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JIS G 5121 : 2003

(JSCFA/JSA)

**Corrosion-resistant cast steels for
general applications**

ICS 77.140.20; 77.140.80

Reference number : **JIS G 5121 : 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 5121 : 1991** is replaced with this Standard.

In order to conform to the International Standard, this revision has been prepared based on **ISO 11972 : 1998** *Corrosion-resistant cast steels for general applications*.

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

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Corrosion-resistant cast steels for general applications

Introduction This Japanese Industrial Standard has been prepared based on the corresponding portions (general conditions for delivery and applicable supplementary requirements) of the first edition of **ISO 11972 Corrosion-resistant cast steels for general applications** published in 1998 without modifying the technical contents. The some items not specified in the original International Standard have been additionally contained herein as Japanese Industrial Standard.

The portions with continuous sidelines or dotted underlines in this Standard are the items not included in the original International Standard. The table of modification is shown as Annex (informative) with their explanations.

1 Scope This Standard specifies cast steels for general corrosion-resistant applications (including centrifugal cast steel pipes, hereafter referred to as “steel castings”).

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 11972 : 1998 *Corrosion-resistant cast steels 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 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 1219 *Iron and steel—Methods for determination of copper 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*

3 General conditions for delivery Steel castings 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 steel castings shall be as given in Table 1.

Table 1 Classification symbols

Classification symbols	Corresponding ISO classification	Similar steels (informative)
		ASTM
SCS 1	—	CA 15
SCS 1X	GX 12 Cr 12	CA 15
SCS 2	—	CA 40
SCS 2A	—	CA 40
SCS 3	—	CA 15M
SCS 3X	GX 8 CrNiMo 12 1	CA 15M
SCS 4	—	—
SCS 5	—	—
SCS 6	—	CA 6NM
SCS 6X	GX 4 CrNi 12 4 (QT1) (QT2)	CA 6NM
SCS 10	—	—
SCS 11	—	—
SCS 12	—	CF 20
SCS 13	—	—
SCS 13A	—	CF 8
SCS 13X	GX 5 CrNi 19 9	—
SCS 14	—	—
SCS 14A	—	CF 8M
SCS 14X	GX 5 CrNiMo 19 11 2	—
SCS 14XNb	GX 6 CrNiMoNb 19 11 2	—
SCS 15	—	—

Table 1 (concluded)

Classification symbols	Corresponding ISO classification	Similar steels (informative)
		ASTM
SCS 16	—	—
SCS 16A	—	CF 3M
SCS 16AX	GX 2 CrNiMo 19 11 2	CF 3M
SCS 16AXN	GX 2 CrNiMoN 19 11 2	CF 3MN
SCS 17	—	CH 10, CH 20
SCS 18	—	CK 20
SCS 19	—	—
SCS 19A	—	CF 3
SCS 20	—	—
SCS 21	—	CF 8C
SCS 21X	GX 6 CrNiNb 19 10	CF 8C
SCS 22	—	—
SCS 23	—	CN 7M
SCS 24	—	CB 7Cu-1
SCS 31	GX 4 CrNiMo 16 5 1	—
SCS 32	GX 2 CrNiCuMoN 26 5 3 3	A890M 1B
SCS 33	GX 2 CrNiMoN 26 5 3	—
SCS 34	GX 5 CrNiMo 19 11 3	CG 8M
SCS 35	GX 2 CrNiMo 19 11 3	CG 3M
SCS 35N	GX 2 CrNiMoN 19 11 3	—
SCS 36	GX 2 CrNi 18 10	—
SCS 36N	GX 2 CrNiN 18 10	—

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

Example : SCS 1–CF

5 Chemical composition Steel castings 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

Unit: %

Classification symbols	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Others
SCS 1	0.15 max.	1.50 max.	1.00 max.	0.040 max.	0.040 max.	(¹)	11.50 to 14.00	(⁴)		
SCS 1X	0.15 max.	0.80 max.	0.80 max.	0.035 max.	0.025 max.	(¹)	11.50 to 13.50	(⁴)		
SCS 2	0.16 to 0.24	1.50 max.	1.00 max.	0.040 max.	0.040 max.	(¹)	11.50 to 14.00	(⁴)		
SCS 2A	0.25 to 0.40	1.50 max.	1.00 max.	0.040 max.	0.040 max.	(¹)	11.50 to 14.00	(⁴)		
SCS 3	0.15 max.	1.00 max.	1.00 max.	0.040 max.	0.040 max.	0.50 to 1.50	11.50 to 14.00	0.15 to 1.00		
SCS 3X	0.10 max.	0.80 max.	0.80 max.	0.035 max.	0.025 max.	0.80 to 1.80	11.50 to 13.00	0.20 to 0.50		
SCS 4	0.15 max.	1.50 max.	1.00 max.	0.040 max.	0.040 max.	1.50 to 2.50	11.50 to 14.00			
SCS 5	0.06 max.	1.00 max.	1.00 max.	0.040 max.	0.040 max.	3.50 to 4.50	11.50 to 14.00			
SCS 6	0.06 max.	1.00 max.	1.00 max.	0.040 max.	0.030 max.	3.50 to 4.50	11.50 to 14.00	0.40 to 1.00		
SCS 6X	0.06 max.	1.00 max.	1.50 max.	0.035 max.	0.025 max.	3.50 to 5.00	11.50 to 13.00	1.00 max.		
SCS 10	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	4.50 to 8.50	21.00 to 26.00	2.50 to 4.00		N 0.08 to 0.30(²)
SCS 11	0.08 max.	1.50 max.	1.00 max.	0.040 max.	0.030 max.	4.00 to 7.00	23.00 to 27.00	1.50 to 2.50		(²)
SCS 12	0.20 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	8.00 to 11.00	18.00 to 21.00			
SCS 13	0.08 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	8.00 to 11.00	18.00(³) to 21.00			
SCS 13A	0.08 max.	2.00 max.	1.50 max.	0.040 max.	0.040 max.	8.00 to 11.00	18.00(³) to 21.00			
SCS 13X	0.07 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	8.00 to 11.00	18.00 to 21.00			
SCS 14	0.08 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	10.00 to 14.00	17.00(³) to 20.00	2.00 to 3.00		
SCS 14A	0.08 max.	1.50 max.	1.50 max.	0.040 max.	0.040 max.	9.00 to 12.00	18.00(³) to 21.00	2.00 to 3.00		
SCS 14X	0.07 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	2.00 to 2.50		

Table 2 (continued)

Unit: %

Classification symbols	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Others
SCS 14XNb	0.08 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	2.00 to 2.50		Nb8 × C % or over up to and incl. 1.00 %
SCS 15	0.08 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	10.00 to 14.00	17.00 to 20.00	1.75 to 2.75	1.00 to 2.50	
SCS 16	0.03 max.	1.50 max.	2.00 max.	0.040 max.	0.040 max.	12.00 to 16.00	17.00 to 20.00	2.00 to 3.00		
SCS 16A	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.040 max.	9.00 to 13.00	17.00 to 21.00	2.00 to 3.00		
SCS 16AX	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	2.00 to 2.50		
SCS 16AXN	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	2.00 to 2.50		N 0.10 to 0.20
SCS 17	0.20 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	12.00 to 15.00	22.00 to 26.00			
SCS 18	0.20 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	19.00 to 22.00	23.00 to 27.00			
SCS 19	0.03 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	8.00 to 12.00	17.00 to 21.00			
SCS 19A	0.03 max.	2.00 max.	1.50 max.	0.040 max.	0.040 max.	8.00 to 12.00	17.00 to 21.00			
SCS 20	0.03 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	12.00 to 16.00	17.00 to 20.00	1.75 to 2.75	1.00 to 2.50	
SCS 21	0.08 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	9.00 to 12.00	18.00 to 21.00			Nb10 × C % or over up to and incl. 1.35 %
SCS 21X	0.08 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	18.00 to 21.00			Nb8 × C % or over up to and incl. 1.00 %
SCS 22	0.08 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	10.00 to 14.00	17.00 to 20.00	2.00 to 3.00		Nb10 × C % or over up to and incl. 1.35 %
SCS 23	0.07 max.	2.00 max.	2.00 max.	0.040 max.	0.040 max.	27.50 to 30.00	19.00 to 22.00	2.00 to 3.00	3.00 to 4.00	
SCS 24	0.07 max.	1.00 max.	1.00 max.	0.040 max.	0.040 max.	3.00 to 5.00	15.50 to 17.50		2.50 to 4.00	Nb0.15 to 0.45

Table 2 (concluded)

Unit: %

Classification symbols	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Others
SCS 31	0.06 max.	0.80 max.	0.80 max.	0.035 max.	0.025 max.	4.00 to 6.00	15.00 to 17.00	0.70 to 1.50		
SCS 32	0.03 max.	1.00 max.	1.50 max.	0.035 max.	0.025 max.	4.50 to 6.50	25.00 to 27.00	2.50 to 3.50	2.50 to 3.50	N0.12 to 0.25
SCS 33	0.03 max.	1.00 max.	1.50 max.	0.035 max.	0.025 max.	4.50 to 6.50	25.00 to 27.00	2.50 to 3.50		N0.12 to 0.25
SCS 34	0.07 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	3.00 to 3.50		
SCS 35	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	3.00 to 3.50		
SCS 35N	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 20.00	3.00 to 3.50		N0.10 to 0.20
SCS 36	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 19.00			
SCS 36N	0.03 max.	1.50 max.	1.50 max.	0.040 max.	0.030 max.	9.00 to 12.00	17.00 to 19.00			N0.10 to 0.20

Notes (1) The maximum added Ni content is 1.00 %.

- (2) If necessary, alloy elements other than those mentioned above may be added.
- (3) Where class SCS 13, SCS 13A, SCS 14 or SCS 14A is used at low temperature, the maximum limit of Cr may be raised to 23.00 %.
- (4) The maximum Mo content for class SCS 1, SCS 1X, SCS 2 or SCS 2A may be 0.50 %.

6 Mechanical properties Steel castings shall be tested in accordance with 12.3, and the proof stress, tensile strength, elongation, reduction of area and hardness shall be as given in Table 3 and Table 4.

The values of Charpy impact strength may be subject to the agreement between the purchaser and the manufacturer.