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EN 1993-1-11:2006, IDT
(ICS 91.010.30; 91.080.10; 93.040)

SINGAPORE STANDARD

Eurocode 3 : Design of steel structures

– Part 1-11 : Design of structures with tension components

This national standard is the identical implementation of EN 1993-1-11 : 2006 and is adopted with permission of CEN, Rue de la Science 23 B - 1040 Brussels

Confirmed 2023

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National Foreword

This Singapore Standard was prepared by the Technical Committee on Building Structure and Sub-structure under the purview of the Building and Construction Standards Committee.

This SS EN is the identical implementation of EN 1993-1-11 : 2006 'Eurocode 3 : Design of steel structures – Part 1-11 : Design of structures with tension components' (incorporating the CEN Corrigendum April 2009) and is adopted with permission of CEN, Rue de la Science 23 B - 1040 Brussels. The text altered by the Corrigendum is indicated by AC1> <AC1.

Attention is drawn to the following:

- The comma has been used throughout as a decimal marker whereas in Singapore Standards, it is a practice to use a full point on the baseline as the decimal marker.
- The Singapore Standards which implement international or European publications referred to in this document may be found in the SS Electronic Catalogue at: <https://www.singaporestandardseshop.sg>

The EN gives values with notes indicating where national choices may be made. Where a normative part of the EN allows for national choice to be made, the range and possible choice will be given in the normative text, and a note will qualify it as a Nationally Determined Parameter (NDP). NDPs can be a specific value for a factor, a specific level or class, a particular method or a particular application rule if several are proposed in the EN.

The requirements of this SS EN 1993-1-11 : 2011 are to be read in conjunction with the Singapore National Annex (NA) to SS EN 1993-1-11 : 2011 which contains information on the Singapore Nationally Determined Parameters and is published separately.

National choice is allowed in EN 1993-1-11 through the following clauses:

- | | | |
|------------|-------------|--------------|
| – 2.3.6(1) | – 5.2(3) | – 7.2(2) |
| – 2.3.6(2) | – 5.3(2) | – A.4.5.1(1) |
| – 2.4.1(1) | – 6.2(2) | – A.4.5.2(1) |
| – 3.1(1) | – 6.3.2(1) | – B(6) |
| – 4.4(2) | – 6.3.4(1) | |
| – 4.5(4) | – 6.4.1(1)P | |

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NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review unless there are requests to review such standards.*
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English Version

Eurocode 3 - Design of steel structures - Part 1-11: Design of structures with tension components

Eurocode 3 - Calcul des structures en acier - Partie 1-11:
Calcul des structures à câbles ou éléments tendus

Eurocode 3 - Bemessung und Konstruktion von
Stahlbauten - Teil 1-11: Bemessung und Konstruktion von
Tragwerken mit Zuggliedern aus Stahl

This European Standard was approved by CEN on 13 January 2006.

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.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This European Standard EN 1993-1-11, Eurocode 3: Design of steel structures: Part 1-11 Design of structures with tension components, has been prepared by Technical Committee CEN/TC250 « Structural Eurocodes », the Secretariat of which is held by BSI. CEN/TC250 is responsible for all Structural Eurocodes.

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 April 2007 and conflicting National Standards shall be withdrawn at latest by March 2010.

ⓘ This Eurocode partially supersedes ENV 1993-2, Annex A. ⓘ

According to the CEN-CENELEC Internal Regulations, the National Standard Organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

National annex for EN 1993-1-11

This standard gives alternative procedures, values and recommendations with notes indicating where national choices may have to be made. The National Standard implementing EN 1993-1-11 should have a National Annex containing all Nationally Determined Parameters to be used for the design of tension components to be constructed in the relevant country.

National choice is allowed in EN 1993-1-11 through:

- 2.3.6(1)
- 2.3.6(2)
- 2.4.1(1)
- 3.1(1)
- 4.4(2)
- 4.5(4)
- 5.2(3)
- 5.3(2)
- 6.2(2)
- 6.3.2(1)
- 6.3.4(1)
- 6.4.1(1)P
- 7.2(2)
- A.4.5.1(1)
- A.4.5.2(1)
- B(6)

1 General

1.1 Scope

(1) prEN1993-1-11 gives design rules for structures with tension components made of steel, which, due to their connections with the structure, are adjustable and replaceable see Table 1.1.

NOTE: Due to the requirement of adjustability and replaceability such tension components are generally prefabricated products delivered to site and installed into the structure. Tension components that are not adjustable or replaceable, e.g. air spun cables of suspension bridges, or for externally post-tensioned bridges, are outside the scope of this part. However, rules of this standard may be applicable.

(2) This standard also gives rules for determining the technical requirements for prefabricated tension components for assessing their safety, serviceability and durability.

Table 1.1: Groups of tension components

Group	Main tension element	Component
A	rod (bar)	tension rod (bar) system, prestressing bar
B	circular wire	spiral strand rope
	circular and Z-wires	fully locked coil rope
	circular wire and stranded wire	strand rope
C	circular wire	parallel wire strand (PWS)
	circular wire	bundle of parallel wires
	seven wire (prestressing) strand	bundle of parallel strands

NOTE 1: Group A products in general have a single solid round cross section connected to end terminations by threads. They are mainly used as

- bracings for roofs, walls, girders
- stays for roof elements, pylons
- tensioning systems for steel-wooden truss and steel structures, space frames

NOTE 2: Group B products are composed of wires which are anchored in sockets or other end terminations and are fabricated primarily in the diameter range of 5 mm to 160 mm, see EN 12385-2.

Spiral strand ropes are mainly used as

- stay cables for aerials, smoke stacks, masts and bridges
- carrying cables and edge cables for light weight structures
- hangers or suspenders for suspension bridges
- stabilizing cables for cable nets and wood and steel trusses
- hand-rail cables for banisters, balconies, bridge rails and guardrails

Fully locked coil ropes are fabricated in the diameter range of 20 mm to 180 mm and are mainly used as

- stay cables, suspension cables and hangers for bridge construction
- suspension cables and stabilizing cables in cable trusses
- edge cables for cable nets
- stay cables for pylons, masts, aerials