

SVENSK STANDARD

SS-EN 1836:2005+A1:2007

Fastställt/Approved: 2007-09-20

Publicerad/Published: 2007-11-15

Utgåva/Edition: 1

Språk/Language: engelska/English

ICS: 13.340.20

Ögonskydd – Solglasögon och solskyddsfilter för allmänt bruk samt filter för direkt iakttagelse av solen

Personal eye-equipment – Sunglasses and sunglare filters for general use and filters for direct observation of the sun

© SIS, Swedish Standards Institute. This product is protected from www.sis.se. Buy the entire standard via: <https://www.sis.se/std-63178>.

Denna produkt är skyddad av svensk och internationell upphovsrättslagstiftning.

Läs noggrant igenom villkoren i Slutavtändarlicensen innan användning sker. Genom att använda produkten godkänner ni och accepterar villkoren i detta licensavtal.

© SIS, Swedish Standards Institute.

This product is protected by Swedish and international copyright law.

Please read the terms and conditions of the End User License Agreement before using the product. By using the product you are accepting the terms and conditions of this license agreement.



SWEDISH
STANDARDS
INSTITUTE

Hitta rätt produkt och ett leveranssätt som passar dig

Standarder

Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

Tjänster

Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på. På så sätt är du säker på att du alltid arbetar efter rätt utgåva.

e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

Leveranssätt

Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

Andra produkter

Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement".

Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på sis.se och ger dig en bra bild över hur olika produkter hör ihop.

Standardiseringsprojekt

Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

Find the right product and the type of delivery that suits you

Standards

By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

Services

Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.

e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

Type of delivery

You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

Other products

We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements.

Matrices, listed at sis.se, provide an overview of which publications belong together.

Standardisation project

You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

Europastandarden EN 1836:2005+A1:2007 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1836:2005+A1:2007.

Denna standard ersätter SS-EN 1836:2005, utgåva 2.

The European Standard EN 1836:2005+A1:2007 has the status of a Swedish Standard. This document contains the official English version of EN 1836:2005+A1:2007.

This standard supersedes the Swedish Standard SS-EN 1836:2005, edition 2.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.

Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00.

Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.

E-mail: sis.sales@sis.se Internet: www.sis.se

EUROPEAN STANDARD

EN 1836:2005+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2007

ICS 13.340.20

Supersedes EN 1836:2005

English Version

Personal eye-equipment - Sunglasses and sunglare filters for general use and filters for direct observation of the sun

Équipement de protection individuelle de l'oeil - Lunettes solaires et filtres de protection contre les rayonnements solaires pour usage général et filtres pour observation directe du soleil

Persönlicher Augenschutz - Sonnenbrillen und Sonnenschutzfilter für den allgemeinen Gebrauch und Filter für die direkte Beobachtung der Sonne

This European Standard was approved by CEN on 28 July 2005 and includes Amendment 1 approved by CEN on 3 August 2007 and the Corrigendum issued in 2006.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Filter requirements	9
4.1 Transmittance	9
4.2 Optical power of oculars	13
4.3 Scattered light	14
4.4 Material and surface quality	15
4.5 Robustness	15
4.6 Resistance to radiation	15
4.7 Ignition	16
5 Requirements for complete sunglasses (frames with filters)	16
5.1 General.....	16
5.2 General construction.....	16
5.3 Mechanical requirements.....	16
5.4 Ignition	16
5.5 Materials for the manufacture of complete sunglasses	17
6 Testing	17
6.1 General.....	17
6.2 Transmittance	17
6.3 Optical power values	22
6.4 Scattered light	22
6.5 Material and surface quality	22
6.6 Robustness	23
6.7 Resistance to radiation	23
6.8 Ignition	24
6.9 Conditioning and test conditions for complete sunglasses	24
6.10 Test for mechanical requirements for complete sunglasses.....	25
7 Information and labelling	27
7.1 General.....	27
7.2 Complete sunglasses.....	27
7.3 Uncut finished lenses and replacement lenses (unmounted sunglass filters).....	29
7.4 Transmittance or reflectance claims	29
7.5 Robustness claims	29
Annex A (normative) Cut-on filter for UV filtering	30
Annex B (normative) Spectral functions for the calculation of luminous transmittance and relative visual attenuation coefficients (quotients).....	32
Annex C (normative) Spectral functions for the calculation of solar UV transmittance values and blue-light transmittance	34
Annex D (normative) Spectral function for the calculation of infrared transmittance	36
Annex E (informative) Use of sunglare filters.....	38
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC.....	41
Bibliography	43

Foreword

This document (EN 1836:2005+A1:2007) 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 March 2008, and conflicting national standards shall be withdrawn at the latest by March 2008.

This document supersedes A1 EN 1836:2005 A1.

This document includes Amendment 1, approved by CEN on 2007-08-03 and the Corrigendum issued in 2006.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags AC AC.

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, 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.

EN 1836:2005+A1:2007 (E)

1 Scope

This European Standard specifies physical properties (mechanical, optical etc.) for sunglasses and sunglare filters of nominal plano power which are not prescription lenses, intended for protection against solar radiation for general use, for social and domestic purposes, including road use and driving. This European Standard specifies also requirements for filters for the direct observation of the sun (e.g. during eclipses). Guidance for selection and use of these filters is given in Annex E. For sunglasses and sunglare filters for industrial use, EN 166 and EN 172 apply.

This European Standard does not apply to eyewear for protection against radiation from artificial light sources, such as those used in solaria. EN 170 applies for these filters.

This European Standard does not apply to ski goggles, for which EN 174 applies, or other types of eye protection used for leisure activities.

This European Standard does not apply to sunglasses and filters that have been medically prescribed for attenuating solar radiation.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. 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 ^{A1}, *Personal eye protection - Vocabulary*

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

EN 167:2001, *Personal eye protection - Optical test methods*

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

EN 1811, *Reference test method for release of nickel from products intended to come into direct and prolonged contact with the skin*

EN 12472, *Method for the simulation of wear and corrosion for the detection of nickel release from coated items* ^{A1}

CIE 85:1989, *Solar spectral irradiance*

ISO 8624:2002, *Ophthalmic optics -- Spectacle frames -- Measuring system and terminology*

ISO/CIE 10526:1999, *CIE standard illuminants for colorimetry*

ISO/CIE 10527:1991, *CIE standard colorimetric observers*

IEC 60050-845:1987, ^{A1} *International Electrotechnical vocabulary – Chapter 845: Lighting* ^{A1}

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in A1 EN 165:2005 A1 and IEC 60050-845:1987 and the following apply.

3.1

absorptance (absorption)

absorptance is the difference 1 minus transmittance minus reflectance

NOTE Some manufacturers use the term absorption and specify the value of the absorption as the difference 1 minus the luminous transmittance.

3.2

degree of polarisation, P

defined as:

$$P = \frac{\tau_{p\max} - \tau_{p\min}}{\tau_{p\max} + \tau_{p\min}}$$

where

$\tau_{p\max}$ is the maximum values of luminous transmittance as determined with linearly polarised radiation;

$\tau_{p\min}$ is the minimum values of luminous transmittance as determined with linearly polarised radiation.

3.3

luminous transmittance of photochromic sunglare filters

five different values of the luminous transmittance of photochromic sunglare filters are defined by this European Standard:

τ_0 luminous transmittance in the faded state as reached at 23 °C after specified conditioning;

τ_1 luminous transmittance in the darkened state as reached at 23 °C after specified irradiation simulating mean outdoor conditions;

τ_w luminous transmittance in the darkened state as reached at 5 °C after specified irradiation simulating outdoor conditions at low temperatures;

τ_s luminous transmittance in the darkened state as reached at 35 °C after specified irradiation simulating outdoor conditions at high temperatures;

τ_a luminous transmittance in the darkened state as reached at 23 °C after specified irradiation simulating reduced light conditions.

EN 1836:2005+A1:2007 (E)

3.4
photochromic range, R_p
range given by the ratio of the difference of the luminous transmittance in the faded state τ_0 and the luminous transmittance in the darkened state τ_1 to the luminous transmittance in the faded state τ_0 :

$$R_p = \frac{\tau_0 - \tau_1}{\tau_0}$$

3.5
photochromic sunglare filter
filter that reversibly alters its luminous transmittance under the influence of sunlight

NOTE This alteration is not instantaneous, but is a function of a temperature and material dependent time constant. In this way, the luminous transmittance of the filter adjusts itself within certain limits to the ambient radiant flux.

3.6
polarising sunglare filter
filter of which transmittance is dependent on the polarisation of the radiation

NOTE Polarising sunglare filters have a preferred plane of polarisation. The plane of polarisation is determined by the transmission direction and the magnetic vector of the transmitted electromagnetic wave.

3.7
reference points
reference points of eye-protectors with afocal lenses are defined in EN 167:2001 by the points where the two light bundles are passing through the oculars, unless the manufacturer specifies different ones (e.g. in the case of frames for children). The boxed centre (see Figure 5) of the ocular takes the place of the reference point if this is not known and cannot be determined by using this method

3.8
relative visual attenuation coefficient (quotient) for signal light recognition
quotient Q is defined as:

$$Q = \frac{\tau_{sign}}{\tau_v}$$

where

τ_v is the luminous transmittance of the sunglare filter for CIE standard illuminant D 65. See ISO/CIE 10526;

τ_{sign} is the luminous transmittance of the sunglare filter for the spectral power distribution of the traffic signal light.

These are given by the equations:

$$\tau_v = \frac{\int_{380 \text{ nm}}^{780 \text{ nm}} \tau_F(\lambda) \cdot V(\lambda) \cdot S_{D65\lambda}(\lambda) \cdot d\lambda}{\int_{380 \text{ nm}}^{780 \text{ nm}} V(\lambda) \cdot S_{D65\lambda}(\lambda) \cdot d\lambda}$$

$$\boxed{\text{AC}} \tau_{\text{sign}} = \frac{\int_{380 \text{ nm}}^{780 \text{ nm}} \tau_F(\lambda) \cdot \tau_s(\lambda) \cdot V(\lambda) \cdot S_{A\lambda}(\lambda) \cdot d\lambda}{\int_{380 \text{ nm}}^{780 \text{ nm}} \tau_s(\lambda) \cdot V(\lambda) \cdot S_{A\lambda}(\lambda) \cdot d\lambda} \boxed{\text{AC}}$$

where

$S_{A\lambda}(\lambda)$ is the spectral distribution of radiation of CIE standard illuminant A (or 3200 K light source for blue signal light). See: ISO/CIE 10526;

$S_{D65\lambda}(\lambda)$ is the spectral distribution of radiation of CIE standard illuminant D 65. See: ISO/CIE 10526:1991;

$V(\lambda)$ is the spectral luminous efficiency for daylight vision. See: ISO/CIE 10527;

$\tau_s(\lambda)$ is the spectral transmittance of the traffic signal lens;

$\tau_F(\lambda)$ is the spectral transmittance of the sunglare filter.

The spectral values of the products of the spectral distributions ($S_{A\lambda}(\lambda)$, $S_{D65\lambda}(\lambda)$) of the illuminants, the spectral luminous efficiency $V(\lambda)$ of the eye and the spectral transmittance $\tau_s(\lambda)$ of the traffic signal lenses are given in Annex B.

3.9

solar blue-light transmittance τ_{sb}

mean of the spectral transmittance between 380 nm and 500 nm weighted with the solar radiation $E_{s\lambda}(\lambda)$ at sea level for air mass 2 and the blue-light hazard function $B(\lambda)$. The complete weighting function is the product of both:

$$WB_\lambda(\lambda) = E_{s\lambda}(\lambda) \times B(\lambda)$$

The values of these functions are given in Annex C and may be interpolated where necessary. The definition of τ_{sb} is the following:

$$\tau_{sb} = \frac{\int_{380 \text{ nm}}^{500 \text{ nm}} \tau_F(\lambda) \cdot E_{s\lambda}(\lambda) \cdot B(\lambda) \cdot d\lambda}{\int_{380 \text{ nm}}^{500 \text{ nm}} E_{s\lambda}(\lambda) \cdot B(\lambda) \cdot d\lambda} = \frac{\int_{380 \text{ nm}}^{500 \text{ nm}} \tau_F(\lambda) \cdot WB_\lambda(\lambda) \cdot d\lambda}{\int_{380 \text{ nm}}^{500 \text{ nm}} WB_\lambda(\lambda) \cdot d\lambda}$$