

Non-alloy steel rod for drawing and/or cold rolling —

Part 2: Specific requirements for general purpose rod

The European Standard EN 10016-2:1994 has the status of a
British Standard

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ISE/71, Steel rod for wire drawing, upon which the following bodies were represented:

- British Steel Industry
- British Steel Industry (Wire Section)
- Process Plant Association
- Welding Manufacturers' Association (BEAMA) Ltd.

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 10016-2	3
List of references	Inside back cover

National foreword

This British Standard has been prepared under the direction of the Engineering Sector Board and is the English language version of EN 10016-2:1994 *Non-alloy steel rod for drawing and/or cold rolling — Part 2: Specific requirements for general purpose rod*, published by the European Committee for Standardization (CEN).

Cross-reference

Publication referred to	Corresponding British Standard
EN 10020	BS EN 10020:1991 <i>Definition and classification of grades of steel</i>

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 6, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Iron and steel products, unalloyed steels, wire drawing, cold rolling, wire rod, chemical composition, grades: quality, defects, inspection

English version

Non-alloy steel rod for drawing and/or cold rolling — Part 2: Specific requirements for general purpose rod

Fil machine en acier non allié destiné au
tréfilage et/ou laminage à froid —
Partie 2: Prescriptions spécifiques au fil
machine d'usage général

Walzdraht aus unlegiertem Stahl zum Ziehen
und/oder Kaltwalzen — Teil 2: Besondere
Anforderungen an Walzdraht für allgemeine
Verwendung

This European Standard was approved by CEN on 1994-11-10. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard EN 10016 is subdivided as follows:

- *Part 1: General requirements;*
- *Part 2: Specific requirements for general purpose rod;*
- *Part 3: Specific requirements for rimmed and rimmed substitute low carbon steel rod;*
- *Part 4: Specific requirements for rod for special applications.*

This European Standard has been drawn up by ECISS/TC 15, *Wire-rod — Qualities, dimensions, tolerances and specific tests*, whose Secretariat is held by UNI/UNSIDER.

Parts 1, 2, 3 and 4 of this European Standard replace:

EURONORM 16 (1987), *Non alloy steel wire rod for cold drawing and/or cold rolling*.

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 June 1995, and conflicting national standards shall be withdrawn at the latest by June 1995.

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

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Requirements	3
3.1 Chemical composition	3
3.2 Internal soundness and surface quality	3
3.3 Depth of surface defects	3
3.4 Core segregation	3
3.5 Mechanical properties	3
Table 1 — Chemical analysis (heat analysis)	4
Table 2 — Permissible deviations in the product analysis in relation to the actual heat analysis	5
Table 3 — Limit values for the depth of surface discontinuities	5

1 Scope

This Part of this European Standard is applicable to general purpose rod for drawing and/or cold rolling.

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 10016-1, *Non-alloy steel rod for drawing and/or cold rolling — Part 1: General requirements*.

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

EN 10221, *Surface quality classes for hot rolled bars and rods — Technical delivery conditions*.

3 Requirements

For the general requirements see EN 10016-1.

3.1 Chemical composition

For the heat analysis, the values shown in Table 1 apply. The permissible deviations of the product analysis relative to the actual heat analysis are given in Table 2.

3.2 Internal soundness and surface quality

The rod shall have no internal and/or surface imperfections such as: shrink holes, segregation, cracks, folds, incrustations, notches, scabs, rolling burrs, damage, which may be prejudicial to its correct use.

3.3 Depth of surface defects

The rod shall not have any surface discontinuities of depth greater than the values shown in Table 3. These limit values apply for the test chosen according to EN 10016-1 (clauses 9.5.1 and 9.6.2).

3.4 Core segregation

In absence of other provisions the following requirements shall be met. By agreement at the time of ordering, rod of steel grade C60D or steel grades with higher carbon content shall be inspected for core segregation. Not more than 20 % of the samples shall be of class 4; class 5 is not allowed (see EN 10016-1, Annex A). It is recommended to do this evaluation as part of a quality assurance system.

3.5 Mechanical properties

At the request of the purchaser at the time of ordering, the manufacturer shall notify indicative values of tensile strength.

Table 1 — Chemical analysis (heat analysis)^{ab}

Steel grade ^c		Heat analysis									
Steel name	Steel number	C %	Si ^{de} %	Mn ^f %	P % max.	S % max.	Cr % max.	Ni % max.	Mo % max.	Cu ^{gh} % max.	Al ⁱ % max.
C4D	1.0300	≤ 0,06	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C7D	1.0313	0,05-0,09	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C9D	1.0304	≤ 0,10	≤ 0,30	≤ 0,60	0,035	0,035	0,25	0,25	0,08	0,30	—
C10D	1.0310	0,08-0,13	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C12D	1.0311	0,10-0,15	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C15D	1.0413	0,12-0,17	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C18D	1.0416	0,15-0,20	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C20D	1.0414	0,18-0,23	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C26D	1.0415	0,24-0,29	0,10-0,30	0,50-0,80	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C32D	1.0530	0,30-0,35	0,10-0,30	0,50-0,80	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C38D	1.0516	0,35-0,40	0,10-0,30	0,50-0,80	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C42D	1.0541	0,40-0,45	0,10-0,30	0,50-0,80	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C48D	1.0517	0,45-0,50	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C50D	1.0586	0,48-0,53	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C52D	1.0588	0,50-0,55	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C56D	1.0518	0,53-0,58	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C58D	1.0609	0,55-0,60	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C60D	1.0610	0,58-0,63	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C62D	1.0611	0,60-0,65	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C66D	1.0612	0,63-0,68	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C68D	1.0613	0,65-0,70	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C70D	1.0615	0,68-0,73	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C72D	1.0617	0,70-0,75	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C76D	1.0614	0,73-0,78	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C78D	1.0620	0,75-0,80	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C80D	1.0622	0,78-0,83	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C82D	1.0626	0,80-0,85	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C86D	1.0616	0,83-0,88	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C88D	1.0628	0,85-0,90	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01
C92D	1.0618	0,90-0,95	0,10-0,30	0,50-0,80	0,035	0,035	0,15	0,20	0,05	0,25	0,01

^a Elements not included in this table may not be added intentionally to the steel without the agreement of the purchaser, except those intended for finishing the cast.

^b The addition of microalloying elements can be agreed between the manufacturer and purchaser at the time of ordering.

^c Quality non-alloy steel according to EN 10020.

^d For rod intended for galvanization the allowed lower limit of silicon content should be specified at the time of ordering.

^e By agreement at the time of ordering the maximum silicon level for grades C4D to C20D may be further restricted.

^f For grades from C15D onwards, for the manganese content a different range from the one indicated in the table, but of the same amplitude, can be agreed at the time of ordering with a maximum value not exceeding 1,20 %.

^g A maximum copper content of 0,20 % may be agreed at the time of ordering.

^h For steels C48D to C92D, Cu + Sn < 0,25 %.

ⁱ By agreement at the time of ordering the value for aluminium can be fixed at 0,02 % to 0,06 %. The value for silicon can then be fixed at ≤ 0,10 % on request.

Table 2 — Permissible deviations in the product analysis in relation to the actual heat analysis

Element	Steel grade	Permissible deviation in product analysis %
C	C4D to C20D	$\pm 0,02$
	C26D to C82D	$\pm 0,03$
	C86D to C92D	$\pm 0,04$
Si	All grades	$\pm 0,04$
Mn	All grades	$\pm 0,06$
P and S	All grades	$\pm 0,005$

Table 3 — Limit values for the depth of surface discontinuities

Class according to EN 10221	Nominal diameter d_N mm	Maximum permissible depth ^a of surface discontinuities mm
B	$5 \leq d_N \leq 12$	0,20
	$12 < d_N \leq 18$	0,25
	$18 < d_N \leq 30$	0,30
^a The depth of surface discontinuities is measured from the actual surface of the product in a radial direction.		

List of references

See national foreword.

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