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Izvedba jeklenih in aluminijastih konstrukcij - 4. del: Tehnične zahteve za hladno oblikovane konstrukcijske jeklene elemente in hladno oblikovane konstrukcijske elemente za strešne, stropne, talne in stenske konstrukcije

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

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

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

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**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**

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aluminium - Partie 4 : Exigences techniques, pour
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plafond, applications pour mur et plancher

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

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (prEN 1090-4:2015) 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 second CEN Enquiry.

EN 1090, Execution of steel structures and aluminium structures will consist of the following parts:

- Part 1: Requirements for conformity assessment of structural components
- Part 2: Technical requirements for steel structures
- Part 3: Technical requirements for aluminium structures
- Part 4: Technical requirements for, cold-formed steel elements and structures for roof, ceiling, floor and wall applications
- Part 5: Technical requirements for, cold-formed aluminium elements and structures for roof, ceiling, floor and wall applications

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prEN 1090-4:2015 (E)**1 Scope**

This European Standard specifies requirements for the execution i.e. the manufacture and the installation of cold-formed steel structural elements and cold-formed structures for roof, ceiling, floor and wall applications.

This European Standard applies to structures designed according to the relevant part of EN 1993.

This European Standard applies to structural components and sheeting as defined in EN 1993-1-3.

This European Standard may 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 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 European Standard covers products of structural classes I and II according to EN 1993-1-3 used in structures.

Structural elements are understood here to be:

- profiled sheets, such as trapezoidal, sinusoidal, liner trays or cassette profiles (Figure 1), or
- members (linear profiled cross sections) that are produced by cold forming (Figure 2).

This European Standard also covers:

- Not welded or bolted build-up sections of thicknesses not greater than 3 mm.
- Cold-formed hollow sections including the welding of the longitudinal seam, not covered by EN 10219-1.
- Perforated, punctured and micro profiled sheeting.

NOTE 1 For build-up sections (Figure 2b and 2c) welded, bolted or of thicknesses greater than 3 mm are not covered the execution provisions are given in EN 1090-2.

This European Standard 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 are involved in load transfer.

This European Standard covers steel profiled sheeting for composite floors.

Composite structural elements 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 standard.

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

Annex B of this standard concerns provisions which the designer has to take into account and which are not yet included in EN 1993-1-3. The guidelines in this annex may be wholly or partially superseded by future guidelines added to EN 1993.

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

NOTE 2 The structures covered in this standard can be for example

- single- or multi-skin roofs, whereby the load-bearing structure (lower skin) as well as the actual roof covering (upper skin) or both consist of thin-gauge structural elements,
- single- or multi-skin walls whereby the load-bearing structure (inner skin) as well as the actual cladding (outer skin) or both consist of thin-gauge structural elements, or
- trusses from cold formed members.

NOTE 3 Structures can consists of an assembly of structural elements made of steel according to EN 1090-4 and of aluminium according to EN 1090-5.

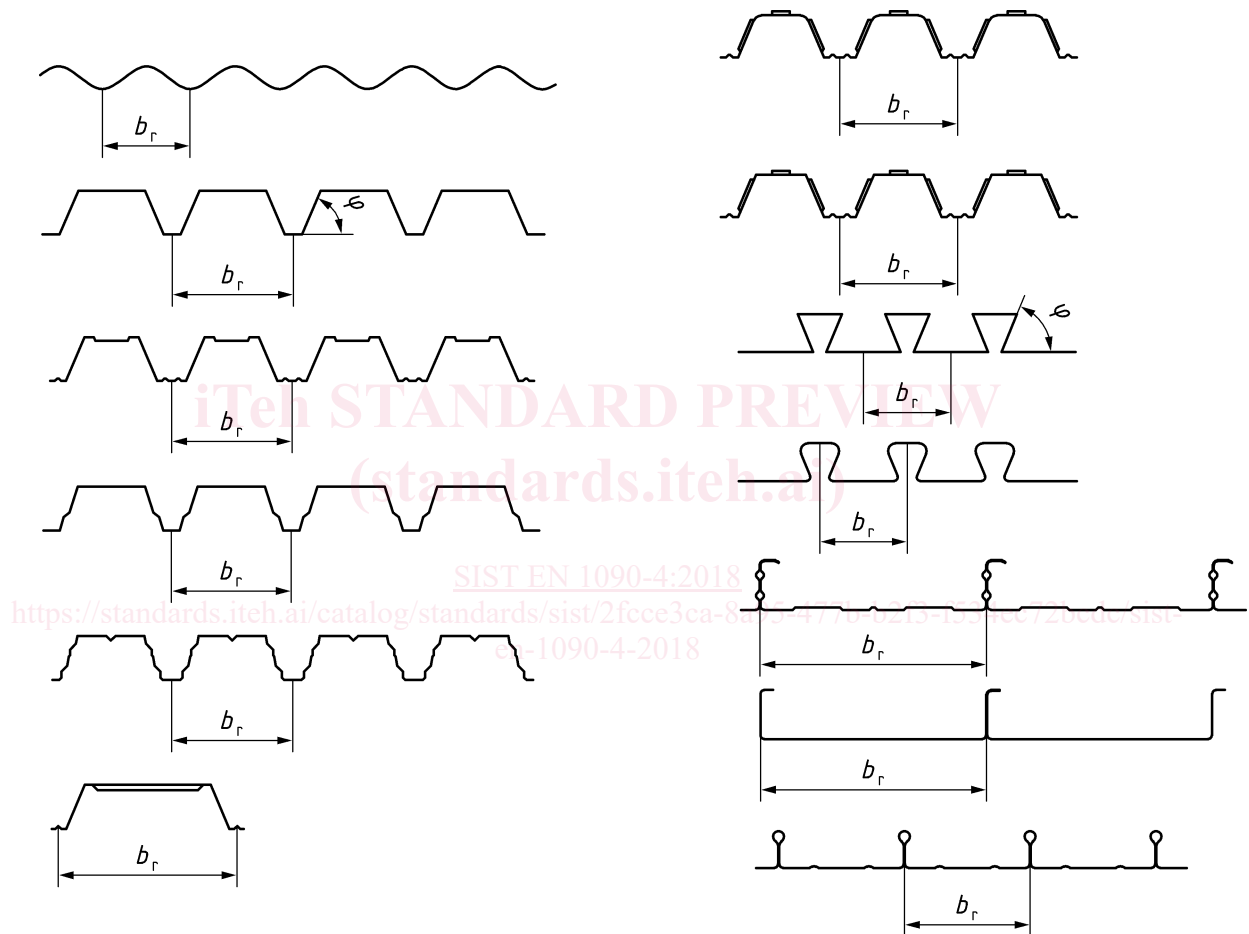


Figure 1 — Examples of profile shapes

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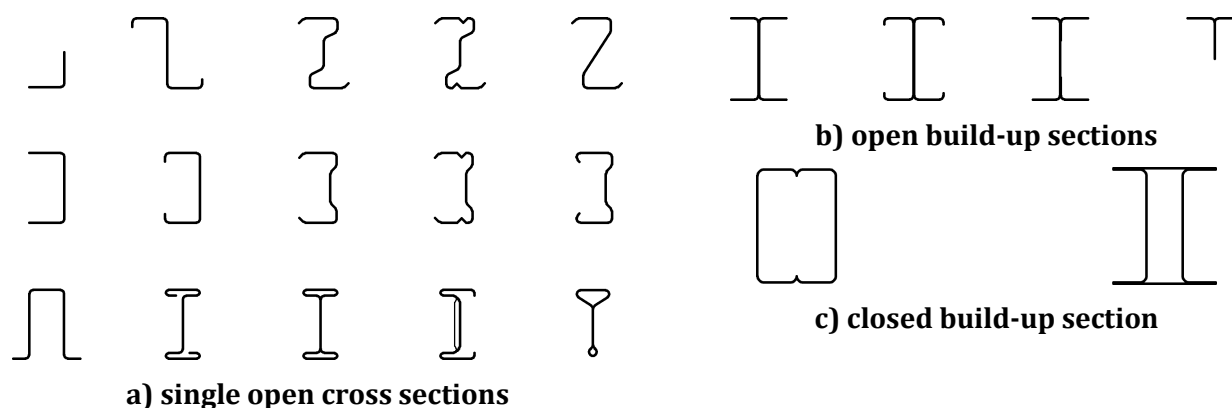


Figure 2 — Examples of linear profile cross sections

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 508-1, *Roofing and cladding products from metal sheet - Specification for self-supporting of steel, aluminium or stainless steel sheet - Part 1: Steel*

EN 508-3, *Roofing 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 1090-2:2008+A1:2011, *Execution of steel structures and aluminium structures — Part 2: Technical requirements for steel structures*

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

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

EN 1993-1-4, *Eurocode 3 - Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels*

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

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 4042:1999, *Fasteners - Electroplated coatings (ISO 4042:1999)*
- EN ISO 6270-1, *Paints and varnishes - Determination of resistance to humidity - Part 1: Continuous condensation (ISO 6270-1)*
- EN ISO 9227, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227)*
- EN 10088-4, *Stainless steels - Part 4: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes*
- 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, *Cold rolled steel sections - Technical delivery conditions - Dimensional and cross-sectional tolerances*
- EN 10169, *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 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)*
- <https://standards.iteh.ai/catalog/standards/sist/2fcce3ca-8a95-477b-b2f3-f534ec72bcde/sist-12944-6>
- 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 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, *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 14782, *Self-supporting metal sheet for roofing, external cladding and internal lining - Product specification and requirements*
- EN ISO 17872, *Paints and varnishes - Guidelines for the introduction of scribe marks through coatings on metallic panels for corrosion testing (ISO 17872)*
- EN 62305-3, *Protection against lightning - Part 3: Physical damage to structures and life hazard*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the following terms and definitions apply:

3.1 Terms and definitions

3.1.1

ancillaries

additional components e.g. as part of a purlin and rail system required to make the system function

3.1.2

apex tie

special restraint used across the two parallel runs of purlins either side of the apex on a duo pitch roof

3.1.3

cassette profile

cassette profiles are roll formed elements with or without stiffeners used as substructures for walls and roofs with a bigger variety in cross sections as liner trays

3.1.4

liner trays

liner trays are roll formed, press-braked or folded structural elements with or without stiffeners used as substructures for walls and roof

3.1.5

cleat

connection bracket used to connect purlins and rails to the main frame. Also a cleat can be connector for attaching cold formed section to each other — example as in forming window or door openings

3.1.6

continuity sleeve

sleeve that connects two structural elements together and provide a continuous or semi continuous moment resistant joint

3.1.7

component I

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

3.1.8

component II

second component of a connection (usually the supporting member)

3.1.9

counter formed hole

surround of a punched hole, formed to create a conical depression to fit a counter sunk head of a mechanical fastener

3.1.10

decking

load bearing sheet to support e. g. insulation and outer skin

3.1.11**edge stiffener**

supporting plate or profile at the longitudinal edge of a laying area to replace the missing neighbored sheeting and stiffen the free edge

3.1.12**edge trims**

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

3.1.13**fastenings**

fasteners and the process of fastening and the final connected components

3.1.14**flashings**

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

3.1.15**layout drawings**

showing the position of structural components and execution details

3.1.16**liner**

inner sheet of a double skin system only carrying self-weight and insulation

3.1.17**penetration**

opening in the decking executed on work-site to allow installation equipment to pass through

3.1.18**rafter**

(stanchion braces, knee braces) compression or tie braces used to connect the inner flange of a rafter, beam or stanchions to a purlin or rail to provide restraint to the inner flange

3.1.19**restraints**

connecting member transverse between two parallel runs of purlin or rail to provide structural restraint to the members — dependent on the system that can be positional or rotational restraint to the sections

3.1.20**saddle washers**

oversized gaskets that are adapted to the respective profile shape. They are made of aluminium, steel or stainless steel with an elastomer or foamed rubber seal bonded to it. Their corrosion protection shall be adapted to that of the profiled sheeting. Saddle washers can be used when attaching profiled sheeting via its top flange

3.1.21**structural cold formed components**

load-bearing element made from steel sheet