Cold rolled strip and sheet —
Technical delivery conditions —
General structural steels
Kaltgewalztes Band und Blech —
Technische Lieferbedingungen —
Allgemeine Baustähle

Translation by DIN-Sprachendienst.
In case of doubt, the German-language original should be consulted as the authoritative text.
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Foreword

This standard was prepared by Subcommittee NA 021-00-01-01 UA Flacherzeugnisse aus Stahl zum Kaltumformen of the Normenausschuss Eisen und Stahl (FES) (Iron and Steel Standards Committee) and represents the current state of negotiations.

Amendments

This standard differs from DIN 1623-2:1986-02 as follows:

a) The scope has been extended to include cold rolled narrow strip having a rolled width < 600 mm.

b) Steel grades St 37-2 G (1.0037 G), USt 37-2 G (1.0036 G), St 50-2 G (1.0050 G), St 60-2 G (1.0060 G) and St 70-2 G (1.0070 G) have been deleted without replacement.

c) Steel names and material numbers have been modified as follows:
   — St 37-3 G (1.0116 G) is now S215G (1.0116G).
   — St 44-3 G (1.0144 G) is now S245G (1.0144G).
   — St 52-3 G (1.0570 G) is now S325G (1.0570G).

d) Specifications regarding chemical composition (ladle analysis) have been modified. Specifications regarding product analysis have been deleted.

e) The technological bend test has been deleted.

f) Specifications regarding surface characteristics and marking of such have been modified in accordance with DIN EN 10130 and DIN EN 10139 (see Bibliography for titles).

g) Specifications regarding testing have been modified and order details have been added.

h) The standard has been editorially revised.

Previous editions

DIN 1623-2: 1961-01, 1986-02
1 Scope

1.1 This standard applies to cold rolled flat products (strip and sheet) made of uncoated general structural steel in thicknesses up to and including 3 mm.

1.2 This standard does not apply to

— cold rolled strip and sheet of low carbon steel for cold forming (see DIN EN 10130);
— cold rolled uncoated low carbon narrow steel strip for cold forming (see DIN EN 10139);
— cold rolled low carbon steel flat products for vitreous enamelling (see DIN EN 10209);
— cold rolled steel flat products with high yield strength for cold forming (see DIN EN 10268);
— hot rolled and cold rolled non-coated flat products of multiphase steels for cold forming (see DIN EN 10338).

2 Normative references

The following referenced documents are indispensable for the application 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.

DIN EN 606, Bar coding – Transport and handling labels for steel products

DIN EN 10002-1, Metallic materials – Tensile testing – Part 1: Method of testing at ambient temperature

DIN EN 10020, Definition and classification of grades of steel

DIN EN 10021, General technical delivery conditions for steel products

DIN EN 10027-1, Designation systems for steels – Part 1: Steel names

DIN EN 10027-2, Designation systems for steels – Part 2: Numerical system

DIN EN 10049, Measurement of roughness average Ra and peak count RPc on metallic flat products

DIN EN 10079, Definition of steel products

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

DIN EN 10140, Cold rolled narrow steel strip – Tolerances on dimensions and shape

DIN EN 10204, Metallic products — Types of inspection documents

CEN/TR 10261, Iron and steel – Review of available methods of chemical analysis

3 Terms and definitions

For the purposes of this document the terms and definitions specified in DIN EN 10020, DIN EN 10021, DIN EN 10079 and DIN EN 10204 apply.
4 Dimensions and tolerances

Dimensions and tolerances for products having a rolled width \( \geq 600 \) mm shall be as in DIN EN 10131, those of products having a rolled width \(< 600 \) mm shall be as in DIN EN 10140.

5 Classification into grades

This standard covers the steel grades given in Table 1. According to DIN EN 10020 these are unalloyed quality steels.

6 Designation

6.1 The steel names used in this standard are in accordance with DIN EN 10027-1, the material numbers are in accordance with DIN EN 10027-2.

6.2 The complete designation of a steel grade as in this standard shall include:

- the steel name or material no. (see Table 1);
- the symbol for the surface quality (see 7.6.2) and — for cold rolled narrow strip — the symbol for the surface finish (see 7.6.3).

6.3 If the product is to comply with additional requirements regarding suitability for coating, this shall be clearly indicated (see 7.6.4), as shall any request that products are to be supplied with an unoiled surface (see clause 13, item k)).

EXAMPLE 1 Steel grade S215G (material no. 1.0116G) as cold rolled wide strip with normal cold rolled surface (A) and a "matt" surface finish (m):

Steel DIN 1623 — S215G+A-m
or
Steel DIN 1623 — 1.0116G+A-m

EXAMPLE 2 Steel grade S215G (material no. 1.0116G) as cold rolled narrow strip with a bright surface (MA) and a "smooth" surface finish (RL):

Steel DIN 1623 — S215G+MA-RL
or
Steel DIN 1623 — 1.0116G+MA-RL

6.4 If the characteristics described in 6.2 and 6.3 are not indicated in the order, products as in this standard will be supplied as follows:

- surface quality A (or MA for rolled widths \(< 600 \) mm);
- surface finish “matt” (or “smooth” for rolled widths \(< 600 \) mm);
- unoiled surface.

6.5 The order shall give the quantity, product form (strip or sheet), relevant dimensional standard, and desired dimensions of the product to be supplied, and shall make reference to this standard and give the steel name or material number of the desired steel grade.

EXAMPLE 1 20 t cold rolled wide strip as in DIN EN 10131, nominal thickness 0,80 mm, nominal width 1 000 mm, standard tolerances for width and thickness, made of a steel grade as in this standard designated as in 6.3:
EXAMPLE 2  20 t cold rolled narrow strip as in DIN EN 10140, nominal thickness 1,50 mm, nominal width 200 mm, with sheared edges (GK), of a steel grade as in this standard designated as in 6.3:

20 t cold rolled narrow strip EN 10140 — 1,50 × 200 GK
Steel DIN 1623 — S215G-MA-RL
or
20 t cold rolled narrow strip EN 10140 — 1,50 × 200 GK
Steel DIN 1623 — 1.0116G-MA-RL

7 Requirements

7.1 Steelmaking process

Where not otherwise agreed at the time of ordering, the steelmaking process is left to the discretion of the manufacturer. Steels are to be killed (deoxidized). The steelmaking process shall be indicated upon request.

7.2 Delivery condition

7.2.1 Products are normally supplied in the skin-passed condition.

7.2.2 Products are normally delivered oiled. In this case, both sides are corrosion protected by a layer of neutral non-drying oil that is free of impurities and is uniformly spread in such a way that the product does not show signs of corrosion under normal packing, transportation, handling and storage conditions for a period of three months. The oil tends to distribute during storage.

7.3 Chemical composition

Chemical composition (ladle analysis) is specified in Table 1.

7.4 Mechanical properties

7.4.1 When tensile testing as in 8.5.1 the requirements specified in Table 1 shall be met.

7.4.2 Tensile test values apply for transverse test pieces. For products which do not present a definite yield-point, yield strength values apply for 0,2% proof stress ($R_{p0,2}$), otherwise the values apply for the upper yield point ($R_{eH}$). The mechanical properties specified in Table 1 apply for a period of six months from the date on which the products are made available at the manufacturer’s works.

7.5 Weldability

Products as in this standard are suitable for conventional industrial welding processes. However, it is useful to state the welding process at the time of ordering, and in the case of gas welding this is obligatory.
### Table 1 — Chemical composition (ladle analysis) and mechanical properties

<table>
<thead>
<tr>
<th>Steel grade</th>
<th>Chemical composition % by mass</th>
<th>Mechanical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel name</td>
<td>Material number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Si</td>
</tr>
<tr>
<td>S215</td>
<td>1.0116G</td>
<td>0,18</td>
</tr>
<tr>
<td>S245</td>
<td>1.0144G</td>
<td>0,20</td>
</tr>
<tr>
<td>S325</td>
<td>1.0570G</td>
<td>0,20</td>
</tr>
</tbody>
</table>

$^a$ 1 MPa = 1 N/mm².

### 7.6 Surface characteristics

#### 7.6.1 General

The surface characteristics are the surface quality and surface finish. The surface characteristics of non-skin-passed products shall be agreed separately.

#### 7.6.2 Surface quality

##### 7.6.2.1 Products having a rolled width ≥ 600 mm

These products are only available with the surface quality A.

--- Surface quality A

Defects such as pores, small grooves, small marks, minor scratches and slight discolouration are permitted as long as they do not have an adverse effect on formability or the application of surface coatings.

In the case of delivery of wide strip or slit wide strip the percentage of defects may be greater than for sheet or cut lengths. The purchaser shall take this into account and the permissible percentage of surface defects shall be agreed at the time of ordering.

If not otherwise agreed, a single surface of the product shall comply with the specified requirements. The other surface shall be such that, during subsequent treatment, it does not have any negative effects on the quality of the better surface.
7.6.2.2 Products with a rolled width < 600 mm

These products can be delivered with a surface quality MA or MB or MC.

— Surface quality MA

Bright, metallically clean surface. Pores, minor defects and minor scratches are permitted.

Surface quality MB

Bright, metallically clean surface. Pores, grooves and scratches are permitted as long as the uniformly smooth appearance is not substantially impaired when viewed with the naked eye.

— Surface quality MC

Bright, metallically clean surface. Pores, grooves and scratches are permitted as long as the uniform appearance of the mirror surface is not impaired.

The characteristics given for MA, MB and MC apply to the inspected surface, which is generally the outside surface of coils and the top surface of lengths. The appearance of the uninspected surface shall meet at least the requirements for surface quality MA. Surface quality MB can be ordered for thicknesses up to 2,0 mm, while surface quality MC can be ordered for thicknesses up to 1,0 mm.

The characteristics do not apply to the first inner and outer laps of coil or to lengths cut from them.

7.6.3 Surface finish

7.6.3.1 Products with a rolled width ≥ 600 mm

Products are supplied with a “matt” (m) surface finish with a mean roughness \( R_a \) of 0,6 µm < \( R_a \) ≤ 1,9 µm. Other surface roughness ranges may be agreed at the time of enquiry and ordering. Testing shall be carried out as in DIN EN 10049.

7.6.3.2 Products with a rolled width < 600 mm

The surface finish may be rough (RR), matt (RM), smooth (RL) or mirror finish (RN).

The different surface finishes are characterized by the following reference values of mean roughness \( R_a \):

- rough (RR): \( R_a \) ≥ 1,5 µm
- matt (RM): 0,6 µm < \( R_a \) ≤ 1,8 µm
- smooth (RL): \( R_a \) ≤ 0,6 µm
- mirror finish (RN): \( R_a \) ≤ 0,2 µm

The mean roughness values shall be determined as in DIN EN 10049.

Products with surface qualities MA and MB are generally supplied with a smooth surface finish (RL). If rough (RR) or matt (RM) finishes are required, the corresponding symbol shall be given in the designation. Products with the surface quality MC are only supplied with a “mirror” finish (RN).

7.6.4 Suitability for coatings

Products may be intended for metallic coating by hot dipping, electrolyte coating, and/or an organic or other type of coating. If such a coating is required, this shall be stated at the time of ordering.
8 Testing

8.1 General

8.1.1 At the time of ordering, the purchaser shall specify whether an inspection document is required. If this is the case, the following information shall be included:

— type of test as in DIN EN 10021;
— type of inspection document as in DIN EN 10204.

8.1.2 Specific tests are to be carried out as specified in 8.2 to 8.5.

8.2 Inspection units

8.2.1 Inspection units for products with a rolled width ≥ 600 mm

Inspection units shall comprise 40 t or a fraction of 40 t of products for the same grade and nominal thickness.

8.2.2 Inspection units for products with a rolled width < 600 mm

Inspection units shall comprise 5 t or a fraction of 5 t of products of the same grade, with the same heat treatment and the same surface characteristics and nominal thickness. Coils exceeding 5 t constitute a single inspection unit.

8.3 Number of tests

A tensile test shall be carried out for each inspection unit.

8.4 Sampling

In the case of sheet, the selection of products to be tested is left to the discretion of the inspection representative.

In the case of wide strip, slit wide strip and narrow strip the sample should preferably be taken from the outer end of the coil.

A sample of adequate size shall be taken from the products selected from the inspection unit, at any position on the strip or length. In cases of dispute, this sample shall be taken from a position at least 3 m from one of the ends of the coil.

Samples from narrow strip supplied in cut lengths may be taken at any position.

Where not otherwise agreed, tensile test pieces shall be taken perpendicular to the rolling direction.

8.5 Test methods

8.5.1 Tensile test

Tensile testing shall be carried out as in DIN EN 10002-1.

Non-proportional test pieces with an initial gauge length of 80 mm and a width of 20 mm shall be used. The test piece thickness shall be equal to the product thickness.

The upper yield point \( R_{eH} \) shall be determined for the proof stress given in Table 1.
If the yield point is not pronounced and in cases of dispute, values for the 0.2 % yield stress ($R_{p0.2}$) are to be determined and shall comply with the corresponding values specified in Table 1.

### 8.5.2 Chemical composition

The selection of a suitable physical or chemical analytical method is left to the manufacturer’s discretion.

**NOTE** A list of European Standards on chemical analysis is given in CEN/TR 10261.

### 9 Inspection documents

The relevant inspection document as in DIN EN 10204 shall be supplied as agreed at the time of ordering.

### 10 Marking

At the time of ordering, marking as in DIN EN 10021 can be agreed upon.

### 11 Packing

Packing requirements shall be agreed at the time of ordering. Bar coding as in DIN EN 606 may be agreed upon by the purchaser and supplier (see clause 10 “Marking”).

### 12 Disputes

DIN EN 10021 applies to disputes and any action taken as a result of such disputes.

### 13 Information to be provided at the time of ordering

The purchaser shall supply the following information to allow the manufacturer to supply products conforming to this standard:

a) designation as in clause 6;

b) nominal dimensions and quantities ordered;

c) if products are to be supplied non-skin-passed;

d) if products are to be delivered with mill edges or trimmed edges;

e) limits on the mass and size of coils and individual bundles;

f) the intended application of the products, including surface coating;

g) if the products are to be welded, an indication of the method to be used;

h) if the products are to be supplied as suitable for making a specific part;

i) if inspection documents are required and their type;

j) if an external inspection is to be carried out at the manufacturer’s works;

k) if oiling is not required;

l) if other protective coatings are required;

m) a detailed description of all other special requirements;

n) any special requirements regarding packing and marking.
Bibliography

DIN EN 10130, *Cold rolled low carbon steel flat products for cold forming – Technical delivery conditions*

DIN EN 10139, *Cold rolled uncoated mild steel narrow steel strip for cold forming – Technical delivery conditions*

DIN EN 10209, *Cold rolled low carbon steel flat products for vitrious enamelling – Technical delivery conditions*

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

E DIN EN 10338, *Hot rolled and cold rolled non-coated flat products of multiphase steels for cold forming – Technical delivery conditions*