a maximum mean power (<i>E</i>) and energy (<i>H</i>) density (see B.1) in the wavelength range										
		180 nm to 315 nm			> 315 nm to 1050 nm	> 1050 nm to 1400 nm	> 315 nm to 1400 nm		> 1400 nm to 10 ⁶ nm			
		For pulse duration in s (see also Table B.2)										
	$ au$ (λ)	D	I, R	М	D	D	I, R	М	D	I, R	М	
		> 0,25	> 10 ⁻⁹ to 0,25	≤10 ⁻⁹	> 5·10 ⁻³	> 2·10 ⁻³	> 10 ⁻⁹ to 0,01	≤ 10 ⁻⁹	> 0,1	> 10 ⁻⁹ to 0,1	≤ 10 ⁻⁹	
		E _D	H _{I, R}	$E_{\mathbf{M}}$	E _D	E _D	$H_{\rm I, R}$	H_{M}	E _D	$H_{\rm I, R}$	E_{M}	
		W/m ²	J/m ²	W/m ²	W/m ²	W/m ²	J/m ²	J/m ²	W/m ²	J/m ²	W/m ²	
A1	10 ⁻¹	0,01	3∙10 ²	30·10 ¹¹	10	2,5·10 ²	0,05	0,0015	10 ⁴	10 ³	10 ¹²	
A2	10 ⁻²	0,1	3·10 ³	3·10 ¹²	10 ²	2,5·10 ³	0,5	0,015	10 ⁵	10 ⁴	10 ¹³	
A3	10 ⁻³	1	3·10 ⁴	3∙10 ¹³	10 ³	2,5·10 ⁴	5	0,15	10 ⁶	10 ⁵	10 ¹⁴	
A4	10 ⁻⁴	i1 Te	B.10 ⁵	A3.1014	AR04	2,5:105	E 50/	1,5	10 ⁷	10 ⁶	10 ¹⁵	
A5	10 ⁻⁵	10 ²	3·10 ⁶	3-10 ¹⁵	rd ^v ite	2,5-10 ⁶	5∙10 ²	15	10 ⁸	10 ⁷	10 ¹⁶	
A6	10 ⁻⁶	10 ³	3∙10 ⁷	3∙10 ¹⁶	10 ⁶	2,5·10 ⁷	5∙10 ³	1,5·10 ²	10 ⁹	10 ⁸	10 ¹⁷	
A7	10 ⁻⁷	10 ⁴	3.10 ⁸	SISTER 1	2254:1999/A1	$\frac{2003}{2,5.10^8}$	5.10^4	1,5·10 ³	10 ¹⁰	10 ⁹	10 ¹⁸	
A8	10 ⁻⁸	10 ⁵	3310 ⁹ 67	0a3320/sist	-en-1 22 84-19	99- 2,5<u>1</u>0 3	5.10 ⁵	1,5·10 ⁴	10 ¹¹	10 ¹⁰	10 ¹⁹	
A9	10 ⁻⁹	10 ⁶	3·10 ¹⁰	3∙10 ¹⁹	10 ⁹	2,5·10 ¹⁰	5∙10 ⁶	1,5·10 ⁵	10 ¹²	10 ¹¹	10 ²⁰	
A10	10 ⁻¹⁰	10 ⁷	3·10 ¹¹	3·10 ²⁰	10 ¹⁰	2,5·10 ¹¹	5·10 ⁷	1,5·10 ⁶	10 ¹³	10 ¹²	10 ²¹	

Add paragraph B.3:

B.3 Caution for users of laser safety screens

The test for stability to laser radiation stipulated in this standard provides an indication of suitability. The protection afforded by a screen depends on several factors, including laser power, beam area, repetition rate, irradiance distribution, exposure duration and condition of surface. Users should satisfy themselves that the screen material provides adequate protection under the worst reasonably foreseeable conditions of exposure.