# SLOVENSKI STANDARD
# SIST EN 10149-1:2014

**01-junij-2014**

**Nadomešča:**
**SIST EN 10149-1:1997**

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**Vroče valjani ploščati izdelki iz jekel z veliko napetostjo tečenja za preoblikovanje v hladnem - 1. del: Splošni tehnični dobavni pogoji**

Hot rolled flat products made of high yield strength steels for cold forming - Part 1: General technical delivery conditions

Warmgewalzte Flacherzeugnisse aus Stählen mit hoher Streckgrenze zum Kaltumformen - Teil 1: Allgemeine technische Lieferbedingungen

Produits plats laminés à chaud en aciers à haute limite d'élasticité pour formage à froid - Partie 1: Conditions générales de livraison

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**Ta slovenski standard je istoveten z:** **EN 10149-1:2013**

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**ICS:**

| | | |
|---|---|---|
| 77.140.10 | Jekla za toplotno obdelavo | Heat-treatable steels |
| 77.140.50 | Ploščati jekleni izdelki in polizdelki | Flat steel products and semi-products |

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 10149-1

September 2013

ICS 77.140.50

Supersedes EN 10149-1:1995

English Version

# Hot rolled flat products made of high yield strength steels for cold forming - Part 1: General technical delivery conditions

Produits plats laminés à chaud en aciers à haute limite d'élasticité pour formage à froid - Partie 1: Conditions générales techniques de livraison

Warmgewalzte Flacherzeugnisse aus Stählen mit hoher Streckgrenze zum Kaltumformen - Teil 1: Allgemeine technische Lieferbedingungen

This European Standard was approved by CEN on 17 August 2013.

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

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SIST EN 10149-1:2014



# Contents

Page


Foreword ..... 3

1 Scope ..... 4

2 Normative references ..... 4

3 Terms and definitions ..... 5

4 Information to be supplied by the purchaser ..... 6
4.1 Mandatory information ..... 6
4.2 Options ..... 6

5 Dimensions, mass and tolerances ..... 6
5.1 Dimensions and tolerances ..... 6
5.2 Mass of steel ..... 6

6 Classification and designation ..... 6
6.1 Classification and grades ..... 6
6.2 Designation ..... 6

7 Technical requirements ..... 7
7.1 Steel manufacturing process ..... 7
7.2 Delivery condition ..... 7
7.3 Chemical composition ..... 8
7.4 Mechanical properties ..... 9
7.5 Technological properties ..... 9
7.6 Surface finish ..... 10
7.7 Internal soundness ..... 10

8 Inspection and testing ..... 11
8.1 General ..... 11
8.2 Sampling ..... 11
8.3 Test units ..... 11
8.4 Verification of chemical composition ..... 11
8.5 Preparation of samples and test pieces ..... 11
8.6 Test methods ..... 12
8.7 Retests and resubmission for testing ..... 13
8.8 Inspection documents ..... 13

9 Marking ..... 14

10 Disputes ..... 14

11 Options ..... 14

Bibliography ..... 16


SIST Preview
(https://ecommerce.sist.si)
SIST EN 10149-1:2014
https://standards.iteh.ai/catalog/standards/sist/09b546cf-f1ec-4f75-aa7b-efedb10aa72a/sist-en-10149-1-2014

SIST EN 10149-1:2014



# Foreword

This document (EN 10149-1:2013) has been prepared by Technical Committee ECISS/TC 103 “Structural steel other than reinforcements”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

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

This document supersedes EN 10149-1:1995.

In comparison with EN 10149-1:1995, the following significant technical changes were made:

— definition 3.2, Note 1 modified;

— subclause 7.4.1.1, Note modified and changed to standard text;

— subclause 7.5.1, Note 2 for welding suitability of grades S900MC and S960MC added;

— Table 1, values for Mn, Ti and Mo modified.

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The specific requirements for hot rolled products made of high yield strength steels for cold forming are given in the EN 10149-2 and EN 10149-3. The titles of the other Parts of this European Standard are:

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— *Part 2: Technical delivery conditions for thermomechanical rolled steels*;

SIST EN 10149-1:2014

— *Part 3: Technical delivery conditions for normalized or normalized rolled steels*.

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SIST EN 10149-1:2014



## 1 Scope

**1.1** This European Standard specifies requirements for flat products made of weldable, hot-rolled, high yield strength alloy quality and special steels for cold forming.

EN 10149-1 specifies the general delivery conditions.

EN 10149-2 specifies the delivery conditions for thermomechanically rolled steels in the grades given in Table 1 (chemical composition) and Table 2 (mechanical properties) of Part 2.

EN 10149-3 specifies the delivery conditions for normalised or normalised rolled steels in the grades given in Table 1 (chemical composition) and Table 2 (mechanical properties) of Part 3.

**1.2** This European Standard does not apply to products for pressure vessels and products for which other European Standards exist or European Standards dealing with steels for general structural applications are being prepared:

— Hot-rolled products of structural steels (see EN 10025 parts 1 to 6);

— Hot finished structural hollow sections of non-alloy and fine grain steels (see EN 10210-1).

## 2 Normative references

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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.

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EN 10020, *Definition and classification of grades of steel*

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

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

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

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

EN 10052:1993, *Vocabulary of heat treatment terms for ferrous products*

EN 10079:2007, *Definition of steel products*

EN 10149-2:2013*, Hot rolled flat products made of high yield strength steels for cold forming – Part 2: Technical delivery conditions for thermomechanically rolled steels*

EN 10149-3:2013*, Hot rolled flat products made of high yield strength steels for cold forming – Part 3: Technical delivery conditions for normalized or normalized rolled steels*

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

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

SIST EN 10149-1:2014



EN 10163-1, *Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 1: General requirements*

EN 10163-2, *Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 2: Plate and wide flats*

EN 10168, *Steel products – Inspection documents – List of information and description*

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

EN ISO 148-1, *Metallic materials – Charpy pendulum impact test – Part 1: Test method (ISO 148-1)*

EN ISO 377, *Steel and steel products – Location and preparation of samples and test pieces for mechanical testing (ISO 377)*

EN ISO 2566-1, *Steel – Conversion of elongation values – Part 1: Carbon and low alloy steels (ISO 2566-1)*

EN ISO 6892-1:2009, *Metallic materials – Tensile testing – Part 1: Method of test at room temperature (ISO 6892-1:2009)*

EN ISO 7438, *Metallic materials – Bend test (ISO 7438)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10052:1993, EN 10079:2007 and the following apply.

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**3.1**
**fine grained steels**
steels with fine grain structure with an equivalent index of ferritic grain size ≥ 6

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Note 1 to entry: For the determination of grain sizes, see EN ISO 643.

**3.2**
**thermomechanical rolling**
rolling process in which the final deformation is carried out in a certain temperature range leading to a material condition with certain properties which cannot be achieved or repeated by heat treatment alone

Note 1 to entry: Hot forming or post weld heat treatment at a temperature above 580 °C may lower the strength values and for this reason is better not performed. Flame straightening can be applied in accordance with CEN/TR 10347. For grades S900MC and S960MC, subsequent heating at temperature above 400 °C is not recommended.

Note 2 to entry: Thermomechanical rolling can include processes with an increasing cooling rate with or without tempering including self-tempering but excluding direct quenching and quenching and tempering.

Note 3 to entry: In some publications, the word TMCP (Thermomechanical Control Process) is also used.

**3.3**
**normalised rolled**
rolling process in which the final deformation is carried out in a certain temperature range leading to a material condition equivalent to that obtained after normalising so that the specified values of the mechanical properties are retained even after normalising

Note 1 to entry: In international publications for both the normalising rolling, as well as the thermomechanical rolling, the expression "controlled rolling" may be found. However, in view of the different applicability of the products, a distinction of the terms is necessary.

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# 4 Information to be supplied by the purchaser

## 4.1 Mandatory information

The following information shall be supplied by the purchaser at the time of the order:

a) details of the product form and quantity;

b) reference to this European Standard;

c) nominal dimensions and tolerances (see 5.1);

d) the grade and delivery condition of the steel (see EN 10149-2 and EN 10149-3);

e) type of inspection document (see 8.8).

## 4.2 Options

A number of options are specified in Clause 11. In the event that the purchaser does not indicate his wish to implement any of these options, the supplier shall supply in accordance with the basic specification.

# 5 Dimensions, mass and tolerances

## 5.1 Dimensions and tolerances

Dimensions and tolerances shall be in accordance with EN 10029, EN 10048 or EN 10051.

## 5.2 Mass of steel

The calculated mass shall be determined using a volumetric mass of 7,85 kg/dm$^3$.

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SIST EN 10149-1:2014
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# 6 Classification and designation

## 6.1 Classification and grades

Classification shall be in accordance with EN 10149-2 and EN 10149-3 which specify steel grades that are alloy quality steels or alloy special steels according to EN 10020.

The steels for flat products specified in EN 10149-2 and EN 10149-3 are subdivided into grades on the basis of the minimum specified yield strength at ambient temperature.

## 6.2 Designation

### 6.2.1 Steel names and steel numbers

For the steel grades covered by this European Standard, the steel names are allocated in accordance with EN 10027-1; the steel numbers are allocated in accordance with EN 10027-2.

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#### 6.2.2 Details for the designation

The designation shall consist of:

— the number of this European Standard (EN 10149-2 or EN 10149-3);

— the steel number or the steel name consisting of:

  — the symbol S (for structural steel);

  — the indication of the minimum specified yield strength expressed in MPa[1)];

  — the symbol for the delivery condition (M or N) (see EN 10149-2 and EN 10149-3);

  — the capital letter C indicating the steel is suitable for cold forming (see EN 10149-2 and EN 10149-3).

EXAMPLE 1 Thermomechanically rolled (M) structural steels (S) with a specified minimum yield strength at room temperature of 420 MPa[1)] (420) suitable for cold forming (C):

Steel EN 10149-2 - 1.0980

or

Steel EN 10149-2 - S420MC

EXAMPLE 2 Structural steels (S) with a specified minimum yield strength at room temperature of 420 MPa[1)] (420) in the normalised or normalised rolled condition (N) suitable for cold forming (C):

Steel EN 10149-3 - 1.0981

or

Steel EN 10149-3 - S420NC

SIST EN 10149-1:2014
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SIST EN 10149-1:2014
https://ecommerce.sist.si/catalog/standards/sist/09b546cf-f1ec-4f75-aa7b-efcdb10aa72a/sist-en-10149-1-2014

## 7 Technical requirements

### 7.1 Steel manufacturing process

**7.1.1** The steel manufacturing process shall be at the manufacturer's option. If specified at the time of the order, the steel manufacturing process shall be reported to the purchaser.

See Clause 11, option 1).

**7.1.2** The steels specified in this European Standard shall be fully killed. The steels shall have a fine grain structure containing nitrogen binding elements in amounts sufficient to bind the available nitrogen.

### 7.2 Delivery condition

#### 7.2.1 Thermomechanically rolled steel

The products described in EN 10149-2 are obtained by thermomechanical rolling.

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1) 1 MPa = 1 N/mm$^2$.

SIST EN 10149-1:2014



### 7.2.2 Normalised or normalised rolled steel

The products described in EN 10149-3 are delivered in the normalised or normalised rolled condition.

### 7.2.3 Surface protection

Unless otherwise agreed at the time of the order, the products are generally supplied with their surfaces in untreated condition. If agreed at the time of the order, the products may be delivered with descaled surfaces. However, it is necessary to take into account the fact that certain descaling processes are liable to modify the cold forming properties.

See Clause 11, option 2).

The descaled continuous rolled products are normally supplied oiled. In this case, their two faces shall be coated with a uniform layer of neutral, non-siccative oil, free from foreign matters, so that under dry conditions of packaging, transportation, handling and storing, the products can be protected from corrosion for at least three months.

When descaled products are supplied oiled, the oil coating shall be removable using alkaline solutions or any other usual solvent.

The type of oil shall be left to the discretion of the manufacturer, unless otherwise agreed.

If transportation or storage conditions are such that special corrosion protection is required, the purchaser shall inform the manufacturer at the time of the order.

If the purchaser does not require surface oiling, he shall clearly state so at the time of the order. In addition, the purchaser should be made aware of the higher risk of scratches during handling, transportation and application.

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NOTE When products are ordered in the un-oiled condition, there is no manufacturer's liability for rust hazards.

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## 7.3 Chemical composition

**7.3.1** The chemical composition determined by ladle analysis shall comply with the values in EN 10149-2 and EN 10149-3.

**7.3.2** The values for the chemical composition as specified in EN 10149-2 and EN 10149-3 are the permitted limits or ranges, between which the various steel grades are delivered.

If agreed at the time of the order, the manufacturer shall inform the purchaser which of the alloying elements appropriate to the steel grade required will be deliberately added to the material to be delivered.

See Clause 11, option 3).

**7.3.3** As the form of sulphide inclusions has an influence on the cold formability of the products, the manufacturer may at his option influence the form of inclusions by adding certain elements (e.g. Ce, Ca) or select a very low sulphur content.

**7.3.4** The product analysis shall be carried out when specified at the time of the order.

See Clause 11, option 4).

The permissible deviations of the product analysis from the specified limits of the ladle analysis shall be as given in Table 1.