SLOVENSKI STANDARD
SIST EN 12150-1:2001

01-september-2001

Steklo v gradbeništvu - Kaljeno natrij-kalcijevo silikatno varnostno steklo - 1. del: Definicija in opis

Glass in building - Thermally toughened soda lime silicate safety glass - Part 1: Definition and description

Glas im Bauwesen - Thermisch vorgespanntes Kalknatron-Einscheibensicherheitsglas - Teil 1: Definition und Beschreibung

Verre dans la construction - Verre de silicate sodo-calcique de sécurité trempé thermiquement - Partie 1: Définition et description

Ta slovenski standard je istoveten z: **EN 12150-1:2000**

ICS:

81.040.20	Steklo v gradbeništvu	Glass in building

SIST EN 12150-1:2001 **en**

EUROPEAN STANDARD
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EN 12150-1

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English version

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This European Standard was approved by CEN on 16 April 1999.

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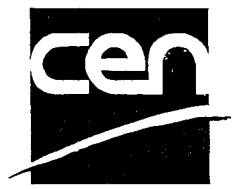

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12150-1:2000 E

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by December 2000, and conflicting national standards shall be withdrawn at the latest by December 2000.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.

Introduction

Thermally toughened soda lime silicate safety glass has a safer breakage behaviour when compared with annealed glass. When it should be used to offer protection under accidental human impact, thermally toughened soda lime silicate safety glass also should be classified according to prEN 12600.

NOTE. CEN/TC129/WG8 is producing standards for the determination of the design strength of glass and is preparing a design method.

NOTE. CEN/TC129/WG2 is preparing a standard for production control and evaluation of conformity.

1 Scope

This European Standard specifies tolerances, flatness, edgework, fragmentation and physical and mechanical characteristics of monolithic flat thermally toughened soda lime silicate safety glass for use in buildings.

Information on curved thermally toughened soda lime silicate safety glass is given in annex B, but this product does not form part of this standard.

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

2 Normative References

This European Standard 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 be revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to 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 673	Glass in building - Determination of thermal transmittance (U value) - Calculation Method
EN 1096-1	Glass in building - Coated glass - Part 1: Definitions and classification
prEN 12600	Glass in building - Pendulum test - Impact test method for flat glass and performance requirements

3 Definitions

For the purposes of this European Standard the following definitions apply:-

3.1 thermally toughened soda lime silicate safety glass: Glass within which a permanent surface compressive stress has been induced by a controlled heating and cooling process in order to give it greatly increased resistance to mechanical and thermal stress and prescribed fragmentation characteristics.

3.2 flat thermally toughened soda lime silicate safety glass: Thermally toughened soda lime silicate safety glass which has not been deliberately given a specific profile during manufacture.

3.3 enamelled thermally toughened soda lime silicate safety glass: Thermally toughened soda lime silicate safety glass which has a ceramic frit fired into the surface during the toughening process. After toughening the ceramic frit becomes an integral part of the glass.

NOTE. In the UK, this glass is also known as opaque thermally toughened soda lime silicate safety glass.

3.4 horizontal toughening: Process in which the glass is supported on horizontal rollers.

3.5 vertical toughening: Process in which the glass is suspended by tongs.

4 Glass products

Thermally toughened soda lime silicate safety 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
- drawn sheet glass according to EN 572-4
- patterned glass according to EN 572-5
- coated glass according to EN 1096-1.

Other nominal thicknesses of glass than those covered in the above standards are possible.

5 Fracture characteristics

In the event of breakage, thermally toughened soda lime silicate safety glass fractures into numerous small pieces, the edges of which are generally blunt.

NOTE : Fragmentation in service does not always correspond to that described in clause 8, due to restraint from fixing or reprocessing (e.g. laminating), or due to the cause of fracture.

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		
	Drawn sheet	Patterned	Float
3	± 0,2	± 0,5	± 0,2
4	± 0,2	± 0,5	± 0,2
5	± 0,3	± 0,5	± 0,2
6	± 0,3	± 0,5	± 0,2
8	± 0,4	± 0,8	± 0,3
10	± 0,5	± 1,0	± 0,3
12	± 0,6	not manufactured	± 0,3
15	not manufactured	not manufactured	± 0,5
19	not manufactured	not manufactured	± 1,0
25	not manufactured	not manufactured	± 1,0

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 3), which may be present.

6.2 Width and length (sizes)

6.2.1 General

When thermally toughened soda lime silicate safety 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.

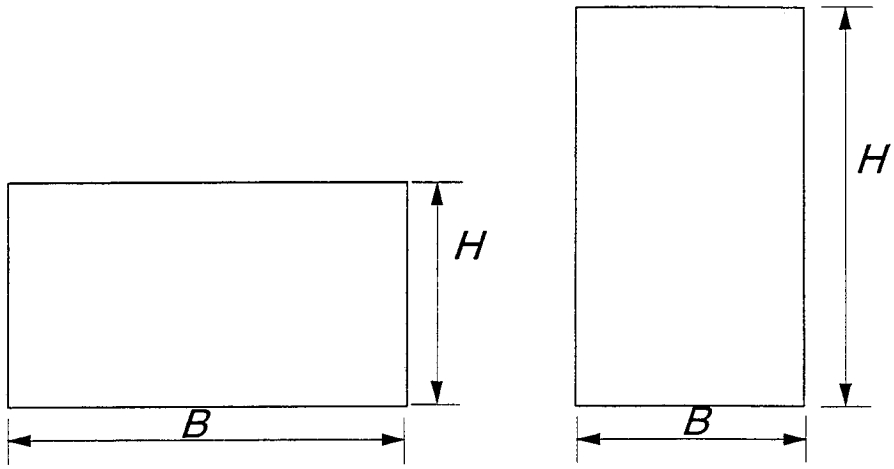


Figure 1: Examples of width, *B*, and length, *H*, relative to the pane shape

NOTE : For thermally toughened soda lime silicate safety 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 a prescribed rectangle resulting from the nominal dimensions increased by the tolerance, *t*, or smaller than a prescribed rectangle reduced by the tolerance, *t*. The sides of the prescribed rectangles are parallel to one another and these rectangles shall have a common centre (see figure 2). The limits of squareness are also the prescribed rectangles. Tolerances are given in table 2.

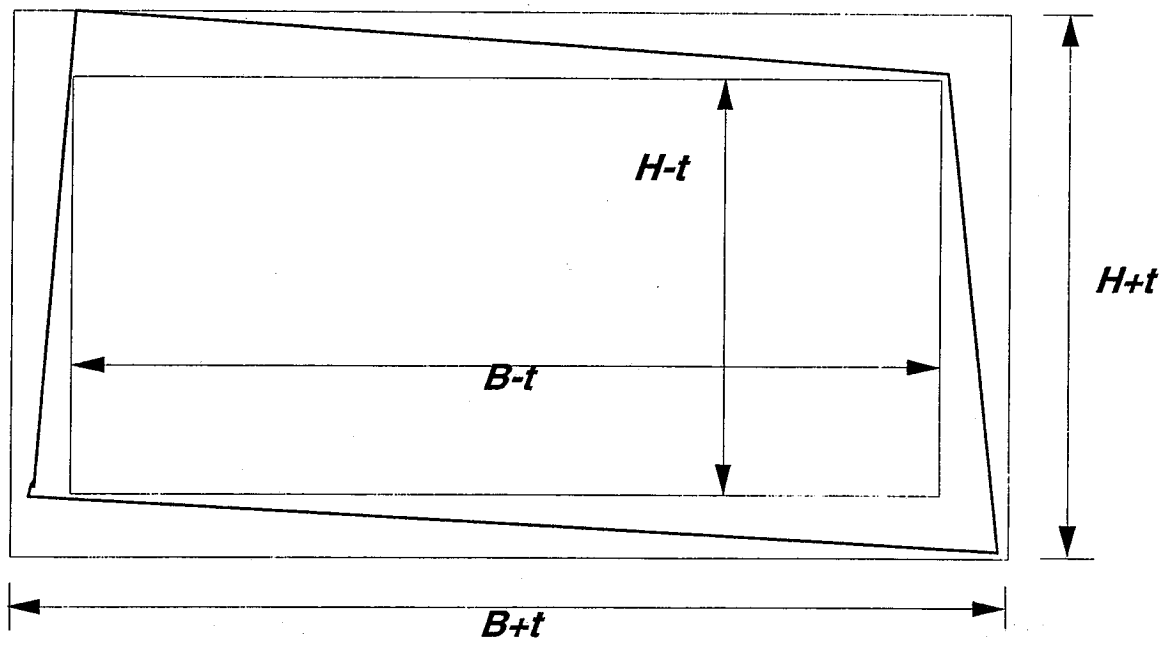


Figure 2: Tolerance limits for dimensions of rectangular panes

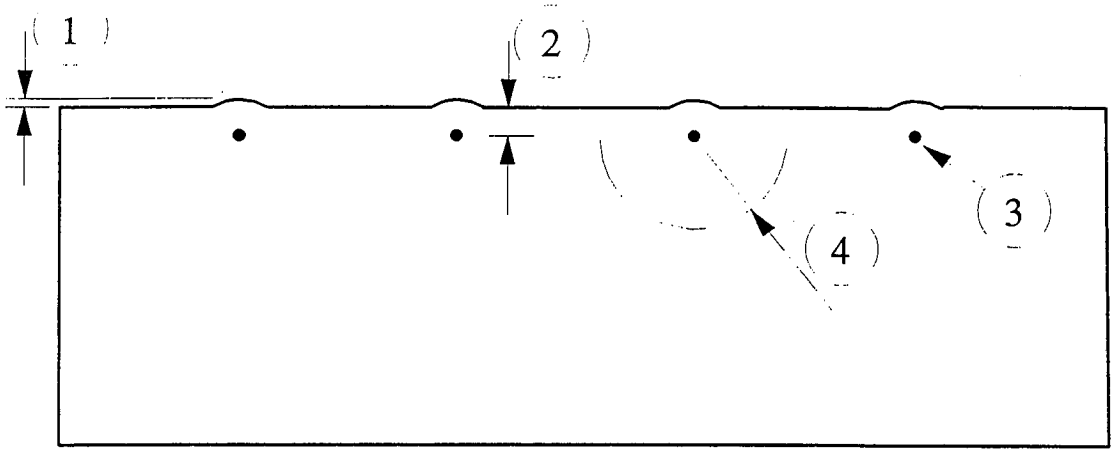
Table 2 : Tolerances on width, *B*, and length, *H*

Dimensions in millimetres

Nominal dimension of side, *B* or *H*	Tolerance, *t*	
	nominal glass thickness, $d \leq 12$	nominal glass thickness, $d > 12$
≤ 2000	± 2,5 (horizontal toughening) ± 3,0 (vertical toughening)	± 3,0
2000 < *B* or *H* ≤ 3000	± 3,0	± 4,0
> 3000	± 4,0	± 5,0

6.2.4 Edge deformation produced by vertical toughening

The tongs used to suspend the glass during toughening result in surface depressions, known as tong marks (see figure 3). 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.



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

Figure 3: Tong mark deformation

6.3 Flatness

6.3.1 General

By the very nature of the toughening process, it is not possible to obtain a product as flat as annealed glass. The difference depends on the nominal thickness, the dimensions and the ratio between the dimensions. Therefore a distortion known as overall bow can occur. There are two kinds of bow (see figure 4):

- overall or general bow
- local bow

NOTE 1: Overall bow can, in general, be accommodated by the framing system.
NOTE 2: Local bow needs to be allowed for in the glazing materials and the weather seals. For special requirements the manufacturers should be consulted.

6.3.2 Measurement of overall bow

The pane of glass shall be placed in a vertical position and supported on its longer side by two load bearing blocks at the quarter points (see figure 5).

The deformation shall be measured along the edges of the glass and along the diagonals, as the maximum distance between a straight metal ruler, or a stretched wire, and the concave surface of the glass (see figure 4).

The value for the bow is then expressed as the deformation, in millimetres, divided by the measured length of the edge of the glass, or diagonal, in millimetres, as appropriate.