SLOVENSKI STANDARD
SIST EN 1090-1:2009+A1:2012

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Izvedba jeklenih in aluminijastih konstrukcij - 1. del: Zahteve za ugotavljanje skladnosti sestavnih delov konstrukcij

Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components

Ausführung von Stahltragwerken und Aluminiumtragwerken - Teil 1: Konformitätsnachweisverfahren für tragende Bauteile

Exécution des structures en acier et des structures en aluminium — Partie 1: Exigences pour l'évaluation de la conformité des éléments structuraux

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Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components

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Ausführung von Stahltragwerken und Aluminiumtragwerken - Teil 1: Konformitätsnachweisverfahren für tragende Bauteile

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1090-1:2009+A1:2011) has been prepared by Technical Committee CEN/TC 135 “Execution of steel and aluminium structures”, the secretariat of which is held by SN.

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of an identical text or by endorsement, at the latest by May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

This document includes Corrigendum 1[1] issued by CEN on 2010-11-17 and Amendment 1, approved by CEN on 2011-10-03.

This document supersedes EN 1090-1:2009.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1⟩ ⟨A1.

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According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[1] This corrigendum has been superseded by the changes of EN 1090-1:2009/FprA1:2011.

Introduction

This harmonised European Standard is a part of a group of European standards dealing with design and manufacturing of load bearing components and structures made of steel or aluminium.

This harmonised European Standard deals with provisions for conformity assessment of components which imply conformity to performance characteristics declared by the manufacturer of the components.

The components have structural characteristics which make them fit for their particular use and function.

The structural characteristics are governed by the design and the manufacture of the components.

This harmonised European Standard does not contain rules for structural design and manufacture. Such rules are called up from the relevant parts of Eurocode for design requirements and from EN 1090-2 (steel) and EN 1090-3 (aluminium) for execution requirements.

To use this harmonised European Standard for assessment and declaration of conformity of structural steel or aluminium components all relevant design and execution standards within the group need to be available.

This harmonised European Standard has been prepared to satisfy Mandate M 120 – Structural metallic products and ancillaries (2/4) – issued by the European Commission.

1 Scope

This European Standard specifies requirements for conformity assessment of performance characteristics for structural steel and aluminium components as well as for kits placed on the market as construction products. The conformity assessment covers the manufacturing characteristics, and where appropriate the structural design characteristics.

This European Standard covers also the conformity assessment of steel components used in composite steel and concrete structures.

The components can be used directly or in construction works or as structural components in the form of kits.

This European Standard applies to series and non-series structural components including kits.

The components can be made of hot rolled or cold formed constituent products or constituent products produced with other technologies. They may be produced of sections/profiles with various shapes, flat products (plates, sheet, strip), bars, castings, forgings made of steel and aluminium materials, unprotected or protected against corrosion by coating or other surface treatment, e.g. anodising of aluminium.

This European Standard covers structural cold formed members and sheeting as defined in EN 1993-1-3 and EN 1999-1-4.

This European Standard does not cover conformity assessment of components for suspended ceilings, rails or sleepers for use in railway systems.

NOTE For certain steel and aluminium components, particular specifications for performance and other requirements have been developed. The particular specifications may be issued as an EN or as Clauses within an EN. An example is given in EN 13084-7 for single wall steel chimneys and steel liners. Such particular specifications will take precedence in case of non-compliance with the requirements of this European Standard.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 1090-2	*Execution of steel structures and aluminium structures — Part 2: Technical requirements for steel structures*
EN 1090-3	*Execution of steel structures and aluminium structures — Part 3: Technical requirements for aluminium structures*
EN 1990:2002	*Eurocode*: *Basis of structural design*
EN 1991 (all parts)	*Eurocode 1*: *Actions on structures*
EN 1993 (all parts)	*Eurocode 3*: *Design of steel structures*
EN 1994 (all parts)	*Eurocode 4*: *Design of composite steel and concrete structures*
EN 1998 (all parts)	*Eurocode 8*: *Design of structures for earthquake resistance*
EN 1999 (all parts)	*Eurocode 9*: *Design of aluminium structures*
EN 10045-1	*Metallic materials — Charpy impact test — Part 1: Test method*

EN 10164	*Steel products with improved deformation properties perpendicular to the surface of the product — Technical delivery conditions*
EN 13501-1	*Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*
EN 13501-2	*Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*
EN ISO 9001	*Quality management systems — Requirements (ISO 9001:2000)*
EN ISO 14731	*Welding coordination — Tasks and responsibilities (ISO 14731:2006)*
ISO 7976-1	*Tolerances for building — Methods of measurement of buildings and building products — Part 1: Methods and instruments*
ISO 7976-2	*Tolerances for building — Methods of measurement of buildings and building products — Part 2: Position of measuring points*
ISO 17123-1	*Optics and optical instruments — Field procedures for testing geodetic and surveying instruments — Part 1: Theory*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
component specification
document or documents giving all necessary information and technical requirements for manufacturing the structural component

3.1.2
constituent products
materials or products used in manufacturing with properties which enter into structural calculations or otherwise relate to the mechanical resistance and stability of works and parts thereof, and/or their fire resistance, including aspects of durability and serviceability

3.1.3
design brief
documents containing all information necessary to perform a structural design of the component, considering its intended use

3.1.4
European technical specifications
European Standards and European Technical Approvals for construction products

3.1.5
evaluation method
means to check that the performance characteristics of the component comply with the values to be declared and any other required values which are used for evaluation of conformity for characteristics such as material properties, geometry and structural characteristics

NOTE 1 Where physical tests are carried out as the basis for the evaluation, the term test method is used.

NOTE 2 Where structural calculations are used to evaluate the load bearing capacity and/or the fatigue strength, the term initial type calculation (ITC) is used.

3.1.6
load bearing capacity
value or set of values for the loads that can be carried by the component referring respectively to either a single type and direction of loading or to a set of loads in various directions and referring to a defined level of resistance in accordance with EN 1990 and the relevant parts of EN 1993, EN 1994 or EN 1999. For kits the load bearing capacity refers to loads and load combinations the kit can carry that are relevant to the structure for its intended purpose.

NOTE The term load bearing capacity in this European Standard refers to situations for which the loads are predominantly static such that the influence of repetitive loads with a potential for fatigue need not be considered. The criteria for where fatigue needs to be considered are given in EN 1993 for steel components and in EN 1999 for aluminium components.

3.1.7
manufacturing
those work operations required to produce the component, which may encompass fabrication, welding, mechanical fastenings, assembly, testing and documentation of the performance characteristics declared

3.1.8
structural characteristics
properties of the component connected with its ability to function satisfactorily under the influence of the actions it is subject to

NOTE In this European Standard the performance characteristics, load bearing capacity, fatigue strength and resistance to fire are defined as structural characteristics together with the manufacturing characteristics that influence the structural behaviour of the component. Manufacturing characteristics are e.g. the execution classes, the welding quality, the geometrical accuracy (tolerances) or the surface properties, i.e. all properties that have influence on the structural behaviour.

3.1.9
structural components
components to be used as load-bearing parts of works designed to provide mechanical resistance and stability to the works and/or fire resistance, including aspects of durability and serviceability which can be used directly as delivered or can be incorporated into a construction work

3.1.10
structural kit
set of structural components to be assembled and installed on site

NOTE The assembled system of the structural components is a “structure”.

3.1.11
weldability
quality of a steel or aluminium material for which a qualified welding procedure can be developed

NOTE See EN ISO 15607.

3.2 Abbreviations

The following abbreviations are used in this European Standard:

FPC factory production control

ITC initial type calculation

ITT initial type testing

MPCS manufacturer provided component specification

NDP nationally determined parameter, a term used in the Eurocodes where a national provision is allowed

NPD no performance determined, a term used if the actual characteristic has not been tested

NOTE This can be the case if e.g. the actual characteristic is not regulated in the member state where the component is to be used.

PPCS purchaser provided component specification

R, E, I M performance characteristics related to testing of fire resistance in accordance with EN 13501-2 with the following meaning for the individual characteristics:

R fire resistance in minutes under a given set of actions on the component

E integrity (maintaining the integrity as a separating element)

I insulation (ability as a separating element to keep the temperature increase on the none fire exposed side below a set limit)

M mechanical action (resistance to withstand dynamic impact by testing – after completed fire heating)

4 Requirements

4.1 Constituent products

4.1.1 General

Structural components of steel and aluminium shall be made of constituent products as given in 4.1.2 and 4.1.3, respectively.

4.1.2 Constituent products for steel components

Constituent products for steel components shall be in accordance with the European Standards referred to in the relevant Clauses of EN 1090-2.

NOTE The standards referred to in EN 1090-2 give information about the strength properties, weldability and fracture toughness of the steels.

4.1.3 Constituent products for aluminium components

Constituent products for aluminium components shall be in accordance with the European Standards referred to in the relevant Clauses of EN 1090-3.

NOTE The standards referred to in EN 1090-3 give information about the strength properties of the aluminium alloys.

4.2 Tolerances on dimensions and shape

The geometrical tolerances specified in EN 1090-2 and EN 1090-3 for the essential tolerances shall apply to all components. If any special tolerances apply these shall be stated in the component specification.

NOTE According to EN 1090-2 and EN 1090-3 the requirements for functional tolerances apply to all components.

4.3 Weldability

If steel and aluminium structural components are to be declared as weldable they shall be made of weldable constituent products according to EN 1090-2 or EN 1999-1-1 as appropriate. If relevant to the performance of a steel product the through-thickness properties shall be declared.

4.4 Fracture toughness

Steel components shall be manufactured from constituent products that meet the fracture toughness properties required. The constituent products specified in the component specification shall be used.

NOTE 1 The fracture toughness properties of the steel are given in relation to the Charpy impact test using the reference temperature and the material thickness.

Fracture toughness is not tested or specified for aluminium materials.

NOTE 2 The material properties for aluminium alloys improve for decreasing temperatures.

4.5 Structural characteristics

4.5.1 General

Structural characteristics of a component covered in this European Standard refer to its 〚A1〛 load bearing capacity, deformation at serviceability limit state, 〚/A1〛 fatigue strength and resistance to fire.

〚A1〛 *deleted text* 〚/A1〛

The required structural characteristics shall be achieved by:

— an adequate structural design, if and as required for the component, and

— manufacturing the component according to the component specification developed in accordance with EN 1090-2 or EN 1090-3.

4.5.2 Load bearing capacity

Declaration of the load bearing capacity may refer to the resistance of the cross sections of the component, expressed as a characteristic value or as a design value. Alternatively the load bearing capacity may be expressed in terms of the loads the component can carry according to the applied design provisions, expressed as a characteristic value or as a design value.

4.5.3 Fatigue strength

Declaration of the fatigue strength of a structural component shall be specific to fatigue actions against which the fatigue strength has been assessed.

Fatigue strength in this standard refers to situations for which the loads are such that the influence of repetitive loads needs to be considered to assess the structural characteristics of the component.

NOTE 1 Requirements for fatigue strength are needed for certain component applications where the specific requirements should be given in the design brief in terms of stress range(s), number of cycles, etc, and where the requirements are formulated according to the provisions in the relevant Eurocode.

NOTE 2 Fatigue strengths are related to cross sectional resistance or resistance of a given structural detail and are usually expressed by reference to S-N diagrams.The conceptual strategy for determination of fatigue strength should be based on the approaches given in the relevant Eurocode. Information on the strategy should be given in the design brief.

4.5.4 Resistance to fire

Declaration of the fire resistance of a structural member may refer to the fire exposure represented by the standard temperature-time relationship to be used for assessment of the performance characteristics R, E, I and M in the classification according to EN 13501-2.

Combinations of these designatory letters, as appropriate, are to be supplemented by a number which in elapsed completed minutes of the nearest lower class during which the functional requirements are satisfied, to provide the classification of performance.

The classification periods against any of the characteristics shall be declared in minutes, using one of the periods: 15, 20, 30, 45, 60, 90, 120, 180, 240 or 360.

Alternatively a declaration of fire resistance under a given set of actions on the component during a fire exposure may be referenced to other specified fire exposures than the standard temperature-time relationship such as the parametric temperature-time curves according to Annex A of EN 1991-1-2.

The requirements to resistance to fire of a component is under the responsibility of each Member State and is generally dependent on the type of structure/building it will be in, where in the structure/building and finally its function in the structural system. This shall appear from the design brief.

NOTE The requirements of a component can include requirements to more than one performance characteristic.

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4.5.5 Deformation at serviceability limit state

The deformations at serviceability limit state determined by using the appropriate combination of actions shall be within the required limits for vertical and horizontal deformations specified in the design assumptions and/or European Standards (e.g. National Determined Parameters, NDP, of the National Annex of EN 1990, EN 1993, EN 1994 and/or EN 1999). A1

4.6 Reaction to fire

Declaration of the reaction to fire shall be in accordance with the classes and test requirements given in EN 13501-1.

4.7 Dangerous substances

Dangerous substances in this standard refer to the material properties with regard to emission of radioactivity or release of cadmium. Only constituent products shall be used for which any emission of radioactivity and any release of cadmium is non-existent or limited to be within an accepted limit in the territory of intended destination. Materials used in coatings shall not release or emit any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material, or permitted in national provisions of the member state of destination.

4.8 Impact resistance

Impact resistance is a material characteristic which expresses the same properties of steel as fracture toughness. There are no additional requirements.

4.9 Durability

The component specification shall specify any requirements for corrosion protection. See EN 1090-2 for carbon steel, EN 1993-1-4 for stainless steel and EN 1999-1-1 for aluminium.

NOTE 1 The durability of components is dependent on their use and the exposure they are subject to and any protection applied.

NOTE 2 The performance characteristics of structural components manufactured from steel or aluminium adequately designed and manufactured are not subject to degradation except where corrosion is allowed to occur. Corrosion can be prevented by the use of protection systems. The service life of a component is preserved by adequate maintenance of the component.