INTERNATIONAL STANDARD

ISO 1288-3

First edition
2016-02-15

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)

Reference number
ISO 1288-3:2016(E)

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is ISO/TC 160, *Glass in building*, Subcommittee SC 2, *Use considerations*.

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*

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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 part of ISO 1288 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 ISO 1288 are described in ISO 1288-1.

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.

ISO 48, *Rubber, vulcanized 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*

3 Terms and definitions

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

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

Note 1 to entry: For testing purposes, the bending stress should be uniform over a specified part of the surface.

3.2
effective bending stress
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
bending stress or effective bending stress which leads to breakage of the specimen

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

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4 Symbols

B	specimen width	m
E	modulus of elasticity (Young's modulus) of the specimen NOTE For soda lime silicate glass (see ISO 16293-1), a value of 70 GPa is used.	Pa
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.	N
g	acceleration due to gravity	m/s^2
h	specimen thickness	m
k	dimensionless factor (see ISO 1288-1:—, 6.2 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.

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