

Cold rolled narrow steel strip for heat treatment — Technical delivery conditions —

Part 2: Case hardening steels

The European Standard EN 10132-2:2000 has the status of a
British Standard

ICS 77.140.10; 77.140.50

National foreword

This British Standard is the official English language version of EN 10132-2:2000. Together with BS EN 10132-1 and BS EN 10132-3, it supersedes BS 1449-1.15:1991 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/31, Wrought steels, which has the responsibility to:

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- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 10, an inside back cover and a back cover.

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English version

Cold rolled narrow steel strip for heat treatment - Technical delivery conditions - Part 2: Case hardening steels

Feuillards laminés à froid pour traitement thermique -
Conditions techniques de livraison - Partie 2: Aciers pour
cémentation

Kaltband aus Stahl für eine Wärmebehandlung -
Technische Lieferbedingungen - Teil 2: Einsatzstähle

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Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 23, Steels for heat treatment, alloy steels and free-cutting steels - Qualities and dimensions, 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of an identical text or by endorsement, at the latest by August 2000, and conflicting national standards shall be withdrawn at the latest by August 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association. This European Standard is considered to be a supporting standard to those application and product standards which in themselves support an essential safety requirement of a New Approach Directive and which make reference to this European Standard.

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

The European Standard EN 10132, Cold rolled narrow steel strip for heat-treatment - Technical delivery conditions, is subdivided as follows:

- Part 1: General;
- Part 2: Case hardening steels;
- Part 3: Steels for quenching and tempering;
- Part 4: Spring steels and other special applications.

1 Scope

1.1 This part of EN 10132 applies to non-alloy and alloy cold rolled narrow steel strip for case hardening with thicknesses up to 10 mm for general applications.

1.2 This EN 10132-2 is complemented by EN 10132-1.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

EN 10132-1, *Cold rolled narrow steel strip for heat treatment - Technical delivery conditions - Part 1: General*.

EN ISO 6508-1, *Metallic materials - Rockwell hardness test - Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)* (ISO 6508-1:1999).

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in EN 10132-1 apply.

4 Classification and designation

4.1 Classification

All steels covered by this European Standard are classified according to EN 10020. Steel grades C10E and C15E are non-alloy special steels, steel grades 16MnCr5 and 17Cr3 are alloy special steels.

4.2 Designation

See EN 10132-1.

5 Information to be supplied by the purchaser

See EN 10132-1.

6 Manufacturing process

See EN 10132-1.

7 Requirements

7.1 General

See EN 10132-1.

7.2 Method of delivery

See EN 10132-1.

7.3 Delivery condition

Cold rolled narrow steel strip covered by EN 10132-2 shall be supplied in one of the following delivery conditions:

- annealed or annealed and skin passed (+A or +LC);
- cold rolled (+CR).

7.4 Chemical composition

7.4.1 Cast analysis

The chemical composition shall be in accordance with the values specified in Table 1 for the cast analysis.

7.4.2 Product analysis

In cases where a product analysis is requested, the admissible deviations from the values specified for the cast analysis are indicated in Table 2.

7.5 Mechanical properties

The mechanical properties of the strip shall be in accordance with the values given in Table 3.

NOTE For those customers who specify Rockwell hardness rather than Vickers hardness or tensile strength, a table is given in A.1, showing Rockwell hardness values for information.

7.6 Structure

7.6.1 Grain size

See EN 10132-1.

7.6.2 Non-metallic inclusions

See EN 10132-1.

7.7 Surface finish

The surface finish of cold rolled narrow steel strip shall be bright as achieved by rolling and annealing in a controlled atmosphere.

7.8 Dimensions and tolerances on dimensions and shape

See EN 10132-1.

8 Inspection

See EN 10132-1.

9 Sampling

See EN 10132-1.

10 Test methods

See EN 10132-1.

11 Labelling, packaging and protection

See EN 10132-1.

12 Retests

See EN 10132-1.

Table 1 - Steel grades and chemical composition^a (cast analysis)

| Steel designation | | % by mass | | | | | |
|--|--------|--------------|------------|--------------|-----------|-----------|--------------|
| name | number | C | Si max. | Mn | P max. | S max. | Cr |
| C10E | 1.1121 | 0,07 to 0,13 | 0,40 | 0,30 to 0,60 | 0,035 | 0,035 | max. 0,40 |
| C15E | 1.1141 | 0,12 to 0,18 | 0,40 | 0,30 to 0,60 | 0,035 | 0,035 | max. 0,40 |
| 16MnCr5 | 1.7131 | 0,14 to 0,19 | 0,40 | 1,00 to 1,30 | 0,035 | 0,035 | 0,80 to 1,10 |
| 17Cr3 | 1.7016 | 0,14 to 0,20 | 0,40 | 0,60 to 0,90 | 0,035 | 0,035 | 0,70 to 1,00 |
| ^a Elements not quoted in this table shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition, from scrap or other material used in manufacture, of such elements which affect the mechanical properties and application. | | | | | | | |

Table 2 - Permissible deviations between the product analysis and the limiting values given in Table 1 for the cast analysis

| Element | Permissible maximum content in the cast analysis % by mass | Permissible deviation ^a % by mass |
|---|--|---|
| C | ≤ 0,20 | ±0,02 |
| Si | ≤ 0,40 | +0,03 |
| Mn | ≤ 1,00 | ±0,04 |
| | > 1,00 ≤ 1,30 | ±0,05 |
| P | ≤ 0,035 | +0,005 |
| S | ≤ 0,035 | +0,005 |
| Cr | ≤ 0,40 | +0,03 |
| | > 0,40 ≤ 1,10 | ±0,04 |
| ^a ± means that in one cast the deviation may occur over the upper value or under the lower value of the specified range in Table 1, but not both at the same time. | | |

Table 3 - Mechanical properties and hardness requirements^{a, b}

| Steel designation | | delivery condition | | | | | |
|--|--------|---|--|---|-------------------------|--|-------------------------|
| name | number | annealed (+A) or annealed and skin passed (+LC) | | | | cold rolled ^c (+CR) | |
| | | R _{p0,2} ^d N/mm ² max. | R _m ^d N/mm ² max. | A ₈₀ ^d % min. | HV ^d max. | R _m ^d N/mm ² max. | HV ^d max. |
| C10E | 1.1121 | 345 | 430 | 26 | 135 | 830 | 250 |
| C15E | 1.1141 | 360 | 450 | 25 | 140 | 870 | 260 |
| 16MnCr5 | 1.7131 | 420 | 550 | 21 | 170 | e | e |
| 17Cr3 | 1.7016 | 420 | 550 | 21 | 170 | e | e |
| <p>^a The customer may specify hardness or tensile values but not both. If neither is specified then tensile values shall apply.</p> <p>^b Values apply to thicknesses $0,30 \text{ mm} \leq t < 3,00 \text{ mm}$. For thicker strip, the values for the mechanical properties shall be agreed at the time of enquiry and order.</p> <p>^c For material supplied in the cold rolled condition, a range of 150 N/mm² or 50 HV shall apply, e.g. 650 N/mm² to 800 N/mm² or e.g. 150 HV to 200 HV.</p> <p>^d R_{p0,2} 0,2 %-Proof strength; R_m Tensile strength; A₈₀ Elongation on a gauge length of 80 mm; HV Vickers hardness.</p> <p>^e Cold rolled condition may be supplied on request. In this case, the mechanical properties shall be agreed at the time of enquiry and order.</p> | | | | | | | |

Annex A (informative)

Reference values for Rockwell hardnesses for case hardening steels

Table A.1 - Rockwell hardness values^a

| Steel designation | | delivery condition |
|---|--------|---|
| name | number | annealed (+A) or annealed and skin passed (+LC) HRB ^b max. |
| C10E | 1.1121 | 73 |
| C15E | 1.1141 | 76 |
| 16MnCr5 | 1.7131 | 84 |
| 17Cr3 | 1.7016 | 84 |
| ^a For thicknesses less than those allowed in EN ISO 6508-1, the scale of Rockwell hardness shall be agreed at the time of enquiry and order. | | |
| ^b HRB Rockwell hardness (scale B). | | |

Annex B (informative)

List of corresponding former national designations

Table B.1 - List of corresponding former designations

| Steel designation according to EN 10132-2:2000 | | Comparable former steel designation in | | | | | | |
|--|--------|--|--------|--------|----------------|---------|---------|---------|
| name | number | Germany | | France | United Kingdom | Finland | Italy | Spain |
| | | name | number | | | | | |
| C10E | 1.1121 | Ck10 | 1.1121 | XC10 | CS 12 | - | C10 | C10k |
| C15E | 1.1141 | Ck15 | 1.1141 | - | CS 17 | 505 | C15 | C16k |
| 16MnCr5 | 1.7131 | 16MnCr5 | 1.7131 | 16MC5 | - | - | 16MnCr5 | 16MnCr5 |
| 17Cr3 | 1.7016 | 17Cr3 | 1.7016 | - | - | - | - | - |

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