
**Non-alloy steel wire rod for conversion to
wire —**

Part 3:

**Specific requirements for rimmed and
rimmed-substitute, low-carbon steel wire
rod**

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Fil-machine en acier non allié destiné à la fabrication de fils —

*Partie 3: Exigences spécifiques au fil-machine en acier effervescent ou
pseudo-effervescent à bas carbone*

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Printed in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 16120 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 16120-3 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 17, *Steel wire rod and wire products*.

This first edition of ISO 16120-3 together with parts 1, 2 and 4 cancels and replaces ISO 8457-2 (1989) which has been technically revised and augmented.

ISO 16120 consists of the following parts, under the general title *Non-alloy steel wire rod for conversion to wire*:

- *Part 1: General requirements* [ISO 16120-3:2001](https://standards.iteh.ai/catalog/standards/sist/1e0651f7-f6b5-4c05-a923-86f9534aa400/iso-16120-3-2001)
- *Part 2: Specific requirements for general purpose wire rod*
- *Part 3: Specific requirements for rimmed and rimmed-substitute, low-carbon steel wire rod*
- *Part 4: Specific requirements for wire rod for special applications*

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Non-alloy steel wire rod for conversion to wire —

Part 3:

Specific requirements for rimmed and rimmed substitute low carbon steel wire rod

1 Scope

This part of ISO 16120 is applicable to wire rod of low carbon, low silicon, rimmed and rimmed substitute steel with high ductility intended for drawing and/or cold rolling.

NOTE Rimmed substitute steel: continuously cast steel designed to substitute the traditional rimming steel for drawability and formability.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 16120. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this ISO 16120 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards

ISO 4948-1:1982, *Steels — Classification — Part 1: Classification of steels into unalloyed and alloyed steels based on chemical composition*

ISO 4948-2:1981, *Steels — Classification — Part 2: Classification of unalloyed and alloyed steels according to main quality classes and main property or application characteristics*

ISO 4967:1998, *Steel — Determination of content of nonmetallic inclusions — Micrographic method using standard diagrams*

ISO 16120-1:2001, *Non-alloy steel wire rod for conversion to wire — Part 1: General requirements*

3 Requirements

3.1 General

For the general requirements see ISO 16120-1.

3.2 Chemical composition

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

Table 1 — Chemical analysis (heat analysis)^a

Steel grade ^b	Heat analysis										
	C	Si	Mn	P	S	Cr ^c	Ni ^c	Mo	Cu ^c	Al ^d	N
	% max.	% max.	%	% max.	% max.	% max.	% max.	% max.	% max.	% max.	% max.
C2D1	0,03	0,05	0,10-0,35	0,020	0,020	0,10	0,10	0,03	0,10	0,01	0,007
C3D1	0,05	0,05	0,20-0,40	0,025	0,025	0,10	0,10	0,03	0,15	0,05	—
C4D1	0,06	0,10	0,20-0,45	0,025	0,025	0,15	0,15	0,03	0,15	0,05	—

^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 heat.

^b Special non-alloy steel complying with ISO 4948-1 and ISO 4948-2.

^c The sum of the contents Cu + Ni + Cr shall not exceed:
 for steel grade C2D1, 0,25 %;
 for steel grade C3D1, 0,30 %;
 for steel grade C4D1, 0,35 %.

^d For steels grade C3D1 and C4D1 a lower maximum limit may be specified at the time of ordering.

Table 2 — Permissible deviation in the product analysis in relation to the specified value of the heat analysis

Elements	Steel grade	Permissible deviation in product analysis %
C	C2D1	+ 0,01
	C3D1 to C4D1	+ 0,02
Si	C2D1 to C3D1	+ 0,02
	C4D1	+ 0,04
Mn	All grades	± 0,05
P and S	All grades	+ 0,005

NOTE These permissible deviations apply for rimmed substitute steels only.

3.3 Internal soundness and surface quality

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

3.4 Depth of surface discontinuities

The wire 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 in accordance with 9.4.3 and 9.5.3 of ISO 16120-1:2001.

Table 3 applies to round wire rod only. Maximum discontinuity levels for other shapes may be agreed.

Table 3 — Limit values for the depth of surface discontinuities of round wire rod

Nominal diameter d_N (mm)	Maximum permissible depth of surface discontinuities ^a mm
$5 \leq d_N \leq 12$	0,17
$12 < d_N \leq 30$	0,23

^a The depth of surface discontinuities is measured from the actual surface of the product in a radial direction.

3.5 Non-metallic inclusions

The method for assessment of non-metallic inclusions and the assessment criteria shall be agreed at the time of ordering, as far as possible with reference to ISO 4967.

3.6 Tensile strength

Unless otherwise specified at the time of ordering, wire rod of diameter 5,5 mm and above shall have the maximum tensile strength values shown in Table 4.

Table 4 — Tensile strength values

Steel grade	Maximum tensile strength N/mm ²
C2D1	360
C3D1	390
C4D1	by agreement

NOTE 1 N/mm² = 1 MPa

3.7 Austenitic grain size

At the request of the purchaser at the time of ordering, where applicable, the parties may agree on a specific austenitic grain size.

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ICS 77.140.60

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