
Jeklene in aluminijevi konstrukcijski sestavni deli Splošni dobavni pogoji

Steel and aluminium structural components - General delivery conditions

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Steel and aluminium structural components - General delivery conditions

Elements de construction en acier et en aluminium -
Conditions générales de livraison

Stahl- und Aluminiumbauteile - Allgemeine
Lieferbedingungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 135.

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.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 1090-1:2004) has been prepared by Technical Committee CEN/TC 135, "Execution of steel and aluminium structures", the secretariat of which is held by SN.

This document is currently submitted to the CEN Enquiry.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

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1 Scope

This European Standard specifies general technical delivery conditions in terms of performance characteristics for structural steel and aluminium components placed on the market as construction products. The components may be used directly or for inclusion in construction works or as structural components in the form of kits. The Standard also specifies requirements to evaluation of conformity to the specified performance characteristics and for the test methods to be used.

This European Standard specifies requirements for steel components made from hot rolled, hot finished, welded and cold-formed products. It also applies to components made from cold formed members and sheeting.

This European Standard does not cover production of components for suspended ceilings, components of cast iron, components of cast steel and steel forging nor rails and sleepers for the use in railway systems.

This Standard does, however, cover fabrication of components from constituent products of cast and forged steel.

This Standard specifies requirements for aluminium components made from semi-finished products, cast or forged constituent materials and products.

NOTE For certain steel and aluminium products, particular specifications for performance and other requirements have been developed. The specifications can be issued as an EN or as clauses within an EN. An example is given in prEN for single wall steel chimneys and steel liners. Such specifications are meant to take precedence in case of non-compliance with the requirements of this 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.

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Relevant for all components:

EN 1990	<i>Basis of structural design</i>
EN 1991	<i>Actions on structures. All parts</i>

Relevant for steel components

EN 1090 - 2	<i>Technical requirements for execution of steel structures</i>
EN 1993	<i>Design of steel structures. All parts</i>
EN 1994	<i>Design of composite structures. All parts</i>

Relevant for aluminium components:

EN 1090 - 3	<i>Technical requirements for execution of aluminium structures</i>
EN 1999	<i>Design of aluminium structures. All parts</i>

Other supporting standards are given in the above listed European Standards.

Editorial comment: The titles of EN 1090-2 and EN 1090-3 are presently being evaluated.

3 Terms and definitions

For the purposes of this European Standard, the following definitions apply:

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

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

design brief a document containing all information necessary to enable a structural design of the component, considering its intended use.

load bearing capacity is one value or a set of values for the loads that can be carried by the component referring respectively to a single type and direction of loading or to a set of loads in various directions of the loads, referring to a defined level of resistance in accordance with EN 1990 and the relevant parts of EN 1993 or EN 1999.

structural components are components to be used as load-bearing part of works designed to provide mechanical resistance and stability to the works and/or fire resistance, including aspects of durability and serviceability; it can be used directly as delivered or for inclusion in a construction work

structural characteristics are properties of the component connected with its ability to function satisfactorily under the influence of the actions it is subject to. In this European Standard the performance characteristics load bearing capacity, fatigue strength and resistance to fire are defined as structural characteristics

structural kit consists of structural components to be assembled and installed on site; the assembled system made from the structural kit is a "structure"

test method is the means to check that the mandated performance characteristics and the other characteristics of the component comply with the values to be declared and any other required values. Test methods are used for evaluation of conformity for characteristics such as material properties, geometry and structural characteristics. Test methods include the determination of characteristics using physical testing, measurements and/or structural calculations. In this standard the term “evaluation” is used as the common word for determination of these characteristics.

NOTE There is presently no European Standard available on how to perform and evaluate results from structural tests. The determination of structural characteristics will consequently rely on calculations in accordance with the European standards for structural design referred to in this standard.

4 Requirements

4.1 Constituent products

Constituent products shall be selected according to 4.1.2 and 4.1.3.

Selection of constituent products shall comply with the required function and use of the component.

4.1.2 Constituent products for steel components

Constituent products for steel components shall be in accordance with the European Standards referred to in EN 1090-2. These standards give information about the strength properties, weldability and fracture toughness of the steels.

4.1.3 Constituent products for aluminium components

Constituent products aluminium components shall be in accordance with the European Standards referred to in EN 1090-3. These standards give information about the strength properties and weldability of the aluminium alloys.

4.2 Tolerances on dimensions and shape

Structural components shall be manufactured within the limits for the normative geometrical tolerances given in EN 1090-2 respectively EN 1090-3. Values for geometrical tolerances shall refer to the tolerance classes given in EN 1090-2 and 1090-3.

4.3 Weldability

Weldability shall be obtained by the use of materials which are characterized as weldable according to EN 1090-2 for steel components and EN 1090-3 for aluminium components.

NOTE These execution standards refer to product standards for materials that require initial type testing for demonstration of weldability.

For steels weldability is expressed by the carbon equivalent value (CEV) in accordance with EN 10025-1. For aluminium the weldability is expressed by the aluminium alloy, defined by the chemical composition, in accordance with EN 1011-4.

4.4 Fracture toughness

Steel components shall be manufactured from materials that meet the required fracture toughness properties.

NOTE The fracture toughness properties are given in relation to the working temperature and the material thickness of the steel. EN 1993-1-10 describes how to determine fracture toughness from Charpy impact tests and gives guidance on the selection of materials for steel components based on their service temperature.

Fracture toughness is not tested for aluminium materials.

4.5 Structural characteristics

4.5.1 General

Structural characteristics of a component covered in this European Standard refer to its load bearing capacity, fatigue strength and resistance to fire. The required or specified structural characteristics shall be obtained from the Design Brief.

NOTE 1 Structural characteristics may also include characteristics that are related to the Serviceability Limit State which covers functional requirements related to the use of the component. These characteristics are not included as requirements in this European Standard, however, may be specified in the Design Brief.

The required structural characteristics shall be obtained by an adequate manufacture of the components, for which the requirements shall be specified in the component specification.

NOTE 2 Manufacturing encompass as relevant fabrication, welding, mechanical fastenings, assembly and testing.

For steel components the work shall be carried out according to the requirements in EN 1090-2, for aluminium components EN 1090-3. Any requirements in the component specification to selection of classes and options given in EN 1090-2 respectively EN 1090-3 shall be complied with.

4.5.2 Load bearing capacity

The load bearing capacity of a structural component shall refer to specified actions given in EN 1991 and to combination of actions according to EN 1990.

NOTE Load bearing capacities in this European Standard refers to situations for which the loads are predominantly static such that the influence of repetitive loads need not be considered.

4.5.3 Fatigue strength

Requirements to fatigue strength of a structural component shall refer to the specified fatigue actions against which the fatigue strength shall be is assessed.

The fatigue strength for structural steel components shall be determined in accordance with EN 1993, and for structural aluminium components in accordance with EN 1999.

NOTE 1 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 load bearing capacity of the component. 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.

NOTE 2 The conceptual strategy for determination of fatigue strength can either be based on "safe life design" or "damage tolerant design" as defined in the relevant Eurocode.

4.5.4 Resistance to fire

Requirements to fire resistance for structural components shall refer to the temperature-time relation to be used for the assessment and the fire class R, E, I or M as relevant.

4.6 Reaction to fire

Steel and aluminium materials fall within Euroclass A1 of the European classification with respect to reaction to fire.

NOTE Reaction to fire of coatings applied to steel or aluminium components for durability or other purposes may be other than Euroclass A1.

4.7 Dangerous substances

Dangerous substances in this standard refer to the materials properties with regard to emission of radioactivity and release of cadmium. Only constituent materials and 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 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 Durability

The durability of components is dependant on their use and the environmental exposure they are subject to.

NOTE 1 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 may be prevented by the use of corrosion protection systems. EN 12944 gives guidance for specification of such systems and the test methods to apply.

NOTE 2 For steel components made from weather-resistant steels to EN 10025-5 or stainless steels to EN 10028-2 a working life of the component may be calculated.
(See Guidance Paper F: Durability and the Construction Products Directive)

NOTE 3 Any requirements or specification to surface treatment of components is a subject for inclusion in the component specification.

A corrosion protection for structural steel components shall be carried out in accordance with EN 1090-2, clause 12.6 and any additional requirements in the component specification.

NOTE EN 1090-2 gives requirements to surface preparation of the steel as a pre-treatment prior to any subsequent application of a protection system.

A corrosion protection of structural aluminium components shall be carried out in accordance with EN 1090-3, clause 10 and any additional requirements in the component specification.

NOTE prEN 1999-1-1 gives guidance related to durability of aluminium alloys.

5 Evaluation methods

5.1 Constituent products

The constituent products are tested by checking that the inspection documents for the products used comply with the requirements of the component specification.

The testing of constituent products shall also include a check that the correct profile types (sections) have been used.

5.2 Tolerances on dimensions and shape

Testing of geometrical tolerances consists of two parts:

- a) for built-up sections (e.g. by welding) it shall be checked that the geometrical deviations comply with the requirements in 4.2;
- b) for the completed component that the geometrical deviations comply with 4.2.

Geometrical tolerances, shall be measured using methods and instruments selected from those listed in ISO 7976-1 and -2. Accuracy of measurements shall be assessed in accordance with the relevant part of ISO 8322.

5.3 Weldability

For weldability of the constituent products, reliance may be placed on properties associated with materials and components used as constituent products if these are given by reference to a European technical specification.

If data on the constituent products are not available, chemical analysis shall be undertaken using appropriate established methods.

5.4 Fracture toughness

For fracture toughness of the constituent products reliance may be placed on properties for impact strength associated with materials and components used as constituent products if these are given by reference to a European technical specification.

If data of the constituent products are not available, fracture toughness shall be determined using Charpy impact tests carried out according to EN 10045-1. For steel components provisions for evaluation of the test results are given in EN 1993-1-10

5.5 Structural characteristics

5.5.1 General

Assessment of structural characteristics shall be based on:

- a) Structural calculations, or
- b) Structural testing assisted by structural calculations for the component

5.5.2 Structural calculations

Verification and assessment of required structural characteristics may be performed by structural calculations, where the requirements for the component to comply with are given in a Component Design Brief.

The structural characteristics shall be evaluated by calculations in accordance with the relevant European Standards for design of structures - Eurocodes. In a general case this requires the use of:

- a) EN 1990 - Basis of structural design
- b) EN 1991 - Actions on structures, all relevant parts
- c) EN 1993 - Design of steel structures, all relevant parts. For steel components
- d) EN 1994 - Design of composite structures of steel and concrete, all relevant parts. For the steel parts in composite structures
- e) EN 1999 - Design of aluminium structures, all relevant parts. For aluminium components

To determine the structural characteristics of a structural component the recommended values for the NDPs in these standards, or the NDPs for the country where the component is to be used shall be taken into account.

5.5.3 Structural testing

Structural testing of one or more of the structural characteristics of a component may have the form of:

- a) Type testing;
- b) Acceptance testing

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Structural testing is not required if the structural design is carried out according to clause 4.5 and evaluated according to clause 5.5.2.

NOTE Guidelines for structural testing are given in EN 1990.

5.5.3.1 Type testing

Type testing may be in the form of an initial type testing carried out for introduction of a new type of product on the market, or a type testing to demonstrate the structural properties of a component type.

5.5.3.2 Acceptance testing

Acceptance testing is a testing carried out for a particular delivery, based on a specified set of loads.

5.5.4 Manufacturing of components

The manufacturing of components shall be evaluated in accordance with the requirements for inspection given in EN 1090-2 for steel structures and 1090-3 for aluminium structures.

NOTE The intention of evaluation of the manufactured components is to secure that the required structural characteristics influenced by the manufacturing are met.

5.6 Resistance to fire

If the component's resistance to fire for performance characteristic R is to be evaluated by another method than by calculation according to 5.5.2, it shall be evaluated by using EN 13501-2, EN 1363 and EN 1365. The other performance characteristics for resistance to fire i.e. E, I or M shall be evaluated according to EN 13501-2, EN 1363 and EN 1365. The component specification shall specify all necessary information on the test methods to be used, including timing and frequency of testing required, acceptance criteria with tolerances and classification of results.

5.7 Reaction to fire

A testing of reaction to fire is not required, see 4.6.

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5.8 Dangerous substances

The requirement in 4.7 is fulfilled if the constituent products comply with the European Standards referred in EN 1090-2 for steels and EN 1090-3 for aluminium alloys. No further testing is required unless protective coatings are used for which a possible emission can not be controlled by control of the raw coating material.

5.9 Durability

There is no direct test method for testing of durability. Durability is indirectly evaluated by a check of the exposure of the components and to the testing of any requirements for surface protection given in the component specification.

6 Evaluation of conformity

6.1 General

The conformity of a component or kit with the requirements of this European standard and with the stated values (including classes) shall be demonstrated by:

- a) initial type evaluation;
- b) factory production control by the manufacturer, including inspection and testing of products sampled from production in accordance with a prescribed plan by the manufacturer.