



DPC: 25/30497187 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 16 January 2025

Origin: European

Latest date for receipt of comments: 11 March 2025

Project No. 2024/02040

Responsible committee: CB/203 Design & execution of steel structures

Interested committees:

Title: Draft BS EN 1090-4 BS 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.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 11 March 2025

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Responsible Committee Secretary: Ms Asky Desta (BSI)

Direct tel: 0208 996 7171

E-mail: asky.desta@bsigroup.com

Full document details: 25/30497187 DC

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

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

Exécution des structures en acier et des structures en
aluminium - Partie 4 : Exigences techniques pour
éléments et structures en acier formés à froid pour
applications en toiture, plafond, paroi verticale et
plancher

Ausführung von Stahltragwerken und
Aluminiumtragwerken - Teil 4: Technische
Anforderungen an tragende, kaltgeformte Bauelemente
aus Stahl und tragende, kaltgeformte Bauteile für Dach-
, Decken-, Boden- und Wandanwendungen

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

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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	7
1 Scope.....	8
2 Normative references.....	10
3 Terms, definitions, symbols and abbreviations	13
3.1 Terms and definitions.....	13
3.2 Symbols and abbreviations	15
4 Specifications and documentation	17
4.1 Execution Specification.....	17
4.1.1 General.....	17
4.1.2 Execution specification of the manufacturer.....	17
4.1.3 Installation specification of the installer	17
4.1.4 Execution classes	17
4.1.5 Structural classes.....	18
4.1.6 Layout drawings.....	18
4.1.7 Geometrical tolerances.....	19
4.2 Installation quality documentation	19
4.2.1 General.....	19
4.2.2 Content of the installation quality documentation.....	19
4.3 Installation documentation.....	20
4.4 Detailed traceability documentation.....	20
4.5 Safety of the installation works	20
5 Products	20
5.1 General.....	20
5.2 Identification, inspection documents and traceability	20
5.3 Materials	21
5.4 Thickness tolerances.....	23
5.5 Minimum nominal sheet thicknesses.....	23
5.5.1 Profiled sheeting.....	23
5.5.2 Structural members.....	24
5.6 Geometrical tolerances.....	24
5.7 Mechanical fasteners	25
5.7.1 General.....	25
5.7.2 Type of fasteners and materials	25
5.8 Accessories.....	26
5.9 Surface protection	26
5.10 External fire performance for profiled sheeting as an outer layer of roofs	26
5.11 Reaction to fire.....	27
5.12 Resistance to fire.....	27
5.13 Release of dangerous substances.....	27
5.14 Lightning protection	27
6 Manufacturing.....	27
6.1 General.....	27
6.2 Identification	27
6.3 Cold forming	28

6.4	Cutting.....	28
6.4.1	General	28
6.4.2	Shearing and nibbling.....	28
6.4.3	Thermal cutting.....	28
6.5	Holing.....	28
6.5.1	General	28
6.5.2	Execution of punching.....	28
7	Welding	29
7.1	General	29
7.2	Welding of the longitudinal weld seam of cold-formed closed and hollow sections	29
7.3	Welding at the construction site	30
8	Mechanical fastening.....	30
8.1	General	30
8.2	Use of self-tapping and self-drilling screws	31
8.3	Use of blind rivets.....	31
8.4	Use of cartridge fired pins	32
8.5	Attachment of cold-formed structural members and profiled sheeting to the supporting member	32
8.5.1	Types of connections and attachments.....	32
8.5.2	Attachment of profiled sheets to the supporting member transverse to the direction of span	32
8.5.3	Attachment of profiled sheeting to supports parallel to the direction of profiled sheeting's span.....	34
8.5.4	Supporting member made of metal	34
8.5.5	Supporting member made of timber or other wood-based materials	34
8.5.6	Supporting member made of concrete or masonry	34
8.6	Connecting profiled sheeting	35
8.7	Edge distances and spacing of fasteners for profiled sheeting	35
8.7.1	General	35
8.7.2	Edge spacings of webs of trapezoidal profiled sheeting and liner tray profiles.....	35
9	Installation	36
9.1	General	36
9.2	Site conditions	36
9.3	Training/instruction of installation personnel.....	36
9.4	Inspection of preceding works	37
9.5	Layout drawing.....	37
9.6	Tools required	37
9.7	Safety on site.....	37
9.8	Inspection of packaging and contents.....	37
9.9	Storage.....	37
9.10	Damaged structural members and profiled sheeting and connecting devices	38
9.11	Unloading, lifting gear/slides/straps	38
9.12	Laying.....	39
9.13	Direction of lay	39
9.14	Maintaining the cover width during installation	39
9.15	Condition after installation (swarf from drilling, fouling of surface, protective film wrap).....	39
9.16	Inspection after installation	39
9.17	Diaphragms.....	39
9.18	Protection against lightning	40
10	Surface protection	40
10.1	Corrosion protection	40

10.1.1	General.....	40
10.1.2	Carbon steels	41
10.1.3	Stainless steels	41
10.1.4	Combination of metallic materials	41
10.2	Cleaning and maintenance	42
10.2.1	Organic coated products	42
10.2.2	Metallic coated products	42
10.2.3	Stainless steel	42
11	Geometrical tolerances.....	42
11.1	General.....	42
11.2	Tolerance types	43
11.3	Essential tolerances	43
11.3.1	General.....	43
11.3.2	Manufacturing tolerances.....	43
11.3.3	Installation tolerances	44
11.4	Functional tolerances.....	44
12	Inspection, testing and correction.....	44
12.1	General.....	44
12.2	Structural members, profiled sheeting and fasteners.....	44
12.2.1	General.....	44
12.2.2	Non-conforming products.....	44
12.3	Manufacturing: geometrical dimensions of manufactured structural members and profiled sheeting	44
12.3.1	General.....	44
12.3.2	Profiled sheeting	45
12.3.3	Members.....	45
12.4	Inspection of the installed structure.....	46
12.5	Inspection of fastening.....	46
12.5.1	Self-tapping and self-drilling screws	46
12.5.2	Blind rivets	46
12.5.3	Cartridge fired pins	46
12.5.4	Bolted Connections	46
13	Deconstruction	47
13.1	General.....	47
13.2	Deconstruction process	47
Annex A (normative)	Basic requirements for profiled sheeting	49
A.1	General.....	49
A.2	Supporting members	51
A.2.1	Materials	51
A.2.2	Shear forces/fixed points.....	52
A.3	Edges of laying area.....	52
A.3.1	Longitudinal decking edge trims.....	52
A.3.2	Weakening of the cross section	53
A.3.3	Reinforcements and double layers.....	53
A.3.4	Avoidance of ice damming.....	54
A.4	Building physics requirements.....	54

A.4.1	General	54
A.4.2	Water permeability.....	54
A.4.3	Thermal insulation	55
A.4.4	Avoidance of condensation/moisture protection.....	55
A.4.5	Airborne sound insulation (R_w)	55
A.4.6	Sound absorption (α_w).....	56
A.4.7	Protection against lightning	56
A.5	Roof drainage	56
Annex B (normative) Additional design requirements for profiled sheeting		58
B.1	General	58
B.2	Serviceability.....	58
B.3	Widths of supports.....	58
B.4	Supports made of concrete or masonry	59
B.5	Walkability.....	61
B.5.1	Walkability during installation	61
B.5.2	Walkability and access after installation.....	61
B.6	Cantilevers	61
B.7	Effective load width	62
B.7.1	Effective load width for non-composite slabs under point or line loads.....	62
B.7.2	Load dispersal by means of other structural members.....	62
Annex C (normative) Installation records		63
Annex D (normative) Geometrical tolerances.....		64
D.1	General	64
D.2	Essential and functional manufacturing tolerances – Cold-formed profiled sheeting.....	64
D.3	Essential and functional manufacturing tolerances – Cold-formed members including custom cold rolled closed and hollow sections.....	70
D.3.1	Press braked or folded members.....	70
D.3.2	Roll-formed members.....	71
D.4	Essential manufacturing tolerances – Punched holes.....	71
Annex E (normative) Corrosion protection by metallic coating with or without organic coatings.....		72
E.1	Corrosion protection	72
E.2	Suitability of corrosion protection	76
E.2.1	Selection.....	76
E.2.2	Examination of suitability (initial inspection).....	82
E.2.3	Monitoring.....	84
E.2.4	Galvanic corrosion	85

Annex F (normative) Additional information.....88

F.1 List of required additional information 88

F.2 List of additional information if not otherwise specified.....89

Bibliography 90

European foreword

This document (prEN 1090-4:2025) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 1090-4:2018.

This document includes the following significant technical changes with respect to EN 1090-4:2018:

- Fundamental revision of the standard and adaptation to the current state of science and technology.

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*

1 Scope

This document specifies requirements for the execution, i.e. the manufacture and the installation, of cold-formed structural steel members and profiled sheeting and cold-formed structures for roof, ceiling, floor, wall and cladding applications.

This document applies to structures designed according to the EN 1993 series.

This document applies to structural members and profiled sheeting designed according to EN 1993-1-3.

This document 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 document also specifies requirements for the execution i.e. the manufacture and the installation of structures made from cold-formed profiled sheeting for roof, ceiling, floor and wall applications under predominately static loading or seismic loading conditions and their documentation.

This document covers structural profiled sheeting of Structural Class I and II and structural profiled sheeting in Structural Class III according to EN 1993-1-3 used in structures.

NOTE 1 In National Annexes of EN 1993-1-3 specifications can be given regarding the use of the Structural Classes.

This document covers structural members of all structural classes according to EN 1993-1-3.

Structural profiled sheeting is understood here to be:

- profiled sheet, such as trapezoidal, sinusoidal or liner trays (Figure 1).

Structural members are understood here to be:

- members (linear profiled cross sections) that are produced by cold forming (Figure 2).

This document also covers:

- not welded built-up sections (Figure 2d);
- cold-formed closed and hollow sections including the welding of the longitudinal seam (Figure 2b and Figure 2c), not covered by EN 10219-1;
- perforated, punctured and micro profiled sheeting and members;

The welding of built-up sections are not covered. The welding provisions are given in EN 1090-2.

This document also covers spacer constructions between the outer and inner or upper and lower skins for roofs, walls and ceilings made from cold-formed profiled sheeting and the connections and attachments of the afore mentioned elements as long as all has a structural purpose.

This document covers steel profiled sheeting for composite floors, e.g. during installation and in stage of pouring concrete.

This document also covers the deconstruction of structures made from cold-formed profiled sheeting and structural members for roof, ceiling, floor and wall applications.

Composite structural members where the interaction between dissimilar materials are an integral part of the structural behaviour such as sandwich panels and composite floors are not covered by this document.

This document does not cover the necessary analyses and detailing and execution rules for thermal insulation, moisture protection, noise control and fire protection.

This document does not cover regulations of roof cladding and wall cladding, produced by traditional plumber methods or tinsmith methods.

This document does not cover detailed requirements for water tightness or air permeability resistance and thermal aspects of profiled sheeting.

NOTE 2 The structures covered in this document can be for example.

- single- or multi-skin roofs, whereby the load-bearing structure (lower skin) or the actual roof covering (upper skin) or both consist of cold-formed structural members and profiled sheeting;
- single- or multi-skin walls whereby the load-bearing structure (inner skin), the actual cladding (outer skin) or both consist of cold-formed structural members and profiled sheeting, or
- trusses from cold-formed members.

NOTE 3 Structures can consist of an assembly of structural members and profiled sheeting made of steel according to EN 1090-4 and of aluminium according to EN 1090-5.

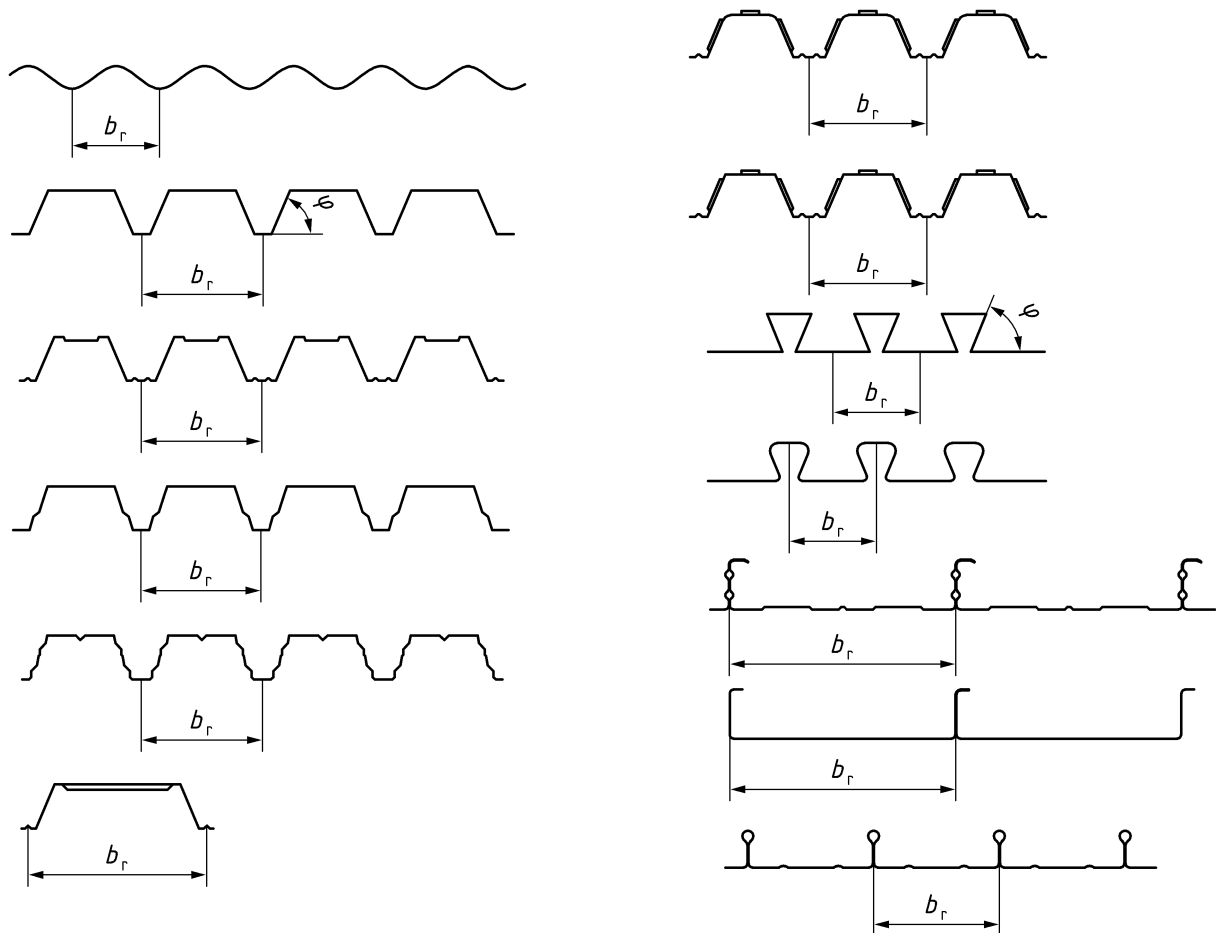


Figure 1 — Examples of profiled sheeting

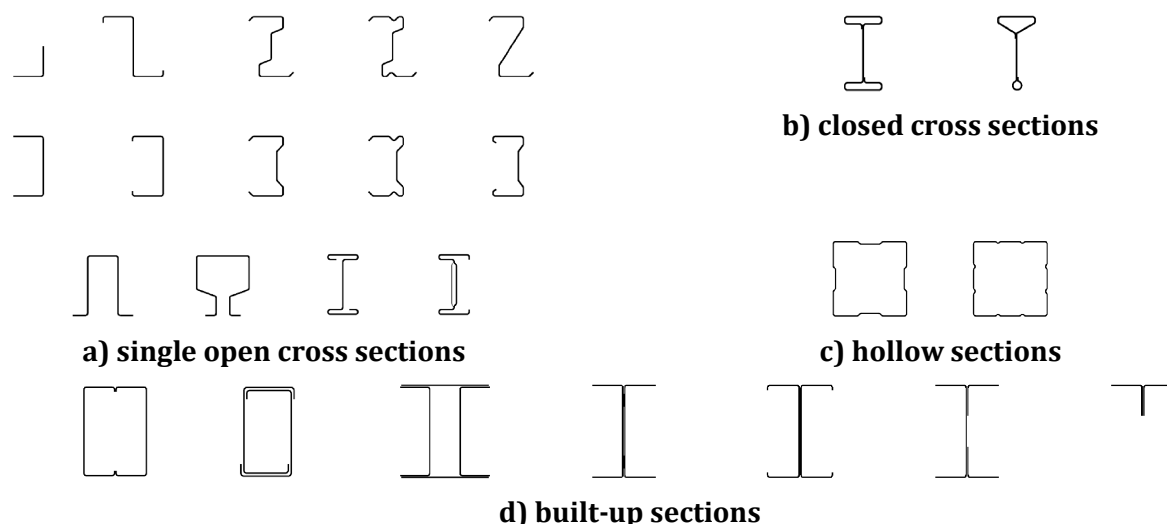


Figure 2 — Examples of members

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.

CEN/TS 1187, *Test methods for external fire exposure to roofs*

EN 508-3, *Roofing and cladding products from metal sheet — Specification for self-supporting products of steel, aluminium or stainless steel sheet — Part 3: Stainless steel*

EN 1090-1, *Execution of steel structures and aluminium structures — Part 1: Requirements for conformity assessment of structural elements*

EN 1090-2:2018+A1:2014, *Execution of steel structures and aluminium structures — Part 2: Technical requirements for steel structures*

EN 1990, *Eurocode - Basis of structural and geotechnical design*

EN 1993-1-3:2024, *Eurocode 3 — Design of steel structures — Part 1-3: General rules — Supplementary rules for cold-formed members and sheeting*

EN 1995-1-1, *Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings*

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

EN 10152, *Electrolytically zinc coated cold rolled steel flat products for cold forming - Technical delivery conditions*

EN 10162:2003, *Cold rolled steel sections — Technical delivery conditions — Dimensional and cross-sectional tolerances*

EN 10169:2022, *Continuously organic coated (coil coated) steel flat products — Technical delivery conditions*

- EN 10204, *Metallic products — Types of inspection documents*
- EN 10346, *Continuously hot-dip coated steel flat products for cold forming — Technical delivery conditions*
- EN 13501-5, *Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests*
- EN 13523-1, *Coil coated metals - Test methods - Part 1: Film thickness*
- EN 13523-6, *Coil coated metals - Test methods - Part 6: Adhesion after indentation (cupping test)*
- EN 13523-7:2021, *Coil coated metals — Test methods — Part 7: Resistance to cracking on bending (T-bend test)*
- EN 13523-8, *Coil coated metals - Test methods - Part 8: Resistance to salt spray (fog)*
- EN 13523-10, *Coil coated metals - Test methods - Part 10: Resistance to fluorescent UV radiation and water condensation*
- EN 13523-19, *Coil coated metals - Test methods - Part 19: Panel design and method of atmospheric exposure testing*
- EN 13523-21, *Coil coated metals - Test methods - Part 21: Evaluation of outdoor exposed panels*
- EN 13523-26, *Coil coated metals - Test methods - Part 26: Resistance to condensation of water*
- EN 15048-1:2016, *Non-preloaded structural bolting assemblies - Part 1: General requirements*
- EN 62305-3:2011, *Protection against lightning - Part 3: Physical damage to structures and life hazard (IEC 62305-3)*
- EN 62561-1, *Lightning Protection System Components (LPSC) - Part 1: Requirements for connection components (IEC 62561 1)*
- EN ISO 717-1, *Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation (ISO 717-1)*
- EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods (ISO 1461)*
- EN ISO 2081, *Metallic and other inorganic coatings - Electroplated coatings of zinc with supplementary treatments on iron or steel (ISO 2081)*
- EN ISO 2409, *Paints and varnishes - Cross-cut test (ISO 2409)*
- EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808)*
- EN ISO 2810, *Paints and varnishes - Natural weathering of coatings - Exposure and assessment (ISO 2810)*
- EN ISO 4042, *Fasteners - Electroplated coating systems (ISO 4042)*
- EN ISO 4136, *Destructive tests on welds in metallic materials - Transverse tensile test (ISO 4136)*

EN ISO 4628-2, *Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 2: Assessment of degree of blistering (ISO 4628-2)*

EN ISO 4628-3, *Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting (ISO 4628-3)*

EN ISO 4628-4, *Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 4: Assessment of degree of cracking (ISO 4628-4)*

EN ISO 4628-5, *Paints and varnishes - Evaluation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 5: Assessment of degree of flaking (ISO 4628-5)*

EN ISO 4628-8, *Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect (ISO 4628-8)*

EN ISO 5173, *Destructive tests on welds in metallic materials - Bend tests (ISO 5173)*

EN ISO 6270-1, *Paints and varnishes - Determination of resistance to humidity - Part 1: Condensation (single-sided exposure) (ISO 6270-1)*

EN ISO 6507 (all parts), *Metallic materials — Vickers hardness test (ISO 6507)*

EN ISO 8492, *Metallic materials - Tube - Flattening test (ISO 8492)*

EN ISO 8493, *Metallic materials - Tube - Drift-expanding test (ISO 8493)*

EN ISO 9227, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227)*

EN ISO 11654, *Acoustics - Sound absorbers for use in buildings - Rating of sound absorption (ISO 11654:1997)*

EN ISO 12944-2, *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments (ISO 12944-2)*

EN ISO 12944-4, *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 4: Types of surface and surface preparation (ISO 12944-4)*

EN ISO 12944-6, *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 6: Laboratory performance test methods (ISO 12944-6)*

EN ISO 12944-7, *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 7: Execution and supervision of paint work (ISO 12944-7)*

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

EN ISO 17639, *Destructive tests on welds in metallic materials - Macroscopic and microscopic examination of welds (ISO 17639)*

EN ISO 17872:2019, *Paints and varnishes — Guidelines for the introduction of scribe marks through coatings on metallic panels for corrosion testing (ISO 17872:2019)*

ASTM D 5796, *Standard Test Method for Measurement of Dry Film Thickness of Thin Film Coil-Coated Systems by Destructive Means Using a Boring Device*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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/>

3.1.1

component I

component (usually the profiled sheeting) that is facing the head of the fastener (the swage head in the case of blind rivets)

3.1.2

component II

second component of a connection (usually the supporting member)

3.1.3

decking

load bearing profiled sheeting to support

EXAMPLE Insulation and outer skin.

3.1.4

decking edge trim

fold added to the free end of an outstand plane element to restrain that element for local buckling and to ensure the geometry under access loads

3.1.5

edge trim

load-bearing flashings around a perimeter of a composite steel deck to retain the wet concrete during casting

3.1.6

fastening

fastener and the process of fastening and the final connected components

3.1.7

flashing

non-load bearing element, for example accessories and coverings in the areas of the skirting, eaves, gable end, ridge and corners

3.1.8

layout drawing

drawing showing the position of structural components and installation details

3.1.9

liner tray

profiled sheet with large lipped edge stiffener, suitable for interlocking with adjacent liner trays to form a plane of ribbed profiled sheeting that is capable of supporting a parallel plane of profiled sheeting

3.1.10

member

linear profiled cross sections (structural element with cross-sectional dimensions much smaller than its length)

Note 1 to entry: This is a narrower definition of the term member than the one given in EN 1990.

3.1.11

penetration

opening in the decking made on-site

3.1.12

restraint

restriction of the lateral or rotational movement, or the torsional or warping deformation, of a member or element, that increases its buckling resistance to the same extent as a rigid support

3.1.13

saddle washer

oversized gasket that is adapted to the respective profile shape and are made of aluminium, steel or stainless steel with a seal bonded to it and an adapted corrosion protection to that of the profiled sheeting which can be used when profiled sheeting are connected via its top flange

Note 1 to entry: The corrosion protection is adapted to that of the profiled sheeting.

Note 2 to entry: Saddle washer can be used when attaching profiled sheeting via its top flange.

Note 3 to entry: As an example, a figure of a saddle washer is given in EN 1993-1-3:2024, Table 11.16.

3.1.14

structural cold-formed component

load-bearing element made from steel sheet by cold rolling or press braking

3.1.15

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.

[SOURCE: ISO 6707-1:2020, 3.1.1, Note 2 and 3 are deleted.]

3.1.15.1

essential tolerance

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

3.1.15.2

functional tolerance

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

3.1.15.3**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

3.1.15.4**manufacturing tolerance**

permitted range in the size of a dimension of a component resulting from component manufacture

3.1.16**trimmer**

beam around an opening in a floor or roof or wall

3.2 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

C	corrosivity category
D	edge waviness of the side lap
E	modulus of elasticity
F	force
I	second moment of area
K	shear force of the fastener
L	span, distance
M	bending moment
R	end support reaction, airborne sound insulation
T	shear flow
V	shear force of the structural component
a	distance between fastener and web of profiled sheet
b	width, width of spacing strip
d	hole diameter, nominal diameter of the fastener
e	distance of hole from edge, distance between fastener and centre line of flange of profiled sheet, distance between fasteners
g	self-weight of the roof including the self-weight of the profile
h	depth of profile
l	length of double layer
p	distances between holes
q_0	α times roof load

r	radius
t	thickness of bare metal of the sheet, hole pitch
Δ	deviation, tolerance
δ	deviation from straightness
φ	inclination of the web of profile

Indices

A	end support, centre-to-centre distance of the penetration from the end support or from the point of zero moment
B	internal, intermediate support
I	component 1, profiled sheeting
II	component 2, supporting member/profiled sheeting
L	longitudinal edge, left side
N	nominal sheet thickness $B_D + \Delta$
R	rib edge, right side
S	tensile force from constraints due to shear reinforcement shear stiffness
V	shear load, thickness of the bare steel measured in the test
f	Width of flange – theoretical requirement used for static calculations
g	self-weight of roof
i	ideal distance between supports
k	cantilever
n	nominal hole diameter required
r	rib
s	stiffener at the web
t	tensile force
u	bottom flange
w	web
α	ratio q_0/q

4 Specifications and documentation

4.1 Execution Specification

4.1.1 General

The necessary information and technical requirements for execution of each part of the works (manufacturing and installation) shall be agreed and complete before commencement of execution of that part of the works.

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

4.1.2 Execution specification of the manufacturer

The execution specification shall consider such of the following items as are relevant:

- a) additional information, as listed in Annex F;
- b) execution classes, see 4.1.4;
- c) structural classes, see 4.1.5;
- d) tolerance classes, see 4.1.7;
- e) preparation grades, if relevant, see EN 1090-2.

4.1.3 Installation specification of the installer

An installation specification consists of layout drawings and details, based on structural design and shall consider such of the following items as relevant:

- a) additional information, as listed in Annex F;
- b) execution classes, see 4.1.4;
- c) structural classes, see 4.1.5;
- d) technical requirements regarding the safety of the works, see 4.5 and 9.7;
- e) preparation grades, if relevant, see EN 1090-2;
- f) tolerance classes, see 4.1.7.

An installation specification that has not been prepared by the installer shall be checked by the installer for completeness and feasibility. Incomplete layout drawings or details that cannot be installed, shall be rejected or corrected by mutual agreement.

NOTE The responsibilities between the parties involved can be regulated by member states.

4.1.4 Execution classes

Four execution classes 1 to 4, denoted EXC1 to EXC4, are given, for which requirement strictness increases from EXC1 to EXC4.

The execution specification and the installation specification shall specify the relevant execution class or classes.

NOTE The requirements for the selection of execution classes are given in EN 1993-1-1:2022, Annex A.

The list of requirements related to execution classes is given in EN 1090-2.

Members and profiled sheeting complying with this document may be used for EXC1 to EXC3. In this document for profiled sheeting there is no differentiation in requirements between execution classes. EN 1090-2 does not apply.

4.1.5 Structural classes

Structural classes shall be specified in the layout drawings, the design brief, and in the operations and maintenance manual.

NOTE 1 In the design of structures a distinction is made between various “structural classes”, based on the level of contribution of cold-formed steel members and profiled sheeting to the strength and stability of the overall structure or that of individual structural components. These structural classes are associated with different requirements in the applicable product standard for cold-formed steel members and profiled sheeting and are defined in EN 1993-1-3.

NOTE 2 The intended use determines the structural class. The same cold-formed steel member or profiled sheeting can be used for different structural classes.

NOTE 3 The type of loading (uniformly distributed loads, access loads, concentrated loads e.g. from PV installation) can change the structural class of the product.

4.1.6 Layout drawings

Layout drawings shall be part of the installation specification and are based on structural design.

Layout drawings and assembly instructions shall include the following details and shall be prepared for the installation:

- type and position of the structural members and profiled sheeting;
- structural class of members and profiled sheeting;
- connection with the supporting member and arrangement of the fasteners;
- structural members and profiled sheeting with profile designation and manufacturer's name, material, nominal sheet thickness, manufactured length and corrosion protection;
- direction of lay of profiled sheeting and special installation sequences;
- statically effective overlapping (moment-resisting connections), if relevant;
- installation tolerances;
- fasteners with type designation, name of manufacturer of the fasteners (not valid for bolts), type of washer and other fixing accessories, arrangement and separation distances, special assembly instructions depending on the type of connection, e.g. hole diameters, axial spacings and edge distances;
- type and details of the supporting member for the structural members and profiled sheeting, such as material, centre to centre distances and dimensions, the inclination;
- details of the side and end overlappings and edges of the installed area;
- openings in the installed areas, including the necessary framing, e.g. for skylights, smoke and heat extractors and roof drainage, if relevant;

- superstructures or suspensions, e.g. for piping, bunched cables or suspended ceilings, if relevant;
- stating that all structural members and profiled sheeting shall be fixed immediately after laying;
- details about any special installation measures, if relevant;
- special devices for installation, if relevant;
- any specific hazards related to construction should be identified;
- details about corrosion protection, e.g. contact surfaces between different metals or between metals and timber, concrete, masonry or plaster, if relevant;
- details about the condition and location of sealant strips, fillers for profiled sheeting and special elements, if relevant;
- details about setting-down places for bundles of structural members and profiled sheeting on roof areas and floors according to the static calculation;
- details about walkability, if relevant;
- details about weather integrity, if relevant;
- details about fire protection, if relevant;
- details about thermal insulation, if relevant;
- details about acoustics, if relevant;
- details about air tightness, if relevant.

Laying areas and parts of laying areas that are intended to act as a diaphragm to stabilize the structure or parts of the structure shall be marked on the layout drawings as 'diaphragm'.

4.1.7 Geometrical tolerances

Two types of geometrical tolerances are defined in Clause 11:

- a) essential tolerances;
- b) functional tolerances, with two classes for which requirement strictness increases from class 1 to class 2 (see 11.4).

4.2 Installation quality documentation

4.2.1 General

It shall be specified if a quality documentation for installation is required. If required, the quality documentation shall be prepared prior to the start of the work.

NOTE 1 The quality documentation is generally prepared in cooperation with the designer.

NOTE 2 The quality documentation is a quality-assuring documentation.

4.2.2 Content of the installation quality documentation

The following points shall be documented:

- a) organization chart and managerial staff responsible for each aspect of the installation;
- b) the procedures, methods and work instructions to be applied;
- c) an inspection plan specific to the works;
- d) a procedure for handling changes and modifications;
- e) a procedure for handling of nonconformities, requests for concessions and quality disputes;
- f) specified hold-points or requirement to witness inspections or tests, and any consequent access requirements.

4.3 Installation documentation

An installation documentation shall be recorded to demonstrate that the works have been carried out according to the installation specification (4.1.3), if not otherwise specified.

NOTE The installation documentation is an evidence-securing documentation.

Installation records shall document the state and progress of the construction works as well as all noteworthy incidents during construction.

Annex C contains a list of recommended items for the installation records.

At completion, a statement of completion demonstrating that the works have been executed in accordance with the installation specifications and the provisions of this document shall be signed by the company responsible for the installation.

4.4 Detailed traceability documentation

Cold-formed steel structural members and profiled sheeting (materials for manufacturing and manufactured products) shall be traceable at all stages, from purchasing the material prior to production of members and profiled sheeting to installation of the manufactured products.

This traceability may be based on documentary records for batches of product allocated to a common production process.

4.5 Safety of the installation works

Method statements giving detailed work instructions shall be specified and shall comply with the technical requirements relating to the safety of the installation works as given in 9.7.

5 Products

5.1 General

This section defines the basic requirements with respect to the structural members and profiled sheeting and the accompanying documents.

Materials to be used for the execution of cold-formed steel structures shall be according to 5.3.

If materials are to be used that are not covered by the standards listed in 5.3, their properties shall be specified.

5.2 Identification, inspection documents and traceability

The properties of supplied products shall be documented in a way that enables them to be compared to the specified properties.

For steel products made of materials given in 5.3, the inspection document shall be 3.1 according to EN 10204.

Products shall be delivered and identified as follows:

- a) They shall be delivered in an appropriate packaging and labelled such that the content is readily identifiable.
- b) Labelling or accompanying documentation shall be in accordance with the requirements of the product standard and should contain the following information in a legible and durable form, attached to every packaged unit:
 - Manufacturer's name and works;
 - Batch designation or documentation number for traceability;
 - Weight;
 - Length, if relevant for lifting;
 - Number of products inside the package;
 - Thickness;
 - Steel grade or specific product reference;
 - Corrosion protection system.

It is recommended that labels be retained. See also Annex C.

5.3 Materials

Materials to be used in the manufacture of structural cold-formed members and profiled sheeting shall have properties that conform to the required suitability for cold forming process.

Carbon steels suitable for cold forming are listed in EN 1993-1-3 or in EN 10346. Stainless steels suitable for cold forming are listed in EN 508-3.

Materials to be used for manufacturing of structural profiled sheets shall conform to the requirements of the relevant European product standards as listed in Table 1, if not otherwise specified (e.g. ETAs). Grades and coating system with full designation shall be specified together with any required options permitted by the product standard.

Deep drawing quality steels according to EN 10346 are not permitted for profiled sheets. The minimum yield strength for profiled sheets is 220 N/mm².

The finished product manufacturer shall buy base materials whose characteristics are declared by the base material supplier with an inspection certificate 3.1 according to EN 10204. Therefore, the finished product manufacturer's system requires only a document check to ensure that the characteristics meet the product manufacturer's specifications. The inspection certificate 3.1 shall contain at least the following data in accordance with EN 10346:

- Name or mark of the manufacturer's work;
- Identification number;
- Type and grade of material;

- Nominal layer weight and type of the metallic protective layers, if relevant, in accordance with EN 10346;
- Adhesion of metallic coating;
- Nominal dimensions of the product ordered and nominal sheet thickness (t_N) (in mm respectively) and special tolerance (S) or normal tolerance (N) (for metallic coated steel according to EN 10143) or a specific tolerance when specified in the execution and installation specification (see 5.4);
- Determined layer weight of the metal protective layer (g/m^2), in accordance with EN 10346 (in case of a steel manufacturer it may not be provided by him);
- Determined thickness of the organic coating visible side/rear side in μm (in case of a steel manufacturer it may not be provided by him);
 - Bend radius to thickness ratio;
 - Coating system; full designation according to EN 10169;
- Determined values of the mechanical material properties (see also EN 10346):
 - Yield strength or 0,2 %-proof strength ($R_{eH}/R_{p0,2}$) in Mpa;
 - Tensile strength (R_m) in Mpa;
 - Elongation after fracture A_{g0} mm in %.

In case of not having a 3.1 inspection document or the 3.1 document is incomplete the material shall be treated as non-conforming until it can be demonstrated that it meets the requirements of the specification. In case of higher mechanical properties documented by the 3.1 document, the finished product manufacturer shall not upgrade the steel. In this case the base material manufacturer can issue a new inspection certificate 3.1 by request.

Table 1 — Materials^a for profiled sheeting

Steel grade	European Standard	Metallic coating ^c	Yield strength $R_{p0,2}$ in N/mm ²	Ultimate tensile strength R_m in N/mm ²	Elongation $A_{80 \text{ mm}}$ in % min.
S220GD ^b	EN 10346	+Z, +ZA, +AZ, +ZM	220	300	20
S250GD ^b	EN 10346	+Z, +ZA, +AZ, +ZM	250	330	19
S280GD	EN 10346	+Z, +ZA, +AZ, +ZM	280	360	18
S320GD	EN 10346	+Z, +ZA, +AZ, +ZM	320	390	17
S350GD	EN 10346	+Z, +ZA, +AZ, +ZM	350	420	16
S390GD	EN 10346	+Z, +ZA, +AZ, +ZM	390	460	16
S420GD	EN 10346	+Z, +ZA, +AZ, +ZM	420	480	15
S450GD	EN 10346	+Z, +ZA, +AZ, +ZM	450	510	14
S550GD ^e	EN 10346	+Z, +ZA, +AZ, +ZM	550	560	— ^d
^a In some countries other materials may be permitted. ^b Profiled sheets made from these grades might not be permitted for use in some countries. ^c Other metallic coatings may also be used and their properties shall be specified by European Standards or ETAs. ^d Shall be specified by the manufacturer of the coil. ^e Profiled sheeting made of this steel grade shall only be used when specified from a test-based design.					

5.4 Thickness tolerances

The execution and installation specification shall specify the tolerance limit value or type for the thickness. This can be in accordance with the product standard for the steel sheet or strip concerned.

Tolerance types (“normal” tolerance (N) or “special” tolerance (S)) are given for continuously hot-dip metal coated steel sheet or strip in EN 10143.

In the structural design a smaller sheet thickness tolerance might be specified compared to the product standard concerned. In such a case this should be explicitly noted in the execution and installation specification.

The thickness of the manufactured components shall be measured in those areas which are not influenced by the cold forming process.

5.5 Minimum nominal sheet thicknesses

5.5.1 Profiled sheeting

The thicknesses shall be in accordance with the execution and installation specification.

The minimum nominal sheet thicknesses shall not be less than shown below, if not otherwise specified:

Decking: $t_N \geq 0,75 \text{ mm}$

Profiled sheeting as an outer layer of roofs: $t_N \geq 0,50 \text{ mm}$

Floors: $t_N \geq 0,75 \text{ mm}$

Walls and wall claddings:

— outer skin $t_N \geq 0,50 \text{ mm}$

— single skin or inner skin for all spans $t_N \geq 0,50 \text{ mm}$

— liner trays $t_N \geq 0,75 \text{ mm}$

NOTE 1 Static calculations according to the Eurocodes give a nominal thickness required for design. The values above are based on installation experiences on the worksite.

NOTE 2 For aesthetic reasons, especially for wall applications, greater thicknesses can be necessary to prevent loss of flatness.

NOTE 3 In some countries lower values than the above listed values can be permitted.

5.5.2 Structural members

The thicknesses shall be in accordance with the execution and installation specification.

The minimum nominal thicknesses for roof and wall structures shall not be less than shown below, if not otherwise specified:

— Purlin and cladding rail $t_N \geq 0,88 \text{ mm}$

— Spacer profiles in roofs and walls $t_N \geq 0,75 \text{ mm}$

— Edge stiffening profiles $t_N \geq 1,00 \text{ mm}$

— Edge trim $t_N \geq 0,75 \text{ mm}$

— Restraint members $t_N \geq 0,88 \text{ mm}$

but at least the nominal thickness of the attached profiled sheets (exception: edge trim).

NOTE 1 Static calculations according to the Eurocodes give a nominal thickness required for design. The values above are based on installation experiences on the worksite.

NOTE 2 In some countries lower values than the above listed values can be permitted.

5.6 Geometrical tolerances

Geometrical tolerances are given in 11 and Annex D.

5.7 Mechanical fasteners

5.7.1 General

This clause specifies the requirements for screws, blind rivets and cartridge fired pins for structural members and profiled sheeting with a thickness not greater than 4 mm. For other types of mechanical fasteners (e.g. bolts and nuts) or thicknesses greater than 4 mm, EN 1090-2 shall apply. Bolt/nut assemblies according to EN 15048-1 with ISO metric pitch thread from size M6 to M39 shall be used for non-preloaded bolt applications according to this document. The bolt manufacturing and purchase requirements shall comply with the requirements specified in EN 1090-2.

NOTE 1 EN 1993-1-3 gives design rules for bolt sizes starting from M6.

NOTE 2 The scope of EN 15048-1:2016 specifies bolt sizes only for structures according to EN 1090-2 and EN 1090-3. The range of bolt sizes for structures according to this document is missing. However, the bolt/nut requirements specified in the EN 15048 series remain the same whether applied in combination with aluminium (EN 1090-3) structures or with steel structures to comply with this document.

NOTE 3 Pre-loaded bolted connections are in general not suitable in joints between components with relatively small clamp thicknesses because of the risk of loss of preload over time. The specific surface condition of cold-formed components can require tests in case of pre-loaded bolted connections to determine the slip factor of the friction surfaces, using the procedure set out in EN 1090-2.

When using electroplated coated bolts in joints between cold-formed members, the risk of hydrogen embrittlement should be considered. In general, there is no risk of hydrogen embrittlement, when the bolted assemblies comply with:

- non-preloaded;
- bolt grade not higher than 8.8 (hardness below 320 HV);
- application only in corrosion categories C1 (very low) and C2 (low) according to EN ISO 12944-2 (no additional hydrogen due to corrosion process).

For fully threaded non-preloaded bolts there are no requirements for the unthreaded parts of the shank.

NOTE 4 Contact between thread and hole edge is considered in the calculation rule for hole bearing given in EN 1993-1-3.

5.7.2 Type of fasteners and materials

Fasteners according to European Standards or European Technical Assessments (ETA) shall be used. The type of fastener with designation of the relevant European Standard or ETA shall be specified.

NOTE For further information for mechanical fasteners for diaphragm application see EN 1993-1-3:2024, 10.3.

The fastener materials shall be adapted to the intended purpose, see EN 1993-1-3:2024, Annex B.

Fastenings are subdivided into:

- a) thread-forming screws, these are subdivided into:
 - thread-forming self-tapping screws, which produce their female threads in predrilled holes in a chipless manner;
 - self-drilling self-tapping screws with a drill tip, with the drilling of a hole, the forming of the female thread and the tightening of the screw all taking place in a single operation;

- self-piercing screw with a piercing tip which forms the female thread without pre-drilling but by material displacement;
- b) blind rivets that comprise a rivet sleeve and a rivet mandrel with a predetermined breaking point;
- c) cartridge fired pins that are forced through the component being attached into the supporting member using a fastening tool. Details of the firing charge and driving forces are given by the relevant ETAs;
- d) bolts and nuts and washers;
- e) clinch connections. Details of clinch connections are given by the relevant ETAs;
- f) spot welds.

Fasteners that are completely or partially exposed to weathering or similar moisture loading (partially exposed does not mean short exposure to weathering during installation) shall be made from austenitic stainless steel or aluminium, if not otherwise specified, unless it can be proven by testing that the corrosion protection system of the exposed part of carbon steel fasteners corresponds the corrosion protection of the parts to be connected. This does not apply to welded-on drill tips. With fasteners that are not made from stainless steel, the corrosion protection of the fasteners shall be adapted to the required corrosion protection of the parts to be connected by means of galvanizing and, if necessary, organic coating. The requirements in EN ISO 4042 shall be observed. In the case of electrolytic galvanizing, the coating thickness shall be at least 8 µm. Less thickness might be acceptable provided specific verification of the durability for the intended use of the fasteners is given.

For a rainproof connection or mounting, washers made of aluminium or austenitic stainless steel with a cured-on elastomer seal at least 1,6 mm thick shall be inserted under the head of the fastener. This seal shall be compressed by fastening of about 30 – 50 % of its thickness for getting a rainproof connection (see Figure 4). Alternatively the fasteners shall be associated with accessories ensuring a rainproof connection. For an accurate implementation, the specifications of the fastener manufacturer shall be followed.

5.8 Accessories

Accessories are components that are absolutely necessary for the function of the construction but for which no analyses of the ultimate limit state or serviceability limit state shall be carried out, e.g. decking side trim, sealant strips, fillers for profiled sheeting or flashings. They shall fulfil the same requirements for durability, corrosion protection and reaction to fire as the structural members and profiled sheeting listed under 5.3 and 5.5 if not otherwise specified.

5.9 Surface protection

Verification of suitability of a corrosion protection system for a corrosivity category shall be carried out with reference to Clause 10 and Annex E of this document.

NOTE Buildings are normally designed for duration high “H” (EN ISO 12944-1) if not otherwise specified.

EN 1993-1-4:2006, Annex A gives a material selection procedure for structural stainless steel in typical building environments.

5.10 External fire performance for profiled sheeting as an outer layer of roofs

The external fire performance shall be tested in accordance with the relevant method(s) in CEN/TS 1187 and in accordance with EN 13501-5.

The products to be tested shall be installed, in addition to the general provisions given in CEN/TS 1187, in a manner representative of their intended use.

NOTE 1 Products covered by this document are considered “deemed to satisfy without the need for testing” in relation to the requirements for external fire performance provided that they meet the definitions given in Commission Decision 2000/553/EC, i.e. flat or profiled metal sheets of nominal thickness $\geq 0,4$ mm with any external coating which is inorganic or has a gross calorific value, $PCS \leq 4,0$ MJ/m² or a mass ≤ 200 g/m².

NOTE 2 Individual Member States can have “deemed to satisfy” lists which go beyond the list given in the Commission Decision 2000/553/EC.

NOTE 3 The following products are considered to be classified in classes $B_{ROOF}(t1)$, $B_{ROOF}(t2)$, $B_{ROOF}(t3)$ and $B_{ROOF}(t4)$ without further testing in accordance with Commission Decision 2005/403/EC: profiled steel sheets, flat steel sheets or panels of coil coated galvanised or zinc-aluminium alloy coated steel of metal thickness $\geq 0,40$ mm with an organic external (weather side) coating and, optionally, a reverse (internal) side organic coating. The external coating is of a liquid-applied plastisol paint of maximum nominal dry film thickness 0,200 mm, a PCS of not greater than 8,0 MJ/m² and a maximum dry mass of 330 g/m².

The reverse side organic coating (if any) shall have a PCS of not greater than 4,0 MJ/m² and a maximum dry mass of 200 g/m².

5.11 Reaction to fire

Reaction to fire shall be according to EN 1090-1.

5.12 Resistance to fire

Resistance to fire shall be according to EN 1090-1.

5.13 Release of dangerous substances

Release of dangerous substances shall be according to EN 1090-1.

5.14 Lightning protection

For structural members and profiled sheeting made of metal that form part of the lightning protection system the recommendations given in EN 62305-3 shall apply.

6 Manufacturing

6.1 General

Structural members and profiled sheeting shall be manufactured by cold forming from steel sheet or strip/coil. There shall be no cracks at the bent areas visible by the naked eye.

NOTE Product standards for flat products as well as EN 10162:2003, Annex A specify limit values for (bend radius)/(thickness) ratios as a function of the steel type and steel grade, above which one can expect that no by the eye visible cracks will occur.

When stainless steel sheet or strip shall be cold-formed, the forming equipment shall be cleaned in case also other steels are formed on the same equipment. Other possibilities shall be proven by testing.

For welding other than the longitudinal welded seam of closed and hollow sections, EN 1090-2 applies.

6.2 Identification

At all stages of manufacturing each piece or package of similar pieces of steel components shall be identifiable by a suitable system.