

# Steel rod, bars and wire for cold heading and cold extrusion —

## Part 2: Technical delivery conditions for steels not intended for heat treatment after cold working

The European Standard EN 10263-2:2001 has the status of a  
British Standard

ICS 77.140.60; 77.140.65

# National foreword

This British Standard is the official English language version of EN 10263-2:2001. Together with BS EN 10263-1:2001, BS EN 10263-3:2001 and BS EN 10263-4:2001 it supersedes BS 3111-1:1987, which is withdrawn. The UK participation in its preparation was entrusted to Technical Committee ISE/71, Steel rods for wire drawing, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 August 2001

## Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 8, an inside back cover and a back cover.

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## Amendments issued since publication

| Amd. No.                   | Date              | Comments                         |
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| 13450<br>Corrigendum No. 1 | 13 September 2001 | Addition of supersession details |
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|                            |                   |                                  |
|                            |                   |                                  |

English version

Steel rod, bars and wire for cold heading and cold extrusion —  
Part 2: Technical delivery conditions for steels not intended for  
heat treatment after cold working

Barres, fil machine et fils en acier pour transformation à  
froid et extrusion à froid — Partie 2: Conditions techniques  
de livraison des aciers n'étant pas destinés à un traitement  
thermique après travail à froid

Walzdraht, Stäbe und Draht aus Kaltstauch- und  
Kaltfließpreßstählen — Teil 2: Technische  
Lieferbedingungen für nicht für eine Wärmebehandlung  
nach der Kaltverarbeitung vorgesehene Stähle

This European Standard was approved by CEN on 19 April 2001.

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CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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## Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 15, Wire-rod - Qualities, dimensions, tolerances and specific tests, the Secretariat of which is held by UNI.

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 December 2001, and conflicting national standards shall be withdrawn at the latest by December 2001.

This European Standard EN 10263 is subdivided as follows:

- *Part 1: General technical delivery conditions;*
- *Part 2: Technical delivery conditions for steels not intended for heat treatment after cold working;*
- *Part 3: Technical delivery conditions for case hardening steels;*
- *Part 4: Technical delivery conditions for steels for quenching and tempering;*
- *Part 5: Technical delivery conditions for stainless steels.*

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## 1 Scope

**1.1** This part of EN 10263 is applicable to round rod and bars and wire with a diameter up to and including 100 mm, of non-alloy and alloy steel, intended for cold heading and cold extrusion without subsequent heat treatment on the final components.

**1.2** This part of EN 10263 is complemented by EN 10263-1.

## 2 Normative references

This European Standard incorporates by date 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 date 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 (including amendments).

|            |                                                                                                                      |
|------------|----------------------------------------------------------------------------------------------------------------------|
| EN 10020   | <i>Definitions and classification of grades of steel.</i>                                                            |
| EN 10263-1 | <i>Steel rod, bars and wire for cold heading and cold extrusion — Part 1: General technical delivery conditions.</i> |

## 3 Terms and definitions

For the purposes of this standard the definitions in EN 10263-1 apply.

## **4 Classification and designation**

### **4.1 Classification**

All steel grades covered by this part of EN 10263 are non-alloy or alloy (8MnSi7) quality steels according to EN 10020.

### **4.2 Designation**

#### **4.2.1 Steel names**

See EN 10263-1:2001.

#### **4.2.2 Steel numbers**

See EN 10263-1:2001.

## **5 Production process**

### **5.1 General**

See EN 10263-1:2001.

### **5.2 Deoxidation**

All steel grades quoted in Table 2, except 8MnSi7, are aluminium-killed steels. By agreement aluminium may be replaced by another suitable element having a similar effect.

## **6 Requirements**

### **6.1 Delivery condition**

The delivery conditions in which the products covered by this part of this European Standard are normally supplied, the product forms and the applicable requirements, are given in Table 1.

### **6.2 Chemical composition**

#### **6.2.1 Heat analysis**

The chemical composition shall be in accordance with the values specified in Table 2 for the heat analysis.

#### **6.2.2 Product analysis**

In cases where a product analysis is requested, the admissible deviations from the values specified for the heat analysis are indicated in Table 3.

### **6.3 Mechanical properties**

The mechanical properties of the products, to be determined by the tensile test, shall be in accordance with the prescriptions given in Table 4.

## **6.4 Surface quality**

See EN 10263-1:2001.

## **6.5 Supplementary or special requirements**

Other requirements that can be agreed at the time of enquiry and order are described in annex B of EN 10263-1:2001.

**Table 1 — Summary of delivery conditions, product forms and applicable requirements**

| Delivery condition                                  |                                             | Symbols      | Products form <sup>a</sup>                                      |     |      | Applicable requirements                             |                                               |                                                                                               |
|-----------------------------------------------------|---------------------------------------------|--------------|-----------------------------------------------------------------|-----|------|-----------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------|
|                                                     |                                             |              | rod                                                             | bar | wire |                                                     |                                               |                                                                                               |
| Untreated                                           | as hot rolled                               | +U           | X                                                               | X   | —    | Chemical composition as specified in Tables 2 and 3 | Mechanical properties as specified in Table 4 | Supplementary or special requirements as specified in annex B of EN 10263-1:2001 <sup>b</sup> |
|                                                     | peeled                                      | +U+PE        | X                                                               | X   | —    |                                                     |                                               |                                                                                               |
|                                                     | cold drawn                                  | +U+C         | —                                                               | X   | X    |                                                     |                                               |                                                                                               |
|                                                     | cold drawn and spheroidized                 | +U+C+AC      | —                                                               | X   | X    |                                                     |                                               |                                                                                               |
|                                                     | cold drawn and spheroidized and skin passed | +U+C+AC+LC   | —                                                               | X   | X    |                                                     |                                               |                                                                                               |
| Annealed to achieve spheroidized carbides           | as treated or peeled                        | +AC or AC+PE | X                                                               | X   | —    |                                                     |                                               |                                                                                               |
|                                                     | cold drawn                                  | +AC+C        | —                                                               | X   | X    |                                                     |                                               |                                                                                               |
| Other                                               |                                             |              | Other delivery conditions can be agreed at the time of ordering |     |      |                                                     |                                               |                                                                                               |
| <sup>a</sup> X = applicable.<br>— = not applicable. |                                             |              |                                                                 |     |      |                                                     |                                               |                                                                                               |
| <sup>b</sup> If agreed at the time of the order.    |                                             |              |                                                                 |     |      |                                                     |                                               |                                                                                               |

**Table 2 — Chemical composition — Heat analysis % by mass <sup>a</sup>**

| Steel grades |              | C         | Si                      | Mn                      | P<br>max. | S<br>max. | Al <sup>b</sup> |
|--------------|--------------|-----------|-------------------------|-------------------------|-----------|-----------|-----------------|
| Steel name   | Steel number |           |                         |                         |           |           |                 |
| C2C          | 1.0314       | 0,03 max. | 0,10 max.               | 0,20/0,40 <sup>d</sup>  | 0,020     | 0,025     | 0,020/0,060     |
| C4C          | 1.0303       | 0,02/0,06 | 0,10 max.               | 0,25/0,40               | 0,020     | 0,025     | 0,020/0,060     |
| C8C          | 1.0213       | 0,06/0,10 | 0,10 max.               | 0,25/0,45               | 0,020     | 0,025     | 0,020/0,060     |
| C10C         | 1.0214       | 0,08/0,12 | 0,10 max. <sup>c</sup>  | 0,30/0,50               | 0,025     | 0,025     | 0,020/0,060     |
| C15C         | 1.0234       | 0,13/0,17 | 0,10 max. <sup>c</sup>  | 0,35/0,60               | 0,025     | 0,025     | 0,020/0,060     |
| C17C         | 1.0434       | 0,15/0,19 | 0,10 max. <sup>c</sup>  | 0,65/0,85               | 0,025     | 0,025     | 0,020/0,060     |
| C20C         | 1.0411       | 0,18/0,22 | 0,10 max. <sup>c)</sup> | 0,70/0,90 <sup>d)</sup> | 0,025     | 0,025     | 0,020/0,060     |
| 8MnSi7       | 1.5113       | 0,10 max. | 0,90/1,10               | 1,60/1,80               | 0,025     | 0,025     |                 |

<sup>a</sup> Elements not quoted in this table should not be intentionally added to the steel without the agreement of the purchaser, except those intended for finishing the heat. All reasonable precautions shall be taken in order to prevent the addition of elements from scrap or other material used in the production process. However, residual elements may be present provided that they do not affect the hardenability, mechanical properties and applicability.

<sup>b</sup> Aluminium may be replaced by another element or elements having a similar effect.

<sup>c</sup> For grades C10C, C15C, C17C, C20C, a silicon content of 0,15/0,35 % may be specified for hot dip galvanizing; in this case the mechanical properties as stated in Table 4 may be affected.

<sup>d</sup> For grades C2C and C20C a lower manganese content may be specified with a range of 0,20 %.

**Table 3 — Permissible deviations between product analysis and the limiting values specified in Table 2 for the heat analysis**

| Elements  | Limiting values of the<br>cast (heat) analysis<br>% by mass | Permissible deviation<br>for the product<br>analysis<br>% by mass <sup>a</sup> |
|-----------|-------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>C</b>  | ≤ 0,22                                                      | ±0,02                                                                          |
| <b>Si</b> | ≤ 1,00                                                      | +0,03                                                                          |
|           | > 1,00                                                      | ±0,05                                                                          |
| <b>Mn</b> | ≤ 1,00                                                      | ±0,04                                                                          |
|           | > 1,00 ≤ 1,80                                               | ±0,05                                                                          |
| <b>P</b>  | ≤ 0,025                                                     | +0,005                                                                         |
| <b>S</b>  | ≤ 0,025                                                     | +0,005                                                                         |
| <b>Al</b> | ≤ 0,060                                                     | ±0,005                                                                         |

<sup>a</sup> ± means that in one heat the deviation of the product analysis for a given element may occur over the upper value or under the lower value of the specified range in Table 2, but not both at the same time.

**Table 4 — Rod, bars and wire not intended for heat treatment after cold working — Mechanical properties**

| Steel grade      |              | Diameter    |             | Delivery Condition         |                         |                            |            |                            |            |                            |            |                            |            |                            |            |
|------------------|--------------|-------------|-------------|----------------------------|-------------------------|----------------------------|------------|----------------------------|------------|----------------------------|------------|----------------------------|------------|----------------------------|------------|
|                  |              |             |             | +U or +U+PE                |                         | +AC or +AC+PE              |            | +U+C                       |            | +U+C+AC                    |            | +U+C+AC+LC                 |            | +AC+C                      |            |
| Steel name       | Steel number | above<br>mm | up to<br>mm | MECHANICAL PROPERTIES      |                         |                            |            |                            |            |                            |            |                            |            |                            |            |
|                  |              |             |             | R <sub>m</sub> max.<br>MPa | Z <sup>c</sup> min<br>% | R <sub>m</sub> max.<br>MPa | Z min<br>% | R <sub>m</sub> max.<br>MPa | Z min<br>% | R <sub>m</sub> max.<br>MPa | Z min<br>% | R <sub>m</sub> max.<br>MPa | Z min<br>% | R <sub>m</sub> max.<br>MPa | Z min<br>% |
| C2C <sup>a</sup> | 1.0314       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 310                        | 80         | 350                        | 75         | -                          | -          |
|                  |              | 5           | 10          | 360                        | 75                      | -                          | -          | 450                        | 70         | 300                        | 80         | 340                        | 75         | -                          | -          |
|                  |              | 10          | 40          | 360                        | 75                      | -                          | -          | 440                        | 70         | 300                        | 80         | 340                        | 75         | -                          | -          |
|                  |              | 40          | 100         | 360                        | 75                      | -                          | -          | 440                        | 68         | 300                        | 80         | 340                        | 75         | -                          | -          |
| C4C              | 1.0303       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 320                        | 77         | 360                        | 73         | -                          | -          |
|                  |              | 5           | 10          | 390                        | 70                      | 330                        | 75         | 470                        | 66         | 310                        | 77         | 350                        | 73         | 410                        | 70         |
|                  |              | 10          | 40          | 390                        | 70                      | 330                        | 75         | 460                        | 66         | 300                        | 77         | 350                        | 73         | 400                        | 70         |
|                  |              | 40          | 100         | 390                        | 70                      | 330                        | 75         | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
| C8C              | 1.0213       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 350                        | 72         | 390                        | 68         | -                          | -          |
|                  |              | 5           | 10          | 410                        | 65                      | 360                        | 70         | 490                        | 63         | 340                        | 72         | 380                        | 68         | 450                        | 65         |
|                  |              | 10          | 40          | 410                        | 65                      | 360                        | 70         | 480                        | 63         | 340                        | 72         | 380                        | 68         | 440                        | 65         |
|                  |              | 40          | 100         | 410                        | 65                      | 360                        | 70         | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
| C10C             | 1.0214       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 370                        | 72         | 410                        | 68         | -                          | -          |
|                  |              | 5           | 10          | 430                        | 60                      | 380                        | 70         | 520                        | 58         | 360                        | 72         | 400                        | 68         | 470                        | 63         |
|                  |              | 10          | 40          | 430                        | 60                      | 380                        | 70         | 510                        | 58         | 360                        | 72         | 400                        | 68         | 460                        | 63         |
|                  |              | 40          | 100         | 430                        | 60                      | 380                        | 70         | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
| C15C             | 1.0234       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 390                        | 70         | 430                        | 66         | -                          | -          |
|                  |              | 5           | 10          | 460                        | 58                      | 400                        | 68         | 550                        | 56         | 380                        | 70         | 420                        | 66         | 490                        | 63         |
|                  |              | 10          | 40          | 460                        | 58                      | 400                        | 68         | 540                        | 56         | 380                        | 70         | 420                        | 66         | 480                        | 63         |
|                  |              | 40          | 100         | 460                        | 58                      | 400                        | 68         | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
| C17C             | 1.0434       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 430                        | 67         | 470                        | 63         | -                          | -          |
|                  |              | 5           | 10          | 520                        | 58                      | 440                        | 65         | 610                        | 56         | 420                        | 67         | 460                        | 63         | 530                        | 60         |
|                  |              | 10          | 40          | 520                        | 58                      | 440                        | 65         | 600                        | 56         | 420                        | 67         | 460                        | 63         | 520                        | 60         |
|                  |              | 40          | 100         | 520                        | 58                      | 440                        | 65         | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
| C20C             | 1.0411       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | 470                        | 67         | 510                        | 63         | -                          | -          |
|                  |              | 5           | 10          | 560                        | 55                      | 480                        | 65         | 650                        | 53         | 460                        | 67         | 500                        | 63         | 570                        | 60         |
|                  |              | 10          | 40          | 560                        | 55                      | 480                        | 65         | 640                        | 53         | 460                        | 67         | 500                        | 63         | 560                        | 60         |
|                  |              | 40          | 100         | 560                        | 55                      | 480                        | 65         | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
| 8MnSi7           | 1.5113       | 2           | 5           | -                          | -                       | -                          | -          | -                          | -          | -                          | -          | -                          | -          | -                          | -          |
|                  |              | 5           | 10          | 540 <sup>b</sup>           | 60                      | -                          | -          | 800 <sup>b</sup>           | -          | -                          | -          | -                          | -          | -                          | -          |
|                  |              | 10          | 25          | 520 <sup>b</sup>           | 60                      | -                          | -          | 800 <sup>b</sup>           | -          | -                          | -          | -                          | -          | -                          | -          |
|                  |              | 25          | 40          | -                          | -                       | -                          | -          | -                          | -          | -                          | -          | -                          | -          | -                          | -          |

<sup>a</sup> For this grade the condition is “soft annealing”.

<sup>b</sup> Minimum values: 1 Mpa = 1 N/mm<sup>2</sup>.

<sup>c</sup> The values are given only for information.

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