
**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

STANDARDSISO.COM : Click to view the full PDF of ISO 17607-1:2023



STANDARDSISO.COM : Click to view the full PDF of ISO 17607-1:2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

| | |
|---|-----------|
| Foreword | iv |
| Introduction | v |
| 1 Scope | 1 |
| 2 Normative references | 2 |
| 3 Terms and definitions | 2 |
| 3.1 Terms related to general requirements..... | 2 |
| 3.2 Terms related to steels..... | 5 |
| 3.3 Terms related to fabrication and erection..... | 7 |
| 3.4 Terms related to welding..... | 8 |
| 3.5 Terms related to structural bolting..... | 8 |
| 4 Execution specification and quality requirements | 12 |
| 4.1 Execution specification..... | 12 |
| 4.1.1 General..... | 12 |
| 4.1.2 Execution levels..... | 13 |
| 4.1.3 Identification and traceability..... | 13 |
| 4.1.4 Geometrical tolerances..... | 14 |
| 4.1.5 Architecturally exposed structural steel (AESS)..... | 14 |
| 4.2 Quality requirements..... | 14 |
| 4.2.1 Quality management system..... | 14 |
| 4.2.2 Quality documentation..... | 14 |
| 4.2.3 Quality plan..... | 15 |
| 4.2.4 Execution documentation..... | 15 |
| 5 Constituent products | 15 |
| 5.1 General..... | 15 |
| 5.2 Conformance with inspection documents..... | 15 |
| 6 Inspection, testing, and correction | 16 |
| 6.1 General..... | 16 |
| 6.2 Constituent products and components..... | 16 |
| 6.2.1 Constituent products..... | 16 |
| 6.2.2 Components..... | 16 |
| 6.2.3 Non-conforming products..... | 17 |
| 6.3 Geometrical dimensions of fabricated and erected components..... | 17 |
| 7 Documents required to claim conformity to this document | 17 |
| 7.1 General..... | 17 |
| 7.2 Declaration of conformity..... | 18 |
| Annex A (normative) Additional information, list of options and requirements related to the execution levels | 19 |
| Annex B (informative) Guidance for development of the execution specification | 21 |
| Annex C (informative) Guidance for the determination of execution levels | 22 |
| Annex D (informative) Checklist for the content of a quality plan | 26 |
| Annex E (informative) Architecturally exposed structural steel (AESS) | 29 |
| Bibliography | 30 |

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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).

STANDARDSISO.COM : Click to view the full PDF of ISO 17607-1:2023

[STANDARDSISO.COM](https://standardsiso.com) : Click to view the full PDF of ISO 17607-1:2023

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 ($< A_{c1}$) 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]

3.3 Terms related to fabrication and erection

3.3.1

tolerance

difference between the upper limit of size and the lower limit of size

Note 1 to entry: Tolerance is an absolute value without sign.

Note 2 to entry: In building construction, tolerance is commonly expressed by “ \pm permitted deviation” so that the value of the tolerance is implicit.

[SOURCE: EN 1090-2:2018, 3.15, modified — Note 2 to entry was added.]

3.3.2

fabrication tolerance

manufacturing tolerance

permitted range in the size or dimensions of a component resulting from component fabrication

3.3.3

erection tolerance

permitted range in the position of an erected component

3.3.4

essential tolerance

basic limits for a geometrical tolerance necessary to satisfy the design assumptions for structures in terms of mechanical resistance and stability

[SOURCE: EN 1090-2:2018, 3.15.1]

3.3.5

functional tolerance

geometrical tolerance which may be specified to meet a function other than mechanical resistance and stability, e.g. appearance or fit up

[SOURCE: EN 1090-2:2018, 3.15.2]

3.3.6

special tolerance

geometrical tolerance which is not covered by the tabulated types or values of tolerances given in this document, and which needs to be specified in a particular case

[SOURCE: EN 1090-2:2018, 3.15.3, modified — Removed reference to European standard.]

3.3.7

limit tolerance

maximum or minimum value for the acceptance criteria that shall not be exceeded

[SOURCE: JASS 6, Appendix 6]^[40]

3.3.8

control tolerance

target value used as a criterion for fabrication or erection so that 95% or more of the products can be accepted based on receiving inspection for dimensional accuracy

Note 1 to entry: An accepted value used to judge whether the inspection lot can be accepted or rejected.

[SOURCE: JASS 6, Appendix 6]^[40]

3.3.9

preparation

all activities performed on the constituent *steel products* (3.1.14) to produce the parts ready for assembly and inclusion in components

Note 1 to entry: As relevant, this comprises, e.g. identification, handling and storage, cutting, shaping and holing.

Note 2 to entry: Not as applied to preparation of steel substrates for the application of coatings.

3.3.10

design basis procedure for erection

design erection sequence

outline of a procedure for erection upon which the design of the structure is based

3.3.11

erection procedure

documentation describing the procedures to be used to erect a structure

3.3.12

trial assembly

putting together sufficient components of a whole structure to check that they fit

3.4 Terms related to welding

3.4.1

prefabrication primer

shop primer

primer that is applied to materials and may or may not be removed prior to any fabrication activities (e.g. cutting, welding) being performed

3.4.2

supplementary non-destructive testing

supplementary NDT

non-destructive testing (NDT) technique which is other than visual inspection (VT)

EXAMPLE Magnetic particle (MT), penetrant (PT), eddy current (ET), ultrasonic (UT) or radiographic (RT) testing.

Note 1 to entry: VT, MT, PT, ET, UT, RT are defined in ISO 17635.

3.5 Terms related to structural bolting

3.5.1

high-strength bolt

bolt with a property class of 8.8 or higher, or with a tensile strength of 830 MPa or higher, used for structural purposes

3.5.2

washer

component of a *bolting assembly* (3.5.4) that accepts a bolt through its centre hole

Note 1 to entry: A washer is typically plain or chamfered.

Note 2 to entry: A washer provides a surface to distribute bearing stress and provides a hardened surface for head or nut rotation during tightening.

Note 3 to entry: Adapted from ASTM F1789-17a:2017, 3, plain washer.

3.5.3

pin

unthreaded fastener

3.5.4**bolting assembly**

bolt, nut and washer(s) as necessary, that is installed as a unit

Note 1 to entry: The bolt, nut and washer(s) may be sourced from different *manufacturers* (3.1.6).

3.5.5**matched bolting assembly**

matching bolt, nut and washer(s) as necessary, that is supplied, tested and installed as a unit

Note 1 to entry: The bolt, nut and washer(s) may be sourced from different *manufacturers* (3.1.6).

3.5.6**manufacturing lot**

quantity of structural bolting components of a single designation including product grade, property class and size, manufactured from bar, wire, rod or flat product from a single cast, processed through the same or similar steps at the same time or over a continuous time period, and through the same heat treatment or coating process, if any

3.5.7**assembly lot**

bolting assemblies supplied together as a set comprising:

- bolts from a single *manufacturing lot* (3.5.6);
- nuts from a single manufacturing lot;
- washers from a single manufacturing lot.

3.5.8**extended assembly lot**

assembly lot containing the component with the main influence on the result of the suitability test from a single *manufacturing lot* (3.5.6) and the other components from several manufacturing lots

Note 1 to entry: The component having the main influence (either nut or direct tension indicator) is determined on the basis of test results.

Note 2 to entry: An extended bolting assembly lot contains bolts, nuts and washers and, if relevant, direct tension indicators and nut face washers or bolt face washers.

3.5.9**bolt group**

bolting assemblies of the same origin in similar *connections* (3.5.14) with the bolting assemblies of the same size and property class

Note 1 to entry: This term is used for purposes of inspection.

3.5.10**special fastener**

fastener that is not covered by international or national standards

3.5.11**non-slip fastener**

fastener that does not allow slip to occur between connected plates or members at the serviceability limit state so that the original alignment and relative positions are maintained, even without pretension

EXAMPLE *Pins* (3.5.3), fit bolts.

3.5.12**k-factor**

relationship between the applied tightening torque, M , and the achieved pretension, F

$$k = M / (F \times d)$$

where d is the nominal diameter of the *bolting assembly* (3.5.4)

3.5.13

k-class

value used to express the ability of a bolting assembly to be pretensioned by a method that relies upon the application of a specific torque

Note 1 to entry: k-class is as specified in EN 14399-1:2015, 4, 5, and Table 1.

Note 2 to entry: k-class K0 indicates no requirements for *k-factor* (3.5.12); K1 indicates individual test value between 0,10 and 0,16, inclusive; K2 indicates mean test value between 0,10 and 0,23, inclusive, and coefficient of variation of *k-factor* (3.5.12) less than or equal to 0,06.

3.5.14

connection

joint

location where *sub-components* (3.1.18) and components are joined

Note 1 to entry: The term joint is more commonly used to describe the type or behaviour of a connection.

3.5.15

bearing-type joint

shear/bearing joint

joint using either non-pretensioned bolts, or *high-strength bolts* (3.5.1) tightened to induce a specified minimum bolt pretension, in which the design action is transferred by shear in the bolts and bearing on the connected parts at the strength limit state

3.5.16

pretensioned joint

joint that transmits shear or tensile loads, or both, in which the bolts have been installed to provide a specified pretension in the installed bolt

3.5.17

non-pretensioned joint

snug-tight joint

joint in which the bolts have been installed to achieve the snug-tight condition, without requirements to provide a specified pretension in the bolt, in which the design action is transferred by shear in the bolts and bearing on the connected parts at the strength limit state

3.5.18

snug-tight condition

condition that exists when all of the plies in a *connection* (3.5.14) have been pulled into *firm contact* (3.5.26) by the bolts in the joint and all of the bolts in the joint have been tightened sufficiently to prevent the removal of the nuts without the use of a wrench

Note 1 to entry: For *pretensioned* (3.5.16) and *slip-resistant joints* (3.5.19), it is additionally the tightness of a bolt achieved by a few impacts of an impact wrench or by the full effort of a person using a standard *podger spanner* (3.5.37).

3.5.19

slip-resistant joint

slip-critical joint

friction-type joint

friction-grip joint

connection (3.5.14) using *high-strength bolts* (3.5.1) tightened to induce a specified minimum bolt pretension so that the resultant clamping action transfers the design shear forces acting in the plane of the common contact surfaces by the friction developed between the contact surfaces

3.5.20

faying surface

plane of contact between two plies of a bolted joint

3.5.21**uncoated faying surface**

faying surface (3.5.20) that has neither been primed, painted, nor galvanized and is free of loose scale, dirt and other foreign material

3.5.22**coated faying surface**

faying surface (3.5.20) that has been primed, primed and painted or protected against corrosion, except by hot-dip galvanizing

3.5.23**galvanized faying surface**

faying surface (3.5.20) that has been hot-dip galvanized

3.5.24**friction surface**

faying surface (3.5.20) that provides a specific slip resistance in a *slip-resistant joint* (3.5.19)

3.5.25**slip factor**

ratio of the frictional shear load at the *faying surface* (3.5.20) to the total normal force when slip occurs

3.5.26**firm contact**

condition that exists on a *faying surface* (3.5.20) when the plies are solidly seated against each other, but not necessarily in continuous contact

3.5.27**packing**

filler plate

plate used to build up the thickness of one component

3.5.28**grip**

plies of a joint through which the bolt passes, exclusive of washers or direct-tension indicators

3.5.29**protected storage**

continuous protection of structural bolting components in closed containers in a protected shelter

3.5.30**pretensioning****DEPRECATED: preloading**

installing and applying a specified pretension in a bolt

Note 1 to entry: Methods for pretensioning are provided in ISO 17607-6.

3.5.31**bolt tension measurement device**

calibrated tension-indicating device that is used to verify the acceptability of the *pretensioning* (3.5.30) method when a *pretensioned joint* (3.5.16) or *slip-critical joint* (3.5.19) is specified

3.5.32**torque method**

method of *pretensioning* (3.5.30) that relies upon the application of a specific torque to the designated part of the *bolting assembly* (3.5.4)

3.5.33

combined method

method of *pretensioning* (3.5.30) that relies upon the application of a specific torque to the designated part of the *bolting assembly* (3.5.4), followed by the application of a specific relative rotation between bolt and nut

3.5.34

spline-drive twist-off method

method of *pretensioning* (3.5.30) that relies upon the application of a torque to the nut that causes, from the torsional shear applied to the spline by the wrench, the removal of the spline from the end of the bolt

3.5.35

direct tension indicator method

method of *pretensioning* (3.5.30) that relies upon specific deformation of the protrusions of the direct tension indicator

3.5.36

turn-of-nut method

method of *pretensioning* (3.5.30) that relies upon application of a specific relative rotation between bolt and nut, starting from the *snug-tight condition* (3.5.18)

3.5.37

podger spanner

spud wrench

hand tool for aligning bolt holes and tightening bolts using the manual effort of the installer

3.5.38

twist-off shear wrench

electric or manual tool equipped with two co-axial sockets which react by torque one against the other, the outer socket which engages the nut rotating clockwise, the inner socket which engages the spline-end of the bolt (i.e. bi-hexagonal) rotating anticlockwise

3.5.39

routine observation

periodic monitoring of the work in progress

4 Execution specification and quality requirements

4.1 Execution specification

4.1.1 General

The specifier shall develop and maintain an execution specification for the structural steelwork.

National standards and documents that provide technically equivalent conditions may be used, in whole or in part, in place of referenced ISO standards or requirements of this document. In these cases, the technically equivalent national standards and documents, and deviations from the requirements of this document, shall be referenced in the execution specification.

The necessary information and technical requirements for execution of each part of the structural steelwork shall be agreed and completed before commencement of execution of that part of the structural steelwork.

The execution specification shall include the following items as relevant:

- a) additional information, see [A.1](#);
- b) options, see [A.2](#);

- c) execution levels, see [4.1.2](#);
- d) identification and traceability requirements, see [4.1.3](#);
- e) geometrical tolerances, see [4.1.4](#);
- f) requirements for architecturally exposed structural steel (AESS), see [4.1.5](#);
- g) requirement for a quality plan, see [4.2.3](#);
- h) inspection, testing and corrections to be undertaken, see [6.1](#);
- i) requirements specified on behalf of the purchaser/client.

Other items may be included in the execution specification, e.g. which components are designated as main components.

There shall be procedures for making alterations to a previously agreed execution specification.

Guidance on the development of the execution specification is given in [Annex B](#).

4.1.2 Execution levels

Four execution levels, denoted EXL1 to EXL4, are given, for which the required strictness increases from EXL1 to EXL4. A description of the requirements is given in [Table 1](#).

Execution levels for fabrication and erection shall be included in the execution specification.

Execution levels may apply to the whole structure or to a part of the structure or to specific details. A structure can include several execution levels. A detail or group of details will normally be ascribed one execution level. However, the choice of an execution level does not necessarily have to be the same for all requirements.

The list of quality requirements related to execution levels is given in [A.3](#).

Recommendations concerning the choice of execution levels are given in [Annex C](#).

4.1.3 Identification and traceability

4.1.3.1 Identification

The requirements for identification shall be specified in the execution specification.

For identification requirements for steels, castings, high-strength cables, and structural bearings, see ISO 17607-2.

For identification requirements for fabrication and for expansion joints for bridges, see ISO 17607-3.

For identification requirements for erection, see ISO 17607-4.

For identification requirements for welding consumables, shielding gases, and studs, see ISO 17607-5.

For identification requirements for bolting products and assemblies, see ISO 17607-6.

Identification documents shall be retained for all constituent products. The retention period shall be specified in the execution specification.

For marking using steel stamps, see ISO 17607-3.

4.1.3.2 Traceability

The level of traceability shall be as required in [Table 1](#) unless otherwise specified in the execution specification. If required, the execution specification shall also identify and specify additional traceability requirements for processes, procedures, operators, welders, machines, constituent products, inspection records, or other factors in addition to those specified.

Table 1 — Traceability requirements

| Execution level | Traceability level | Requirement |
|-----------------|--------------------|---|
| EXL1 | T1 | Traceability to the inspection documents for steel products is not required. |
| EXL2 | T2 | Lot traceability to the inspection documents for steel products shall be performed for main components. |
| EXL3 | T3 | Lot traceability to the inspection documents for steel products shall be performed for main components and for steel sub-component connections between main components. |
| EXL4 | T4 | Lot traceability to the inspection documents for all constituent products is required. |

4.1.4 Geometrical tolerances

The selection or designation of geometrical tolerances shall consider requirements for structural stability for individual elements and for the structural system as a whole.

Geometrical tolerances for fabrication and erection shall be included in the execution specification.

Geometrical tolerances for fabrication are addressed in ISO 17607-3. Geometrical tolerances for erection are addressed in ISO 17607-4.

NOTE Tolerances for constituent products are addressed in their applicable product standards.

4.1.5 Architecturally exposed structural steel (AESS)

If the structural steelwork includes items that are designated as architecturally exposed, the location and requirements shall be included in the execution specification.

National standards and documents that address AESS are listed in [Annex E](#).

4.2 Quality requirements

4.2.1 Quality management system

The constructor shall maintain and operate a quality management system to ensure conformity to the requirements of this document.

The major processes used in fabrication and erection shall be listed and a control plan developed.

4.2.2 Quality documentation

The following points shall be documented for EXL2, EXL3, and EXL4:

- a) the organisation chart and managerial staff responsible for each aspect of the execution;
- b) the procedures, methods, and work instructions to be applied;
- c) an inspection and test plan (ITP) specific to the structural steelwork, see [Annex D](#);

- d) a procedure for handling changes and modifications, see [Annex D](#);
- e) a procedure for handling of nonconformities, requests for concessions, and quality disputes;
- f) specified hold-points or requirements to witness inspections or tests, and any consequent access requirements.

4.2.3 Quality plan

The execution specification shall specify if a quality plan for the execution of the structural steelwork is required.

If a quality plan is required, it shall include, as a minimum:

- a) a general management document addressing the following points:
 - 1) review of specification requirements against process capabilities;
 - 2) the allocation of tasks and authority during the various phases of the project;
 - 3) principles and organisation arrangements for inspection including allocation of responsibilities for each inspection task;
- b) quality documentation prior to execution. The documents shall be produced before execution of the construction step to which they relate;
- c) execution records, which can be actual records of inspections and tests carried out or demonstrate implementation of qualified or certified resources. Execution records related to specified hold-points shall be produced before the hold-point is released.

[Annex D](#) gives a checklist for the content of a quality plan recommended for the execution of structural steelwork, with reference to the general guidelines in ISO 10005.

If no quality plan is required in the execution specification, the constructor shall review the quality requirements prior to commencing work.

4.2.4 Execution documentation

Documentation shall be prepared during execution, and as a record of the as-built structure, to demonstrate that the structural steelwork has been carried out in accordance with the execution specification.

5 Constituent products

5.1 General

Materials and constituent products to be used for the execution of steel structures shall be selected from the relevant ISO standards, equivalent national standards, or equivalent documents, and shall be specified in the execution specification.

If materials or constituent products not covered by standards or other documents are required, their relevant properties shall be specified in the execution specification.

5.2 Conformance with inspection documents

For constituent products ordered to relevant ISO standards, equivalent national standards, or equivalent documents, their conformity with the relevant product standard shall be checked in accordance with [6.2.1](#).

The properties of supplied constituent products not covered by standards or other documents shall be stated in a way that enables them to be compared to the properties specified in the execution specification.

For steels, castings, high-strength cables, and structural bearings, see ISO 17607-2.

For expansion joints for bridges, see ISO 17607-4.

For welding consumables, see ISO 17607-5.

For bolting products and assemblies, see ISO 17607-6.

If marking is required, unmarked constituent products shall be treated as non-conforming product.

Methods of marking shall be in accordance with that for components in accordance with [4.1.3.1](#) and [6.2](#).

6 Inspection, testing, and correction

6.1 General

This clause specifies the requirements for inspection and testing with respect to the quality requirements included in quality documentation (see [4.2.2](#)) and quality plan (see [4.2.3](#)) as relevant.

Inspection, testing and corrections shall be undertaken on the structural steelwork in accordance with the execution specification and within the quality requirements set out in this document.

In case of nonconformities with the requirements of this document, each defect may be assessed individually. Such evaluation should be based on the function of the component in which the defect occurs and on the characteristics of the imperfection (type, size, location) in deciding if the defect is either acceptable or shall be repaired.

All inspection and testing shall be undertaken to a predetermined plan, including specified hold-points or requirements to witness inspections or tests, in accordance with the execution specification with documented procedures. Specific inspection testing and associated corrections shall be documented.

6.2 Constituent products and components

6.2.1 Constituent products

Documents supplied with constituent products shall be checked to verify that the information on the products supplied matches those ordered.

Specific testing of products is not required unless specified in the execution specification.

NOTE 1 These documents include inspection documents, test reports, declaration of conformity as relevant for plates, sections, hollow sections, welding consumables, studs, bolting products and assemblies.

NOTE 2 This documentation check is intended to eliminate the need for testing products generally.

6.2.2 Components

Documents supplied with components shall be checked to verify that the information on the components supplied matches those ordered.

NOTE This applies to all delivered and part-fabricated products received into a constructor's works for further processing (e.g. welded I-sections for incorporation into plate girders), and to products received on site for erection by the constructor if these are not fabricated by the constructor.

6.2.3 Non-conforming products

If the documentation supplied does not include a declaration from the supplier that the products conform to the specifications, they shall be treated as non-conforming products until it can be demonstrated that they meet the requirements of the ITP.

For structural bolting products, the supplier may declare conformity to the specifications by means of marking the product with their manufacturing mark, the property class, the system, the product standard, and manufacturing lot number, if applicable.

If products are first designated as nonconforming and are subsequently proved to be in conformity by test or retest, the test results shall be recorded.

6.3 Geometrical dimensions of fabricated and erected components

The inspection plan shall consider the requirements and the necessary checks on prepared constituent steel products and fabricated components.

Dimensional measurements of components shall always be taken.

Methods and instruments used shall be selected, as appropriate, from those listed in ISO 7976-1 and ISO 7976-2 unless specified in the execution specification. Accuracy can be assessed in accordance with the relevant part of ISO 17123.

The location and frequency of measurements shall be specified in the inspection plan.

For acceptance criteria of fabrication, see ISO 17607-3.

For acceptance criteria of erection, see ISO 17607-4.

The deviations shall be measured with respect to any specified camber or preset.

If acceptance inspection results in the identification of nonconformity, the action on such nonconformity shall be as follows:

- a) if practicable, the nonconformity shall be corrected using methods that are in accordance with the applicable standard and checked again;
- b) alternatively, the nonconformity shall be evaluated for acceptability according to [6.1](#);
- c) if correction is not practicable, modifications to the steel structure may be made to compensate for the nonconformity, provided that this is in accordance with a procedure for handling nonconformities.
- d) otherwise, the component shall not be used.

7 Documents required to claim conformity to this document

7.1 General

Constructors may claim conformity with the requirements of this document either by:

- adoption of the ISO standards referenced in this document and in ISO 17607-2, ISO 17607-3, ISO 17607-4, ISO 17607-5, ISO 17607-6, as applicable; or
- adoption of other standards that provide technically equivalent conditions to the ISO documents listed in this document or in ISO 17607-2, ISO 17607-3, ISO 17607-4, ISO 17607-5, ISO 17607-6, as applicable; or

- adoption of other documents that provide technically equivalent conditions to the ISO documents listed in this document or in ISO 17607-2, ISO 17607-3, ISO 17607-4, ISO 17607-5, ISO 17607-6, as applicable.

Unless otherwise listed in the execution specification, it is the responsibility of the constructor to demonstrate that the standards or documents selected provide technically equivalent conditions to those in the corresponding ISO standards.

Prior to execution, adoption of other standards or documents shall be verified and approved by the specifier and shall be incorporated into the execution specifications.

7.2 Declaration of conformity

A constructor claiming conformity with these requirements shall list the applicable supporting standards or documents.

STANDARDSISO.COM : Click to view the full PDF of ISO 17607-1:2023

Annex A (normative)

Additional information, list of options and requirements related to the execution levels

A.1 List of required additional information

For steels, castings, high-strength cables, and structural bearings, see ISO 17607-2.

For fabrication of components, including expansion joints for bridges, see ISO 17607-3.

For erection, see ISO 17607-4.

For welding and for welding consumables, see ISO 17607-5.

For bolting, bolting products and assemblies, see ISO 17607-6.

[Table A.1](#) provides the additional information that is required in the text of this document as appropriate to fully define the requirements for execution of the work to be in accordance with this document (i.e. where the wording “shall be specified” is used).

Table A.1 — Additional information required

| Clause | Additional information required |
|---|---|
| 4 – Execution specification and quality requirements | |
| 4.1.2 | execution levels for fabrication and erection |
| 4.1.3.1 | requirements for identification |
| 4.1.3.1 | retention period for Identification documents |
| 4.1.4 | geometrical tolerances for fabrication and erection |
| 4.2 – Quality requirements | |
| 4.2.2 | Quality documentation specified hold-points or requirements to witness inspections or tests |
| 5 – Constituent products | |
| 5.1 | materials and constituent products to be used |
| 5.1 | properties of products not covered by listed standards or documents |
| 6 – Inspection, testing, and correction | |
| 6.1 | inspection, testing and corrections to be undertaken |
| 7 – Documents required to claim conformity to these requirements | |
| 7.1 | adoption of other standards or documents verified and approved |
| 7.1 | incorporation of approved standards or documents into execution specification |

A.2 List of options

For steels, castings, high-strength cables, and structural bearings, see ISO 17607-2.

For fabrication of components, including expansion joints for bridges, see ISO 17607-3.

For erection, see ISO 17607-4.

For welding and for welding consumables, see ISO 17607-5.

For bolting, bolting components and assemblies, see ISO 17607-6.

Table A.2 lists the items which may be specified in the execution specification to define requirements for the execution of the work where options are given in this document.

Table A.2 — List of option(s) to be specified

| Clause | Option(s) to be specified |
|---|---|
| 4 – Execution specification and quality requirements | |
| 4.1.3.1 | If die (hard) stamping is prohibited for cyclically loaded members |
| 4.1.3.2 | If not as specified in Table 1 , the level of traceability |
| 4.1.3.2 | If required, identification and specification of additional traceability requirements for processes, procedures, operators, welders, machines, constituent products, inspection records, or other factors |
| 4.1.5 | If designated as architecturally exposed, the location and requirements for AESS |
| 4.2 – Quality requirements | |
| 4.2.3 | If a quality plan for execution of the structural steelwork is required |
| 6 – Inspection, testing, and corrections | |
| 6.2.1 | If specific testing of products is required |
| 6.3 | If alternative criteria are applicable for acceptance of nonconformities |

A.3 Requirements related to the execution levels

This clause lists requirements specific to each of the execution levels referenced in this document.

For steels, castings, high-strength cables, and structural bearings, see ISO 17607-2.

For fabrication of components, including expansion joints for bridges, see ISO 17607-3.

For erection, see ISO 17607-4.

For welding and for welding consumables, see ISO 17607-5.

For bolting, bolting components and assemblies, see ISO 17607-6.

Items identified in bold letters in [Table A.3](#) relate to the general system of control of execution and are amenable to a common choice of execution level across the whole of the structural steelwork (or a phase of the structural steelwork). The other items generally demand the selection of the appropriate execution level on a component-by-component or a connection detail-by-detail basis.

Table A.3 — Requirements to each execution level

| Clauses | EXL1 | EXL2 | EXL3 | EXL4 |
|---|------|------|------|------|
| 4 – Execution specification and quality requirements | | | | |
| 4.1 – Quality requirements | | | | |
| 4.1.3.2 Traceability | T1 | T2 | T3 | T4 |
| 4.2.2 Quality documentation | — | Yes | Yes | Yes |
| Key | | | | |
| a dash “—” means no specific requirement in the text. | | | | |

Annex B (informative)

Guidance for development of the execution specification

B.1 General

The definition of the execution specification is given in [3.1.10](#), and the requirements are given in [4.1](#).

The development of the complete execution specification is a progressive one that may continue as the structural steelwork progresses. In particular, the complete execution specification will recognise changes and modifications specified on behalf of the purchaser/client.

B.2 Development process

The execution specification develops in parallel with the development of the design. In terms of steel construction, this is typically from design concept, through frame design to detail design. In many cases these phases of the design are undertaken by more than one party.

In some cases, the constructor undertakes some of the design tasks, such as detailing and production of the shop fabrication drawings and schedules. These latter documents give all necessary information and technical requirements for fabricating of a structural component. Other project-specific procedures can need to be developed as part of the constructor's methodology for undertaking the structural steelwork and would require inclusion in the complete execution specification. An example would be the fabricator's procedures for hot bending of rolled sections.

The execution specification also includes erection drawings or equivalent instructions that form part of the erection procedure.

As an example of how the execution specification is developed, the development of the erection procedure is a progressive process, as follows:

- a) once the design concept is defined, the site conditions can be established that permit those items in ISO 17607-4 to be specified for inclusion in the execution specification. Typically, those items are included by reference to a document often termed the execution specification that deals with similar issues for all site trades;
- b) once the frame design is complete, the design basis method of erection referred to in ISO 17607-4 can be included in the execution specification. In particular, this permits a sequence of erection and the stability concept for the part-erected structure to be defined including any requirements for temporary bracing or propping (shoring);
- c) the completion of the detail design also defines how the structure is to be erected on site, for instance by the exact choice of welded or bolted connections and whether the latter are to use pretensioned assemblies. These decisions are needed in order for the constructor's erection procedure to be finalised, and for this to be reviewed in terms of its engineering design implications.

As stated in ISO 17607-4, the erection procedure needs to be checked in accordance with design rules, notably with respect to the resistance of the partly erected structure to erection loads and other loading, including identification of sway or overturning forces, particularly those due to the predicted wind conditions on site during erection. The exact methods of maintaining adequate sway and overturning resistance can require the constructor to provide temporary works that need to be connected to the permanent works (by welded attachments or additional bolt holes) and hence require incorporation into the execution specification.

Annex C (informative)

Guidance for the determination of execution levels

C.1 General

Execution level (EXL) is defined (see [3.1.12](#)) as a classified set of requirements specified for the execution of the structural steelwork, of an individual component or of a detail of a component.

This document requires that the execution level is specified for requirements as listed in [A.3](#). [A.3](#) identifies some of these requirements that relate to the general system of control of execution and are amenable to a common choice of execution level across the whole of the structural steelwork (or a phase of the structural steelwork). The other items generally demand the selection of the appropriate execution level on a component-by-component or a connection detail-by-detail basis.

Hence the specifier needs to specify a suitable execution level for the structural steelwork as a whole, see [C.2.1](#). The specifier then separately needs to consider whether there are any particular requirements that differ from this general specification, see [C.2.2](#).

[Table C.1](#) can be used for guidance on selection of the appropriate execution level, especially for structural steelwork as a whole.

C.2 Selection criteria

C.2.1 Selection criteria for the structural steelwork as a whole

With respect to the execution of the structural steelwork as a whole, it is recommended that the selection of the execution level should be based on the required reliability, the type of structure, and the type of loading for which the structure is designed. Reliability can include considerations of safety, serviceability, durability, life-cycle considerations, consequences, structural response, and other factors as appropriate for the structure.

In terms of the required reliability and the type of structure, it is recommended that EXL2 be used as a reference level that should provide a level of reliability that is appropriate to most building structures, and EXL3 be used as a reference level that should provide a level of reliability that is appropriate to most bridge structures.

Consequently, it is recommended that EXL1 is only specified for the execution of minor works.

In terms of the type of loading, it is recommended that the choice of EXL2 should be appropriate for static and quasi-static loading, for example gravity and commonly-occurring environmental loading from wind or snow. It can also be appropriate for structures in areas of low or very low levels of seismicity.

In areas of medium or high seismicity, it is recommended that EXL3 is specified.

In terms of the type of structure, it is recommended that EXL3 is specified for those structures with high public occupancy and for tall- or large-scale structures.

For bridge structures, redundancy can be considered as the ability of a structure to find alternative load paths following failure of one or more members or connections, thus limiting the consequences of such failures.

Table C.1 — Recommended execution levels for building types

| Execution level | Building type |
|-----------------|---|
| EXL3 | High rise buildings (i.e. over 15 storeys) |
| | Large grandstands and stadia (i.e. over 5 000 persons) |
| | Heavy industrial plate work (e.g. plant structures, bunkers, hoppers, silos). |
| | Structures supporting equipment/piping containing hydrocarbons or whose failure would damage hydrocarbon piping/vessels |
| EXL2 | Medium- and low-rise buildings up to 15 storeys |
| | Sheds including those with large span trusses and tubular steelwork |
| | Frames for machinery, supports for plant and conveyors |
| | Specialist fabrication services (e.g. bending, cellular/castellated beams, plate girders) |
| EXL1 | Minor buildings for storage or farm animals |
| | Minor buildings for industry, where personnel visit only occasionally |
| | Architectural steelwork (e.g. staircases, balconies, canopies) |
| | Lighter fabrications including fire escapes, ladders and catwalks |

Table C.2 — Recommended execution levels for bridge types

| Execution level | Bridge type |
|-----------------|--|
| EXL3 | Cable-supported bridges (e.g. cable-stayed or suspension) and other major structures (e.g. 100 metre span) |
| | Bridges with stiffened complex plate work (e.g. in decks, box girders or arch boxes) |
| | Moving bridges |
| | Bridges made principally from truss work or plate girders, or both |
| | Bridges made principally from non-redundant rolled shapes |
| EXL2 | Bridges made principally from rolled shapes, using redundant members |
| | Footbridges and sign gantries |
| | Bridge refurbishment |
| EXL1 | none |

C.2.2 Selection criteria for individual components or details

Based on a review of the relevance of the items listed in [A.3](#), it can be appropriate to specify an execution level for particular components or details that is different from that applicable to the structure in general, and if so these components or details should be clearly identified in the execution specification.

In terms of fatigue loading, it is common that only some components of the whole works are subjected to significant fatigue loading, and it is recommended that EXL3 is specified for those components, unless the consequence of failure is low when EXL2 is sufficient.

It is possible that the fatigue demand on some particular welds is very high and that EXL3 is insufficient. In such a case and similar cases there can be the need to specify EXL4. If EXL4 is specified, then it should make no difference to the execution level specified for the structural steelwork as a whole selected in accordance with [C.2.1](#). If EXL4 is specified (e.g. an individual weld), the specifier needs to specify the relevant detail-specific inspection/testing required and the relevant acceptance criteria.

Some components may only be used to provide secondary supports to roof and wall panels. Provided that these components do not form part of the main load-resisting structural frame, they may be considered for specification as EXL1.

However, it is recommended that EXL1 is specified only for components that are simpler to fabricate. Hence, it is recommended that the following types of components be specified as EXL2 minimum:

- a) welded components fabricated from steel products of specified minimum yield strength of 355 MPa and greater;
- b) welded components essential for structural integrity that are assembled by welding on the construction site;
- c) welded components of circular hollow section lattice girders requiring end profile cuts;
- d) components with hot forming during fabrication or receiving thermic treatment during fabrication.

C.3 Implications for traceability

C.3.1 General

Traceability means the ability to identify a specific piece of steel in a structure throughout the life of the structure, and its specific inspection document, which is commonly referred to as a material test report or a mill test report (MTR). If the steel product is transformed by the supplier, an inspection document, commonly referred to as a supplier's test report, is used in traceability. As such, traceability requirements are significantly more expensive than the identification requirements. The specifier should clearly understand the differences, limitations and relative costs involved.

In terms of traceability, further commentary for each of the four execution levels is as follows:

C.3.2 Execution level 1 (EXL1) (Traceability level T1)

EXL 1 does not require traceability, however it does require the control of the incoming material against the purchase order. This includes steel products, consumables, bolting products and assemblies, subcontracted fabrication, and items delivered directly to site such as purlins.

C.3.3 Execution level 2 (EXL2) (Traceability level T2)

EXL2 requires control of incoming material against the purchase order and a certain level of traceability defined as T2. T2 traceability is required only for steel products of primary components or sometimes referred to as main or major components or members. A primary member is defined as a steel member or component that transmits gravity and lateral loads through a necessary as-designed load path. These members are subjected to more stringent fabrication and testing requirements; considered synonymous with the term 'main member'. Primary members shall be explicitly identified in the execution specification by the specifier. Several examples of primary members are:

- beams, girders, bent caps, stringers, floor beams;
- rigid frames;
- columns, arch ribs, and tower members;
- bracing (horizontal or vertical), steel plate shear wall, composite shear wall;
- end cross-frames/diaphragms and cross-frames/diaphragms in horizontally curved girder bridges;
- suspenders/tension ties and anchorage, suspension cables and anchorages;
- trusses, joists.

C.3.4 Execution level 3 (EXL3) (Traceability level T3)

EXL3 requires control of the incoming material against the purchase order and a higher degree of traceability than T2. T3 traceability is required for main components and for steel sub-component

connections between main components and shall be traceable to the inspection documents for the steel products. Connections between main components or other steel sub-component connections requiring T3 traceability shall be specified in the execution specification. Several examples are:

- connections and joints between primary members;
- connection used as fuse in a Seismic Load Resisting System (SLRS);
- splice plates joining primary members;
- stiffeners under through-thickness tension;
- longitudinal web and flange stiffeners.

C.3.5 Execution level 4 (EXL4) (Traceability level T4)

EXL4 requires control of the incoming material against the purchase order and a higher degree of traceability than T3. T4 traceability is required for all constituent products, including bolting products and welding consumables. This level of traceability is typically reserved for very critical structures or applications only, such as the construction of a nuclear power facility.

STANDARDSISO.COM : Click to view the full PDF of ISO 17607-1:2023

Annex D (informative)

Checklist for the content of a quality plan

D.1 General

In accordance with [4.2.3](#), this annex gives a list of recommended items to be included in a project-specific quality plan for the execution of a steel structure.

D.2 Content

D.2.1 Management

Recommended management items include:

- definition of the particular steel structure and its location with relation to the project;
- project management organisation plan stating names of key personnel, their function and responsibilities during the project, the chain of command, and lines of communication;
- arrangements for planning and coordination with other parties throughout the project, and for monitoring of performance and progress;
- identification of functions delegated to subcontractors and others not in-house;
- identification and proof of competence of qualified personnel to be employed on the project, such as supervision, production, and inspection personnel;
- arrangements for controlling variations and changes that take place during the project.

D.2.2 Specification review

Recommended specification review items include:

- requirement to review the specified project requirements to identify the implications, including the choices of execution levels that would require additional or unusual measures beyond those ensured by the company's quality management system;
- additional quality management procedures necessitated by the review of the specified project requirements.

D.2.3 Documentation

D.2.3.1 General

Recommended items for procedures to manage all received and issued execution documentation include:

- a) identification of the current revision status;
- b) prevention of the use of invalid or obsolete documents in-house or by subcontractors.