SLOVENSKI STANDARD
oSIST prEN 19100-1:2024

01-november-2024

Evrokod 10 - Projektiranje steklenih konstrukcij - 1. del: Splošna pravila

Eurocode 10 - Design of glass structures - Part 1: General rules

Eurocode 10 - Bemessung und Konstruktion von Bauteilen aus Glas - Teil 1: Grundlagen

Eurocode 10 - Calcul des structures en verre - Partie 1 : Règles générales

Ta slovenski standard je istoveten z: **prEN 19100-1**

ICS:

81.040.20	Steklo v gradbeništvu	Glass in building
91.080.99	Druge konstrukcije	Other structures

oSIST prEN 19100-1:2024 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 19100-1

September 2024

ICS 81.040.20; 91.080.99

Will supersede CEN/TS 19100-1:2021

English Version

Eurocode 10 - Design of glass structures - Part 1: General rules

Eurocode 10 - Calcul des structures en verre - Partie 1 : Règles générales

Eurocode 10 - Bemessung und Konstruktion von Bauteilen aus Glas - Teil 1: Grundlagen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 250.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. prEN 19100-1:2024 E

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European foreword

This document (prEN 19100-1:2024) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI. CEN/TC 250 is responsible for all Structural Eurocodes and has been assigned responsibility for structural and geotechnical design matters by CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 19100-1:2021.

In comparison with the previous edition, the following changes have been made:

— modified title and scope;

— updated references;

— improved provisions for action;

— improved provisions for coefficients and factor values;

— combined Annex A “Bending strength resistance” and Annex B “Bending strength resistance with interference factor” into new Annex A “Design bending strength”.

The first generation of EN Eurocodes was published between 2002 and 2007. This document forms part of the second generation of the Eurocodes, which have been prepared under Mandate M/515 issued to CEN by the European Commission and the European Free Trade Association.

The Eurocodes have been drafted to be used in conjunction with relevant execution, material, product and test standards, and to identify requirements for execution, materials, products and testing that are relied upon by the Eurocodes.

The Eurocodes recognize the responsibility of each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level through the use of National Annexes.

0 Introduction

0.1 Introduction to the Eurocodes

The Structural Eurocodes comprise the following standards generally consisting of a number of Parts:

— EN 1990 *Eurocode — Basis of structural and geotechnical design*

— EN 1991 *Eurocode 1 — Actions on structures*

— EN 1992 *Eurocode 2 — Design of concrete structures*

— EN 1993 *Eurocode 3 — Design of steel structures*

— EN 1994 *Eurocode 4 — Design of composite steel and concrete structures*

— EN 1995 *Eurocode 5 — Design of timber structures*

— EN 1996 *Eurocode 6 — Design of masonry structures*

— EN 1997 *Eurocode 7 — Geotechnical design*

— EN 1998 *Eurocode 8 — Design of structures for earthquake resistance*

— EN 1999 *Eurocode 9 — Design of aluminium structures*

— EN 19100 *Eurocode 10 — Design of glass structures*

The Eurocodes are intended for use by designers, clients, manufacturers, constructors, relevant authorities (in exercising their duties in accordance with national or international regulations), educators, software developers, and committees drafting standards for related product, testing and execution standards.

NOTE Some aspects of design are most appropriately specified by relevant authorities or, where not specified, can be agreed on a project-specific basis between relevant parties such as designers and clients. The Eurocodes identify such aspects making explicit reference to relevant authorities and relevant parties.

0.2 Introduction to EN 19100 (all parts)

EN 19100 (all parts) applies to the structural design of mechanically supported glass components and assemblies of glass components. It complies with the principles and requirements for the safety and serviceability of structures, the basis of their design and verification that are given in EN 1990, *Basis of structural and geotechnical design*.

EN 19100 is subdivided into three parts:

— EN 19100-1, *Eurocode 10 — Design of glass structures — Part 1: General rules*

— EN 19100-2, *Eurocode 10 — Design of glass structures — Part 2: Out-of-plane loaded glass components*

— EN 19100-3, *Eurocode 10 — Design of glass structures — Part 3: In-plane loaded glass components*

0.3 Introduction to EN 19100-1

EN 19100-1 applies to the structural design of mechanically supported glass components and assemblies of glass components according to EN 19100-2 and EN 19100-3.

0.4 Verbal forms used in the Eurocodes

The verb “shall" expresses a requirement strictly to be followed and from which no deviation is permitted in order to comply with the Eurocodes.

The verb “should” expresses a highly recommended choice or course of action. Subject to national regulation and/or any relevant contractual provisions, alternative approaches could be used/adopted where technically justified.

The verb “may" expresses a course of action permissible within the limits of the Eurocodes.

The verb “can" expresses possibility and capability; it is used for statements of fact and clarification of concepts.

0.5 National Annex for EN 19100-1

National choice is allowed in this document where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

The national standard implementing EN 19100-1 can have a National Annex containing all national choices to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

When no national choice is given, the default choice given in this document is to be used.

When no national choice is made and no default is given in this document, the choice can be specified by a relevant authority or, where not specified, agreed for a specific project by appropriate parties.

National choice is allowed in EN 19100-1 through notes to the following clauses:

3.1.16	4.2.4(1)	4.3.1 (3) – 2 choices	4.3.1(8)
4.3.1(9)	4.3.1(10)	4.4.2(2)	4.4.2(3)
5.2(1)	7.2.2(2)	7.2.2(3)	7.2.2(4)
8.2(2)	8.3.2(1)	9.2(1)	

National choice is allowed in EN 19100-1 on the application of the following informative annexes:

Annex A	Annex B	Annex C

The National Annex can contain, directly or by reference, non-contradictory complementary information for ease of implementation, provided it does not alter any provisions of the Eurocodes.

1 Scope

1.1 Scope of prEN 19100-1

(1) This document gives basic design rules for glass structures, assemblies and components. This document is concerned with the requirements for resistance, serviceability, fracture characteristics and glass component failure consequences in relation to human safety, robustness and redundancy of glass structures.

(2) This document covers the basis of design, structural design, materials, durability, and construction rules.

1.2 Assumptions

(1) The assumptions given in EN 1990 apply.

(2) This document is intended to be used in conjunction with EN 1990, EN 1991 (all parts), the parts of EN 1992 to EN 1999 where glass structures or glass components are referred to within those documents and EN 12488.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE See the Bibliography for a list of other documents cited that are not normative references, including those referenced as recommendations (i.e. through 'should' clauses) and permissions (i.e. through 'may' clauses).

EN 572 (all parts), *Glass in building — Basic soda lime silicate glass products*

EN 1279-5:2018, *Glass in building — Insulating glass units — Part 5: Product standard*

EN 1990:2023,[1] *Eurocode — Basis of structural and geotechnical design*

EN 1991 (all parts), *Eurocode 1 — Actions on structures*

EN 12488, *Glass in building — Glazing recommendations — Assembly principles for vertical and sloping glazing*

EN 13022-1, *Glass in building — Structural sealant glazing — Part 1: Glass products for structural sealant glazing systems for supported and unsupported monolithic and multiple glazing*

EN 13022-2, *Glass in building — Structural sealant glazing — Part 2: Assembly rules*

EN 15434-1, *Bonding sealants — Part 1: Bonded glazing sealants for direct light exposure*

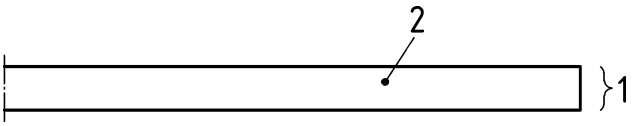
3 Terms, definitions and symbols

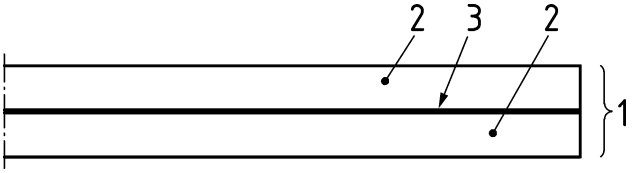
3.1 Terms and definitions

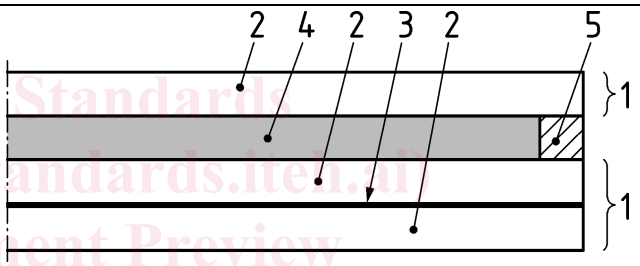
For the purposes of this document, the terms and definitions given in EN 1990 and the following apply.

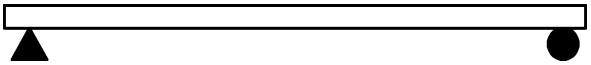
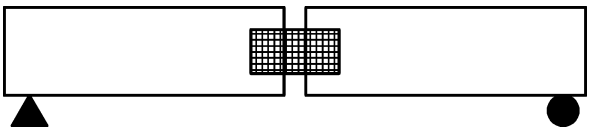
[1] As impacted by EN 1990:2023/prA1:2024.

Table 3.1— Glass component, glass member and system of glass members

<table>
<tr><td rowspan="3">Glass component</td><td>Monolithic glass</td><td> 

Key
1 pane
2 single ply</td></tr>
<tr><td>Laminated glass</td><td> 

Key
1 pane
2 ply
3 interlayer</td></tr>
<tr><td>Insulated glass unit (IGU)</td><td> 

Key
1 pane
2 ply
3 interlayer
4 cavity
5 spacer</td></tr>
<tr><td>Glass member</td><td>Glass component + boundary conditions</td><td>  </td></tr>
<tr><td>System of glass members</td><td>Glass components + their interconnections + boundary conditions</td><td>  </td></tr>
</table>

3.1.1
glass component
glass product being monolithic, laminated, and/or insulating glass unit, after installation

Note 1 to entry: See Table 3.1.

3.1.2
glass member
glass component with clear mechanical boundary conditions so that the effects (stresses or sectional forces) of a defined action can be calculated

Note 1 to entry: See Table 3.1.

3.1.3
insulating glass unit
IGU
assembly consisting of at least two panes of glass, separated by one or more spacers, hermetically sealed along the periphery, mechanically stable and durable

3.1.4
limit state scenario
LSS
set of limit states (SLS, ULS, FLS and PFLS) to be verified whilst designing a glass component

3.1.5
ultimate limit state
ULS
state associated with collapse or other forms of structural failure

Note 1 to entry: Generally, it corresponds to the maximum load-carrying resistance of a structure or structural member.

[SOURCE: EN 1990:2023, 3.1.2.15]

3.1.6
serviceability limit state
SLS
state that correspond to conditions beyond which specified service requirements for a structure or structural member are no longer met

[SOURCE: EN 1990:2023, 3.1.2.16]

3.1.7
failure
event where the total loss of structural resistance of the glass component or supports or bonding occurs

3.1.8
fracture
macroscopic physical disintegration due to crack propagation in glass

Note 1 to entry: For a monolithic glass pane, a glass fracture results into a failure of the component. For a laminated glass pane, fracture of a ply or even of all plies does not necessarily result into a failure of the component. For an IGU, fracture of one glass pane does not necessarily result into failure of the component.

3.1.9
fracture limit state
FLS
ultimate limit state beyond which, during accidental fracture of a glass component or part of glass component, the following requirements are no longer satisfied

— the prevention of injuries by contact with glass fragments and/or,

— the prevention of body to pass through and/or,

— the ability to limit the failure to that glass component or part of glass component

Note 1 to entry: The requirements can usually be satisfied by choosing an appropriate mode of breakage of glass, boundary conditions and other mechanical characteristics.

3.1.10
post fracture limit state
PFLS
ultimate limit state beyond which, in case of accidental failure of a glass component, the required residual load bearing capacity provided by

— redundancy of the glass component,

— undamaged ply(ies) of that glass component,

— structure alternative load path(s)

during a defined period is no longer satisfied

3.1.11
redundancy
provision or existence of additional load paths or structural systems than strictly necessary to resist design actions

3.1.12
robustness
ability of a structure to withstand unforeseen adverse events without being damaged to an extent disproportionate to the original cause

[SOURCE: EN 1990:2023, 3.1.2.30]

Note 1 to entry: See EN 1990 and EN 1991-1-7.

3.1.13
ply
sheet of monolithic glass, cut to size and shape

3.1.14
in-plane loaded glass component
glass component subjected to a significant force component parallel to the glass surface

3.1.15
out-of-plane loaded glass component
glass component subjected to a significant force component perpendicular to the glass surface