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**SANS 10162-1:2011**

Edition 2.1

# **SOUTH AFRICAN NATIONAL STANDARD**

## **The structural use of steel**

### **Part 1: Limit-states design of hot-rolled steelwork**

## SANS 10162-1:2011

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### Table of changes

Change No.	Date	Scope
Amdt 1	2011	Amended to update referenced standards.

### Foreword

This South African standard was approved by National Committee SABS SC 59F, *Construction standards – Steel and aluminium structures*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in May 2011.

This document supersedes SANS 10162-1:2005 (edition 2).

A vertical line in the margin shows where the text has been technically modified by amendment No. 1.

SANS 10162 consists of the following parts, under the general title *The structural use of steel*:

*Part 1: Limit-states design of hot-rolled steelwork.*

*Part 2: Limit-states design of cold-formed steelwork.*

*Part 4: The design of cold-formed stainless steel structural members.*

Annexes A to H are for information only.

### Introduction

This is the second edition in South Africa of a general limit-states design standard for steel structures. When the limit-states design standard was first introduced, it was designated Part 1 to distinguish it from cold-formed design (Part 2) and allowable stress design (Part 3). The allowable stress design standard has subsequently been withdrawn.

This standard is appropriate for the design of a broad range of structures. It sets out minimum requirements and is expected to be used only by engineers competent in this field. The scope recognizes that the requirements for the design of specific structures, such as bridges, are given in other international standards and that supplementary requirements may be needed for some particular structures.

Although the basic limit-states format as set out in the first edition has proven itself in use and remains unaltered, a number of technical changes reflecting the latest research developments and changes in practice have been incorporated. These changes are based on an increased understanding of the behaviour of structural materials and members, and thus of the overall behaviour of structures, as well as on major advances in methods of structural analysis and on improvements in fabrication and erection. Limit-states design has enhanced this development because the designer explicitly recognizes the different modes of failure and designs against these failure modes.

## **Introduction** *(concluded)*

The clauses of this standard have been re-ordered and in some cases, combined. The annexes have been re-ordered: some have been brought into the standard, others have been eliminated. In addition, a new annex on crane-supporting structures has been added.

Specific changes in this standard include the following:

- semi-rigid construction is introduced as one of three types of construction;
- notional lateral loads are applied in all lateral load combinations and not as a minimum;
- the simplified method for bracing design is included as an alternative;
- high-strength bolts are assigned a higher resistance factor;
- web-bearing rules are simplified;
- a distinction is made between braced and unbraced frames;
- class 2 sections are reunited with class 1 sections in combined compression and bending;
- new clauses are provided for tension-shear block failures, for trusses (including a simple approach), and for composite columns;
- the clauses on bolting, welding and fatigue have been revised substantially.

The standard refers to SANS 2001:CS1, which defines the standards according to which steel structures have to be fabricated and erected. This standard does not apply to structures not meeting these standards as a minimum.

The standard is compatible with the load and combination factors defined in the national loading standard, SANS 10160 (all parts). **Amdt 1**

This standard is based largely on the Canadian standard, CSA S16, *Limit-states design of steel structures*. The assistance of the CISC and CSA is gratefully acknowledged. This South African standard has been prepared by a Technical Committee convened by the South African Institute of Steel Construction.

NOTE 1 Use of singular does not exclude the plural (and vice versa) when the sense allows.

NOTE 2 Although the intended primary use of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

NOTE 3 This publication was developed by consensus, which is defined as “substantial agreement”. Consensus implies much more than a simple majority, but not necessarily unanimity.

NOTE 4 South African standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.

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