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Steel structures — Execution of structural steelwork —

Part 1: General requirements and terms and definitions

Structures en acier – Exécution des charpentes et ossatures en acier —

Partie 1: Exigences générales et termes et définitions

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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 167, *Steel and aluminium structures*.

This first edition cancels and replaces ISO 10721-2:1999, which has been technically revised.

A list of all parts in the ISO 17607 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Specific requirements for the achievement of structures that are optimal with respect to safety, the state of the economy, development and general values of a nation are given in the appropriate regional or national standards, if they exist.

Many nations do not have their own standards for structural steelwork. Some refer to other national or regional standards. Some permit the project's standard to be selected by the owner, designer or constructor of the structure. Some do not require any standards to be followed.

The ISO 17607 series of standards on the execution of structural steelwork was developed to serve as a means to provide a set of requirements and guidance for projects that are constructed without a governing regional or national standard. The ISO 17607 series can also serve to reduce trade barriers.

Additional requirements to be addressed in the execution of structural steelwork, as structures or as fabricated components, can be found in the other parts of the series:

— ISO 17607-2 (Steels);

— ISO 17607-3 (Fabrication);

— ISO 17607-4 (Erection);

— ISO 17607-5 (Welding);

— ISO 17607-6 (Bolting).

Steel structures — Execution of structural steelwork —

Part 1:
General requirements and terms and definitions

1 Scope

This document defines general requirements for the execution of structural steelwork for:

— structural steel buildings;

— general structures, designed, fabricated, and erected in a manner similar to buildings with building-like load-resisting elements, e.g. support framing for equipment, tanks, vessels, and pipelines;

— crane-supporting structures;

— typical roadway and pedestrian bridges including those constructed using rolled sections, welded plate girders, or trusses (lattices).

This document applies to structures or fabricated components that are produced from:

— hot-rolled and cold-formed structural steel products up to and including a nominal yield strength of 700 MPa with a thickness of 3 mm and above;

— hot-finished and cold-formed structural steel hollow sections, up to and including a nominal yield strength of 700 MPa, including standard range and custom-made rolled products and hollow sections manufactured by welding.

This document also applies to steel components in composite steel and concrete structures, and in structures combining steel with other materials.

This document defines requirements independent of the type and shape of the steel structure, including structures subjected to fatigue or seismic loading. The requirements are expressed in terms of execution levels.

This document does not define all requirements for other types of fabricated steel structures (e.g. railway bridges, roadway and pedestrian bridges using welded box sections or arch boxes, cable-supported bridges over 100 m span, moving bridges, monorails, steel towers, masts, chimneys, silos, tanks, pipelines, antennae, offshore platforms). However, this document provides general guidance regarding fabrication and erection practices that may be used together with the appropriate ISO, regional or national design standards for such structures.

This document does not cover requirements for the following:

— sheeting;

— fabrication of stainless steels.

This document does not apply to design of steel structures.

NOTE Design is inextricably a part of the design-fabrication-erection sequence, including the application of tolerances, and cannot be considered in isolation.

This document is intended to be used, as appropriate, together with national standards and other documents, observing the provisions in this document concerning such use.

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.

ISO 6707-1, *Buildings and civil engineering works — Vocabulary — Part 1: General terms*

ISO 6707-2, *Buildings and civil engineering works — Vocabulary — Part 2: Contract and communication terms*

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/TR 25901-1, *Welding and allied processes — Vocabulary — Part 1: General terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO 6707-2 and ISO/TR 25901-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms related to general requirements

3.1.1
structure
organized combination of connected parts designed to carry loads and provide rigidity, redundancy, and structural stability

3.1.2
structural steelwork
steel structures or fabricated steel components used in *construction works* (3.1.4)

3.1.3
architecturally exposed structural steel
AESS
structural steelwork (3.1.2) exposed to view with additional requirements specified to achieve designated aesthetic qualities

3.1.4
construction works
everything that is constructed or results from construction operations

Note 1 to entry: This term covers both building and civil engineering works. It refers to the complete construction comprising both structural and non-structural components.

3.1.5
constructor
person or organization executing the *structural steelwork* (3.1.2)

Note 1 to entry: Multiple constructors may be involved in a project.

Note 2 to entry: The term constructor includes fabricator and erector.

Note 3 to entry: In ISO 9000, the term *"supplier"* (3.1.7) is used.

3.1.6
manufacturer
organization that manufactures the respective products according to the requirements of the order and to properties specified in the referenced product specification or *execution specification* (3.1.10)

Note 1 to entry: As used in this document, the term manufacturer does not include the organization performing *fabrication* (3.1.9), which is termed the *constructor* (3.1.5).

[SOURCE: ISO 10474:2013, 3.4, modified, — Added reference to execution specification.]

3.1.7
supplier
organization that is supplied with products by the *manufacturers* (3.1.6) and that then, in turn, supplies them without further processing or after processing without changing the properties specified in the purchase order, the referenced product specification or *execution specification* (3.1.10)

Note 1 to entry: Examples of suppliers can be steel service centres and stockists.

[SOURCE: ISO 10474:2013, 3.5, modified — Changed term from intermediary to supplier, added reference to execution specification.]

3.1.8
execution
all activities performed for the physical completion of the *structural steelwork* (3.1.2), i.e. *procurement, fabrication* (3.1.9), welding, bolting, transportation, erection, and the inspection and documentation thereof

3.1.9
fabrication
DEPRECATED: **manufacturing**
all activities required to produce and deliver a component

Note 1 to entry: As relevant, this comprises, e.g. procurement, *preparation* (3.3.9) and assembly, welding, bolting, transportation, and the inspection and documentation thereof.

3.1.10
execution specification
set of documents covering technical data and requirements for a particular steel structure, including those specified to supplement and qualify the rules of this document

Note 1 to entry: Execution specification includes requirements where this document identifies items to be specified.

3.1.11
specifier
organization, firm, agency, or individual responsible for development and maintenance of the *execution specification* (3.1.10)

3.1.12
execution level
classified set of requirements specified for the execution of the *structural steelwork* (3.1.2) as a whole, of an individual component or a detail of a component

Note 1 to entry: Execution level is similar to, but not necessarily identical to, execution classes in other standards.

Note 2 to entry: Execution levels are described in Annex A and Annex C, Table C.1 and Table C.2.

3.1.13
constituent product
material and product used for fabricating a *sub-component* (3.1.18) or *component* (3.1.16) and which remains as part of it

EXAMPLE *Steel product* (3.1.14), bolting product, welding consumable.

3.1.14
steel product
constituent product (3.1.13) supplied as hot-rolled or cold-formed steel shapes, plates or bars, or as hot-finished or cold-formed steel hollow sections

3.1.15
inspection document
document, issued by the *manufacturer* (3.1.6), or *supplier* (3.1.7) if applicable, and supplied to the purchaser, of the *constituent product* (3.1.13) that describes properties of supplied constituent product in a way that enables it to be compared to the specified properties

Note 1 to entry: For further information, see ISO 10474 for steels and *steel products* (3.1.14) and ISO 16228 for bolting and fastener products.

EXAMPLE 1 Manufacturer's certificate of compliance, manufacturer's test report, material test report.

EXAMPLE 2 Declaration of compliance 2.1, test report 2.2, or inspection certificates 3.1 and 3.2 for the material.

3.1.16
component
shipping piece
shipping member
erectable part of a steel structure, which can itself be an assembly of several *sub-components* (3.1.18)

3.1.17
main component
primary load-carrying steel component

Note 1 to entry: Main components can be identified in the *execution specification* (3.1.10).

Note 2 to entry: This excludes sub-components.

EXAMPLE Beam, girder. column, bracing, truss.

3.1.18
sub-component
constituent product (3.1.13) that is transformed or fabricated to be incorporated into a fabricated component or into the erected steel structure

EXAMPLE *Connection* (3.5.14) detail, stiffener, curb angle.

3.1.19
identification
ability of recognizing, by way of suitable tagging, tracking, marking or other means, the identity of a specific piece or pieces, products, processes, procedures or personnel

3.1.20
identification means
descriptive matter, including tags, words, particulars, trademarks, brand name, pictorial matter, symbols, or other methods referring to *constituent product* (3.1.13), process, or personnel, written, printed, stencilled, marked, embossed or impressed on, or attached to a piece or component and referenced in the *constructor's* (3.1.5) documentation

3.1.21
identification document
set of data enabling the identity of *constituent product* (3.1.13), process, or personnel

EXAMPLE *Inspection documents* (3.1.15), material test reports, heat treatment documents, welding procedure specifications, welder and welding operator certificates.

3.1.22
traceability
process and ability of associating product, process, procedure, or personnel back to non-specific data related to the respective family of either products or relevant *fabrication* (3.1.9) processes, or both, e.g. *inspection documents* (3.1.15) or identification marks

Note 1 to entry: Additional information and levels of traceability are given in C.3.

3.1.23
lot traceability
process and ability of associating product, process, procedure, or personnel back to specific data related to an individual lot of either products or individual *fabrication* (3.1.9) processes, or both, e.g. specific *inspection documents* (3.1.15) or individual lot identification marks

3.1.24
quality plan
document or set of documents that describes the standards, quality practices, resources and processes pertinent to a specific product, service or project

3.1.25
inspection and test plan
ITP
document providing the type and sequence of inspections and tests, including appropriate resources, procedures and other relevant information

Note 1 to entry: Inspection and test plans may be presented as a single document or as a series of interdependent or supporting documents.

3.1.26
inspector
party responsible to ensure that the *constructor* (3.1.5) has satisfied the requirements stated in the *execution specification* (3.1.10) in the work

3.1.27
inspection report
document prepared by an *inspector* (3.1.26) of materials, *fabrication* (3.1.9), erection, welding, or bolting, according to an *inspection and test plan* (3.1.25) that describes conformance or non-conformance with specified requirements

3.1.28
nonconformity
non-fulfilment of a requirement

[SOURCE: ISO 9000:2015, 3.6.9, modified — Deleted Note 1 to entry.]

3.2 Terms related to steels

3.2.1
as-rolled steel
steel without any special rolling and/or heat treatment condition

Note 1 to entry: Adapted from ISO 630-6:2014, 3.1.

3.2.2
normalized steel
steel produced by heating to a suitable temperature above the transformation range and then cooling in air to a temperature substantially below the transformation range

Note 1 to entry: For structural steel hollow sections, the definition for normalizing in ISO 4885 may be used.

Note 2 to entry: Adapted from ISO 630-6:2014, 3.2.

3.2.3
quenched steel
steel subjected to cooling more rapidly than in still air from a high temperature above Ac1

Note 1 to entry: Ac1 is the temperature at which austenite begins to form during heating.

Note 2 to entry: Adapted from ISO 630-6:2014, 3.3.

3.2.4
tempered steel
steel subjected to heat treatment, generally after quench hardening or another heat treatment to bring the properties to the required level, and consisting of heating to specific temperatures (< Ac1) and soaking for an appropriate duration followed by cooling at an appropriate rate

Note 1 to entry: Additionally, the following may apply: processes of direct quenching plus tempering.

Note 2 to entry: Adapted from ISO 630-6:2014, 3.4.

3.2.5
thermomechanical processed steel
steel rolled with a process in which the final deformation is carried out in a certain temperature range leading to a material condition with certain properties which cannot be achieved or repeated by heat treatment alone

Note 1 to entry: Hot forming or post-weld heat treatment above 580 °C can lower the strength values and should not be performed. Flame straightening may be applied in accordance with relevant technical recommendations.

Note 2 to entry: Thermomechanical rolling can include processes with an increasing cooling rate with or without tempering, including self-tempering but excluding direct quenching and quenching and tempering.

Note 3 to entry: In some publications, the term “Thermomechanical Control Process” is also used.

Note 4 to entry: Adapted from ISO 630-6:2014, 3.5.

3.2.6
atmospheric corrosion resistant steel
steel with the ability to resist degradation or alteration of material through chemical reaction with the surrounding atmosphere

Note 1 to entry: Adapted from ASTM A941:2017, 3, atmospheric corrosion resistance.

3.2.7
cold formed component
cold formed long products or profiled sheet having various cross-section shapes, either open or with edges abutting, constant along their length, made from coated or uncoated hot or cold rolled flat products whose thicknesses are only slightly modified by the cold forming process (e.g. profiling, drawing, press forming, flanging)

[SOURCE: EN 1090-2:2018, 3.9.1]