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**Izdelava in montaža jeklenih konstrukcij – 2. del: Dopolnilna pravila za hladno oblikovane tankostenske profile in pločevine (prevzet ENV 1090-2:1998 z metodo platnice)**

Execution of steel structures - Part 2: Supplementary rules for cold formed thin gauge components and sheeting

Exécution des structures en acier - Partie 2: Règles supplémentaires pour les bacs nervurés et les éléments minces formés à froid

Ausführung von Tragwerken aus Stahl - Teil 2: Ergänzende Regeln für kaltgeformte dünnwandige Bauteile und Bleche

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Deskriptorji: jeklene konstrukcije, konstrukcijska jekla, pločevine, hladno oblikovanje, pogoji izvajanja, izdelava, stikovanje, varjenje, spojna sredstva, geometrijska odstopanja, zaščita, pregledi

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ICS 77.140.50; 91.080.10

Referenčna številka  
SIST ENV 1090-2:2001 ((sl),en)

Nadaljevanje na straneh od II do IV in od 1 do 35

## NACIONALNI UVOD

Predstandard SIST ENV 1090-2 ((sl),en), Izdelava in montaža jeklenih konstrukcij - 2. del: Dopolnilna pravila za hladno oblikovane tankostenske profile in pločevine, prva izdaja, 2001, ima status slovenskega predstandarda in je z metodo platnice prevzet evropski predstandard ENV 1090-2 (en), Execution of steel structures - Part 2: Supplementary rules for cold formed thin gauge components and sheeting, July 1998.

## NACIONALNI PREDGOVOR

Evropski predstandard ENV 1090-2:1998 je pripravil tehnični odbor Evropskega komiteja za standardizacijo CEN/TC 135 Izdelava in montaža jeklenih konstrukcij.

Odločitev za prevzem tega predstandarda po metodi platnice je sprejela delovna skupina USM/TC KON/WG 3 Jeklene konstrukcije, ki je pripravila tudi nacionalni dokument za uporabo v Sloveniji, potrdil pa tehnični odbor USM/TC KON Konstrukcije.

Ta slovenski predstandard se lahko uporablja samo v skladu z nacionalnim dokumentom, ki je sestavni del SIST ENV 1090-2:2001.

Ta slovenski predstandard je dne 2000-12-04 odobril direktor USM.

Rok veljavnosti tega predstandarda je do izdaje evropskega standarda EN 1090-2.

## ZVEZE S STANDARDI

S prevzemom tega evropskega predstandarda veljajo naslednje zveze:

- |                        |           |   |
|------------------------|-----------|---|
| SIST ENV 1090-1:1999   | ((sl),en) | Izdelava in montaža jeklenih konstrukcij – 1. del: Splošna pravila in pravila za stavbe   |
| SIST ENV 1992-1-1:1999 | ((sl),en) | Eurocode 2: Projektiranje betonskih konstrukcij – Del 1-1: Splošna pravila in pravila za stavbe   |
| SIST ENV 1993-1-1:1996 | ((sl),en) | Eurocode 3: Projektiranje jeklenih konstrukcij - Del 1-1: Splošna pravila in pravila za stavbe  |
| SIST ENV 1993-1-3:2001 | ((sl),en) | Eurocode 3: Projektiranje jeklenih konstrukcij – Del 1-3: Splošna pravila – Dodatna pravila za hladnooblikovane tankostenske profile in pločevine |
| SIST ENV 1994-1-1:1998 | ((sl),en) | Eurocode 4: Projektiranje sovprežnih konstrukcij – Del 1-1: Splošna pravila in pravila za stavbe  |

## OPOMBI

- Povsod, kjer se v besedilu predstandarda uporablja izraz “evropski predstandard”, v SIST ENV 1090-2:2001 to pomeni “slovenski predstandard”.
- Nacionalni uvod in nacionalni predgovor nista sestavni del predstandarda.

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## **Nacionalni dokument za uporabo v Sloveniji**

Tekst evropskega predstandarda ENV 1090-2:1998 se v SIST ENV 1090-2:2001 uporablja brez sprememb in dodatnih zahtev.

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Descriptors: steel construction, structural steels, flat bars, cold-working, specifications, setting-up, conditions, manufacturing, joining, welding, fastenings, geometrical tolerances, protection, inspection

English version

## Execution of steel structures - Part 2: Supplementary rules for cold formed thin gauge components and sheeting

Execution des structures en acier - Partie 2: Règles  
supplémentaire pour les bacs nervurés et les éléments  
minces formés à froid

Ausführung von Tragwerken aus Stahl - Teil 2: Ergänzende  
regeln für kaltgeformte dünnwandige Bauteile und Bleche

This European Prestandard (ENV) was approved by CEN on 16 July 1997 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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

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## BIBLIOGRAPHY

## FOREWORD

This European Prestandard has been prepared by the Technical Committee CEN/TC 135 "Execution of steel structures", the secretariat of which is held by NSF.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## INTRODUCTION

### *Addition:*

(104) This European Prestandard ENV 1090-2 is a supplement to the ENV 1090-1: Execution of Steel structures - General rules and rules for buildings.

(105) This European Prestandard presupposes that the work is performed in accordance with the requirements of ENV 1090-1, as amended by this supplement.

(106) In this European Prestandard, the following terms are used thus:

*Addition:* means that the text applies in addition to the corresponding clause/subclause of ENV 1090-1 without any amendment to the text of ENV 1090-1;

*Modification:* means that the text shall modify the corresponding text of ENV 1090-1 as appropriate.

(107) An addition is identified by the subsequent number to the last subclause, respective paragraph number, of ENV 1090-1 added to 100.

(108) Where a subclause of ENV 1090-1 is not mentioned in this ENV 1090-2, it applies as far as deemed appropriate in each case.

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## 1 SCOPE

This clause of ENV 1090-1 is applicable except as follows :

### *Addition:*

(106) This part of ENV 1090 specifies particular requirements for the execution of steel structures produced from cold formed thin gauge components and sheeting designated construction classes I and II in ENV 1993-1-3.

Note 1: Supplementary rules for execution of structures with cold formed closed hollow sections are given in ENV 1090-4.

Note 2: The construction classes differentiate between levels of reliability.

Note 3: Requirements for execution of sheeting in construction class III may be specified in national rules.

Note 4: This European Prestandard does not cover requirements for water tightness and draught resistance of sheeting.



## 2 NORMATIVE REFERENCES

This clause of ENV 1090-1 is applicable except as follows :

### *Addition.*

prEN 505	Roofing products from metal sheet - Specification for fully supported roofing products of steel sheet
prEN 508-1	Roofing products from metal sheet - Specification for self-supporting products of steel, aluminium or stainless steel sheet - Part 1: Steel
ENV 1090-1:1996	Execution of steel structures - Part 1: General rules and rules for buildings
ENV 1090-4	Execution of steel structures - Part 4: Supplementary rules for hollow section lattice structures
ENV-1993-1-3:1996	Eurocode 3: Design of steel structures - Part 1-3: General rules - Supplementary rules for cold formed thin gauge members and sheeting
EN 10002-1:1990	Metallic materials - Tensile testing - Part 1: Method of test
EN 10048:1996	Hot rolled narrow strips - Tolerances on dimensions and shape
EN 10140:1996	Cold rolled narrow strips - Tolerances on dimensions and shape
EN 10142:1990	Continuously hot-dip zinc coated low carbon steel sheet and strip for cold forming - Technical delivery conditions
EN 10142:1990/A1	Admendment A1 to EN 10142:1990 - Continuously hot-dip zinc coated low carbon steel sheet and strip for cold forming - Technical delivery conditions
EN 10143:1993	Continuously hot-dip metal coated steel sheet and strip - Tolerances on dimensions and shape
EN 10147:1991	Continuously hot-dip zinc coated structural steel sheet and strip - Technical delivery conditions
EN 10147:1991/A1	Admendment A1 to EN 10147:1990 - Continuously hot-dip zinc coated structural steel sheet and strip - Technical delivery conditions
EN 10149-1:1995	Hot-rolled flat products made of high yield strength steels for cold forming - Part 1: General delivery conditions
EN 10149-2:1995	Hot-rolled flat products made of high yield strength steels for cold forming - Part 2: Delivery conditions for thermomechanically rolled steels
EN 10149-3:1995	Hot-rolled flat products made of high yield strength steels for cold forming - Part 3: Delivery conditions for normalized or normalized rolled steels
prEN 10162	Cold rolled sections - Technical delivery conditions
prEN 10169-2	Continuously organic coated steel flat products - Part 2: Performance requirements for building applications
EN 10214:1995	Continuously hot-dip zinc-aluminium (ZA) coated steel strip and sheet -Technical delivery conditions
EN 10215:1995	Continuously hot-dip aluminium-zinc (AZ) coated steel strip and sheet -Technical delivery conditions
EN ISO 9003:1994	Quality systems - Model for quality assurance in final inspection and test

### *Modification.*

EN ISO 9002:1994	Quality systems - Model for quality assurance in production and installation
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*Addition:*

ISO 3269:1988	Fasteners - Acceptance inspection
ISO 4997:1991	Cold reduced steel sheet of structural quality
ISO 8501-1:1988	Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings.
ISO 10447:1991	Welding - Peel and chisel testing of resistance spot, projection and seam welds

### 3 DEFINITIONS

This clause of ENV 1090-1 is applicable except as follows :

*Addition:*

- 3.118: **cold forming:** The process of forming steel sheet or strip into a component with open or closed cross section, or into a profiled sheet, by either roll forming, pressing or folding.
- 3.119: **construction classes:** See ENV 1993-1-3.
- 3.120: **fabrication:** All activities performed to produce finished steel components including cold formed thin gauge components and sheeting ready for assembly on site.
- 3.121: **fabrication tolerance:** Permitted variation in the size of a dimension of a component resulting from component manufacture.
- 3.122: **stressed skin action:** Structural behaviour involving in-plane shear in the sheeting and forces in the edge components.
- 3.123: **structural sheeting:** Profiled steel sheets produced by cold forming and used in such a manner as to form either:
- a stressed skin shear diaphragm;
  - a bracing system offering structural restraint to other components or assemblies of components;
  - part of a cladding system intended to offer access to roofs for the purpose of maintenance and repair.
- 3.124: **thin gauge components:** Open or closed section structural components with a cross section bounded by either free edges or by bends produced by cold forming sheet or strip steel.
- Note: Closed hollow section components may be made either:
- by joining two previously formed open sections by continuous welding; or
  - from a single flat strip by forming the corners to make a box and continuously welding the longitudinal seam.

### 4 DOCUMENTATION

This clause of ENV 1090-1 is applicable, however, this supplementary part ENV 1090-2 includes additional information in table C.1 that should be considered for inclusion in the project specification as appropriate.

## 5 MATERIALS

This clause of ENV 1090-1 is applicable except as follows :

### 5.1 General

*Addition:*

(106) Steels to be used in the manufacture of cold formed members and sheeting shall have properties that conform to the required suitability for the cold forming process, welding and galvanizing as appropriate.

Note: Table 1 gives information on the most relevant product standards for flat rolled steel products suitable for cold forming. Grades, grade suffixes and, where appropriate, coating weights and finishes, should be stated in the project specification together with any options allowed by the product standard.

Table 1: Steels for cold forming. Product standards for sheet and strip

Product	Technical delivery conditions	Tolerances
Non-alloy structural steels	EN 10025	EN 10051
Weldable fine grain structural steels	EN 10113	EN 10051
High yield strength steel for cold forming	EN 10149-1 EN 10149-2 EN 10149-3	
Cold reduced steels	ISO 4997	EN 10131
Continuously coated hot dip coated steels	EN 10142 (Zinc coated; Formability Grades) EN 10147 (Zinc coated; Structural Grades) EN 10214 (Zinc-aluminium coated) EN 10215 (Aluminium-zinc coated)	EN 10143
Narrow strips	<a href="https://standards.iteh.ai/catalog/standards/sist/1681c5ff-5d0d-47d5-8fb7-75c30d403b7c/sist-env-1090-2-2001">https://standards.iteh.ai/catalog/standards/sist/1681c5ff-5d0d-47d5-8fb7-75c30d403b7c/sist-env-1090-2-2001</a>	EN 10048 EN 10140

(107) The use of steels to other than European or International Standards may be permitted where so allowed by the project specification, provided it can be shown that the steel to be used meets the requirements of the relevant European Standard.

(108) The materials of the connectors and fasteners shall meet the requirements of the project specification such as to avoid structural failure of the connectors and fasteners or deterioration of the steel structure and cladding material.

(109) The corrosion resistance of the connectors, fasteners and sealing washers shall be at least equal to that specified for the fastened component.

(110) Fasteners shall be selected from a corrosion resistant material if the load bearing part is likely to be in direct contact with moisture or a chemically aggressive atmosphere. If only the head is exposed to the aggressive environment, and corrosion mechanisms on load-bearing parts can be excluded, suitable corrosion resistant coatings may be used provided the head is totally encapsulated in non-corrosive materials.

Note: In some circumstances stainless steel fasteners can provide the appropriate level of corrosion resistance. If fasteners with encapsulated heads are to be used the encapsulating material should be resistant to UV radiation and aggressive chemicals in the atmosphere.

## 5.2 Use of materials

### 5.2.3 Steel for welded components

*Addition:*

(105) For cold formed steel to be incorporated into welded components the product standard for the basic steel strip may be relied upon concerning the suitability of the steel for welding if this information is given. This may be taken as fulfilling the requirement to check the chemical composition given in the material certificate for compliance with the welding process to be used.

## 5.4 Mechanical fasteners

### 5.4.3 Special fasteners

*Addition:*

(103) Mechanical fasteners for use in stressed skin applications shall be of a type which will not work loose in service, and which will neither pull out nor fail in shear before causing tearing in the connected material.

(104) The following fasteners generally used for fastening in thin gauge components and sheeting shall be treated as special fasteners:

- self-tapping and self-drilling screws;
- blind rivets;
- cartridge fired pins;
- air driven pins.

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Note: Annex J gives guidance for selection of these mechanical fasteners.

(105) Special fasteners shall be delivered in appropriate durable packaging and labelled such that the content is readily identifiable.

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Note: Labelling or accompanying documentation should bear the following information in a legible and durable form:

- manufacturer's or supplier's identification;
- type of fastener and, if appropriate, its assembly;
- fastener material and if appropriate, protective coating;
- dimensions in mm, as appropriate for nominal diameter, length, washer diameter and thickness of elastomeric part, effective fastening range;
- size of drill bit as appropriate;
- for screws: details of the limiting torque values;
- for cartridge fired and air driven pins: details of the firing charge and driving forces as appropriate.

A drawing to the scale 1:1, with the appropriate notation is adequate to provide the dimensional information.

(106) Special fasteners and any associated washers shall bear a manufacturer's or supplier's identification mark on the assemblies that is recognisable after the fasteners have been set.

## 5.7 Shear connectors

*Addition:*

Note to (1):

Note 102: In applications using cold formed components the term 'shear connector' has two possible meanings. In composite deck construction, the term relates to a welded stud or a cartridge-fired or air-driven pin. In stressed skin construction, the term relates to a cold formed component that provides a means of connection between the structural frame and the stressed skin (see 3.122) if they are not otherwise in contact.

## 6 FABRICATION

This clause of ENV 1090-1 is applicable except as follows:

### 6.1 General

*Addition:*

(103) This part of ENV 1090 specifies requirements for cold forming processes of thin gauge members and sheeting except for products covered by product standards.

### 6.2 Identification and marking

*Addition:*

(103) At all stages of fabrication each piece or package of similar pieces of steel components shall be identifiable by a suitable system. Identification may be achieved as appropriate by batching or by the shape and the size of the component or by the use of durable and distinguishing marks applied in a way not producing any damage. The project specification shall state whether finished components shall be identified to material certificates.

(104) Stamped numbers or punched marks to identify cold-formed components shall not be used on coated materials unless permitted by the project specification. Chiselled notches are not permitted.

### 6.3 Handling and storing

*Addition to (1):*

Note: Certain cold formed thin gauge components may be particularly prone to edge damage, twisting and distortion if handled as individual items. Single point lifting of long components should be avoided by the use of spreader beams as appropriate. If bundled together, nested components may be more robust, but care should be taken to avoid localized damage to unstiffened edges at lifting points or other zones where the total weight of the bundle is imposed on a single unreinforced edge.

*Addition:*

(103) Cold formed steel components less than 4 mm thick shall receive appropriate corrosion protection treatment before they leave the fabricating works, sufficient at least to resist the environments likely to be met during transportation, storage and initial erection.

(104) Precautions shall be taken to avoid the penetration of moisture into bundles of sections with metallic pre-coatings. Where prolonged open storage on site is unavoidable the bundles of sections shall be opened and the sections separated to avoid the occurrence of 'black or white rust'. Profiled sheeting, and other materials supplied with pre-finished decorative surfaces, shall be stored according to the requirements of relevant standards.

Note: prEN 508-1 gives requirements for roofing products from steel sheets used as self-supporting products.

### 6.4 Cutting

*Modification:*

(1) The project specification shall define if disc cutting, laser, plasma or thermal cutting are permitted. If coated materials are used, the method of cutting shall not introduce severe heating of the material.

Note: Cutting or piercing of light gauge sections by shearing does not generally lead to work hardening of the edges over 380HV10. Sheared or punched edges in light gauge sections do not normally require any further treatment.