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

Part 2:
**Specific requirements for general purpose
wire rod**

iTeh STANDARD PREVIEW

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

Partie 2: Exigences spécifiques au fil-machine d'usage général

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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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 16120-2 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 17, *Steel wire rod and wire products*.

This first edition of ISO 16120-2, together with parts 1, 3 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 16120-2:2001](https://standards.iteh.ai/catalog/standards/sist/ead1d69d-6a4e-411b-8ff6-d1ff1d3a266/iso-16120-2-2001)
- *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 2:

Specific requirements for general purpose wire rod

1 Scope

This part of ISO 16120 is applicable to general purpose wire rod for drawing and/or cold rolling.

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*

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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 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 ^c	Si ^d	Mn ^e	P	S	Cr	Ni	Mo	Cu ^f	Al ^g
	%	%	%	%	%	%	%	%	%	%
			max.	max.	max.	max.	max.	max.	max.	max.
C4D	≤ 0,06	≤ 0,30	0,30-0,60	0,035	0,035	0,20	0,25	0,05	0,30	0,01
C7D	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	≤ 0,10	≤ 0,30	≤ 0,60	0,035	0,035	0,25	0,25	0,05	0,30	—
C10D	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	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	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	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	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	0,24-0,29	0,10-0,30	0,50-0,80	0,030	0,030	0,20	0,25	0,05	0,30	0,01
C32D	0,30-0,35	0,10-0,30	0,50-0,80	0,030	0,030	0,20	0,25	0,05	0,30	0,01
C38D	0,35-0,40	0,10-0,30	0,50-0,80	0,030	0,030	0,20	0,25	0,05	0,30	0,01
C42D	0,40-0,45	0,10-0,30	0,50-0,80	0,030	0,030	0,20	0,25	0,05	0,30	0,01
C48D	0,45-0,50	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C50D	0,48-0,53	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C52D	0,50-0,55	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C56D	0,53-0,58	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C58D	0,55-0,60	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C60D	0,58-0,63	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C62D	0,60-0,65	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C66D	0,63-0,68	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C68D	0,65-0,70	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C70D	0,68-0,73	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C72D	0,70-0,75	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C76D	0,73-0,78	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C78D	0,75-0,80	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C80D	0,78-0,83	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C82D	0,80-0,85	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C86D	0,83-0,88	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C88D	0,85-0,90	0,10-0,30	0,50-0,80	0,030	0,030	0,15	0,20	0,05	0,25	0,01
C92D	0,90-0,95	0,10-0,30	0,50-0,80	0,030	0,030	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 heat. The addition of microalloying elements may be agreed upon between the manufacturer and purchaser at the time of ordering.

^b Non-alloy quality steel complying with ISO 4948-1 and ISO 4948-2.

^c For steels C26D to C92D the carbon range may be enlarged by lowering the minimum by 0,01 % and by increasing the maximum by 0,01 % by agreement between the manufacturer and purchaser.

^d For wire rod intended for galvanization the required lower limit of silicon content should be specified at the time of ordering. By agreement at the time of ordering the maximum silicon level for grades C4D to C20D may be further restricted.

^e For grades from C15D onwards a different range from the one indicated in the table, but of the same amplitude, can be agreed upon at the time of ordering with a maximum value not exceeding 1,20 % and a minimum of 0,30 %.

^f A maximum copper content of 0,20 % may be agreed at the time of ordering. For steels C48D to C92D, Cu + Sn ≤ 0,25 %.

^g By agreement at the time of ordering the value for aluminium can be fixed at 0,01 to 0,06 %. In such cases the value of silicon can be fixed at ≤ 0,10 % on request.

**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	C4D to C20D	± 0,02
	C26D to C82D	± 0,03
	C86D to C92D	± 0,04
Si	All grades	± 0,04
Mn	All grades	± 0,06
P and S	All grades	+ 0,005
NOTE If wire rod has been ordered as rimmed steel then the permissible deviations of the table do not apply and shall be agreed between the parties.		

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 that 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 and maximum discontinuities 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
$5 \leq d_N \leq 12$	0,20
$12 < d_N \leq 18$	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.	

3.5 Core segregation

Unless otherwise agreed at the time of ordering, not more than 20 % of specimens, inspected from steel grade C60D or those with higher carbon content, shall be Class 4, and none shall be of Class 5 (see annex A of ISO 16120-1:2001). However, it is recommended that this evaluation be done as part of a quality system.

3.6 Tensile strength

If requested by the purchaser at the time of ordering, the manufacturer shall provide guidance values of tensile strength.

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