



**SLOVENSKI STANDARD**  
**oSIST prEN 14178-1:2017**  
**01-september-2017**

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**Steklo v gradbeništvu - Osnovni izdelki iz zemljoalkalijskega silikatnega stekla - 1.  
del: Ravno steklo**

Glass in building - Basic alkaline earth silicate glass products - Part 1: Float glass

Glas im Bauwesen - Basiserzeugnisse aus Erdalkali-Silicatglas - Teil 1: Floatglas

Verre dans la construction - Verre de silicate alcalino-terreux de base - Partie 1 : Glace  
flottée

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 14178-1**

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ICS 81.040.20

Will supersede EN 14178-1:2004

English Version

## Glass in building - Basic alkaline earth silicate glass products - Part 1: Float glass

Verre dans la construction - Verre de silicate  
alcalinoterreux de base - Partie 1 : Glace flottée

Glas im Bauwesen - Basiserzeugnisse aus Erdalkali-  
Silikatglas - Teil 1: Floatglas

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 129.

If this draft becomes a European Standard, 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.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (prEN 14178-1:2017) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14178-1:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European standard consists of the following parts:

- prEN 14178-1: Glass in building — Basic alkaline earth silicate glass — Part 1: Float glass;
- prEN 14178-2: Glass in building — Basic alkaline earth silicate glass — Part 2: Product standard.

This European standard differs from EN 14178-1:2004 as follows:

- a) chemical composition has been modified in Table 1;
- b) dimension, observation methods and defect tolerances have been modified in adequation with EN 572-2 and -8 standards; **(standards.iteh.ai)**
- c) a new informative Annex B given complementary information related to REACH has been added; [oSIST prEN 14178-1:2017](https://standards.iteh.ai/catalog/standards/sist/cf50011b-ce0d-45a9-af3f-b331f74c37e0/osist-pren-14178-1-2017)
- d) the document has been editorially revised. <https://standards.iteh.ai/catalog/standards/sist/cf50011b-ce0d-45a9-af3f-b331f74c37e0/osist-pren-14178-1-2017>

## prEN 14178-1:2017 (E)

### 1 Scope

This European standard specifies and classifies basic alkaline earth silicate glass products for use in building. It indicates their chemical composition, main physical and mechanical properties, dimensional and minimum quality requirements (in respect of optical and visual faults).

This European standard applies to basic alkaline earth silicate glass supplied in jumbo sizes, split sizes, supplied sizes or in cut sizes for final end use.

This European standard does not apply to final cut sizes having a dimension less than 100 mm or a surface area less than 0,05 m<sup>2</sup>.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 9385, *Glass and glass-ceramics — Knoop hardness test*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

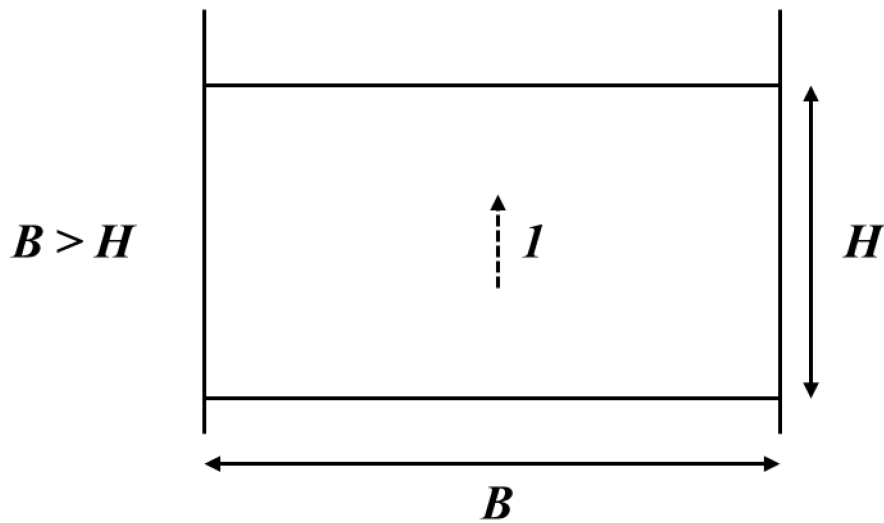
##### **basic alkaline earth silicate float glass**

flat, transparent, clear or tinted float glass with a chemical composition according to 4.1 of this document, having parallel and polished faces obtained by continuous casting and floatation on a metal bath

#### 3.2

##### **length, *H* and width, *B***

defined with reference to the direction of draw of the glass ribbon as shown in Figure 1

**Key**

- 1 --- > direction of draw
- H length
- B width

Figure 1 — Relationship between length, width and direction of draw

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**3.3****jumbo sizes**

glass delivered in the following sizes: [oSIST prEN 14178-1:2017](https://standards.iteh.ai/catalog/standards/sist/cf50011b-ce0d-45a9-af3f-b331f74c37e0/osist-pren-14178-1-2017)

- nominal length H: 4 500 mm, 5 100 mm or 6 000 mm;
- nominal width B: 3 210 mm

Note 1 to entry: The usual width is 3 210 mm. Exceptional production requirements may cause this to be reduced but the nominal width is never below 3 150 mm.

**3.4****split sizes**

glass delivered in the following size ranges:

- nominal length H: 1 000 mm to 2 550 mm;
- nominal width B: 3 210 mm

Note 1 to entry: The usual width is 3 210 mm. Exceptional production requirements may cause this to be reduced but the nominal width is never below 3 150 mm.

**3.5****optical fault**

fault which lead to distortions on the appearance of objects observed through the glass

**prEN 14178-1:2017 (E)****3.6****visual fault**

fault which alter the visual quality of the glass

Note 1 to entry: Visual faults include spot faults and linear / extended faults.

**3.7****spot fault**

nucleus which is generally accompanied by a halo of distorted glass

Note 1 to entry: Spot fault can be solid inclusions, bubbles, etc.

**3.8****halo**

area locally distorted, generally around a point defect

**3.9****linear / extended fault**

fault which can be on or in the glass, in the form of deposits, marks or scratches that occupy an extended length or area

**4 Chemical composition****4.1 Principal constituents**

The basic glass products covered by this European standard are all manufactured from basic alkaline earth silicate glass.

The magnitude of the proportions by mass of the constituents of basic alkaline earth silicate glass covered by this standard is given in Table 1, see also Annex B.

NOTE Oxygen is not mentioned in Table 1 (see Annex A).

**Table 1 — Magnitude of the proportions by mass of the constituents of basic alkaline earth silicate glass**

<b>Constituents</b>	<b>Proportion by mass of element [%]</b>
Silicon (Si)	25,7 to 32,8
Calcium (Ca)	2,1 to 8,6
Potassium (K)	4,1 to 11,7
Aluminium (Al)	0 to 8,0
Zirconium (Zr)	0 to 6,0
Strontium (Sr) + Barium (Ba)	0,8 to 13,2
Other components excluding oxygen <sup>a</sup>	< 5
<sup>a</sup> Properties other than photometric characteristics shall not be significantly altered by these other components.	



## 4.2 Tint

Body tinted basic alkaline earth silicate glass is obtained by the addition of suitable materials.

## 5 Physical and mechanical characteristics

### 5.1 General characteristics

Conventional numerical values for the physical and mechanical characteristics of basic alkaline earth silicate glass excluding 'Characteristic bending strength' ( $f_{g,k}$ ) are given in Table 2. These values, for normal annealed basic alkaline earth silicate glass without any further toughening, are not precise requirements with which the glass shall strictly comply, but are the generally accepted figures for use in calculations where a high degree of accuracy is not required.

**Table 2 — Physical and mechanical characteristics of basic alkaline earth silicate glass**

Characteristic	Symbol	Value and unit
Density (at 18 °C)	$\rho$	2 700 kg/m <sup>3</sup>
Hardness (Knoop)	$HK_{0,1/20}$	5 GPa to 6 GPa <sup>a</sup>
Young's modulus (modulus of elasticity)	$E$	$7,7 \times 10^{10}$ Pa
Poisson's ratio	$\mu$	0,2
Specific heat capacity	$c_p$	$0,7 \times 10^3$ J/(kg·K)
Nominal value of average coefficient of linear expansion between 20 °C and 300 °C	$\alpha$	$8 \times 10^{-6}$ /K
Resistance against temperature differential and sudden temperature change		40 K <sup>b</sup>
Thermal conductivity	$\lambda$	0,8 W/(m·K) to 1,1 W/(m·K)
Mean refractive index to visible radiation (380 nm to 780 nm)	$n$	1,5
Emissivity (corrected)	$\varepsilon$	0,837
<sup>a</sup> Knoop Hardness in accordance with ISO 9385. <sup>b</sup> Generally accepted value that is influenced by edge quality.		

### 5.2 Characteristic bending strength

The characteristic bending strength value applies to quasi-static loading over a short time, e.g. wind loading, and relate to a 5 % probability of breakage at the lower limit of the 95 % confidence interval.

The value of the characteristic bending strength,  $f_{g,k}$  for basic alkaline earth silicate float glass is 45 MPa.

NOTE Methods of determination of the bending strength of glass are given in EN 1288-1 and EN 1288-2 (see [1], [2]). Design of glass panes is covered by prEN 16612 (see [3]).

### 5.3 Designation of clear basic alkaline earth silicate glass

#### 5.3.1 General

A basic alkaline earth silicate glass product is designated as clear basic alkaline earth silicate glass when it is not tinted and when the light transmittance of the glass material, unmodified by the possible presence of a coating, complies with 5.3.2.

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In order to measure the light transmittance characteristics of basic alkaline earth silicate glass, to determine whether it can be designated as a clear basic alkaline earth silicate glass, it is necessary, in some cases, to carry out a pre-treatment: coatings on smooth surfaces have to be eliminated, without modifying the thickness of the basic alkaline earth silicate glass substrate.

The light transmittance of the glass substrate shall be measured with its surfaces in a polished condition.

NOTE The light transmittance values given in 5.3.2 are not suitable for design. They are values used only for the designation of clear glass and exclude the effects of coatings and of surface roughness. The values of light transmittance used for design can be obtained from the glass manufacturer. They are determined in accordance with EN 410.

**5.3.2 Clear transparent basic alkaline earth silicate glass**

A transparent basic alkaline earth silicate glass product is designated as clear when it is not tinted and when its light transmittance:

- after any necessary pre-treatment,
- measured according to EN 410 and
- rounded to the nearest 0,01

is greater than or equal to the value given in Table 3 for the nominal thickness of the glass product.

NOTE The limiting value given in Table 3 is appropriate provided that the measured thickness of the glass product is within the allowable tolerances for the nominal thickness of that glass product.

**Table 3 — Minimum light transmittance values for designating a transparent basic alkaline earth silicate glass product as clear**

Nominal thickness [mm]	Minimum value
2	0,90
3	0,90
4	0,90
5	0,89
6	0,89
8	0,88
10	0,87
12	0,86
15	0,84

**5.4 Stability of physical and chemical characteristics**

For basic alkaline earth silicate glass, the physical and chemical characteristics can be considered as remaining constant over time.

- a) Since basic alkaline earth silicate glass is insensitive to photochemical effects, the spectral properties (transmission of light and solar energy) of the glass products are not modified by direct or indirect solar radiation.
- b) The surface of basic alkaline earth silicate glass used in building is virtually insensitive to attack from the environment.

Whilst the surface of the basic alkaline earth silicate glass when installed in a building is virtually insensitive to attack from water care should be taken to protect the glass surface prior to installation. Inappropriate storage can result in water/humidity being drawn up between glass sheets. This concentrated environment can cause attack of the surface (see [4]).

## 6 Dimensional requirements

### 6.1 Thickness

#### 6.1.1 General

The actual thickness shall be the average of four measurements, taken to the nearest 0,01 mm, one taken at the centre of each side. Measurement shall be made by means of an instrument of the calliper micrometre type.

#### 6.1.2 Tolerances

The actual thickness, rounded to the nearest 0,1 mm shall not vary from the nominal thickness by more than the tolerances shown in Table 4.

**Table 4 — Nominal thicknesses and thickness tolerances**

Dimensions in millimetres

Nominal thickness, <i>d</i>	Thickness tolerances
2	±0,2
3	±0,2
4	±0,2
5	±0,2
6	±0,2
8	±0,3
10	±0,3
12	±0,3
15	±0,5

### 6.2 Length, width and squareness

The tolerance, *t*, on the nominal dimensions length, *H* and width, *B* are ± 5 mm.

The limits of squareness are described by the difference between diagonals. Limits are given in Table 5.

**Table 5 — Limits for the difference between diagonals**

Dimensions in millimetres

Nominal thickness, <i>d</i>	Limit for the difference between diagonals			
	Jumbo sizes	Split, sizes		
		$(H, B) \leq 1\ 500$	$1\ 500 < (H, B) \leq 3\ 000$	$(H, B) > 3\ 000$
2 to 6	10	3	4	5
8 to 12	10	4	5	6
15	10	5	6	8