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High carbon chromium bearing steels

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In the event of any doubts arising as to the contents,
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Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Classification and designation	2
5 Manufacturing method	2
6 Chemical composition	2
7 Shape, dimensions and dimensional tolerances	3
7.1 Standard dimensions	3
7.2 Dimensional tolerances	3
7.3 Bend	5
7.4 Dimensional tolerances and bend for other steels	5
8 Appearance	5
8.1 Appearance	5
8.2 Permissible depth of surface discontinuities and limit of removal	5
9 Total decarburized depth	6
10 Hardness	7
11 Microstructure	8
12 Macrostructure	8
13 Non-metallic inclusion	8
14 Tests	9
14.1 Chemical analysis	9
14.2 Measurement of total decarburized depth	9
14.3 Hardness test	9
14.4 Microstructure examination	10
14.5 Macrostructure examination	10
14.6 Non-metallic inclusion test	10
15 Inspection	10
16 Marking	11
17 Report	11
Annex JA (informative) Comparison table between JIS and corresponding International Standard	12

Foreword

This Japanese Industrial Standard has been 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 4805:2008** is replaced with this Standard.

However, **JIS G 4805: 2008** may be applied in the **JIS** mark certification based on the relevant provisions of Article 19 Clause 1, etc. of the Industrial Standardization Law until March 19, 2020.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

High carbon chromium bearing steels

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 683-17 : 2014**, Edition 3, with some modifications of the technical contents.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies the requirements for high carbon chromium bearing steels (hereafter referred to as steels) used for roller bearings.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 683-17 : 2014 *Heat-treated steels, alloy steels and free-cutting steels — Part 17 : Ball and roller bearing steels* (MOD)

In addition, 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 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

- JIS G 0201 *Glossary of terms used in iron and steel (Heat treatment)*
- JIS G 0202 *Glossary of terms used in iron and steel (Testing)*
- JIS G 0203 *Glossary of terms used in iron and steel (Products and quality)*
- JIS G 0320 *Standard test method for heat analysis of steel products*
- JIS G 0321 *Product analysis and its tolerance for wrought steel*
- JIS G 0404 *Steel and steel products — General technical delivery requirements*
- JIS G 0415 *Steel and steel products — Inspection documents*
- JIS G 0553 *Steel — Macroscopic examination by etching*
- JIS G 0555 *Microscopic testing method for the non-metallic inclusions in steel*
- JIS G 0558 *Steels — Determination of depth of decarburization*
- JIS G 3191 *Dimensions, mass and permissible variations of hot rolled steel bars*

and bar in coil

JIS G 3192 *Dimensions, mass and permissible variations of hot rolled steel sections*

JIS G 3193 *Dimensions, shape, mass and permissible variations of hot rolled steel plates, sheets and strips*

JIS G 3194 *Dimensions, mass and permissible variations of hot rolled flat steel*

JIS Z 2243-1 *Brinell hardness test — Part 1 : Test method*

NOTE Corresponding International Standard : ISO 6506-1 *Metallic materials — Brinell hardness test — Part 1 : Test method* (IDT)

JIS Z 2244 *Vickers hardness test — Test method*

JIS Z 2245 *Rockwell hardness test — Test method*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in JIS G 0201, JIS G 0202 and JIS G 0203 apply.

4 Classification and designation

Steels shall be classified into four grades, and their designations shall be as given in Table 1.

5 Manufacturing method

The manufacturing method of steels shall be as follows.

- a) The steels shall be manufactured from the killed steels produced by applying a vacuum degassing process to molten metal or the killed steels produced by the method as agreed between the purchaser and the manufacturer.
- b) The steels shall be manufactured by rolling, forging, etc. to attain the forging ratio of 6S or more for steels for cutting and 4S or more for steels for forging, unless otherwise specified.
- c) The steels shall be generally subjected to the spheroidization; however, it may be omitted, when specified by the purchaser.
- d) The steels may be manufactured from the hot-rolled steels or hot-forged steels by cold-rolling, cold-drawing, cutting, grinding, etc. or any combination thereof, when specified by the purchaser.

6 Chemical composition

The steels shall be tested in accordance with 14.1, and the heat analysis values shall be as given in Table 1. If the product analysis on steels is performed as agreed between the purchaser and the manufacturer, the steels shall be tested in accordance with 14.1, and the tolerances for the values in Table 1 shall be in accordance with Table 4 of JIS G 0321.

Table 1 Chemical composition

Designation of grade	Unit: %								
	C	Si	Mn	P	S	Cr	Mo	Ni	Cu ^{a)}
SUJ2	0.95 to 1.10	0.15 to 0.35	0.50 max.	0.025 max.	0.025 max.	1.30 to 1.60	0.08 max.	0.25 max.	0.25 max.
SUJ3	0.95 to 1.10	0.40 to 0.70	0.90 to 1.15	0.025 max.	0.025 max.	0.90 to 1.20	0.08 max.	0.25 max.	0.25 max.
SUJ4	0.95 to 1.10	0.15 to 0.35	0.50 max.	0.025 max.	0.025 max.	1.30 to 1.60	0.10 to 0.25	0.25 max.	0.25 max.
SUJ5	0.95 to 1.10	0.40 to 0.70	0.90 to 1.15	0.025 max.	0.025 max.	0.90 to 1.20	0.10 to 0.25	0.25 max.	0.25 max.
Elements not included in this table shall not be intentionally added for other purposes than to finish the molten metal unless otherwise agreed between the purchaser and the manufacturer.									
Note ^{a)} Cu in wire rod shall be 0.20 % or under.									

7 Shape, dimensions and dimensional tolerances

7.1 Standard dimensions

The standard diameters for hot-rolled round steel bars and wire rods shall be as given in Table 2.

Table 2 Standard diameter

Unit: mm														
Round steel bar (diameter)										Wire rod (diameter)				
15	16	17	18	19	20	21	22	23	24	5.5	6	7	8	9
25	26	27	28	29	30	(31)	32	33	34	9.5	(10)	11	(12)	13
(35)	36	37	38	(39)	40	42	44	46	(48)	(14)	(15)	16	(17)	(18)
49	50	51	(54)	55	60	(64)	65	(66)	70	19	(20)	22	(24)	25
75	(76)	80	83	(84)	(88)	90	93	99	104	(26)	28	30	32	34
114	(119)	124	130	140	150	160				36	38	40		
NOTE 1 The standard diameters not in parentheses should be used.														
NOTE 2 The wire rods in this table refer to those having a round cross-section, and include the bars in coil.														

7.2 Dimensional tolerances

The dimensional tolerances on steels for the hot-rolled round steel bars and the wire rods shall be as given in Table 3 and Table 4 respectively, regardless of the heat treatment. Those on cold-drawn steels (cold-drawn round steel bars and wires) shall be as given in Table 5.