



SLOVENSKI STANDARD
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Zaslони proti bleščanju - 1. del: Lastnosti in karakteristike

Anti-glare systems for roads - Part 1: Performance and characteristics

Blendschutzsysteme für Straßen - Teil 1: Anforderungen und Eigenschaften

Systemes anti-éblouissement routiers - Partie 1: Performances et caractéristiques

Ta slovenski standard je istoveten z: EN 12676-1:2000

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ICS:

93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12676-1

March 2000

ICS 93.080.30

English version

Anti-glare systems for roads - Part 1: Performance and characteristics

Systèmes anti-éblouissement routiers - Partie 1:
Performances et caractéristiques

Blendschutzsysteme für Straßen - Teil 1: Anforderungen
und Eigenschaften

This European Standard was approved by CEN on 18 February 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 226 "Road 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of an identical text or by endorsement, at the latest by September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This European Standard consists of the following Parts under the general title :

Anti-glare systems for roads :

- Part 1 : Performance and characteristics ;
- Part 2 : Test methods.

NOTE This draft standard was submitted to the CEN Enquiry as prEN 12676:1999.

Annex A of this European Standard is informative.

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Introduction

Anti-glare systems consist of manufactured equipment which reduces the glare of approaching headlights or of other external light sources.

Anti-glare systems are generally installed on public roads when it is considered beneficial to reduce the effect of glare. Common situations where anti-glare systems may be used are as follows :

- a) in the central reservation of dual carriageway roads and motorways ;
- b) between parallel or converging roads where traffic is travelling in opposing directions ;
- c) glaring light sources reflecting on installations and buildings adjacent to the road ;
- d) glaring light from installations and buildings adjacent to the road.

The test methods for verification of conformity to the performance requirements of this standard are given in EN 12676-2.

1 Scope

This Part of EN 12676 specifies the characteristics of an anti-glare system in terms of its optical effectiveness and of the mechanical performance of its elements. It gives a method for the determination of the optical performance of anti-glare systems by calculation. Requirements and recommendations for the design of anti-glare systems to minimize maintenance are also given.

This Part of EN 12676 does not apply to :

- types of anti-glare systems other than those attached to safety barriers;
- regulatory characteristics which might be required to ensure that anti-glare systems are compatible with road signs;
- specific requirements resulting from extreme environmental conditions experienced in some European countries.

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2 Normative references

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This Part of EN 12676 incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Part of EN 12676 only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 1317-2 Road restraint systems - Part 2 : Performance classes, impact test acceptance criteria and test methods for safety barriers

ISO 1043-1	Plastics - Symbols and abbreviated - Part 1 : Basic polymers with their special characteristics
ISO 1043-2	Plastics – Symbols - Part 2 : Fillers and reinforcing materials
ISO 9227	Corrosion tests in artificial atmospheres - Salt spray tests
EN 12676-2	Anti-glare systems for roads – Part 2 : Test methods

3 Definitions and symbols

For the purposes of this Part of EN 12676, the following definitions apply :

3.1 occluding element: element of the anti-glare system blocking out light which would be distracting to road users

3.2 support: element onto which occluding elements are mounted

3.3 base: structure (safety barrier) to which the support is attached

3.4 fixing element: component, e.g. screw and nut, which enables the fastening of the occluding elements onto the support, or the support onto its base

NOTE The fixing elements of the anti-glare system are part of the system.

3.5 light transmission factor, C_i : the proportion of incident light which passes through the anti-glare system at a particular angle of incidence i

3.6 limiting angle, α_1 : angle of incidence below which incident light is completely blocked out by the anti-glare system ($C_i = 0$)

4 Requirements

4.1 Design and fixation

The anti-glare system design shall consist of occluding elements which are mounted on a support (figure 1) or directly on the base. Anti-glare systems shall only be fixed in the lower part and shall be designed to be compatible with safety barriers fulfilling the requirements of EN 1317-2.

The complete fixed anti-glare system, or parts of it, even fixing elements, may not project over the edge of the safety barrier. Nevertheless, it is allowed that the plastic parts of an anti-glare system fixed on a concrete barrier may project up to 100 mm beyond the edge of the upper part of the barrier.

4.2 Maintenance

Hollow bodies shall be closed at the top in order to prevent any dirt, snow and water from penetrating into them and also to prevent birds from nesting inside.

Anti-glare systems shall be designed in such a way to enable the replacement of any section of the system without having to remove adjacent parts in any way.

NOTE Anti-glare systems should only require attention if damaged by vehicle impact or by other unusually severe conditions. During its functional life time, it should resist minor impacts from stones.

4.3 Characteristics

If accessibility is required, it shall fall into one of the two following categories:

Category 1: designed to permit at any place the passage of personnel carrying stretchers from one side of the base to the other without the need to remove a section of the anti-glare system.

Category 2: not designed to permit access at any place, but requiring a section of the anti-glare system to be removed to permit access.

NOTE This design may be appropriate in areas, such as urban areas, where it is desirable to prevent pedestrians climbing over the base. This category of anti-glare systems should permit sections to be removed by emergency service personnel.

4.4 Durability

4.4.1 Synthetic materials

The durability of the synthetic materials shall be verified by testing the impact strength of specimens before and after ageing in accordance with EN 12676-2. When new, the relative difference between the values of tensile impact strength obtained at temperatures of (23 ± 3) °C and (-30 ± 3) °C shall not exceed 15 %. After ageing, the tensile impact test values shall be more than 80 % of their initial values for each of the tested specimens at (23 ± 3) °C and at (-30 ± 3) °C.

Only ductile fractures are acceptable.

4.4.2 Metallic elements

Metallic elements of the anti-glare system shall be made of, or coated with, corrosion resistant materials. Durability shall be assessed in accordance with EN 12676-2. Parts which are made of, or coated with, synthetic materials shall be aged by the process described in EN 12676-2 before being tested. After exposure of the metallic elements of the anti-glare system to the salt spray test, as described in ISO 9227, there shall be no evidence of corrosion, such as rust stains or blistering of the coating.

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4.5 Effectiveness with respect to glare

4.5.1 General

The anti-glare system shall reduce the level of light that would otherwise dazzle road users, as described below. It shall be effective over its full height, i.e. from the upper edge of the base on which it is mounted. However, a maximum gap of 20 mm is admissible between the upper edge of the base and the bottom edge of the support or of the occluding elements.

NOTE The height of the anti-glare system depends on general conditions, such as the relative levels of vehicle headlights and the eyes of the drivers in the opposing traffic directions. The main factors to be considered are the height of these above the road and their distance to the anti-glare systems. However, it may not be possible in every situation to completely eliminate the effect of glare because of conflicting road geometry. Annex A provides examples of the heights of anti-glare systems needed to block out light for a number of typical cases.

4.5.2 Verification by calculation

Because of the way they are constructed, some systems totally block out the incident rays up to a limit angle α_1 . For elements perpendicular to the axis of installation, this angle may be found by calculating its tangent using the following equation :

$$\tan \alpha_1 = \frac{L}{D}$$

where:

D is the distance between two occluding elements;

L is the width of an occluding element.

If L is not constant it shall be obtained by dividing the surface area resulting from the projection of an occluding element on a vertical plane perpendicular to the direction of the axis of installation of the system, by the height of the occluding element (see figure 2).

If $\tan \alpha_1 \geq 0,33$ verification in accordance with 4.5.3 is not necessary.

4.5.3 Verification by testing

This verification is necessary when $\tan \alpha_1 < 0,33$.

The level of screening produced by the anti-glare system for an angle of incidence i is given by the transmission factor C_{ti} where i is the angle between the axis of the system and the direction of the incident ray.

C_{ti} shall be determined in accordance with EN 12676-2.

The maximum acceptable values of C_{ti} shall be as follows:

- a) for angles of incidence $\leq 12^\circ$, $C_{ti} \leq 0,05$;
- b) either $C_{15} \leq 0,05$, or $C_{18} \leq 0,2$ and $C_{15} \leq 0,15$.

4.6 Lateral visibility

There are two groups of anti-glare systems.

Group 1 : Good lateral visibility through the occluding elements is ensured. For this purpose, any rectangle of length 1 m and of the same height as the occluding elements is selected in a vertical plane which contains the direction of the axis of installation of the system (see figure 3). The surface area occupied by material (the solid area) shall not exceed 20 % of the total surface area of the rectangle.

Group 2 : Other anti-glare systems.

4.7 Resistance to wind

A complete section of the anti-glare system shall be tested in a wind tunnel at an air speed of 40 m/s (144 km/h), as described in EN 12676-2. None of the recorded deformation values shall exceed 10 % in the transverse direction and 25 % in the longitudinal direction.

If the system is available in several heights only the highest shall be tested.

5 Marking

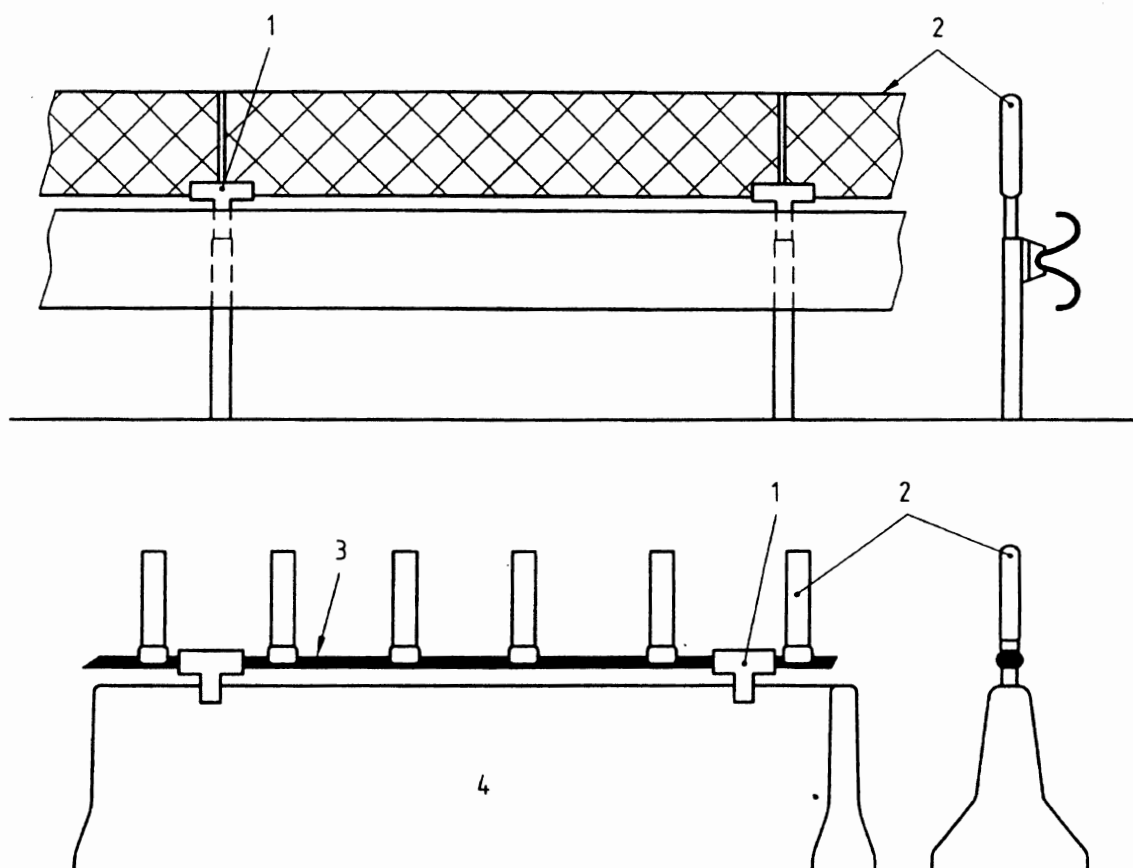
Every occluding element of the anti-glare system shall be marked with the following data which shall be clearly visible :

- a) name of the manufacturer;
- b) year and quarter of manufacture;
- c) abbreviation of the group of synthetic materials used in accordance with ISO 1043-1 and ISO 1043-2.

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- 1 Fixing element
- 2 Occluding element
- 3 Support
- 4 Base

Figure 1 - Two types of anti-glare systems mounted onto different types of bases