SLOVENSKI STANDARD
oSIST prEN ISO 1288-3:2014

01-april-2014

Steklo v stavbah - Ugotavljanje upogibne trdnosti stekla - 3. del: Preskušanje dvakrat podprtega vzorca (štiritočkovna obremenitev) (ISO/DIS 1288-3:2014)

Glass in building - Determination of the bending strength of glass - Part 3: Test with specimen supported at two points (four-point bending) (ISO/DIS 1288-3:2014)

Glas im Bauwesen - Bestimmung der Biegefestigkeit von Glas - Teil 3: Prüfung von Proben bei zweiseitiger Auflagerung (Vierschneiden-Verfahren) (ISO/DIS 1288-3:2014)

Verre dans la construction - Détermination de la résistance du verre à la flexion - Partie 3: Essais avec éprouvettes supportées en deux points (flexion quatre points) (ISO/DIS 1288-3:2014)

Ta slovenski standard je istoveten z: **prEN ISO 1288-3 rev**

ICS:

81.040.20	Steklo v gradbeništvu	Glass in building

oSIST prEN ISO 1288-3:2014 **en**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 1288-3

ISO/TC **160**/SC **2** Secretariat: **ANSI**

Voting begins on: **2014-01-09**

Voting terminates on: **2014-06-09**

Glass in building — Determination of the bending strength of glass —

Part 3: Test with specimen supported at two points (four-point bending)

Verre dans la construction — Détermination de la résistance du verre à la flexion —

Partie 3: Essais avec éprouvettes supportées en deux points (flexion quatre points)

ICS: 81.040.20

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Reference number
ISO/DIS 1288-3:2013(E)

Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 1288 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 1288-3 was prepared by Technical Committee ISO/TC 160, *Glass in building*, Subcommittee SC 2, *Use considerations* in conjunction with Technical Committee CEN/TC 129, *Glass in building*.

ISO 1288 consists of the following parts, under the general title *Glass in building — Determination of the bending strength of glass*:

— *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 4: Testing of channel shaped glass*

— *Part 5: Coaxial double ring test on flat specimens with small test surface areas*

This Standard has been based on 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)*** prepared by Technical Committee CEN/TC 129 "Glass in building"/WG8 "Mechanical Strength".

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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.

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

1 Scope

This International Standard specifies a method for determining the bending strength, including the effects of the edges, of flat glass for use in building. The method specified can also be used to determine the bending strength of the edges of glass separately.

The limitations of this part of this International Standard are described in ISO 1288-1.

ISO 1288-1 should be read in conjunction with this part of this International Standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 1288. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 1288 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 48, *Rubber, vulcanised or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 1288-1, *Glass in building—Determination of the bending strength of glass*—Part 1 : *Fundamentals of testing glass*

ISO 16293-1: *Glass in building – Basic soda lime silicate glass products – Part 1: Definitions and general physical and mechanical properties*

3 Terms and definitions

For the purposes of this part of ISO 1288, the following terms and definitions apply.

3.1
bending stress
the tensile bending stress induced in the surface of a specimen

NOTE For testing purposes, the bending stress should be uniform over a specified part of the surface.

3.2
effective bending stress
a weighted average of the tensile bending stresses, calculated by applying a factor to take into account non-uniformity of the stress field

3.3
bending strength
the bending stress or effective bending stress which leads to breakage of the specimen

3.4
equivalent bending strength
the apparent bending strength of patterned glass, for which the irregularities in the thickness do not allow precise calculation of the bending stress

4 Symbols (and abbreviated terms)

B	Specimen width	m
E	Modulus of elasticity (Young's modulus) of the specimen	Pa
	NOTE for soda lime silicate glass (see ISO 16293-1) a value of 70 GPa is used.	
F_{max}	Maximum force	N
	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	Acceleration due to gravity	m/s^2
h	Specimen thickness	m
k	Dimensionless factor (see 6.2 of ISO 1288-1 for explanation)	
L	Specimen length	m
L_s	Distance between the centre lines of the supporting rollers	m
L_b	Distance between the centre lines of the bending rollers	m
M_b	Bending moment	Nm
y	Central deflection of the specimen relative to the supporting rollers	m
Z	Section modulus	m^3
σ_b	Bending stress in the surface area defined by the bending rollers	Pa
σ_{beff}	Effective bending stress	Pa
σ_{bB}	Bending strength	Pa
σ_{bG}	Bending stress imposed by the self-weight of the specimen	Pa
ρ	Density of the specimen	kg/m^3

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:

a) 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;

b) The stressing device shall be capable of the specified rate of stressing;

c) The testing machine shall incorporate a load measuring device with a limit of error of ± 2,0 % within the measuring range;

d) The supporting rollers and the bending rollers (see figure 2) shall have a diameter of 50 mm and a length of not less than 365 mm. All the rollers shall be free to rotate.

5.2 Measuring instruments

The following measuring instruments are required:

- a measuring instrument enabling the width of the specimen to be measured to the nearest 1 mm;

- a measuring instrument allowing the thickness of the specimen to be measured to the nearest 0,01 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 ISO 1288-1 for a discussion of numbers of specimens).

6.2 Specimen dimensions

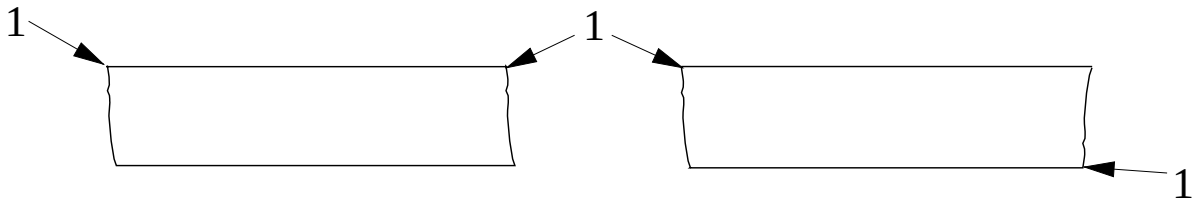
Specimen length *L*: 1100 mm ± 5 mm

Specimen width *B*: 360 mm ± 5 mm

Specimen thickness *h*: thickness of the glass within the tolerance specified for the condition as supplied for test.

6.3 Specimen condition and treatment

The specimens shall be flat and their edges shall be representative of the edge finish to be tested. If the edge is asymmetrical with respect to the neutral axis of the specimen, both stressed edges shall be in the same orientation (see figure 1) and all specimens in a sample shall be tested the same way up.



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1 Wheel cut edges.

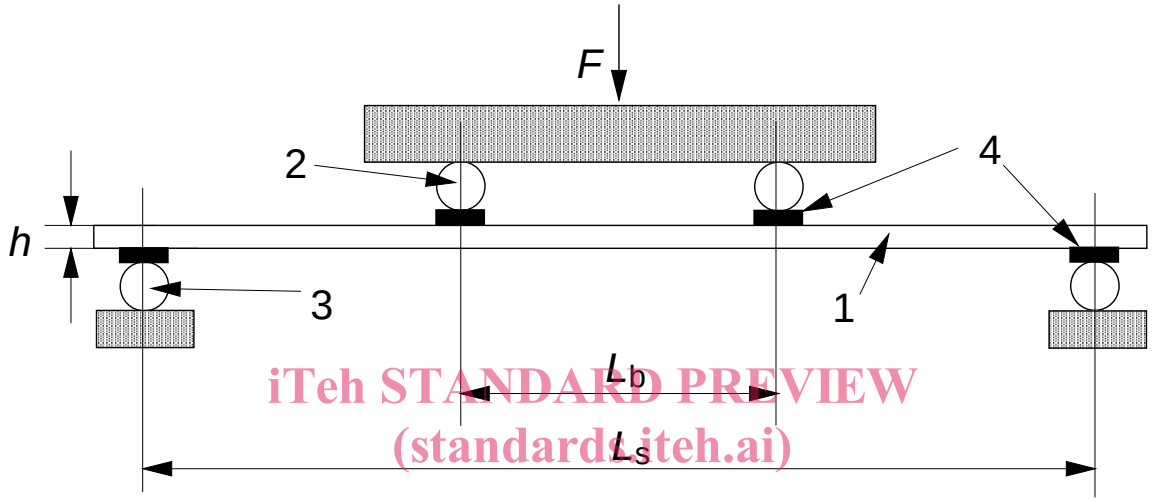
NOTE The edges of cut glass are not the same on both corners, because wheel cut edges have the wheel applied to only one surface of the glass. In this instance the edges are asymmetrical with respect to the neutral axis of the specimen..

Figure 1 — Asymmetrical edges

Any intended changes to the condition of the test piece by means of edge working, prior mechanical damage, etching, etc., shall be completed at least 24 h before testing the bending strength (see ISO 1288-1). Similarly, protective coatings shall be removed at least 24 h before the test. The specimens shall be stored in the testing environment (see 7.2) for at least 4 h before being tested.

6.4 Adhesive film

To hold together the fragments, an adhesive film shall be fixed to the side of the specimens facing the bending rollers (see figure 2). This facilitates location of the fracture origin and measurement of the specimen thickness.



1 Specimen

2 Bending roller

3 Supporting roller

4 Rubber strips

L_b = 200 ± 1 mm

L_s = 1000 ± 2 mm

Figure 2— Mounting of the test specimen

7 Procedure

7.1 Measuring width and thickness of each specimen

The width shall be determined as the arithmetic mean of at least three individual measurements.

The thickness shall be determined as the arithmetic mean of at least four individual measurements to the nearest 0,05 mm. The measured positions shall lie outside the two bending rollers, to avoid damaging the test surface, and shall be taken from both ends of the specimen. In the case of specimens with one or two ornamental surfaces, both the plate thickness and core thickness shall be measured. The average is taken from all these measured values.