



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS G 3314 : 2019

(JISF)

**Hot-dip aluminium-coated steel
sheet and strip**

ICS 77.140.50

Reference number : JIS G 3314 : 2019 (E)

Date of Establishment: 1977-01-01

Date of Revision: 2019-09-20

Date of Public Notice in Official Gazette: 2019-09-20

Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area
Technical Committee on Metal and Inorganic
Materials

JIS G 3314:2019, First English edition published in 2020-04

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

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

© JSA 2020

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 Symbol of grade, applicable nominal thickness and coating mass symbol	1
4 Chemical composition	2
5 Coating	3
5.1 Chemical composition of plating bath	3
5.2 Coating mass	3
5.3 Coating adherence	4
6 Chemical treatment	4
7 Oiling	5
8 Mechanical properties	5
8.1 Tensile test characteristics	5
8.2 Bendability	6
9 Dimensions	6
9.1 Expression of dimensions	6
9.2 Standard dimensions	6
9.3 Dimensional tolerances	7
10 Shape	8
10.1 Camber	8
10.2 Squareness	9
10.3 Flatness	10
11 Mass	11
12 Appearance	12
13 Tests	12
13.1 Chemical analysis	12
13.2 Chemical analysis of plating bath	12
13.3 Coating mass test	12
13.4 Coating adherence test	13
13.5 Mechanical tests	14
14 Inspection and reinspection	14
14.1 Inspection	14
14.2 Reinspection	15

15	Marking	15
16	Information to be supplied in enquiry and order	16
17	Report	16
Annex JA (normative)	Nominal thicknesses and coating mass symbols for sheets and coils for roofing or architectural siding	17
Annex JB (normative)	Coating mass test of hot-dip aluminium-coated steel sheets and strips	18
Annex JC (informative)	Comparison table between JIS and corresponding International Standard	26

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, paragraph (1) of the Industrial Standardization Act applied *mutatis mutandis* pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS G 3314:2017**), which has been technically revised.

However, **JIS G 3314:2017** may be applied in the **JIS** mark certification based on the relevant provisions of Article 30, paragraph (1), etc. of the Industrial Standardization Act until 19 September 2020.

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

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

NOTE Based on Article 9 of the Supplementary Provisions to the Unfair Competition Prevention Act etc., any submission of proposal, or employment of procedures such as deliberation by the Japanese Industrial Standards Committee under the previous Industrial Standardization Act shall be deemed to have been conducted pursuant to the provision of Article 12, paragraph (1) of the revised Industrial Standardization Act.

Blank

Hot-dip aluminium-coated steel sheet and strip

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 5000:2011**, Edition 4, 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 JC. Annex JA and Annex JB are unique to **JIS** and not given in the corresponding International Standard.

1 Scope

This Standard specifies requirements for steel sheets and strips coated by a hot-dip aluminium coating process (hereafter referred to as sheets and coils, respectively).

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

ISO 5000:2011 *Continuous hot-dip aluminium-silicon-coated cold-reduced carbon steel sheet of commercial and drawing qualities* (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 0320 *Standard test method for heat analysis of steel products*

JIS G 0404 *Steel and steel products—General technical delivery requirements*

JIS G 0415 *Steel and steel products—Inspection documents*

JIS K 0119 *General rules for X-ray fluorescence analysis*

JIS K 8576 *Sodium hydroxide (Reagent)*

JIS K 8847 *Hexamethylenetetramine (Reagent)*

JIS Z 2241 *Metallic materials—Tensile testing—Method of test at room temperature*

JIS Z 8401 *Rounding of numbers*

3 Symbol of grade, applicable nominal thickness and coating mass symbol

The symbol of grade, applicable nominal thickness and coating mass symbol shall be as follows.

- a) Sheets and coils are classified into eight grades, and their symbols, applicable thicknesses and coating mass symbols are given in Table 1.
- b) The nominal thicknesses for heat-resistant steel grades given in Table 1 shall apply to the thickness of base metal after coating (hereafter referred to as the product thickness), and those for weather-resistant steel grades shall apply to the thickness of base metal before coating (hereafter referred to as the base metal thickness). In the latter case, the letter B shall be attached after the symbol of grade.
- c) Symbols for roofing or architectural siding applications are given in Table 2.

Table 1 Symbol of grade, applicable nominal thickness and coating mass symbol

Classification	Symbol of grade	Application (informative)	Applicable nominal thickness mm	Coating mass symbol
Heat resistant	SA1C	Commercial	0.3 or over up to and incl. 2.5	40, 60, 80, 100, 120
	SA1D	Drawing		
	SA1E	Deep drawing	0.4 or over up to and incl. 2.5	
	SA1F	Extra deep drawing		
Weather resistant	SA2C	Commercial	0.3 or over up to and incl. 2.5	120 ^{a)} , 150, 200
	SA2 400	Structural	0.4 or over up to and incl. 2.5	
	SA2 440			
	SA2 490			
Note ^{a)} Only applicable to architectural siding applications.				

Table 2 Symbols for roofing or architectural siding applications

Application	Symbol
Roofing	R
Architectural siding	A

4 Chemical composition

When subjected to the heat analysis specified in 13.1, the base metal of the sheets and coils shall show the composition given in Table 3.

Table 3 Chemical composition

Unit: %

Symbol of grade	C	Mn	P	S
SA1C	0.15 max.	0.60 max.	0.050 max.	0.050 max.
SA1D	0.12 max.	0.50 max.	0.040 max.	0.040 max.
SA1E	0.10 max.	0.45 max.	0.030 max.	0.030 max.
SA1F	0.08 max.	0.45 max.	0.030 max.	0.030 max.
SA2C	0.15 max.	0.60 max.	0.050 max.	0.050 max.
SA2 400	0.25 max.	1.70 max.	0.200 max.	0.050 max.
SA2 440	0.25 max.	2.00 max.	0.200 max.	0.050 max.
SA2 490	0.30 max.	2.00 max.	0.200 max.	0.050 max.
Alloy elements other than given in this table may be added as required.				

5 Coating

5.1 Chemical composition of plating bath

When subjected to the analysis specified in **13.2**, the plating bath shall show the composition given in Table 4.

NOTE In hot-dip coating, the base metal is dipped in a bath of hot molten metal called the plating bath, and then cooled to form a coating layer on its surface.

Table 4 Chemical composition of plating bath

Unit: %

Si	Other elements than Si, Al	Al
7.0 or over up to and incl. 12.0	1.0 or under ^{a)}	Remainder ^{b)}
Notes ^{a)} Total of intentionally added elements. ^{b)} This may include unintentionally mixed elements.		

5.2 Coating mass

5.2.1 Coating mass symbol

The sheets and coils shall be given equal thickness coating on both sides. The coating mass symbols are given in Table 5. Coating mass symbols for roofing or architectural siding applications are given in Table JA.1.

5.2.2 Coating mass

When tested according to **13.3**, the coating mass of sheets and coils shall be as follows.

- The total coating mass of both surfaces of sheets and coils shall meet the minimum triple-spot average and single-spot value given in Table 5. The minimum triple-spot average shall apply to the average of measurements of three test pieces taken from the sample, and the single-spot value, to the smallest of measurements of the three

test pieces of which the average has been obtained. When coating mass is measured in accordance with **JB.5**, Table 5 shall apply to the average and minimum value determined in accordance with **JB.5.6.5**.

Table 5 Coating mass (total of both surfaces)

Unit: g/m²

Coating mass symbol	40	60	80	100	120	150	200
Minimum triple-spot average	40	60	80	100	120	150	200
Single-spot	30	45	60	75	90	113	150

5.3 Coating adherence

The coating adherence shall be as follows.

- When bent in accordance with **13.4** under the conditions given in Table 6, the test piece shall be free from flaking of the coating on its external surface in areas not less than 7 mm inside from the transverse edges of the test piece.
- Other test than specified in **13.4** may be performed at the discretion of the manufacturer, in which case the criteria applied shall be at least equivalent that applied in the test specified in **13.4**.

Table 6 Coating adherence and bendability

Classifica- tion	Symbol of grade	Bend angle	Internal spacing ^{a)} (Number of sheets)	
			Nominal thickness 0.3 mm or over to and excl. 1.6 mm	Nominal thickness 1.6 mm or over up to and incl. 2.5 mm
Heat resistant	SA1C	180°	2	2
	SA1D		1	2
	SA1E		1	2
	SA1F		1	2
Weather resistant	SA2C		4	4
	SA2 400		4	4
	SA2 440		4	4
	SA2 490		4	4
Note ^{a)} The internal spacing of bend is expressed as the number of sheets of nominal thick- ness.				

6 Chemical treatment

The classification and symbols for chemical treatment for sheets and coils shall be as given in Table 7. Where no specific treatment has been requested, the chromate-free ¹⁾ treatment shall be performed.

Note ¹⁾ Chromate-free means that the resulting coating does not contain hexavalent chromium.

Table 7 Classification and symbols for chemical treatment

Classification	Symbol
Chromate-free	a)
Untreated	M
Note a) Agreed between the purchaser and the manufacturer. The symbol "NC" specified in JIS G 3314:2011 may be used.	

7 Oiling

The classification and symbols for oiling for sheets and coils shall be as given in Table 8. The oiling requirement shall be as agreed between the purchaser and the manufacturer.

Table 8 Classification and symbols for oiling

Classification	Symbol
Oiled	O
Uncoiled	X

8 Mechanical properties

8.1 Tensile test characteristics

When tested in accordance with 13.5.2, the sheets and coils shall satisfy the requirements given in Table 9. Table 9 shall apply to the delivery inspection²⁾.

Note ²⁾ Sheets and coils may harden over time, exhibiting a higher yield point or proof stress, or decrease in elongation.

Table 9 Tensile test characteristics

Classification	Symbol of grade	Yield point or proof stress	Tensile strength	Elongation			
				%			
		N/mm ²	N/mm ²	Nominal thickness			
mm							
				0.30 or over to and excl. 0.40	0.40 or over to and excl. 0.60	0.60 or over to and excl. 1.00	1.00 or over
Heat resistant	SA1C	—					
	SA1D	—	270 min.	28 min.	30 min.	32 min.	34 min.
	SA1E	—	270 min.	—	34 min.	36 min.	38 min.
	SA1F	—	270 min.	—	35 min.	37 min.	39 min.
Weather resistant	SA2C	—					
	SA2 400	295 min.	400 min.	—	18 min.	18 min.	18 min.
	SA2 440	335 min.	440 min.	—	18 min.	18 min.	18 min.
	SA2 490	365 min.	490 min.	—	16 min.	16 min.	16 min.
When applying the coating mass symbol 120 to grades SA1D, SA1E and SA1F, the purchaser and the manufacturer may agree to reduce the minimum elongation value in the table by 2.							
NOTE 1 To grades SA1C and SA2C, yield point or proof stress minimum value of 205 N/mm ² , and tensile strength minimum value of 270 N/mm ² are in some cases applied upon agreement between the manufacturer and the purchaser.							
NOTE 2 1 N/mm ² = 1 MPa							

8.2 Bendability

When bent in accordance with **13.5.3**, the base metal of the test piece shall be free from visible cracks or fractures on its external surface in areas not less than 7 mm inside from the transverse edges of the test piece.

NOTE For the details of bend test, see **13.5.3**.

9 Dimensions

9.1 Expression of dimensions

The expression of dimensions of coils and sheets shall be as follows.

- Sheet dimensions shall be expressed by nominal thickness, width and length in millimetres.
- Coil dimensions shall be expressed by nominal thickness and width in millimetres. The coil length, where theoretical mass is applied, shall be expressed in metres.

NOTE The nominal thickness depends on the classification as provided in Table 1. See **3 b**).

9.2 Standard dimensions

The standard dimensions of sheets and coils shall be as follows.

- Standard nominal thicknesses**, as shown in Table 10.