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JIS G 5122 : 2003
(JSCFA/JSA)

**Heat-resistant cast steels and
alloys for general applications**

ICS 77.140.20; 77.140.80

Reference number : JIS G 5122 : 2003 (E)

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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 Steel Castings and Forgings Association of Japan (JSCFA)/Japanese Standards Association (JSA) 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 5122 : 1991** is replaced with this Standard.

In order to conform to the International Standard, this revision has been prepared based on **ISO 11973 : 1999** *Heat-resistant cast steels and alloys for general applications*.

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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.

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Heat-resistant cast steels and alloys for general applications

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 11973** *Heat-resistant cast steels and alloys for general applications* published in 1999 with some modifications of technical contents.

The portions with continuous sidelines or dotted underlines in this Standard are items modified the original International Standard. The table of modifications is shown as Annex (informative) with their explanations.

1 Scope This Standard specifies heat-resistant cast steels and alloys (including centrifugal cast steel pipes, hereafter referred to as “cast materials”).

Remarks : The International Standard corresponding to this Standard is as follows:

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**.

ISO 11973 : 1999 *Heat-resistant cast steels and alloys for general applications* (MOD)

2 Normative references The following standards 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.

JIS G 0307 *Steel castings—General technical delivery requirements*

Remarks : **ISO 4990** : 1986 *Steel castings—General technical delivery requirements* is equivalent to the said standard.

JIS G 0567 *Method of elevated temperature tensile test for steels and heat-resisting alloys*

JIS G 1211 *Iron and steel—Methods for determination of carbon content*

JIS G 1212 *Iron and steel—Methods for determination of silicon content*

JIS G 1213 *Iron and steel—Methods for determination of manganese content*

JIS G 1214 *Iron and steel—Methods for determination of phosphorus content*

JIS G 1215 *Iron and steel—Methods for determination of sulfur content*

JIS G 1216 *Iron and steel—Methods for determination of nickel content*

JIS G 1217 *Methods for determination of chromium in iron and steel*

JIS G 1218 *Iron and steel—Methods for determination of molybdenum content*

JIS G 1220 *Iron and steel—Methods for determination of tungsten content*

JIS G 1222 *Iron and steel—Methods for determination of cobalt content*

JIS G 1228 *Iron and steel—Methods for determination of nitrogen content*

JIS G 1237 *Iron and steel—Methods for determination of niobium content*

JIS G 1238 *Steel and iron—Determination of chromium content—Potentiometric or visual titration*

JIS G 1253 *Iron and steel—Method for spark discharge atomic emission spectrometric analysis*

JIS G 1256 *Iron and steel—Method for X-ray fluorescence spectrometric analysis*

JIS G 1257 *Iron and steel—Methods for atomic absorption spectrometric analysis*

JIS G 1281 *Methods for chemical analysis of nickel-chromium-iron alloys*

3 General conditions for delivery Cast materials furnished according to this Standard shall conform to the requirements specified in **JIS G 0307**, including the supplementary requirements indicated on the inquiry and purchase order.

4 Classification symbols Classification symbols of cast materials shall be as given in Table 1.

Table 1 Classification symbols

Classification symbols	Corresponding ISO classification	Similar steels (informative)
		ASTM
SCH 1	—	—
SCH 1X	GX40CrSi13	—
SCH 2	—	HC
SCH 2X1	GX40CrSi24	HC
SCH 2X2	GX40CrSi28	HC
SCH 3	—	—
SCH 4	GX30CrSi7	—
SCH 5	GX40CrSi17	—
SCH 6	GX130CrSi29	—
SCH 11	—	HD
SCH 11X	GX40CrNiSi27-4	HD
SCH 12	—	HF
SCH 12X	GX40CrNiSi22-10	HF
SCH 13	—	HH
SCH 13A	—	HHtype II
SCH 13X	GX40CrNiSi25-12	HHtype II
SCH 15	—	HT
SCH 15X	GX40NiCrSi35-17	HT
SCH 16	—	HT30
SCH 17	—	HE
SCH 18	—	HI

Table 1 (concluded)

Classification symbols	Corresponding ISO classification	Similar steels (informative)
		ASTM
SCH 19	—	HN
SCH 20	—	HU
SCH 20X	GX40NiCrSi38-19	HU
SCH 20XNb	GX40NiCrSiNb38-19	—
SCH 21	—	HK30
SCH 22	—	HK40
SCH 22X	GX40CrNiSi25-20	HK40
SCH 23	—	HL
SCH 24	—	HP
SCH 24X	GX40NiCrSi35-26	HP
SCH 24XNb	GX40NiCrSiNb35-26	HP
SCH 31	GX25CrNiSi18-9	—
SCH 32	GX25CrNiSi20-14	—
SCH 33	GX40CrNiSiNb24-24	—
SCH 34	GX10NiCrNb31-20	CT15C
SCH 41	GX40NiCrCo20-20-20	—
SCH 42	GX45NiCrWSi48-28-5	—
SCH 43	GX10NiCrNb50-50	50Cr-50Ni-Nb
SCH 44	GX50NiCrSi52-19	—
SCH 45	GX50NiCr65-15	HX
SCH 46	GX45NiCrCoWSi35-25-15-5	—
SCH 47	GX30CoCr50-28	—

Remarks : For centrifugal cast steel pipes, the notation –CF shall be suffixed to the symbol listed in the above Table.

Example : SCH 13–CF

5 Chemical composition Cast materials shall be subjected to the test of 12.2, and the ladle test value shall be as given in Table 2.

Table 2 Chemical composition

Classification symbols	Unit: %											
	C	Si	Mn	P	S	Ni	Cr	Mo	Nb	W	Co	Others
SCH 1	0.20 to 0.40	1.50 to 3.00	1.00 max.	0.040 max.	0.040 max.	1.00 max.	12.00 to 15.00	(¹)				
SCH 1X	0.30 to 0.50	1.00 to 2.50	0.50 to 1.00	0.040 max.	0.030 max.	1.00 max.	12.00 to 14.00	(¹)				
SCH 2	0.40 max.	2.00 max.	1.00 max.	0.040 max.	0.040 max.	1.00 max. ⁽²⁾	25.00 to 28.00	(¹)				
SCH 2X1	0.30 to 0.50	1.00 to 2.50	0.50 to 1.00	0.040 max.	0.030 max.	1.00 max.	23.00 to 26.00	(¹)				
SCH 2X2	0.30 to 0.50	1.00 to 2.50	0.50 to 1.00	0.040 max.	0.030 max.	1.00 max.	27.00 to 30.00	(¹)				
SCH 3	0.40 max.	2.00 max.	1.00 max.	0.040 max.	0.040 max.	1.00 max.	12.00 to 15.00	(¹)				
SCH 4	0.20 to 0.35	1.00 to 2.50	0.50 to 1.00	0.040 max.	0.040 max.	0.50 max.	6.00 to 8.00	(¹)				
SCH 5	0.30 to 0.50	1.00 to 2.50	0.50 to 1.00	0.040 max.	0.030 max.	1.00 max.	16.00 to 19.00	(¹)				
SCH 6	1.20 to 1.40	1.00 to 2.50	0.50 to 1.00	0.040 max.	0.030 max.	1.00 max.	27.00 to 30.00	(¹)				
SCH 11	0.40 max.	2.00 max.	1.00 max.	0.040 max.	0.040 max.	4.00 to 6.00	24.00 to 28.00	(¹)				
SCH 11X	0.30 to 0.50	1.00 to 2.50	1.50 max.	0.040 max.	0.030 max.	3.00 to 6.00	25.00 to 28.00	(¹)				
SCH 12	0.20 to 0.40	2.00 max.	2.00 max.	0.040 max.	0.040 max.	8.00 to 12.00	18.00 to 23.00	(¹)				
SCH 12X	0.30 to 0.50	1.00 to 2.50	2.00 max.	0.040 max.	0.030 max.	9.00 to 11.00	21.00 to 23.00	(¹)				

Table 2 (continued)

Classification symbols	Unit: %											
	C	Si	Mn	P	S	Ni	Cr	Mo	Nb	W	Co	Others
SCH 13	0.20 to 0.50	2.00 max.	2.00 max.	0.040 max.	0.040 max.	11.00 to 14.00	24.00 to 28.00	(¹)				(³)
SCH 13A	0.25 to 0.50	1.75 max.	2.50 max.	0.040 max.	0.040 max.	12.00 to 14.00	23.00 to 26.00	(¹)				(³)
SCH 13X	0.30 to 0.50	1.00 to 2.50	2.00 max.	0.040 max.	0.030 max.	11.00 to 14.00	24.00 to 27.00	(¹)				
SCH 15	0.35 to 0.70	2.50 max.	2.00 max.	0.040 max.	0.040 max.	33.00 to 37.00	15.00 to 19.00	(¹)				
SCH 15X	0.30 to 0.50	1.00 to 2.50	2.00 max.	0.040 max.	0.030 max.	34.00 to 36.00	16.00 to 18.00	(¹)				
SCH 16	0.20 to 0.35	2.50 max.	2.00 max.	0.040 max.	0.040 max.	33.00 to 37.00	13.00 to 17.00	(¹)				
SCH 17	0.20 to 0.50	2.00 max.	2.00 max.	0.040 max.	0.040 max.	8.00 to 11.00	26.00 to 30.00	(¹)				
SCH 18	0.20 to 0.50	2.00 max.	2.00 max.	0.040 max.	0.040 max.	14.00 to 18.00	26.00 to 30.00	(¹)				
SCH 19	0.20 to 0.50	2.00 max.	2.00 max.	0.040 max.	0.040 max.	23.00 to 27.00	19.00 to 23.00	(¹)				
SCH 20	0.35 to 0.75	2.50 max.	2.00 max.	0.040 max.	0.040 max.	37.00 to 41.00	17.00 to 21.00	(¹)				
SCH 20X	0.30 to 0.50	1.00 to 2.50	2.00 max.	0.040 max.	0.030 max.	36.00 to 39.00	18.00 to 21.00	(¹)				
SCH 20XNb	0.30 to 0.50	1.00 to 2.50	2.00 max.	0.040 max.	0.030 max.	36.00 to 39.00	18.00 to 21.00	(¹)	1.20 to 1.80			
SCH 21	0.25 to 0.35	1.75 max.	1.50 max.	0.040 max.	0.040 max.	19.00 to 22.00	23.00 to 27.00	(¹)				(³)