SLOVENSKI STANDARD
SIST EN 1096-1:2012

01-april-2012

Nadomešča:
SIST EN 1096-1:1999

Steklo v gradbeništvu - Steklo z nanosi - 1. del: Definicije in klasifikacija

Glass in building - Coated glass - Part 1: Definitions and classification

Glas im Bauwesen - Beschichtetes Glas - Teil 1: Definitionen und Klasseneinteilung

Verre dans la construction - Verre à couche - Partie 1: Définitions et classification

Ta slovenski standard je istoveten z: EN 1096-1:2012

ICS:

01.040.81	Steklarska in keramična industrija (Slovarji)	Glass and ceramics industries (Vocabularies)
81.040.20	Steklo v gradbeništvu	Glass in building

SIST EN 1096-1:2012 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1096-1

January 2012

ICS 01.040.81; 81.040.20

Supersedes EN 1096-1:1998

English Version

Glass in building - Coated glass - Part 1: Definitions and classification

Verre dans la construction - Verre à couche - Partie 1: Définitions et classification

Glas im Bauwesen - Beschichtetes Glas - Teil 1: Definitionen und Klasseneinteilung

This European Standard was approved by CEN on 3 December 2011.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 1096-1:2012: E

Contents

Page

Foreword

This document (EN 1096-1:2012) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by NBN.

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 July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

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 1096-1:1998.

EN 1096, *Glass in building - Coated glass*, is composed of the following parts:

— Part 1: Definitions and classification

— Part 2: Requirements and test methods for A, B and S coatings

— Part 3: Requirements and test methods for C and D coatings

— Part 4: Evaluation of conformity/Product standard

— Part 5: Test method and classification for the self-cleaning performances of coated glass surfaces

The main changes compared to the previous edition are:

— reference to the future EN 1096-5: Test method and classification for the Self-cleaning performances of coated glass surfaces;

— Clause 3, Terms and definitions, and Clause 5, Glass substrates, were reorganised and completed;

— addition of a definition of shading coefficient (6.3);

— the wavelengths defining the thermal range were corrected according to EN 12898;

— the identity card is moved to an informative annex.

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, Turkey and the United Kingdom.

1 Scope

This European Standard defines the characteristics, properties and classification of coated glass for use in building.

Test methods and procedures used to establish durability are in Parts 2 and 3 of this standard.

Factory production control and evaluation of conformity, including Annex ZA, are in Part 4 of this standard.

Test methods for determination of self cleaning performances of coated glass are in Part 5.

This standard applies to coated glass for glazing application for use in normally occupied domestic or commercial premises.

This standard is not applicable to:

— adhesive backed polymeric films on glass (prEN 15755-1);

— mirrors made from silvered float glass (EN 1036-1);

— enamelled glass (EN 12150-1, EN 1863-1, 14179-1).

— Painted glass (standard in development)

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 410:2011, *Glass in building — Determination of luminous and solar characteristics of glazing*

EN 572-2, *Glass in building —- Basic soda lime silicate glass products — Part 2: Float glass*

EN 572-4, *Glass in building — Basic soda lime silicate glass products — Part 4: Drawn sheet glass*

EN 572-5, *Glass in building — Basic soda lime silicate glass products — Part 5: Patterned glass*

EN 572-6, *Glass in building — Basic soda lime silicate glass products — Part 6: Wired patterned glass*

EN 572-7, *Glass in building — Basic soda lime silicate glass products — Part 7: Wired or unwired channel shaped glass*

EN 673:2011, *Glass in building — Determination of thermal transmittance (U value) — Calculation method*

EN 674, *Glass in building — Determination of thermal transmittance (U value) — Guarded hot plate method*

EN 675, *Glass in building — Determination of thermal transmittance (U value) — Heat flow meter method*

EN 1096-2, *Glass in building — Coated glass — Part 2: Requirements and test methods for A, B and S coatings*

EN 1096-3, *Glass in building — Coated glass — Part 3: Requirements and test methods for C and D coatings*

EN 1748-1-1, *Glass in building — Special basic products — Borosilicate glasses — Part 1-1: Definition and general physical and mechanical properties*

EN 1748-2-1, *Glass in building — Special basic products — Glass ceramics — Part 2-1: Definition and general physical and mechanical properties*

EN 1863-1, *Glass in building — Heat strengthened soda lime silicate glass — Part 1: Definition and description*

EN 12150-1, *Glass in building — Thermally toughened safety soda lime silicate safety glass — Part 1: Definition and description*

EN 12898:2001, *Glass in building — Determination of the emissivity*

EN 13024-1, *Glass in building — Thermally toughened borosilicate safety glass — Part 1: Definition and description*

EN 14178 -1, *Glass in building — Basic alkaline earth silicate glass products — Part 1: Float glass*

EN 14179-1, *Glass in building — Heat soaked thermally toughened soda lime silicate safety glass — Part 1; Definition and description*

EN 14321-1, *Glass in building — Thermally toughened alkaline earth silicate safety glass — Part 1: Definition and description*

prEN 15681-1, *Glass in building — Basic alumino silicate glass products — Part 1: Definitions and general physical and mechanical properties*

prEN 15682-1, *Glass in building — Heat soaked thermally toughened alkaline earth silicate safety glass — Part 1: Definition and description*

prEN 15683-1, *Glass in building — Thermally toughened soda lime silicate channel shaped safety glass — Part 1: Definition and description*

EN ISO 12543-2, *Glass in building — Laminated glass and laminated safety glass — Part 2: Laminated safety glass (ISO 12543-2)*

EN ISO 12543-3, *Glass in building — Laminated glass and laminated safety glass — Part 3: Laminated glass (ISO 12543-3)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 410:2011, EN 673:2011 and EN 12898:2001 and the following apply.

NOTE For the purposes of these definitions, the term thermally toughened also applies to heat soaked thermally toughened.

3.1 Product definition

3.1.1
coated glass
glass substrate, as defined in 3.1.2, to which has been applied a coating, as defined in 3.1.3, in order to modify one or more of its properties

NOTE The properties modified could be one and/or more of the following:

- light transmittance/reflectance;
- solar heat transmittance /reflectance;
- ultra violet transmittance;
- emissivity;
- self-cleaning performances.

3.1.2
glass substrate
basic glass, special basic glass, chemically strengthened basic glass, thermally treated basic and special basic glass, laminated glass or laminated safety glass (see Clause 4)

3.1.3
coating
one or more thin solid layers of inorganic materials applied on to the surface of a glass substrate by various methods of deposition

3.1.4
on-line coating
treatment of the surface of a moving continuous ribbon of a basic glass, at a stage during its manufacture, before it is cut

3.1.5
off-line coating
application of a coating to individual pieces of glass within a manufacturer's or processor's premises

3.1.6
additive methods of deposition:
single or multilayer systems (consisting of metals, oxides, nitrides, fluorides, diamond like carbon or other compounds) added to the surface of the glass by different methods

3.1.7
coated annealed glass
coated glass which has an annealed glass substrate

3.1.8
coated toughened or heat strengthened glass
coated glass which has a thermally toughened or heat strengthened glass substrate

3.1.9
thermally treated coated glass
coated glass that is thermally toughened or heat strengthened

3.1.10
coated glass - to be toughened or to be heat strengthened
coated glass which has to be thermally toughened or heat strengthened to meet its final spectrophotometric properties

3.1.11
toughenable or heat strengthenable coated glass
coated glass which can be thermally toughened or heat strengthened while keeping its final spectrophotometric properties

3.2 Definitions of luminous, solar and thermal properties

3.2.1
colour rendering in transmission (R_a)
change in colour of an object as a result of the light being transmitted by the coated glass

3.2.2
light reflectance of coated side (ρ_v)
fraction of the incident light that is reflected by the coated glass when the light is incident on the coated side

3.2.3
light reflectance of uncoated side (ρ'_v)
fraction of the incident light that is reflected by the coated glass when the light is incident on the uncoated side

3.2.4
light transmittance (τ_v)
fraction of the incident light that is transmitted by the coated glass

3.2.5
nominal colour in reflection of coated side
colour of the glass observed from the coated side

3.2.6
nominal colour in reflection of uncoated side
colour of the glass observed from the uncoated side

3.2.7
nominal colour in transmission
colour of the glass observed in transmission

NOTE Nominal colour in 3.2.5, 3.2.6 and 3.2.7 is defined with a qualitative indication.

3.2.8
normal emissivity (ε_n)
ratio, in a direction normal to the surface, of the emissive power of the coated surface of the glass to the emissive power of a black body

NOTE For method of determination see EN 12898.

3.2.9
solar direct reflectance of coated side (ρ_e)
fraction of the incident solar radiation that is reflected by the coated glass when the radiation is incident on the coated side

3.2.10
solar direct reflectance of uncoated side (ρ'_e)
fraction of the incident solar radiation that is reflected by the coated glass when the radiation is incident on the uncoated side

3.2.11
solar direct transmittance (τ_e)
fraction of incident solar radiation that is directly transmitted by the coated glass

3.2.12
total solar energy transmittance (solar factor) (g)
total fraction of the incident solar radiation that is transmitted by the coated glass

NOTE For method of calculation see EN 410.

3.2.13
shading coefficient (SC)
ratio of the solar factor of the glass to the solar factor of a reference glass (clear float)

3.2.14
thermal transmittance (*U*)
quantity of heat flowing, under steady conditions, in unit time, through a unit surface of the coated glass, for each degree of temperature difference between inside and outside

NOTE 1 For method of calculation see EN 673.

NOTE 2 In some instances, the symbol U_g is used for the U-value of glazing.

3.2.15
ultraviolet transmittance (τ_{UV})
fraction of the incident UV component of the solar radiation that is transmitted by the coated glass

3.3 Definitions of appearance defects

3.3.1
uniformity defect
slight visible variation in colour, in reflection or transmission, within a coated glass pane or from pane to pane

3.3.2
stain
defect in the coating larger than punctual defect, often irregularly shaped, partially of mottled structure

3.3.3
punctual defect
punctual disturbance of the visual transparency looking through the glass and of the visual reflectance looking at the glass

NOTE Spot, pinhole and scratch are types of punctual defect.

3.3.3.1
spot
defect that commonly looks dark against the surrounding coating, when viewed in transmission

3.3.3.2
pinhole
punctual void in the coating with partial or total absence of coating and it normally contrasts clear relative to the coating, when viewed in transmission

3.3.3.3
scratch
variety of linear score marks, whose visibility depend on their length, depth, width, position and arrangements

3.3.4
cluster
accumulation of very small defects giving the impression of stain

3.4 Symbols

ε_n	normal emissivity
g	total solar energy transmittance (solar factor)

SC	shading coefficient
ρ_e	solar direct reflectance of coated side
ρ'_e	solar direct reflectance of uncoated side
ρ_v	light reflectance of coated side
ρ'_v	light reflectance of uncoated side
R_a	colour rendering in transmission
τ_e	solar direct transmittance
τ_v	light transmittance
τ_{UV}	ultraviolet transmittance
U	thermal transmittance (U-value)
NOTE Some glasses are coated on both sides; in which case they do not have an uncoated side but two coated sides.	

4 Description of additive methods of deposition

4.1 Chemical film formation processes:

Processes where chemical reactions produce films on the glass from liquid, vapour or powder.

NOTE The following are examples:

a) **wet chemical deposition:**
mixture of a dissolved metal salt and a reducing compound is sprayed on to the glass surface. A reduction reaction takes place and fine grained metal is precipitated.

b) **sol-gel coating:**
solutions of metallo-organic-compounds are dip coated and pyrolytically transformed into suitable oxides.

c) **chemical-vapour deposition:**
Compounds in a vapour phase reacting chemically on the hot surface of the glass substrate.

d) **spray-coating:**
Sprayed liquids reacting pyrolytically on the hot surface(s) of the glass substrate.

e) **powder coating:**
Powders reacting chemically on the hot surface of the glass substrate.

4.2 Physical film formation processes

Processes under vacuum conditions, whereby materials from a source are transferred as elements, compounds or ions which subsequently condensation on the glass surface producing the film.

NOTE 1 Chemical reactions can also be associated with this process.