

English Version

Design of glass structures - Part 1: Basis of design and materials

Conception et calcul des structures en verre - Partie 1 :
Bases de conception et matériaux

Bemessung und Konstruktion von Tragwerken aus
Glas - Teil 1: Grundlagen der Bemessung und
Materialien

This Technical Specification (CEN/TS) was approved by CEN on 25 July 2021 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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European foreword

This document (CEN/TS 19100-1:2021) has been prepared by Technical Committee CEN/TC 250 “Structural Euro-codes”, 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.

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

This document has been prepared under Mandate M/515 issued to CEN by the European Commission and the European Free Trade Association.

This document has 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 this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

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 CEN/TS 19100 (all parts)

CEN/TS 19100 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 design*.

CEN/TS 19100 is subdivided into three parts:

- *Part 1: Basis of design and materials*
- *Part 2: Design of out-of-plane loaded glass components*
- *Part 3: Design of in-plane loaded glass components and their mechanical joints*

0.3 Introduction to CEN/TS 19100-1

CEN/TS 19100-1 applies to the structural design of mechanically supported glass components and assemblies of glass components according CEN/TS 19100-2 and CEN/TS 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 CEN/TS 19100-1

CEN/TS 19100-1 gives values within notes indicating where national choices can be made. Therefore, a national document implementing CEN/TS 19100-1 can have a National Annex containing all Nationally Determined Parameters to be used for the assessment of buildings and civil engineering works in the relevant country.

When not given in the National Annex, the national choice will be the default choice specified in the relevant Technical Specification.

The national choice can be specified by a relevant authority.

When no choice is given in the Technical Specification, in the National Annex, or by a relevant authority, the national choice can be agreed for a specific project by appropriate parties.

National choice is allowed in CEN/TS 19100-1 through the following clauses:

3.1.16 NOTE

4.1.2. (1) NOTE 2

4.2.4 (1) NOTE 2

4.4.2 (2) NOTE

4.4.2 (3) NOTE

5.2 (1) NOTE 4

7.2.2 (2) NOTE 1

7.2.2 (3) NOTE

7.2.2 (4) NOTE

7.2.4 (2) NOTE 2

7.2.4 (2) NOTE 3

8.2 (2) NOTE

8.3.2 (1) NOTE 1

Clause 9 (2) NOTE

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

Annex A Bending strength resistance based on nominal product strengths

Annex B Bending strength resistance based on intrinsic glass strength and glass surface pre-stress

Annex C Thermally induced stress caused by temperature differentials in the glass pane

Annex D Risk Assessment

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 CEN/TS 19100-1

(1) CEN/TS 19100-1 gives basic design rules for mechanically supported glass components. This document is concerned with the requirements for resistance, serviceability, fracture characteristics and glass component failure consequences in relation to human safety, robustness, redundancy and durability of glass structures.

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

(3) This document also covers construction rules for the structural design of glass components.

1.2 Assumptions

(1) The assumptions of EN 1990 apply to CEN/TS 19100-1.

(2) This document is intended to be used in conjunction with EN 1990, EN 1991 (all parts), EN 1993-1-1, EN 1995-1-1, EN 1998-1, EN 1999-1-1 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 1863-1, *Glass in building - Heat strengthened soda lime silicate glass - Part 1: Definition and description*

EN 1990:2002, *Eurocode - Basis of structural design*

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

EN 12150-1, *Glass in building - Thermally toughened soda lime silicate safety glass - Part 1: Definition and description*

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 14179-1, *Glass in building - Heat soaked thermally toughened soda lime silicate safety glass - Part 1: Definition and description*

EN 15434, *Glass in building - Product standard for structural and/or ultra-violet resistant sealant (for use with structural sealant glazing and/or insulating glass units with exposed seals)*