

SVENSK STANDARD

SS-EN 1090-2:2018



Fastställt/Approved: 2018-06-27
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 91.040.01;91.080.13;92.200.20

Utförande av stål- och aluminiumkonstruktioner – Del 2: Stålkonstruktioner

Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures

Denna standard är såld av
SEK Svensk Elstandard som även lämnar
allmänna upplysningar om svensk och utländsk standard.
Postadress: SEK, Box 1284, 164 29 Kista
Telefon: 08-444 14 00.
E-post: sek@elstandard.se Internet: www.elstandard.se

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

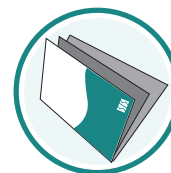
Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN 1090-2:2018 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1090-2:2018.

Denna standard ersätter SS-EN 1090-2:2008+A1:2011, utgåva 1 och SS-EN 1090-2:2008+A1:2011, utgåva 1.

The European Standard EN 1090-2:2018 has the status of a Swedish Standard. This document contains the official version of EN 1090-2:2018.

This standard supersedes the SS-EN 1090-2:2008+A1:2011, edition 1 and SS-EN 1090-2:2008+A1:2011, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Stål- och aluminiumkonstruktioner samt samverkanskonstruktioner i stål och betong, SIS/TK 188.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN 1090-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2018

ICS 91.080.13

Supersedes EN 1090-2:2008+A1:2011

English Version

Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures

Exécution des structures en acier et des structures en
aluminium - Partie 2: Exigences techniques pour les
structures en acier

Ausführung von Stahltragwerken und
Aluminiumtragwerken - Teil 2: Technische Regeln für
die Ausführung von Stahltragwerken

This European Standard was approved by CEN on 22 January 2018.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword	9
Introduction	11
1 Scope.....	12
2 Normative references.....	12
2.1 Constituent products	12
2.1.1 Steels.....	12
2.1.2 Steel castings	15
2.1.3 Welding consumables	15
2.1.4 Mechanical fasteners	16
2.1.5 High strength cables	16
2.1.6 Structural bearings	17
2.2 Preparation.....	17
2.3 Welding.....	17
2.4 Testing	19
2.5 Erection	19
2.6 Corrosion protection	19
2.7 Miscellaneous.....	20
3 Terms and definitions	21
4 Specifications and documentation	23
4.1 Execution Specification.....	23
4.1.1 General.....	23
4.1.2 Execution classes	23
4.1.3 Requirements for surface preparation for corrosion protection	24
4.1.4 Geometrical tolerances.....	24
4.2 Constructor's documentation.....	24
4.2.1 Quality documentation	24
4.2.2 Quality plan.....	24
4.2.3 Safety of the erection works	25
4.2.4 Execution documentation.....	25
5 Constituent products	25
5.1 General.....	25
5.2 Identification, inspection documents and traceability	26
5.3 Structural steel products	28
5.3.1 General.....	28
5.3.2 Thickness tolerances.....	29
5.3.3 Surface conditions	30
5.3.4 Additional properties.....	30
5.4 Steel castings	31
5.5 Welding consumables	31
5.6 Mechanical fasteners.....	33
5.6.1 General.....	33
5.6.2 Terminology	33
5.6.3 Structural bolting assemblies for non-preloaded applications	33
5.6.4 Structural bolting assemblies for preloading.....	34

5.6.5	Direct tension indicators	34
5.6.6	Weather resistant assemblies.....	34
5.6.7	Foundation bolts.....	34
5.6.8	Locking devices	35
5.6.9	Washers.....	35
5.6.10	Solid rivets for hot riveting.....	35
5.6.11	Special fasteners	35
5.6.12	Delivery and identification	35
5.7	Studs and shear connectors	36
5.8	Reinforcing steel welded to structural steel.....	36
5.9	Grouting materials	36
5.10	Expansion joints for bridges.....	36
5.11	High strength cables, rods and terminations	36
5.12	Structural bearings	37
6	Preparation and assembly	37
6.1	General	37
6.2	Identification.....	37
6.3	Handling and storage	37
6.4	Cutting.....	39
6.4.1	General	39
6.4.2	Shearing and nibbling.....	39
6.4.3	Thermal cutting.....	39
6.4.4	Hardness of free edge surfaces.....	40
6.5	Shaping.....	40
6.5.1	General	40
6.5.2	Hot forming.....	40
6.5.3	Flame straightening.....	41
6.5.4	Cold forming.....	42
6.6	Holing.....	44
6.6.1	Dimensions of holes.....	44
6.6.2	Tolerances on hole diameter for bolts and pins.....	45
6.6.3	Execution of holing.....	45
6.7	Cut outs.....	46
6.8	Full contact bearing surfaces	46
6.9	Assembly.....	46
6.10	Assembly check.....	47
7	Welding	47
7.1	General	47
7.2	Welding plan	47
7.2.1	Requirements for a welding plan.....	47
7.2.2	Content of a welding plan	48
7.3	Welding processes.....	48
7.4	Qualification of welding procedures and welding personnel	49
7.4.1	Qualification of welding procedures	49
7.4.2	Welders and welding operators	51
7.4.3	Welding coordination	52
7.5	Preparation and execution of welding.....	54
7.5.1	Joint preparation	54
7.5.2	Storage and handling of welding consumables	55
7.5.3	Weather protection.....	55
7.5.4	Assembly for welding.....	55
7.5.5	Preheating.....	56

7.5.6	Temporary attachments.....	56
7.5.7	Tack welds.....	56
7.5.8	Fillet welds	56
7.5.9	Butt welds.....	57
7.5.10	Welds on steels with improved atmospheric corrosion resistance	58
7.5.11	Branch connections.....	58
7.5.12	Stud welding	58
7.5.13	Slot and plug welds.....	58
7.5.14	Other weld types	59
7.5.15	Post-weld heat treatment	59
7.5.16	Execution of welding.....	59
7.5.17	Welding of orthotropic bridge decks.....	59
7.6	Acceptance criteria.....	59
7.6.1	Routine requirements.....	59
7.6.2	Fatigue requirements.....	60
7.6.3	Orthotropic bridge decks.....	60
7.7	Welding of stainless steels.....	60
8	Mechanical fastening	60
8.1	General.....	60
8.2	Use of bolting assemblies.....	61
8.2.1	General.....	61
8.2.2	Bolts	61
8.2.3	Nuts	62
8.2.4	Washers.....	62
8.3	Tightening of non-preloaded bolting assemblies	63
8.4	Preparation of contact surfaces in slip resistant connections	63
8.5	Tightening of preloaded bolting assemblies.....	65
8.5.1	General.....	65
8.5.2	Torque reference values	66
8.5.3	Torque method.....	67
8.5.4	Combined method	67
8.5.5	HRC method	68
8.5.6	Direct tension indicator method	69
8.6	Fit bolts.....	69
8.7	Hot riveting.....	69
8.7.1	Rivets.....	69
8.7.2	Installation of rivets.....	69
8.7.3	Acceptance criteria.....	70
8.8	Use of special fasteners and fastening methods	70
8.9	Galling and seizure of stainless steels	71
9	Erection	71
9.1	General.....	71
9.2	Site conditions.....	71
9.3	Erection method.....	72
9.3.1	Design basis for the erection method.....	72
9.3.2	Constructor's erection method	73
9.4	Survey.....	74
9.4.1	Reference system	74
9.4.2	Position points	74
9.5	Supports, anchors and bearings	74
9.5.1	Inspection of supports	74
9.5.2	Setting out and suitability of supports.....	74

9.5.3	Maintaining suitability of supports.....	75
9.5.4	Temporary supports	75
9.5.5	Grouting and sealing.....	75
9.5.6	Anchoring	76
9.6	Erection and work at site	76
9.6.1	Erection drawings	76
9.6.2	Marking	76
9.6.3	Handling and storage on site	76
9.6.4	Trial erection	77
9.6.5	Erection works.....	77
10	Surface treatment.....	79
10.1	General	79
10.2	Preparation of steel substrates for paints and related products.....	79
10.3	Weather resistant steels	80
10.4	Galvanic coupling.....	80
10.5	Hot dip galvanizing	80
10.6	Sealing of spaces	81
10.7	Surfaces in contact with concrete	81
10.8	Inaccessible surfaces.....	81
10.9	Repairs after cutting or welding	81
10.10	Cleaning of stainless steel components	82
11	Geometrical tolerances.....	82
11.1	Tolerance types.....	82
11.2	Essential tolerances	82
11.2.1	General	82
11.2.2	Manufacturing tolerances	82
11.2.3	Erection tolerances.....	83
11.3	Functional tolerances.....	84
11.3.1	General	84
11.3.2	Tabulated values.....	85
11.3.3	Alternative criteria	85
12	Inspection, testing and correction.....	85
12.1	General	85
12.2	Constituent products and components.....	85
12.2.1	Constituent products.....	85
12.2.2	Components.....	86
12.2.3	Non-conforming products	86
12.3	Manufacturing: geometrical dimensions of manufactured components	86
12.4	Welding	87
12.4.1	General	87
12.4.2	Inspection after welding	87
12.4.3	Inspection and testing of welded shear studs for composite steel and concrete structures	91
12.4.4	Production tests on welding	91
12.4.5	Inspection and testing of welding of reinforcing steel.....	92
12.5	Mechanical fastening.....	92
12.5.1	Inspection of non-preloaded bolted connections	92
12.5.2	Inspection and testing of preloaded bolted connections.....	92
12.5.3	Inspection and repairs of solid rivets for hot riveting.....	95
12.5.4	Special fasteners and fastening methods.....	96
12.6	Surface treatment and corrosion protection.....	96

12.7	Erection	96
12.7.1	Inspection of trial erection	96
12.7.2	Inspection of the erected structure.....	96
12.7.3	Survey of geometrical position of connection nodes	97
12.7.4	Other acceptance tests	98
Annex A (normative) Additional information, options and requirements related to the execution classes.....		99
A.1	Additional information.....	99
A.2	Options.....	102
A.3	Requirements related to the execution classes	107
Annex B (normative) Geometrical tolerances		111
B.1	General.....	111
B.2	Manufacturing tolerances.....	111
B.3	Erection tolerances	136
Annex C (informative) Check-list for the content of a quality plan.....		153
C.1	General.....	153
C.2	Content.....	153
C.2.1	Management	153
C.2.2	Specification review.....	153
C.2.3	Documentation	153
C.2.3.1	General.....	153
C.2.3.2	Documentation prior to execution	154
C.2.3.3	Execution records	154
C.2.3.4	Documentary records.....	154
C.2.4	Inspection and testing procedures.....	155
Annex D (informative) Procedure for checking capability of automated thermal cutting processes.....		156
D.1	General.....	156
D.2	Description of the procedure.....	156
D.2.1	General.....	156
D.2.2	Average surface roughness R_{Z5}	157
D.2.3	Perpendicularity and angularity tolerance.....	158
D.2.4	Hardness test.....	158
D.3	Range of qualification.....	159
D.3.1	Material groups	159
D.3.2	Material thickness	160
D.3.3	Pressures of gases.....	160
D.3.4	Cutting speed and height.....	160

D.3.5	Preheat temperature.....	160
D.4	Test report	160
Annex E (informative) Welded joints in hollow sections		164
E.1	General	164
E.2	Guidance for start and stop positions	164
E.3	Preparation of joint faces	164
E.4	Assembly for welding.....	165
E.5	Fillet welded joints.....	172
Annex F (normative) Corrosion protection.....		173
F.1	General	173
F.1.1	Field of application	173
F.1.2	Performance specification	173
F.1.3	Prescriptive requirements.....	173
F.1.4	Work method	174
F.2	Surface preparation of carbon steels	174
F.2.1	Surface preparation of carbon steels prior to painting or metal spraying.....	174
F.2.2	Surface preparation of carbon steels prior to hot dip galvanizing.....	175
F.3	Welds and surfaces for welding	175
F.4	Surfaces in preloaded connections	175
F.5	Preparation of fasteners	175
F.6	Coating methods	176
F.6.1	Painting	176
F.6.2	Metal spraying	176
F.6.3	Hot dip galvanizing	176
F.7	Inspection and checking	176
F.7.1	General	176
F.7.2	Routine checking	176
F.7.3	Reference areas.....	177
F.7.4	Hot dip galvanized components.....	177
Annex G (normative) Determination of slip factor.....		178
G.1	General	178
G.2	Significant variables	178
G.3	Test specimens	178
G.4	Slip test procedure and evaluation of results.....	181
G.5	Extended creep test procedure and evaluation.....	183
G.6	Test results.....	183

Annex H (normative) Calibration test for preloaded bolting assemblies under site conditions	185
H.1 General.....	185
H.2 Symbols and units.....	185
H.3 Principle of the test	186
H.4 Test apparatus	186
H.5 Test assemblies.....	186
H.6 Test set up.....	186
H.7 Test procedure.....	187
H.8 Evaluation of test results.....	187
H.9 Test report.....	189
Annex I (informative) Determination of loss of preload for thick surface coatings.....	190
I.1 General.....	190
I.2 Test procedure.....	191
Annex J (informative) Resin injection bolts	193
J.1 General.....	193
J.2 Hole sizes	193
J.3 Bolts	193
J.4 Washers.....	194
J.5 Nuts	195
J.6 Resin	195
J.7 Tightening	195
J.8 Installation	195
Annex K (informative) Guide to flow diagram for development and use of a WPS.....	196
Annex L (informative) Guidance on the selection of weld inspection classes	197
L.1 General.....	197
L.2 Selection criteria.....	197
L.3 Extent of supplementary testing	198
Annex M (normative) Sequential method for fasteners inspection	200
M.1 General.....	200
M.2 Application	200
Bibliography	202

European foreword

This document (EN 1090-2:2018) has been prepared by Technical Committee CEN/TC 135 “Execution of steel structures and aluminium structures”, the secretariat of which is held by SN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2018 and conflicting national standards shall be withdrawn at the latest by December 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1090-2:2008+A1:2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document is part of the EN 1090 series, which comprises the following parts:

- EN 1090-1, *Execution of steel structures and aluminium structures - Part 1: Assessment and verification of constancy of performance for structural components*
- EN 1090-2, *Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures*
- EN 1090-3, *Execution of steel structures and aluminium structures - Part 3: Technical requirements for aluminium structures*
- EN 1090-4, *Execution of steel structures and aluminium structures - Part 4: Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*
- EN 1090-5, *Execution of steel structures and aluminium structures - Part 5: Technical requirements for cold-formed structural aluminium elements and cold-formed structures for roof, ceiling, floor and wall applications*

Technical requirements for cold-formed structural steel elements, members and sheeting and cold-formed steel structures for roof, ceiling, floor, wall, and cladding applications have been removed from this Part of the EN 1090 series, as they are given in EN 1090-4.

Informative Annex B giving guidance for the determination of execution class has been removed as normative requirements for the selection of execution class are now included in of EN 1993-1-1:2005/A1:2014, Annex C.

A new informative Annex D has been included giving guidance on a procedure for checking the capability of thermal cutting processes.

A new informative Annex I has been included giving guidance on determination of the loss of preload from thick coatings on contact surfaces in preloaded connections.

Normative Annex J “Use of compressible washer-type direct tension indicators” has been removed.

A new informative Annex L has been included giving guidance on the selection of weld inspection classes.

SS-EN 1090-2:2018 (E)

Other annexes have been renumbered accordingly:

- Annex D becomes Annex B;
- Annex K becomes Annex J;
- Annex L becomes Annex K.

Annexes A, C, E, F, G, H and M have not been renumbered.

There have been some amendments included in these annexes.

The main text contains some changes. It includes updated cross-references to supporting standards and some corrections.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard specifies requirements for execution of steel structures, in order to ensure adequate levels of mechanical resistance and stability, serviceability and durability.

This European Standard specifies requirements for execution of steel structures in particular those that are designed according to the EN 1993 series and the steel parts of composite steel and concrete structures designed according to the EN 1994 series.

This European Standard presupposes that the work is carried out with the necessary skill and adequate equipment and resources to perform the work in accordance with the execution specification and the requirements of this European Standard.

1 Scope

This European Standard specifies requirements for execution of structural steelwork as structures or as manufactured components, produced from:

- hot rolled, structural steel products up to and including grade S700;
- cold formed components and sheeting up to and including grade S700 (unless coming within the scope of EN 1090-4);
- hot finished or cold formed austenitic, austenitic-ferritic and ferritic stainless steel products;
- hot finished or cold formed structural hollow sections, including standard range and custom-made rolled products and hollow sections manufactured by welding.

For components produced from cold formed components, and cold formed structural hollow sections that are within the scope of EN 1090-4, the requirements of EN 1090-4 take precedence over corresponding requirements in this European Standard.

This European Standard can also be used for structural steel grades up to and including S960, provided that conditions for execution are verified against reliability criteria and any necessary additional requirements are specified.

This European Standard specifies requirements, which are mostly independent of the type and shape of the steel structure (e.g. buildings, bridges, plated or latticed components) including structures subjected to fatigue or seismic actions. Certain requirements are differentiated in terms of execution classes.

This European Standard applies to structures designed according to the relevant part of the EN 1993 series. Sheet piling, displacement piles and micropiles designed to EN 1993-5 are intended to be executed in accordance with respectively EN 12063, EN 12699 and EN 14199. This European Standard only applies to the execution of waling, bracing, and connections.

This European Standard applies to steel components in composite steel and concrete structures designed according to the relevant part of the EN 1994 series.

This European Standard can be used for structures designed according to other design rules provided that conditions for execution comply with them and any necessary additional requirements are specified.

This European Standard includes the requirements for the welding of reinforcing steels to structural steels. This European Standard does not include requirements for the use of reinforcing steels for reinforced concrete applications.

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.

2.1 Constituent products

2.1.1 Steels

EN 10017, *Steel rod for drawing and/or cold rolling - Dimensions and tolerances*

EN 10021, *General technical delivery conditions for steel products*

EN 10024, *Hot rolled taper flange I sections - Tolerances on shape and dimensions*

EN 10025-1, *Hot rolled products of structural steels - Part 1: General technical delivery conditions*

EN 10025-2, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10025-3, *Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*

EN 10025-4, *Hot rolled products of structural steels - Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*

EN 10025-5, *Hot rolled products of structural steels - Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance*

EN 10025-6, *Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*

EN 10029, *Hot-rolled steel plates 3 mm thick or above - Tolerances on dimensions and shape*

EN 10034, *Structural steel I and H sections - Tolerances on shape and dimensions*

EN 10048, *Hot rolled narrow steel strip - Tolerances on dimensions and shape*

EN 10051, *Continuously hot-rolled strip and plate/sheet cut from wide strip of non-alloy and alloy steels - Tolerances on dimensions and shape*

EN 10055, *Hot rolled steel equal flange tees with radiused root and toes - Dimensions and tolerances on shape and dimensions*

EN 10056-1, *Structural steel equal and unequal leg angles - Part 1: Dimensions*

EN 10056-2, *Structural steel equal and unequal leg angles - Part 2: Tolerances on shape and dimensions*

EN 10058, *Hot rolled flat steel bars for general purposes - Dimensions and tolerances on shape and dimensions*

EN 10059, *Hot rolled square steel bars for general purposes - Dimensions and tolerances on shape and dimensions*

EN 10060, *Hot rolled round steel bars for general purposes - Dimensions and tolerances on shape and dimensions*

EN 10061, *Hot rolled hexagon steel bars for general purposes - Dimensions and tolerances on shape and dimensions*

EN 10080, *Steel for the reinforcement of concrete - Weldable reinforcing steel - General*

EN 10088-1, *Stainless steels - Part 1: List of stainless steels*

EN 10088-4:2009, *Stainless steels - Part 4: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes*

EN 10088-5:2009, *Stainless steels - Part 5: Technical delivery conditions for bars, rods, wire, sections and bright products of corrosion resisting steels for construction purposes*

SS-EN 1090-2:2018 (E)

EN 10131, *Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming - Tolerances on dimensions and shape*

EN 10139, *Cold rolled uncoated low carbon steel narrow strip for cold forming - Technical delivery conditions*

EN 10140, *Cold rolled narrow steel strip - Tolerances on dimensions and shape*

EN 10143, *Continuously hot-dip coated steel sheet and strip - Tolerances on dimensions and shape*

EN 10149 (all parts), *Hot rolled flat products made of high yield strength steels for cold forming*

EN 10163 (all parts), *Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections*

EN 10164, *Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions*

EN 10169, *Continuously organic coated (coil coated) steel flat products — Technical delivery conditions*

EN 10204, *Metallic products - Types of inspection documents*

EN 10210-1, *Hot finished structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions*

EN 10210-2, *Hot finished structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties*

EN 10219-1, *Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions*

EN 10219-2, *Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties*

EN 10268, *Cold rolled steel flat products with high yield strength for cold forming — Technical delivery conditions*

EN 10279, *Hot rolled steel channels - Tolerances on shape, dimensions and mass*

EN 10296-2:2005, *Welded circular steel tubes for mechanical and general engineering purposes - Technical delivery conditions - Part 2: Stainless steel*

EN 10297-2:2005, *Seamless circular steel tubes for mechanical and general engineering purposes - Technical delivery conditions - Part 2: Stainless steel*

EN 10346, *Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions*

EN 10365, *Hot rolled steel channels, I and H sections - Dimensions and masses*

EN ISO 1127, *Stainless steel tubes - Dimensions, tolerances and conventional masses per unit length (ISO 1127)*

EN ISO 9444-2, *Continuously hot-rolled stainless steel - Tolerances on dimensions and form - Part 2: Wide strip and sheet/plate (ISO 9444-2)*

EN ISO 9445 (all parts), *Continuously cold-rolled stainless steel - Tolerances on dimensions and form - Part 1: Narrow strip and cut lengths (ISO 9445 series)*

EN ISO 18286, *Hot-rolled stainless steel plates - Tolerances on dimensions and shape (ISO 18286)*

ISO 4997, *Cold-reduced carbon steel sheet of structural quality*

2.1.2 Steel castings

EN 1559-1, *Founding - Technical conditions of delivery - Part 1: General*

EN 1559-2, *Founding - Technical conditions of delivery - Part 2: Additional requirements for steel castings*

EN 10340, *Steel castings for structural uses*

2.1.3 Welding consumables

EN ISO 636, *Welding consumables - Rods, wires and deposits for tungsten inert gas welding of non-alloy and fine-grain steels - Classification (ISO 636)*

EN ISO 2560, *Welding consumables - Covered electrodes for manual metal arc welding of non-alloy and fine grain steels - Classification (ISO 2560)*

EN ISO 3581, *Welding consumables - Covered electrodes for manual metal arc welding of stainless and heat-resisting steels - Classification (ISO 3581)*

EN ISO 13918, *Welding - Studs and ceramic ferrules for arc stud welding (ISO 13918)*

EN ISO 14171, *Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels - Classification (ISO 14171)*

EN ISO 14174, *Welding consumables - Fluxes for submerged arc welding and electroslag welding - Classification (ISO 14174)*

EN ISO 14175, *Welding consumables - Gases and gas mixtures for fusion welding and allied processes (ISO 14175)*

EN ISO 14341, *Welding consumables - Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels - Classification (ISO 14341)*

EN ISO 14343, *Welding consumables - Wire electrodes, strip electrodes, wires and rods for arc welding of stainless and heat resisting steels - Classification (ISO 14343)*

EN ISO 16834, *Welding consumables - Wire electrodes, wires, rods and deposits for gas shielded arc welding of high strength steels - Classification (ISO 16834)*

EN ISO 17632, *Welding consumables - Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels - Classification (ISO 17632)*

EN ISO 17633, *Welding consumables - Tubular cored electrodes and rods for gas shielded and non-gas shielded metal arc welding of stainless and heat-resisting steels - Classification (ISO 17633)*

EN ISO 18275, *Welding consumables - Covered electrodes for manual metal arc welding of high-strength steels - Classification (ISO 18275)*

SS-EN 1090-2:2018 (E)

EN ISO 18276, *Welding consumables - Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high strength steels - Classification (ISO 18276)*

EN ISO 26304, *Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels - Classification (ISO 26304)*

2.1.4 Mechanical fasteners

EN 14399 (all parts), *High-strength structural bolting assemblies for*

EN 15048 (all parts), *Non-preloaded structural bolting assemblies*

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread (ISO 898-1)*

EN ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified property classes - Coarse thread and fine pitch thread (ISO 898-2)*

EN ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners - Part 1: Bolts, screws and studs (ISO 3506-1)*

EN ISO 3506-2, *Mechanical properties of corrosion-resistant stainless steel fasteners - Part 2: Nuts (ISO 3506-2)*

EN ISO 4042, *Fasteners - Electroplated coatings (ISO 4042)*

EN ISO 6789 (all parts), *Assembly tools for screws and nuts - Hand torque tools (ISO 6789)*

EN ISO 7089, *Plain washers - Normal series - Product grade A (ISO 7089)*

EN ISO 7090, *Plain washers, chamfered - Normal series - Product grade A (ISO 7090)*

EN ISO 7091, *Plain washers - Normal series - Product grade C (ISO 7091)*

EN ISO 7092, *Plain washers - Small series - Product grade A (ISO 7092)*

EN ISO 7093-1, *Plain washers - Large series - Part 1: Product grade A (ISO 7093-1)*

EN ISO 7094, *Plain washers - Extra large series - Product grade C (ISO 7094)*

EN ISO 10684, *Fasteners - Hot dip galvanized coatings (ISO 10684)*

EN ISO 21670, *Fasteners - Hexagon weld nuts with flange (ISO 21670)*

2.1.5 High strength cables

prEN 10138-3, *Prestressing steels — Part 3: Strand*

EN 10244-2, *Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc alloy coatings*

EN 10264-3, *Steel wire and wire products - Steel wire for ropes - Part 3: Round and shaped non alloyed steel wire for high duty applications*

EN 10264-4, *Steel wire and wire products - Steel wire for ropes - Part 4: Stainless steel wire*

EN 12385-1, *Steel wire ropes — Safety — Part 1: General requirements*

EN 12385-10, *Steel wire ropes — Safety — Part 10: Spiral ropes for general structural applications*

EN 13411-4, *Terminations for steel wire ropes - Safety - Part 4: Metal and resin socketing*

2.1.6 Structural bearings

EN 1337-2, *Structural bearings - Part 2: Sliding elements*

EN 1337-3, *Structural bearings - Part 3: Elastomeric bearings*

EN 1337-4, *Structural bearings - Part 4: Roller bearings*

EN 1337-5, *Structural bearings - Part 5: Pot bearings*

EN 1337-6, *Structural bearings - Part 6: Rocker bearings*

EN 1337-7, *Structural bearings - Part 7: Spherical and cylindrical PTFE bearings*

EN 1337-8, *Structural bearings - Part 8: Guide Bearings and Restraint Bearings*

2.2 Preparation

EN ISO 286-2, *Geometrical product specifications (GPS) - ISO code system for tolerances on linear sizes - Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts (ISO 286-2)*

EN ISO 9013, *Thermal cutting - Classification of thermal cuts - Geometrical product specification and quality tolerances (ISO 9013)*

CEN/TR 10347, *Guidance for forming of structural steels in processing*

2.3 Welding

EN 1011-1, *Welding - Recommendations for welding of metallic materials - Part 1: General guidance for arc welding*

EN 1011-2, *Welding - Recommendations for welding of metallic materials - Part 2: Arc welding of ferritic steels*

EN 1011-3, *Welding - Recommendations for welding of metallic materials - Part 3: Arc welding of stainless steels*

EN ISO 3834 (all parts), *Quality requirements for fusion welding of metallic materials (ISO 3834)*

EN ISO 4063, *Welding and allied processes - Nomenclature of processes and reference numbers (ISO 4063)*

EN ISO 5817:2014, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817:2014)*

EN ISO 9606-1:2017, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1:2017)*

EN ISO 9692-1, *Welding and allied processes - Types of joint preparation - Part 1: Manual metal arc welding, gas-shielded metal arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1)*

SS-EN 1090-2:2018 (E)

EN ISO 9692-2, *Welding and allied processes - Joint preparation - Part 2: Submerged arc welding of steels (ISO 9692-2)*

EN ISO 11970, *Specification and qualification of welding procedures for production welding of steel castings (ISO 11970)*

EN ISO 13916, *Welding - Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature (ISO 13916)*

EN ISO 14554 (all parts), *Quality requirements for welding - Resistance welding of metallic materials (ISO 14554 series)*

EN ISO 14555, *Welding - Arc stud welding of metallic materials (ISO 14555)*

EN ISO 14731, *Welding coordination - Tasks and responsibilities (ISO 14731)*

EN ISO 14732, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials - General rules (ISO 15607)*

CEN ISO/TR 15608, *Welding — Guidelines for a metallic material grouping system*

EN ISO 15609 (all parts), *Specification and qualification of welding procedures for metallic materials - Welding procedure specification (ISO 15609)*

EN ISO 15610, *Specification and qualification of welding procedures for metallic materials - Qualification based on tested welding consumables (ISO 15610)*

EN ISO 15611, *Specification and qualification of welding procedures for metallic materials - Qualification based on previous welding experience (ISO 15611)*

EN ISO 15612, *Specification and qualification of welding procedures for metallic materials - Qualification by adoption of a standard welding procedure (ISO 15612)*

EN ISO 15613, *Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613)*

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1)*

EN ISO 15614-11, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 11: Electron and laser beam welding (ISO 15614-11)*

EN ISO 15614-12, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 12: Spot, seam and projection welding (ISO 15614-12)*

EN ISO 15614-13, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 13: Upset (resistance butt) and flash welding (ISO 15614-13)*

EN ISO 15620, *Welding - Friction welding of metallic materials (ISO 15620)*

EN ISO 17652-1, *Welding - Test for shop primers in relation to welding and allied processes - Part 1: General requirements (ISO 17652-1)*

EN ISO 17652-2, *Welding - Test for shop primers in relation to welding and allied processes - Part 2: Welding properties of shop primers (ISO 17652-2)*

EN ISO 17652-3, *Welding - Test for shop primers in relation to welding and allied processes - Part 3: Thermal cutting (ISO 17652-3)*

EN ISO 17652-4, *Welding - Test for shop primers in relation to welding and allied processes - Part 4: Emission of fumes and gases (ISO 17652-4)*

EN ISO 17660 (all parts), *Welding - Welding of reinforcing steel (ISO 17660 series)*

2.4 Testing

EN 10160, *Ultrasonic testing of steel flat product of thickness equal or greater than 6 mm (reflection method)*

EN ISO 3452-1, *Non-destructive testing - Penetrant testing - Part 1: General principles (ISO 3452-1)*

EN ISO 6507 (all parts), *Metallic materials - Vickers hardness test - Part 1: Test method (ISO 6507 series)*

EN ISO 9018, *Destructive tests on welds in metallic materials - Tensile test on cruciform and lapped joints (ISO 9018)*

EN ISO 9712, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712)*

EN ISO 17635, *Non-destructive testing of welds - General rules for metallic materials (ISO 17635)*

EN ISO 17636 (all parts), *Non-destructive testing of welds - Radiographic testing (ISO 17636 series)*

EN ISO 17637, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637)*

EN ISO 17638, *Non-destructive testing of welds - Magnetic particle testing (ISO 17638)*

EN ISO 17640, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels and assessment (ISO 17640)*

EN ISO 23279, *Non-destructive testing of welds - Ultrasonic testing - Characterization of indications in welds (ISO 23279)*

2.5 Erection

EN 1337-11, *Structural bearings - Part 11: Transport, storage and installation*

ISO 4463 (all parts), *Measurement methods for building - Setting-out and measurement*

2.6 Corrosion protection

EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods (ISO 1461)*

SS-EN 1090-2:2018 (E)

EN ISO 2063 (all parts), *Thermal spraying - Metallic and other inorganic coatings - Zinc, aluminium and their alloys (ISO 2063 series)*

EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808)*

EN ISO 8501 (all parts), *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness (ISO 8501)*

EN ISO 8502 (all parts), *Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface (ISO 8502)*

EN ISO 8503 (all parts), *Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates (ISO 8503)*

EN ISO 8504 (all parts), *Preparation of steel substrates before application of paints and related products - Surface preparation methods (ISO 8504)*

EN ISO 12670, *Thermal spraying - Components with thermally sprayed coatings - Technical supply conditions (ISO 12670)*

EN ISO 12679, *Thermal spraying - Recommendations for thermal spraying (ISO 12679)*

EN ISO 12944 (all parts), *Paints and varnishes - Corrosion protection of steel structures by protective paint systems (ISO 12944-1 series)*

EN ISO 14713-1:2017, *Zinc coatings - Guidelines and recommendations for the protection against corrosion of iron and steel in structures - Part 1: General principles of design and corrosion resistance (ISO 14713-1)*

EN ISO 14713-2, *Zinc coatings - Guidelines and recommendations for the protection against corrosion of iron and steel in structures - Part 2: Hot dip galvanizing (ISO 14713-2)*

ISO 19840, *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Measurement of, and acceptance criteria for, the thickness of dry films on rough surfaces*

2.7 Miscellaneous

EN 1090-4, *Execution of steel structures and aluminium structures - Part 4: Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*

EN 1993-1-6, *Eurocode 3 - Design of steel structures - Part 1-6: Strength and Stability of Shell Structures*

EN 1993-1-8, *Eurocode 3: Design of steel structures - Part 1-8: Design of joints*

EN 1993-1-9:2005, *Eurocode 3: Design of steel structures - Part 1-9: Fatigue*

EN 1993-2:2006, *Eurocode 3 - Design of steel structures - Part 2: Steel Bridges*

EN 13670, *Execution of concrete structures*

ISO 2859-5, *Sampling procedures for inspection by attributes — Part 5: System of sequential sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection*