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High carbon steel wire rods

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by the Japan Iron and Steel Federation(JISF), with the draft being attached, based on the provision of Article 12 clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently JIS G 3506:1996 is replaced with this Standard.

This revision has been made based on ISO 16120-1:2001, Non-alloy steel wire rod for conversion to wire—Part 1: General requirements and ISO 16120-2:2001, Non-alloy steel wire rod for conversion to wire—Part 2: Specific requirements for general purpose wire rod for the purposes of making it easier to compare this Standard with International Standards; to prepare Japanese Industrial Standard conforming with International Standards; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

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the original JIS is to be the final authority.

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High carbon steel wire rods

Introduction This Japanese Industrial Standard has been prepared based on the first editions of ISO 16120-1, Non-alloy steel wire rod for conversion to wire—Part 1: General requirements and ISO 16120-2, Non-alloy steel wire rod for conversion to wire—Part 2: Specific requirements for general purpose wire rod published in 2001.

Portions underlined with dots are the matters modified from the original International Standards. The list of modification with its explanation is given in annex 3 (informative).

1 Scope This Japanese Industrial Standard specifies high carbon steel wire rods (hereafter referred to as “wire rod”) to be used for the manufacture of hard drawn steel wires, oil tempered steel wires, hard drawn steel wires for prestressed concrete, galvanized steel wire strands, wire ropes, etc. However, the piano wire rods shall be excluded.

Remarks 1 The purchaser may designate Special quality requirements in annex 1, in addition to the items specified in this text by preliminary agreement with the manufacturer.

2 The International Standard corresponding to this Standards are as follows.

In additions, Symbols which denote the degree of correspondence in the contents between the relevant International Standard and JIS are IDT (identical), MOD (modified), and NEQ (not equivalent) according to ISO/IEC Guide 21.

ISO 16120-1, Non-alloy steel wire rod for conversion to wire—Part 1: General requirements (MOD)

ISO 16120-2, Non-alloy steel wire rod for conversion to wire—Part 2: Specific requirements for general purpose wire rod (MOD)

3 Quality requirements based on International Standard shall be specified in annex 2.

2 Normative references The standards listed in attached table 1 contain provisions which through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

3 Classification and symbol The wire rod shall be classified into 21 grades, and the symbol shall be as given in table 1.

4 Chemical composition The wire rod shall be tested in accordance with 8.1, and the

cast analysis value shall be as given in table 1.

Table 1. Chemical composition

Unit: %

Symbol of grad	C	Si	Mn	P	S
SWRH 27	0.24 to 0.31	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 32	0.29 to 0.36	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 37	0.34 to 0.41	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 42A	0.39 to 0.46	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 42B	0.39 to 0.46	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 47A	0.44 to 0.51	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 47B	0.44 to 0.51	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 52A	0.49 to 0.56	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 52B	0.49 to 0.56	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 57A	0.54 to 0.61	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 57B	0.54 to 0.61	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 62A	0.59 to 0.66	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 62B	0.59 to 0.66	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 67A	0.64 to 0.71	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 67B	0.64 to 0.71	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 72A	0.69 to 0.76	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 72B	0.69 to 0.76	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 77A	0.74 to 0.81	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 77B	0.74 to 0.81	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.
SWRH 82A	0.79 to 0.86	0.15 to 0.35	0.30 to 0.60	0.030 max.	0.030 max.
SWRH 82B	0.79 to 0.86	0.15 to 0.35	0.60 to 0.90	0.030 max.	0.030 max.

Remarks : Carbon content may be specified so as to be within the range narrowed by 0.01 % each from the upper and the lower limits given in table 1, when agreed upon between the purchaser and manufacturer.

5 Physical properties

5.1 Decarburized depth The wire rod shall be tested in accordance with 8.2, and the average of the total decarburized depth shall be 0.20 mm or less. However, this test may be omitted unless especially designated by the purchaser.

Furthermore, the purchaser may designate Special quality requirements given in annex 1, provided that agreed between the purchaser and the manufacturer.

5.2 Austenitic grain size and non-metallic inclusions The purchaser may designate either or both of the austenitic grain size and non-metallic inclusions. According to the designation, either or both of tests specified in 8.3 and 8.4 shall be carried out, and the specified values shall be agreed between the purchaser and the manufacturer.

6 Dimensions The diameter and its tolerances and out-of-round ⁽¹⁾ of the wire rod

shall be as given in the following:

Note (1) Out-of-round is the difference between the maximum and minimum values of diameter on the same cross-section of the wire rod.

- a) The standard diameters of the wire rod shall conform to table 2.

Table 2. Standard diameters

Unit: mm
5.5, 6, 6.4, 7, 8, 9, 9.5, 10, 11, 12, 13, 14, 15, 16, 17, 19

- b) The tolerances on diameter and out-of-round of the wire rod shall conform to table 3.

Table 3. Tolerance and out-of-round

Unit: mm	
Tolerance	Out-of-round
± 0.40	0.64 max.

7 Appearance The wire rod shall be free from any defects that are detrimental to practical use. However, since generally it is difficult for the wire rod to be inspected to detect flaw(s) throughout its whole length and the wire rod is afforded no opportunity to remove defective portion(s), some irregular parts may be included. Accordingly, the disposition of such irregular parts shall be determined by agreement between the purchaser and the manufacturer.

8 Test

8.1 Chemical analysis The chemical analysis shall be as follows:

- a) **General requirements for chemical analysis and sampling method of specimen for analysis** The chemical composition of the wire rod shall be determined by cast analysis, and general requirements for chemical analysis and sampling method of specimen for analysis shall be as specified in clause 8 of JIS G 0404.
- b) **Method for chemical analysis** The method for chemical analysis shall conform to one of the following standards:

JIS G 1211, JIS G 1212, JIS G 1213, JIS G 1214, JIS G 1215, JIS G 1253,
JIS G 1256, JIS G 1257, JIS G 1258

8.2 Test on measurement of decarburized depth The test on measurement of decarburized depth shall be performed on request by the purchaser, and the measurement method shall be as given in the following:

- a) **Sampling method of test piece** One representative test piece shall be taken from one end of the coil of each lot of the same heat rolled to the same dimension.
- b) **Test method** The test method shall be in accordance with 4.1 of JIS G 0558. In this case, the average of total decarburized depth for the cross-section of the wire rod shall be measured at four positions where the circumference is equally divided