

# SLOVENSKI STANDARD

## SIST EN 1863-1:2012

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Nadomešča:  
SIST EN 1863-1:2000

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### **Steklo v gradbeništvu - Delno kaljeno natrij-kalcijevo silikatno steklo - 1. del: Definicija in opis**

Glass in building - Heat strengthened soda lime silicate glass - Part 1: Definition and description

Glas im Bauwesen - Teil vorgespanntes Kalknatronglas - Teil 1: Definition und Beschreibung

Verre dans la construction - Verre de silicate sodocalcique durci thermiquement - Partie 1: Définition et description  
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**Ta slovenski standard je istoveten z: EN 1863-1:2011**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 1863-1**

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English Version

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

Verre dans la construction - Verre de silicate sodo-calciq  
durci thermiquement - Partie 1: Définition et description

Glas im Bauwesen - Teilvorgespanntes Kalknatronglas -  
Teil 1: Definition und Beschreibung

This European Standard was approved by CEN on 25 September 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.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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# Contents

Page

Foreword.....	4
Introduction .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions .....	6
4 Glass products.....	7
5 Fracture characteristics .....	8
6 Dimensions and tolerances .....	8
6.1 Nominal thickness and thickness tolerances .....	8
6.2 Width and length (sizes) .....	9
6.2.1 General.....	9
6.2.2 Maximum and minimum sizes .....	9
6.2.3 Tolerances and squareness .....	9
6.2.4 Edge deformation produced by the vertical process.....	10
6.3 Flatness .....	10
6.3.1 General.....	10
6.3.2 Measurement of overall bow .....	13
6.3.3 Measurement of roller wave .....	14
6.3.4 Measurement of edge lift (for horizontally heat strengthened glass only).....	15
6.3.5 Measurement of local distortion (for vertically heat strengthened glass only) .....	16
6.3.6 Limitation on overall bow, roller waves and edge lift for horizontally heat strengthened glass.....	17
6.3.7 Limitation on overall bow and local distortion for vertically heat strengthened glass.....	18
6.3.8 Other distortions.....	18
7 Edge and/or surface work, holes, notches and cut-outs.....	18
7.1 Warning.....	18
7.2 Edge working of glass for toughening .....	18
7.3 Profiled edges .....	19
7.4 Round holes .....	19
7.4.1 General.....	19
7.4.2 Diameter of holes.....	20
7.4.3 Limitations on position of holes .....	20
7.4.4 Tolerances on hole diameters .....	21
7.4.5 Tolerances on position of holes.....	21
7.5 Holes/others .....	22
7.6 Notches and cut-outs .....	22
7.7 Shaped panes.....	23
8 Fragmentation test.....	23
8.1 General.....	23
8.2 Dimensions and number of test specimens .....	23
8.3 Test procedure .....	23
8.4 Assessment of fragmentation .....	24
8.5 Evaluation of fragmentation .....	26
9 Other physical characteristics .....	26
9.1 Optical distortion .....	26
9.1.1 Heat strengthened soda lime silicate glass produced by vertical toughening .....	26
9.1.2 Heat strengthened soda lime silicate glass produced by horizontal toughening .....	27

9.2	Anisotropy (iridescence) .....	27
9.3	Thermal durability .....	27
9.4	Mechanical strength .....	27
10	Marking .....	28
Annex A	(informative) Alternative method for the measurement of roller wave distortion .....	29
A.1	Apparatus .....	29
A.2	Method .....	29
A.3	Limitations .....	30
A.4	Alternative use of apparatus .....	30

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## EN 1863-1:2011 (E)

## Foreword

This document (EN 1863-1:2011) 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 May 2012, and conflicting national standards shall be withdrawn at the latest by May 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 1863-1:2000.

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

EN 1863 is divided into the following parts:

- EN 1863-1, *Glass in building — Heat strengthened soda lime silicate glass — Part 1: Definition and description*;
- EN 1863-2, *Glass in building — Heat strengthened soda lime silicate glass — Part 2: Evaluation of conformity/Product standard*.

This European Standard differs from EN 1863-1:2000 as follows:

- a) some figures have been revised and some new figures have been added;
- b) new terms and definitions have been included in Clause 3, e.g. edge deformation (3.2), local distortion (3.8) and overall bow (3.9);
- c) further nominal thicknesses have been included in Table 1;
- d) Subclause 6.2.3 "Tolerances and squareness" has been completely revised; the squareness of rectangular glass panes is now expressed by the difference between its diagonals;
- e) Clauses 6 and 7 have been completely revised;
- f) the previous Clauses 9 and 10 have been revised and have been combined in a new Clause 9 "Other physical characteristics";
- g) the normative Annex "Determination of U value" has been deleted;
- h) a new informative Annex dealing with an alternative method for the measurement of roller wave distortion has been added.

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 and the United Kingdom.

## Introduction

Heat strengthened soda lime silicate glass has a higher resistance to thermal stress and an enhanced mechanical strength when compared to annealed glass.

NOTE CEN/TC 129/WG 8 is producing standards for the determination of the design strength of glass and is preparing a design method.

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## EN 1863-1:2011 (E)

## 1 Scope

This European Standard specifies tolerances, flatness, edgework, fragmentation and physical and mechanical characteristics of monolithic flat heat strengthened soda lime silicate glass of nominal thicknesses from 3 mm to 12 mm for use in buildings.

Other requirements, not specified in this standard, can apply to heat strengthened soda lime silicate glass which is incorporated into assemblies, e.g. laminated glass or insulating glass units, or undergo an additional treatment, e.g. coating. The additional requirements are specified in the appropriate product standard. Heat strengthened soda lime silicate glass, in this case, does not lose its mechanical or thermal characteristics.

This European Standard does not cover glass sandblasted after toughening.

## 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 572-1, *Glass in building — Basic soda lime silicate glass products — Part 1: Definitions and general physical and mechanical properties*

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 572-8, *Glass in building — Basic soda lime silicate glass products — Part 8: Supplied and final cut sizes*

EN 1096-1, *Glass in building — Coated glass — Part 1: Definitions and classification*

EN 1288-3, *Glass in building — Determination of the bending strength of glass — Part 3: Test with specimen supported at two points (four point bending)*

## 3 Terms and definitions

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

**3.1**  
**curved heat strengthened soda lime silicate glass**  
heat strengthened soda lime silicate glass which has been deliberately given a specific profile during manufacture

**3.2**  
**edge deformation**  
deformation of the edge because of the tong marks

**3.3**  
**edge lift (also referred to as edge dip)**  
distortion produced in horizontal heat strengthened glass, at the leading and trailing edge of the plate

NOTE This is a distortion produced by a reduction in surface flatness.

**3.4****enamelled heat strengthened soda lime silicate glass**

heat strengthened soda lime silicate glass which has a ceramic frit fired into the surface during the heat strengthening process

NOTE 1 After heat strengthening the ceramic frit becomes an integral part of the glass.

NOTE 2 In the UK, this glass is also known as opaque heat strengthened soda lime silicate glass.

NOTE 3 The application of the ceramic frit may be by a continuous process or discontinuous application, e.g. screen printing. The enamelled surface could be partially or wholly covered.

**3.5****flat heat strengthened soda lime silicate glass**

heat strengthened soda lime silicate glass which has not been deliberately given a specific profile during manufacture

**3.6****heat strengthened soda lime silicate glass**

glass within which a permanent surface compressive stress, additionally to the basic mechanical strength, has been induced by a controlled heating and cooling process in order to give it increased resistance to mechanical and thermal stress and prescribed fracture characteristics

NOTE The thermal durability and mechanical strength are generated by the level of surface compression. These properties are not size dependent.

**3.7****horizontal process**

process in which the glass is supported on horizontal rollers

**3.8****local distortion**

local deformation of vertically heat strengthened glass underneath the tong marks

**3.9****overall bow**

deformation of the whole pane of horizontally and vertically heat strengthened glass caused by the heating and cooling process

**3.10****roller wave distortion**

distortion produced in horizontal heat strengthened glass as a result of the glass during heat strengthening process being in contact with the rollers

NOTE This is a surface distortion produced by a reduction in surface flatness.

**3.11****vertical process**

process in which the glass is suspended by tongs

**4 Glass products**

Heat strengthened soda lime silicate glass is made from a monolithic glass generally corresponding to one of the following standards:

- soda lime silicate glass according to EN 572-1;
- float glass according to EN 572-2;

**EN 1863-1:2011 (E)**

- drawn sheet glass according to EN 572-4;
- patterned glass according to EN 572-5;
- supplied and final cut sizes according to EN 572-8;
- coated glass according to EN 1096-1.

Glass of nominal thicknesses between 3 mm and 12 mm other than those covered in the above standards are possible.

## 5 Fracture characteristics

In the event of breakage, heat strengthened soda lime silicate glass fractures in a manner similar to annealed glass (see Clause 8).

The fragmentation described in Clause 8 is undertaken on unrestrained test specimens.

The fragmentation in service may not always correspond to that determined during the fragmentation test due to the imposition of other stresses, i.e. from fixing or from reprocessing (e.g. laminating).

NOTE The fracture characteristics of glass are unaffected by temperatures between – 50 °C and + 100 °C.

## 6 Dimensions and tolerances

### 6.1 Nominal thickness and thickness tolerances

The nominal thicknesses and thickness tolerances are those given in the relevant product standard (see Clause 4), some of which are reproduced in Table 1.

**Table 1 — Nominal thicknesses and thickness tolerances**

Dimensions in millimetres

Nominal thickness $d$	Thickness tolerances for glass type			
	Float	Patterned	Drawn sheet	New antique drawn sheet
3	$\pm 0,2$	$\pm 0,5$	$\pm 0,2$	not manufactured
4	$\pm 0,2$	$\pm 0,5$	$\pm 0,2$	$\pm 0,3$
5	$\pm 0,2$	$\pm 0,5$	$\pm 0,3$	not manufactured
6	$\pm 0,2$	$\pm 0,5$	$\pm 0,3$	$\pm 0,3$
8	$\pm 0,3$	$\pm 0,8$	$\pm 0,4$	not manufactured
10	$\pm 0,3$	$\pm 1,0$	$\pm 0,5$	not manufactured
12	$\pm 0,3$	$\pm 1,5$	$\pm 0,6$	not manufactured

The thickness of a pane shall be determined as for the basic product. The measurement shall be taken at the centres of the 4 sides, and away from the area of any tong marks (see Figure 2), which may be present.

## 6.2 Width and length (sizes)

### 6.2.1 General

When heat strengthened soda lime silicate glass dimensions are quoted for rectangular panes, the first dimension shall be the width,  $B$ , and the second dimension the length,  $H$ , as shown in Figure 1. It shall be made clear which dimension is the width,  $B$ , and which is the length,  $H$ , when related to its installed position.

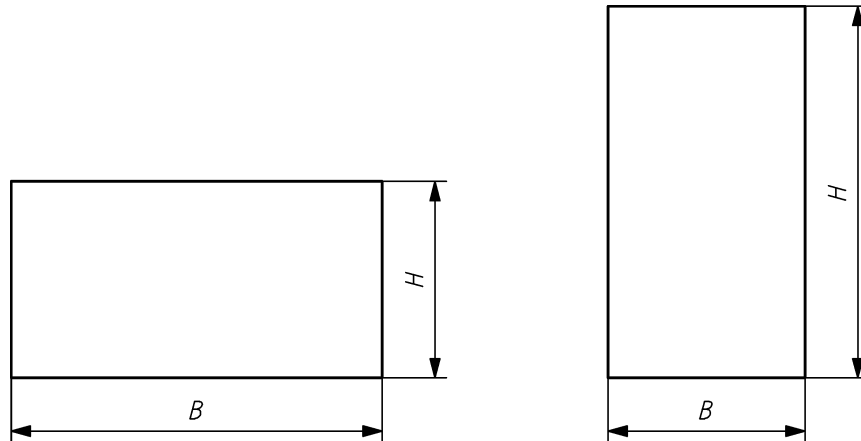


Figure 1 — Examples of width,  $B$ , and length,  $H$ , relative to the pane shape

NOTE For heat strengthened soda lime silicate glass manufactured from patterned glass, the direction of the pattern should be specified relative to one of the dimensions.

### 6.2.2 Maximum and minimum sizes

For maximum and minimum sizes, the manufacturer should be consulted.

### 6.2.3 Tolerances and squareness

The nominal dimensions for width and length being given, the finished pane shall not be larger than the nominal dimensions increased by the tolerance  $t$ , or smaller than the nominal dimensions reduced by the tolerance  $t$ . Limits are given in Table 2.

The squareness of rectangular glass panes is expressed by the difference between its diagonals.

The difference between the two diagonal lengths of the pane of glass shall not be larger than the deviation limit  $v$  as specified in Table 3.

Table 2 — Tolerances on width,  $B$ , and length,  $H$

Dimensions in millimetres

Nominal dimension of side, $B$ or $H$	Tolerance, $t$	
	nominal glass thickness, $d \leq 8$	nominal glass thickness, $d > 8$
$\leq 2\,000$	$\pm 2,0$	$\pm 3,0$
$2\,000 < B \text{ or } H \leq 3\,000$	$\pm 3,0$	$\pm 4,0$
$> 3\,000$	$\pm 4,0$	$\pm 5,0$

Table 3 — Limit deviations for the difference between diagonals

Dimensions in millimetres

Limit deviation $v$ on the difference between diagonals		
Nominal dimension $B$ or $H$	nominal glass thickness, $d \leq 8$	nominal glass thickness, $d > 8$
$\leq 2\,000$	$\leq 4$	$\leq 6$
$2\,000 < B \text{ or } H \leq 3\,000$	$\leq 6$	$\leq 8$
$> 3\,000$	$\leq 8$	$\leq 10$

### 6.2.4 Edge deformation produced by the vertical process

The tongs used to suspend the glass during heat strengthening result in surface depressions, known as tong marks (see Figure 2). The centres of the tong marks are situated up to a maximum of 20 mm in from the edge. A deformation of the edge less than 2 mm can be produced in the region of the tong mark and there may also be an area of optical distortion. These deformations are included in the tolerances in Table 2.



#### Key

- 1 deformation
- 2 up to 20 mm
- 3 tong mark
- 4 100 mm radius maximum area of optical distortion

Figure 2 — Tong mark deformation

## 6.3 Flatness

### 6.3.1 General

By the very nature of the heat strengthening process, it is not possible to obtain a product as flat as annealed glass. This difference in flatness depends on the type of glass, e.g. coated, patterned etc., glass dimensions, i.e. the nominal thickness, the dimensions and the ratio between the dimensions, and the heat strengthening process employed, i.e. vertical or horizontal.

There are four kinds of distortion:

- overall bow (see Figure 3);
- roller wave distortion (for horizontally heat strengthened glass only) (see Figure 4);