



SLOVENSKI STANDARD

SIST EN 1288-4:2001

01-september-2001

Steklo v stavbah - Ugotavljanje upogibne trdnosti stekla - 4. del: Preskušanje profilnega stekla

Glass in building - Determination of the bending strength of glass - Part 4: Testing of channel shaped glass

Glas im Bauwesen - Bestimmung der Biegefestigkeit von Glas - Teil 4: Prüfung von Profilbauglas

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Verre dans la construction - Détermination de la résistance du verre a la flexion - Partie 4: Essais sur verre profilé

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ICS:

81.040.20 Steklo v gradbeništvu Glass in building

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en

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EUROPEAN STANDARD

EN 1288-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2000

ICS 81.040.20

English version

Glass in building - Determination of the bending strength of glass - Part 4: Testing of channel shaped glass

Verre dans la construction - Détermination de la résistance du verre à la flexion - Partie 4: Essais sur verre profilé

Glas im Bauwesen - Bestimmung der Biegefestigkeit von Glas - Teil 4: Prüfung von Profilbauglas

This European Standard was approved by CEN on 5 September 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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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

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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.

CEN/TC 129/WG8 "Mechanical Strength" prepared the draft "Glass in building - Determination of the bending strength of glass" - Part 4 : Testing of channel shaped glass".

There are four other parts to this standard:

- Part 1 : Fundamentals of testing glass
- Part 2 : Coaxial double ring test on flat specimens with large test surface areas
- Part 3 : Test with specimen supported at two points (four point bending)
- Part 5 : Coaxial double ring test on flat specimens with small test surface areas

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.

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1 Scope

This European standard specifies a method for determining the bending strength (defined as the profile bending strength) of wired or unwired channel shaped glass for use in buildings.

The limitations of this standard are described in EN 1288-1.

EN 1288-1 should be read in conjunction with this standard.

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 or 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 572-7	Glass in building - Basic soda lime silicate glass products - Part 7 : Wired or unwired channel shaped glass
EN 1288-1	Glass in building - Determination of the bending strength of glass - Part 1 : Fundamentals of testing glass
ISO 48	Rubber, vulcanised or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD)

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3 Definitions

For the purposes of this standard, the following definition applies:

3.1 profile bending strength: The quotient of the maximum bending moment and the section modulus of a channel shaped glass (EN 572-7).

NOTE: Due to sideways movement of the flanges of the channel shaped profile in the bending test, the specimens break almost exclusively at the transition from web to flange (i.e. not at the extreme edge of the flange or the face of the web). Consequently, the profile bending strength is not the glass strength, but rather a value representing the strength of the profile.

4 Symbols

B	Width of web
F_{\max}	Maximum force

NOTE: Where the bending rollers are not firmly attached to the testing machine, but are laid on the specimen, the force resulting from their weight is added to the maximum measured force.

G	Specimen's own weight
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h_F	Thickness of flange
h_W	Thickness of web
H	Height of flange
L_s	Distance between supporting rollers
M_{bB}	Maximum bending moment
F_{bB}	Profile bending strength
Z	Section modulus
Z_F	Section modulus with flanges in tension
Z_W	Section modulus with web in tension

5 Apparatus

5.1 Testing machine

The bending test shall be carried out using a suitable bending testing machine, which shall incorporate the following features:

- The stressing of the specimen shall be capable of being applied from zero up to a maximum value in a manner which minimizes shock and is stepless;
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- The stressing device shall be capable of the specified rate of stressing;
- The testing machine shall incorporate a load measuring device with a limit of error of $\pm 2,0$ % within the measuring range;
- The supporting rollers and the bending rollers (see figure 2) shall have a diameter of 50 mm and a length of not less than 550 mm. All the rollers shall be free to rotate.

5.2 Measuring instruments

The following measuring instruments are required:

- a measuring instrument enabling the web width, B , of the specimen to be measured to the nearest millimeter and the flange height, H , of the specimen to be measured to the nearest 0,5 mm;
- a measuring instrument allowing the thickness of the specimen flange, h_F , and web, h_W , to be measured to the nearest 0,1 mm.

6 Sample

6.1 Number of specimens

The number of specimens to be tested shall be determined depending on the confidence limits required, especially with regard to estimating the extremes of the strength distribution (see EN 1288-1 for a discussion of numbers of specimens).

6.2 Specimen dimensions

The dimensions of the specimen web, B , flange height, H , the web thickness, h_w , the flange thickness, h_f , and the angle between the web and the flanges, shall be within the tolerances specified for the product to be tested (in accordance with EN 572-7).

The length of the specimens shall be $2100 \text{ mm} \pm 5 \text{ mm}$.

6.3 Specimen condition

The specimens shall be stored in the testing environment (see 7.2) for at least 4 h before being tested.

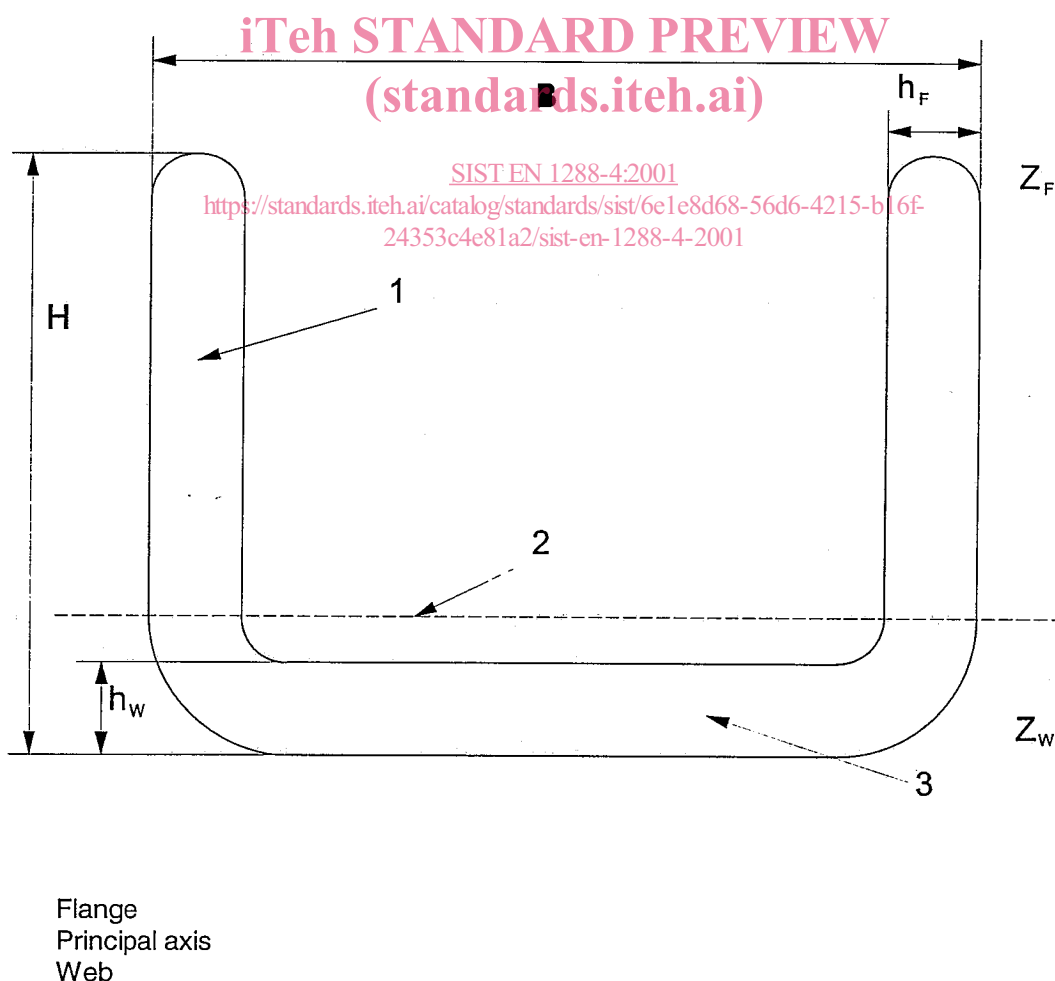


Figure 1: Cross section of specimen

7 Procedure

7.1 Determination of dimensions of each specimen

The width of the web, B , the height of the flange, H , and the thickness of the flanges h_F shall be measured at the ends of the profiles and in the centre of the specimen. The web thickness, h_W , shall be measured only at the ends (see figure 1 and figure 2).

7.2 Bending test

The specimens shall be mounted as shown in figure 2.

Rubber strips, 5 mm thick and of hardness of (40 ± 10) IRHD, (in accordance with ISO 48), shall be placed between the specimen and the bending and supporting rollers.

The bending test shall be carried out at (23 ± 5) °C with the relative humidity between 40 % and 70 %. During the test the temperature shall be kept constant to 1 °C, in order to avoid development of thermal stresses.

The specimen shall be bent with a uniformly increasing bending stress at a rate of $(2 \pm 0,4)$ N/(mm².s) until failure occurs. The maximum force, F_{max} , shall be measured and the time taken to reach this force shall be recorded.

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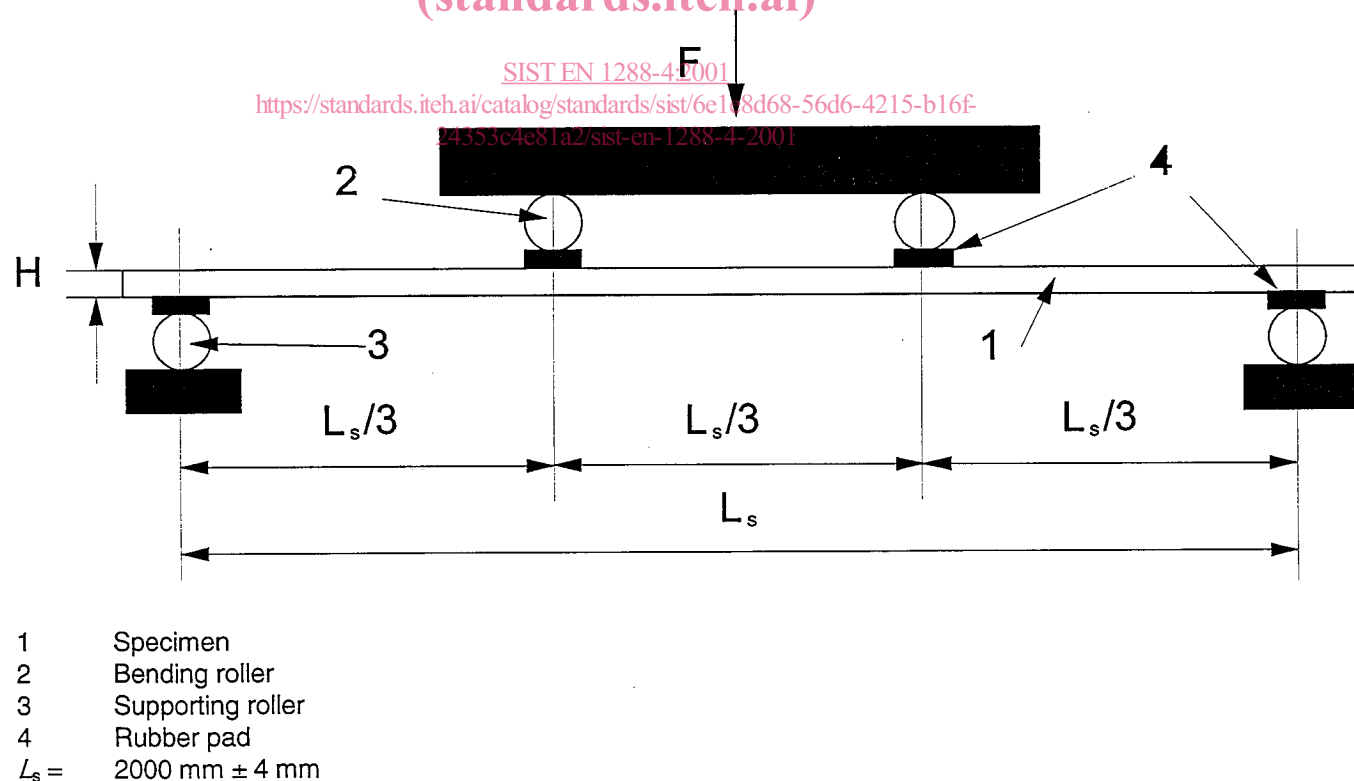


Figure 2 : Arrangement of specimen in testing machine