



JAPANESE  
INDUSTRIAL  
STANDARD

Translated and Published by  
Japanese Standards Association

---

☞ JIS G 3505 : 2004  
(JISF)

**Low carbon steel wire rods**

---

ICS 77.140.60

Reference number : JIS G 3505 : 2004 (E)

PROTECTED BY COPYRIGHT

## 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 3505 : 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.

Date of Establishment: 1956-08-21

Date of Revision: 2004-03-20

Date of Public Notice in Official Gazette: 2004-03-22

Investigated by: Japanese Industrial Standards Committee  
Standards Board

Technical Committee on Iron and Steel

---

JIS G 3505 : 2004, First English edition published in 2004-05

Translated and published by: Japanese Standards Association  
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

---

In the event of any doubts arising as to the contents,  
the original JIS is to be the final authority.

© JSA 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

## Contents

|                                                                                                      | Page |
|------------------------------------------------------------------------------------------------------|------|
| Introduction .....                                                                                   | 1    |
| 1 Scope .....                                                                                        | 1    |
| 2 Normative references .....                                                                         | 1    |
| 3 Grade and symbol.....                                                                              | 1    |
| 4 Chemical composition .....                                                                         | 2    |
| 5 Dimensions .....                                                                                   | 2    |
| 6 Appearance .....                                                                                   | 3    |
| 7 Test .....                                                                                         | 3    |
| 7.1 Chemical analysis .....                                                                          | 3    |
| 8 Inspection .....                                                                                   | 3    |
| 9 Marking .....                                                                                      | 3    |
| 10 Report .....                                                                                      | 3    |
| Attached Table 1 Normative references .....                                                          | 4    |
| Annex 1 (normative) Special quality requirements .....                                               | 5    |
| Annex 2 (normative) Quality requirements based on International<br>Standard .....                    | 6    |
| Annex 3 (informative) Comparison table between JIS and corresponding<br>International Standard ..... | 8    |

## Low carbon steel wire rods

**Introduction** This Japanese Industrial Standard has been prepared based on the first edition 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 with some modifications of the technical contents.

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

**1 Scope** This Standard specifies low carbon steel wire rods, (hereafter referred to as “wire rods”), to be used for the manufacture of the low carbon steel wire, zinc-coated low carbon steel wire, etc. However, the wire rods for core wire of electrode shall be excluded.

**Remarks 1** The purchaser may designate a part of or all of clauses 1, 2 and 3 of special quality requirements in annex 1, in addition to the items specified in this text by preliminary agreement with the manufacturer.

Annex 1 1 Designation of low carbon steel

Annex 1 2 Designation of Mn

Annex 1 3 Dimensional tolerance and out-of-roundness

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

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

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

ISO 16120-2 : 2001 *Non-alloy steel wire rod for conversion to wire—Part 2 : Specific requirements for general purpose wire rod* (MOD)

**3** Quality requirements given in the International Standard are 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) shall be applied.

**3 Grade and symbol** The wire rod shall be classified into 8 grades, and the symbols shall be as given in table 1.

**4 Chemical composition** The wire rod shall be tested in accordance with 7.1, and the cast analysis value shall be as given in table 1.

**Table 1 Chemical composition**

Unit: %

| Symbol of grade | C            | Mn           | P          | S          |
|-----------------|--------------|--------------|------------|------------|
| SWRM 6          | 0.08 max.    | 0.60 max.    | 0.040 max. | 0.040 max. |
| SWRM 8          | 0.10 max.    | 0.60 max.    | 0.040 max. | 0.040 max. |
| SWRM 10         | 0.08 to 0.13 | 0.30 to 0.60 | 0.040 max. | 0.040 max. |
| SWRM 12         | 0.10 to 0.15 | 0.30 to 0.60 | 0.040 max. | 0.040 max. |
| SWRM 15         | 0.13 to 0.18 | 0.30 to 0.60 | 0.040 max. | 0.040 max. |
| SWRM 17         | 0.15 to 0.20 | 0.30 to 0.60 | 0.040 max. | 0.040 max. |
| SWRM 20         | 0.18 to 0.23 | 0.30 to 0.60 | 0.040 max. | 0.040 max. |
| SWRM 22         | 0.20 to 0.25 | 0.30 to 0.60 | 0.040 max. | 0.040 max. |

Remarks : When killed steel is specified, the letter K shall be suffixed to the end of the symbol of grade.

Example : SWRM 10 K

**5 Dimensions** The diameter and its tolerances and out-of-roundness<sup>(1)</sup> of the wire rod shall be in accordance with the following.

Note <sup>(1)</sup> The out-of-roundness is the difference between the maximum and minimum values of diameter on the same section of the wire rod.

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

**Table 2 Standard diameter**

Unit: mm

|                                                               |
|---------------------------------------------------------------|
| 5.5, 6, 6.4, 7, 8, 9, 9.5, 10, 11, 12, 13, 14, 15, 16, 17, 19 |
|---------------------------------------------------------------|

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

**Table 3 Tolerance and out-of-roundness**

Unit: mm

| Diameter                   | Tolerance | Out of roundness |
|----------------------------|-----------|------------------|
| 15 or less                 | ±0.40     | 0.64 max.        |
| Over 15 up to and incl. 25 | ±0.50     | 0.80 max.        |
| Over 25                    | ±0.60     | 0.96 max.        |

**6 Appearance** The wire rod shall be free from any defects that are detrimental to practical use. However, since it is generally difficult to inspect the wire rod for detection of flaws throughout the whole length and no opportunity is afforded to remove the flaws, some imperfections may be included. Accordingly, the management of such imperfections shall be subject to the agreement between the purchaser and the supplier.

## 7 Test

**7.1 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 obtained 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 any 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 Inspection** The inspection shall be as given in the following.

- a) General requirements for inspection shall conform to JIS G 0404.
- b) The chemical composition shall conform to the requirements of clause 4.
- c) The dimensions shall conform to the requirements of clause 5.
- d) The appearance shall conform to the requirements of clause 6.
- e) When "Special quality requirements" in annex 1 are designated to apply by agreement between the purchaser and the supplier, the wire rod shall conform to the requirements of clauses 1, 2 and 3 of annex 1.

**9 Marking** The wire rod having passed the inspection shall be marked on each coil with the following particulars by suitable means. However, when approved by the purchaser, a part of them may be omitted.

- a) Symbol of grade
- b) Heat number or inspection number
- c) Diameter of the wire rod
- d) Manufacturer's name or identifying brand

**10 Report** The manufacturer shall submit to the purchaser the test results on the specified items when so requested by the purchaser.

If killed steel is specified, the silicon content shall be appended in the test results.