SLOVENSKI STANDARD
SIST EN 10263-4:2018

01-februar-2018

Nadomešča:
SIST EN 10263-4:2002
SIST EN 10263-4:2002/AC:2003

Jekleni drogovi, palice in žica za hladno nakrčevanje in hladno iztiskanje - 4. del: Tehnični dobavni pogoji za jekla za poboljšanje

Steel rod, bars and wire for cold heading and cold extrusion - Part 4: Technical delivery conditions for steels for quenching and tempering

Walzdraht, Stäbe und Draht aus Kaltstauch- und Kaltfließpressstählen - Teil 4: Technische Lieferbedingungen für Vergütungsstähle

Barres, fil machine et fils en acier pour transformation à froid et extrusion à froid - Partie 4: Conditions techniques de livraison des aciers pour trempe et revenu

Ta slovenski standard je istoveten z: **EN 10263-4:2017**

ICS:

77.140.60	Jeklene palice in drogovi	Steel bars and rods
77.140.65	Jeklene žice, jeklene vrvi in verige	Steel wire, wire ropes and link chains

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 10263-4

November 2017

ICS 77.140.60; 77.140.65

Supersedes EN 10263-4:2001

English Version

Steel rod, bars and wire for cold heading and cold extrusion - Part 4: Technical delivery conditions for steels for quenching and tempering

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This European Standard was approved by CEN on 26 July 2017.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 10263-4:2017) has been prepared by Technical Committee ECISS/TC 106 “Wire rod and wires”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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

This document supersedes EN 10263-4:2001.

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 round bars and wire with a diameter up to and including 100 mm, of non-alloy and alloy steel, intended for cold heading, cold extrusion, subsequent quenching and tempering or induction hardening or flame hardening.

1.2 EN 10263-1:2017 is indispensable for this part of EN 10263.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 10263-1:2017, *Steel rod, bars and wire for cold heading and cold extrusion — Part 1: General technical delivery conditions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10263-1:2017 and the following apply.

3.1
quenched and tempered steels
engineering steels which, because of their chemical composition, are suitable for hardening and in the quenched and tempered condition to provide enhanced toughness at a given tensile strength

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4 Classification and designation

4.1 Classification

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All steels covered by this part of EN 10263 are special steels according to EN 10020.

Steel grades from C35EC to C45RC as quoted in Table 3 are non-alloy steels and all others are alloy steels according to EN 10020.

4.2 Designation

See EN 10263-1:2017.

5 Production Process

5.1 Steelmaking process

See EN 10263-1:2017.

5.2 Deoxidation

All steels according to this part of EN 10263 shall be deoxidised.

6 Requirements

6.1 Delivery conditions

The delivery conditions in which the products covered by this part of EN 10263 are normally supplied, the product forms and the applicable requirements are given in Tables 1 and 2.

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6.2 Chemical composition

6.2.1 Cast analysis

The chemical composition for the cast analysis shall be in accordance with the values specified in Tables 3 and 4.

6.2.2 Product analysis

In cases where a product analysis is requested, the permissible deviations from the values specified for the cast analysis are indicated in Table 5.

6.3 Mechanical properties

The mechanical properties of the products, to be determined by the tensile test, shall be in accordance with the Tables 6, 7 and 8 but by considering the prescriptions given in Table 1 and the delivery condition given in Table 2.

6.4 Hardenability

6.4.1 In the case of products ordered with standard requirements regarding hardenability, that is, when the steel names or numbers as quoted in Tables 3 and 4 are supplemented by the symbol "+H", the hardness values obtained in the end quench test (Jominy test) (see Table 1 of EN 10263-1:2017) shall be in compliance with the values given in Tables 9 and 11.

6.4.2 In the case of products ordered with restricted requirements regarding the scatter bands of the hardness values obtained by the Jominy test, that is when the steel name or number as quoted in Table 3 is supplemented by the symbol "+HH" or "+HL", the above hardness values shall be in compliance with the values given in Table 10.

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NOTE 1 The symbol "+HH" denotes that the upper limit of the scatter band coincides with the upper limit for the corresponding steel "+H".

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NOTE 2 The symbol "+HL" denotes that the lower limit of the scatter band coincides with the lower limit for the corresponding steel "+H".

NOTE 3 See EN 10263-1:2017, 7.7.4 and 10.2

6.4.3 The austenizing temperatures for the Jominy test are given in Tables 9, 10 and 11.

6.4.4 Core hardening

In the case of products ordered with requirements for core hardening, that is when the steel name or number, as quoted in Tables 3 and 4 is supplemented by the symbol "+CH", the core hardening temperature, the hardness values and the corresponding maximum diameters for the lowest hardenability shall be in compliance with the values given in Table 12.

6.5 Surface requirements

For any particular surface requirement to be agreed at the time of ordering, see EN 10263-1:2017, 7.10.

6.6 Supplementary or special requirements

Other requirements which can be agreed at the time of enquiry and order are described in EN 10263-1:2017, Annex A.

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

Heat-treatment condition at delivery	Symbol	Products form			Applicable requirements in cases where the steel concerned has been ordered with reference to the steel names indicated in								
		bar	rod	wire	Tables 3 and 4, 6 or 7 or 8		Tables 3 and 4, 6 or 7 or 8, 9 or 10 or 11			Tables 3 and 4, 6 or 7 or 8, 12			Tables 3,4,6,7,8,9, 10,11 or 12
untreated	None or +U	X	X	–	Chemical composition as specified in Tables 3 and 4	Mechanical properties as specified in Table 6 or 7 or 8	Chemical composition as specified in Tables 3 and 4	Mechanical properties as specified in Table 6 or 7 or 8	Values for hardenability according to Tables 9 or 10 or 11	Chemical composition as specified in Tables 3 and 4	Mechanical properties as specified in Table 6 or 7 or 8	Minimum core hardness and maximum diameter according to Table 12	Supplementary or special requirements as specified in Annex A of EN 10263-1 [a]
spheroidised	+AC	X	X	X									
Others	Other delivery conditions may be agreed at the time of ordering												

Key
X = applicable
– = not applicable

[a] If agreed at the time of the enquiry and order.

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Table 2 — Surface condition at delivery

Surface condition at delivery		Symbol	bar	rod	wire
Unless otherwise agreed	as rolled	none or +AR	x	x	–
Particular surface conditions supplied by agreement	cold drawn	+C	–	–	x
	skin passed	+LC	x	–	x
	peeled	+PE	x	x	x

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Table 3 — Chemical composition for steel grades without boron – cast analysis % by mass

Steel grade Steel name	Steel number	C [b]	Si max [a]	Mn	P max	S	Cr	Mo	Ni	Cu max
C35EC	1.1172	0,32 to 0,39	0,30	0,50 to 0,80	0,025	0,025 max				0,25
C35RC	1.1060	0.32 to 0,39	0,30	0,50 to 0,80	0,025	0.020 to 0,035				0,25
C45EC	1.1192	0,42 to 0,50	0,30	0,50 to 0,80	0,025	0,025 max				0,25
C45RC	1.1061	0,42 to 0,50	0,30	0,50 to 0,80	0,025	0.020 to 0,035				0,25
37Mo2	1.5418	0,35 to 0,40	0,30	0,60 to 0,90	0,025	0,025 max		0,20 to 0,30		0,25
38Cr2	1.7003	0,35 to 0,42	0,30	0,50 to 0,80	0,025	0,025 max	0,40 to 0,60			0,25
46Cr2	1.7006	0,42 to 0,50	0,30	0,50 to 0,80	0,025	0,025 max	0,40 to 0,60			0,25
34Cr4	1.7033	0,30 to 0,37	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20			0,25
37Cr4	1.7034	0,34 to 0,41	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20			0,25
41Cr4	1.7035	0,38 to 0,45	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20			0,25
41CrS4	1.7039	0,38 to 0,45	0,30	0,60 to 0,90	0,025	0.020 to 0,040	0,90 to 1,20			0,25
25CrMo4	1.7218	0,22 to 0,29	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20	0,15 to 0,30		0,25
25CrMoS4	1.7213	0,22 to 0,29	0,30	0,60 to 0,90	0,025	0.020 to 0,040	0,90 to 1,20	0,15 to 0,30		0,25
34CrMo4	1.7220	0,30 to 0,37	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20	0,15 to 0,30		0,25
37CrMo4	1.7202	0,35 to 0,40	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20	0,15 to 0,30		0,25
42CrMo4	1.7225	0,38 to 0,45	0,30	0,60 to 0,90	0,025	0,025 max	0,90 to 1,20	0,15 to 0,30		0,25
42CrMoS4	1.7227	0,38 to 0,45	0,30	0,60 to 0,90	0,025	0.020 to 0,040	0,90 to 1,20	0,15 to 0,30		0,25
34CrNiMo6	1.6582	0,30 to 0,38	0,30	0,50 to 0,80	0,025	0,025 max	1,30 to 1,70	0,15 to 0,30	1,30 to 1,70	0,25
41NiCrMo7–3–2	1.6563	0.38 to 0,44	0,30	0,60 to 0,90	0,025	0,025 max	0,70 to 0,90	0,15 to 0,30	1,65 to 2,00	0,25

[a] Lower silicon contents may be agreed at the time of ordering, in which case due consideration should be given to the effects that could result for what concerns the specified properties such as, for example, hardenability.

[b] A carbon range of 0,04 % (e.g. 0,33 % - 0,37 %) may be agreed at the time of enquiry and order.

NOTE 1 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 such elements from scrap or other materials used in the production process, which may affect the hardenability, mechanical properties and applicability.

NOTE 2 In the case of steels with hardenability requirements (see Tables 9 to 11) minor deviation from the specified limits are permitted (with the exception of sulphur and phosphorus), provided that they do not exceed 0,01 % for carbon and the values indicated in Table 5 for the other elements.

NOTE 3 To improve the performance of cold heading, it is possible to add Aluminium Al: 0,020 to 0,050 %.

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Table 4 — Chemical composition for boron alloyed steel grades – cast analysis % by mass

Steel grade		C	Si [a]	Mn	P max	S max	Cr [b]	Mo	Cu max	B
Steel name	Steel number									
17B2	1.5502	0,15 to 0,20	≤ 0,30	0,60 to 0,90	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
23B2	1.5508	0,20 to 0,25	≤ 0,30	0,60 to 0,90	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
28B2	1.5510	0,25 to 0,30	≤ 0,30	0,60 to 0,90	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
33B2	1.5514	0,30 to 0,35	≤ 0,30	0,60 to 0,90	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
38B2	1.5515	0,35 to 0,40	≤ 0,30	0,60 to 0,90	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
17MnB4	1.5520	0,15 to 0,20	≤ 0,30	0,90 to 1,20	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
23MnB3	1.5507	0,21 to 0,25	0,15 max.	0,80 to 1,00	0,015	0,015	0,25 to 0,35		0,25	0,0008 to 0,005
20MnB4	1.5525	0,18 to 0,23	≤ 0,30	0,90 to 1,20	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
23MnB4	1.5535	0,20 to 0,25	≤ 0,30	0,90 to 1,20	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
27MnB4	1.5536	0,25 to 0,30	0,15 to 0,30	0,90 to 1,20	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
30MnB4	1.5526	0,27 to 0,32	≤ 0,30	0,80 to 1,10	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
36MnB4	1.5537	0,33 to 0.38	≤ 0,30	0,80 to 1,10	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
37MnB5	1.5538	0,35 to 0,40	≤ 0,30	1,15 to 1,45	0,025	0,025	≤ 0,30		0,25	0,0008 to 0,005
30MoB1	1.5408	0,28 to 0,32	≤ 0,30	0,80 to 1,00	0,025	0,025	≤ 0,30 [b]	0,08 to 0,12	0,25	0,0008 to 0,005
32CrB4	1.7076	0,30 to 0,34	≤ 0,30	0,60 to 0,90	0,025	0,025	0,90 to 1,20		0,25	0,0008 to 0,005
36CrB4	1.7077	0,34 to 0,38	≤ 0,30	0,70 to 1,00	0,025	0,025	0,90 to 1,20		0,25	0,0008 to 0,005
31CrMoB2–1	1.7272	0,28 to 0,33	≤ 0,30	0,90 to 1,20	0,025	0,025	0,40 to 0,55	0,10 to 0,15	0,25	0,0008 to 0,005

[a] Where a maximum chromium content of 0,30 % is specified, a minimum level may also be agreed at the time of enquiry and order

[b] In order to obtain a core hardening for the steel grade 1.5408 the lower limit of Cr shall be 0,15 % and may be agreed at the time of enquiry and order. For certain applications the higher limit for Cr may also be lowered by agreement at time of enquiry and order.

NOTE 1 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 such elements from scrap or other materials used in the production process, which may affect the hardenability, mechanical properties and applicability.

NOTE 2 In the case of steels with hardenability requirements (see Tables 9 to 11) minor deviation from the specified limits are permitted (with the exception of sulphur and phosphorus), provided that they do not exceed 0,01 % for carbon and the values indicated in Table 5 for the other elements.

NOTE 3 To improve the performance of cold heading, it is possible to add Aluminium Al: 0,020 % to 0,050 %.

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