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**Prepainted hot-dip zinc-5 % alumin-
ium alloy-coated steel sheet and
strip**

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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 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 3318:2005** is replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

Prepainted hot-dip zinc-5 % aluminium alloy-coated steel sheet and strip

1 Scope

This Japanese Industrial Standard specifies the prepainted hot-dip zinc-5% aluminium alloy-coated steel sheet and strip (hereinafter referred to as “sheets and coils”), produced by applying a uniform coat of durable synthetic resin paint and baking it on either one or both surfaces of hot-dip zinc-5% aluminium alloy-coated steel sheet and strip (hereinafter referred to as “substrate for prepainting”), using cold-reduced base metal specified in JIS G 3317. In this case, the term “sheets” includes not only flat sheets but also sheets with corrugation of specified shape and dimensions given in JIS G 3316.

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 0404 *Steel and steel products — General technical delivery requirements*
- JIS G 0415 *Steel and steel products — Inspection documents*
- JIS G 3316 *Shapes and dimensions of corrugated steel sheets*
- JIS G 3317 *Hot-dip zinc-5 % aluminium alloy-coated steel sheet and strip*
- JIS H 8502 *Methods of corrosion resistance test for metallic coatings*
- JIS K 5600-7-9 *Testing methods for paints — Part 7 : Determination of resistance to cyclic corrosion conditions — Section 9 : Salt fog/dry/humidity*
- JIS K 5600-8-1 *Testing methods for paints — Part 8 : Evaluation of degradation of paint coatings — Section 1 : General principles and rating schemes*
- JIS K 5600-8-2 *Testing methods for paints — Part 8 : Evaluation of degradation of paint coatings — Section 2 : Designation of degree of blistering*
- JIS K 5600-8-4 *Testing methods for paints — Part 8 : Evaluation of degradation of paint coatings — Section 4 : Designation of degree of cracking*
- JIS K 5600-8-6 *Testing methods for paints — Part 8 : Evaluation of degradation of paint coatings — Section 6 : Rating of degree of chalking*
- JIS R 6252 *Abrasive papers*
- JIS S 6006 *Pencil, coloured pencils and leads for them*

- JIS Z 1522 *Pressure sensitive adhesive cellophane tapes*
 JIS Z 2371 *Methods of salt spray testing*
 JIS Z 8401 *Guide to the rounding of numbers*
 JIS Z 8703 *Standard atmospheric conditions for testing*
 JIS Z 9117 *Retroreflective sheeting and tape for safety*

3 Classification and symbol

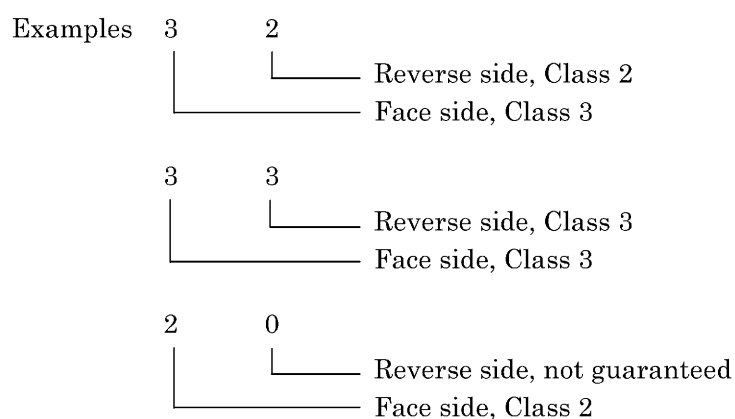
3.1 Classification and symbol of durability of paint coating

The durability of paint coating shall be classified into three classes, and their symbols shall be as given in table 1.

Table 1 Class of durability of paint coating and symbol

Class	Symbol	Durability
Class 1	1	Consisting of mainly one coat ^{a)} having durability as specified in clause 5.
Class 2	2	Consisting of mainly two coats having durability as specified in clause 5.
Class 3	3	Consisting of mainly two coats or more having durability as specified in clause 5.
Regardless of the existence of paint coatings, the non-guaranteed side shall be indicated by 0. Here, guarantee refers to conformity with clause 5, clause 6 and clause 12. However, for the sheets and coils for roofing, a) of clause 5 shall be applied also to durability of 0 side. Note a) Coat refers to formation of a coating film by coating and baking, and the figure indicates number of times of coating and baking.		

The classes of paint coating durability for the face side of sheets and coils, and for the reverse side shall be expressed in 2-digit figures consisting of combination of the symbol used to represent the classes of durability for respective sides.



3.2 Classification of sheets and coils, symbol of class and applicable nominal thickness ¹⁾, and substrate for prepainting

The classification of sheets and coils, symbol of class and applicable nominal thickness, and substrate for prepainting shall be as follows.

Note ¹⁾ Nominal thickness refers to the thickness of cold-reduced base metal before coating on the substrate for prepainting [see **a)** of clause 7].

- a) The sheets and coils shall be classified into 10 classes, and symbol of class and applicable nominal thickness shall be as given in table 2. However, the applicable nominal thickness may be the nominal thickness other than those given in table 2 in accordance with the agreement between the purchaser and the supplier. The substrate for prepainting used for the sheets and coils shall be the hot-dip zinc-5 % aluminium alloy-coated steel sheet and strip using cold-reduced base metal specified in **JIS G 3317**.
- b) For Class 3 paint coating durability, the coating mass of symbol Y27 given in **JIS G 3317** or over shall be applied to the substrate for prepainting.
- c) In the case of the sheets and coils for roofing and architectural siding, the symbol R for roofing and the symbol A for architectural siding shall be suffixed to the symbols given in table 2. In this case, the applicable nominal thickness and the symbol of coating mass shall be as specified in Annex JA of **JIS G 3317**.
- d) For roofing and architectural siding uses, Class 2 or Class 3 durability of paint coating shall be applied.
- e) The sheets and coils for roofing, for which the quality is guaranteed for one side only, shall be coloured beige on the reverse side for Class 2 durability of paint coating.
- f) For corrugation, the commercial, the commercial hard qualities and the structural quality among those listed in table 2 shall be used.
- g) For the sheets and coils subjected to corrugating in accordance with **JIS G 3316**, the symbol W which stands for corrugated sheet and the shape symbol (1 or 2) for corrugated sheets shall be suffixed to the symbol of class given in table 2 (or symbol R or A, in the case of roofing or architectural siding use, respectively). In this case, the applicable nominal thickness and the symbol of coating mass shall be as specified in Annex JB of **JIS G 3317**.

Table 2 Symbol of class and applicable nominal thickness

Unit : mm

Symbol of class	Applicable nominal thickness	Applicable	Symbol of class of substrate for prepainting
CZACC	0.25 or over up to and incl. 2.3	Commercial	SZACC
CZACH	0.25 or over up to and incl. 1.0	Commercial, hard	SZACH
CZACD1	0.40 or over up to and incl. 2.3	Drawing, Class 1	SZACD1
CZACD2	0.40 or over up to and incl. 2.3	Drawing, Class 2	SZACD2
CZACD3	0.60 or over up to and incl. 2.3	Drawing, Class 3	SZACD3
CZAC340	0.25 or over up to and incl. 1.6	Structural	SZAC340
CZAC400			SZAC400
CZAC440			SZAC440
CZAC490			SZAC490
CZAC570			SZAC570

The examples of symbol of class shall be as follows :

- In the case of one-side guaranteed prepainted hot-dip zinc-5 % aluminium alloy-coated steel sheets, commercial Class 2, CZACC-20
- In the case of both-side guaranteed prepainted hot-dip zinc-5 % aluminium alloy-coated steel sheets for roofing, using commercial quality, Class 2 (Class 2 for reverse side), CZACCR-22
- In the case of both-side guaranteed prepainted hot-dip zinc-5 % aluminium alloy-coated steel sheets, structural, Class 3 (substrate for prepainting SZAC400, Class 2 for reverse side), CZAC400-32
- In the case of one-side guaranteed corrugated steel sheets for roofing of prepainted hot-dip zinc-5 % aluminium alloy-coated steel sheets, using commercial quality, Class 2, CZACCR-20 W2

4 Surface protective treatments

The surface protective treatment shall be as designated by the purchaser. The types and symbols used for designating the surface protective treatment for sheets and coils shall be as given in table 3.

Table 3 Type of surface protective treatment and symbol

Type of surface protective treatment	Symbol
Protective films	P
Wax application	T

5 Paint coating durability

The durability of paint coating of the sheets and coils shall be in accordance with the

following. However, the durability evaluated by the cycle corrosion testing is applied by the agreement between the purchaser and the supplier.

- a) The neutral salt spray test shall be performed as given in table 4 and in accordance with 13.1.1, and no defects, except for slight blistering and rust, shall be found on the test piece.

For the limit of slight blistering, 2(S2) of JIS K 5600-8-1 and JIS K 5600-8-2 shall apply. The slight rust generated in the scuffed part may be excluded from object of evaluation.

- b) For the dew-cycle type accelerated weathering test, the test in table 4 shall be performed in accordance with 13.1.2 and durability of paint coatings shall be as follows. However, the paint coatings within 10 mm from the edge of the test piece shall not be subject to observation and evaluation.

- 1) No cracks shall be detected visually and those of Class 2 to 5 given in table 1 of JIS K 5600-8-4 shall not be found.
- 2) No peeling shall be detected visually and further paint coatings shall not be peeled ²⁾ when the pressure sensitive adhesive cellophane tape specified in JIS Z 1522 is placed on the paint coating, strongly pressed, rubbed with fingers and peeled.

Note ²⁾ This is equivalent to Class 0 in table 1 of JIS K 5600-8-5.

- 3) Chalking shall be evaluated in accordance with 6.1 of JIS K 5600-8-6, and acceptance criteria shall be in accordance with the agreement between the purchaser and the supplier.

NOTE : Fading may be evaluated in the dew-cycle type accelerated weathering test.

- c) When the cycle corrosion test was performed in accordance with 13.1.3, no defects, except for slight blistering and rust, shall be found on the plane of test piece. For the limit of slight blistering, 2(S2) of JIS K 5600-8-1 and JIS K 5600-8-2 shall apply. The slight rust generated in the scuffed part may be excluded from object of evaluation.

Furthermore, classification and test duration of the cycle corrosion test in accordance with 13.1.3 may be as agreed between the purchaser and the supplier.

Table 4 Duration of durability test of paint coating

Unit : h

Classification of durability	Durability test	
	Duration of salt spray test ^{a)}	Duration of dew-cycle type accelerated weathering test
Class 1	200	Not applied
Class 2	500	Not applied
Class 3	2 000	1 500
Note ^{a)} For the sheets and coils for roofing for which the quality is guaranteed for one side only, the duration of the salt spray test for the reverse side shall be 150 h.		

6 Physical properties of paint coatings

After being tested for items marked with a circle in table 5 below in accordance with 13.2 and 13.3, the sheets and coils shall, by visual inspection, be free from the defects given in table 5.

Table 5 Physical properties

Item	Commercial, hard (CZACH) Structural (CZAC570)	Commercial (CZACC), Drawing (CZACD1, CZACD2, CZACD3) Structural (CZAC340, CZAC400, CZAC440, CZAC490)	Judgment criteria	Test methods
Bending adhesion	—	○	No peeling from the substrate on the outer surface of the bent portion not less than 7mm from each side edge of the test piece.	13.2.2
Paint film hardness	○	○	No scratch marks on the paint film.	13.2.3
Impact resistance	—	○	No peeling from the substrate.	13.2.4
Adhesion	○	—	Irregular buildups shall not occur in such a manner that the paint coating peels from the substrate, cracks are produced in the paint coating or wrinkles produced in the paint coating gather.	13.2.5

7 Presentation of dimensions

The dimensions of the sheets and coils shall be expressed as follows :

- For the thickness of sheets and coils, the substrate thickness before plating shall be taken as the nominal thickness, and the thickness after coating is applied to the substrate shall be taken as the product thickness.

NOTE : “Nominal thickness” specified in this Standard and “nominal thickness” specified in JIS G 3317 indicate the same thickness.

- The dimensions of sheets shall be expressed by nominal thickness, width and length in millimetres.
- The dimensions of coils shall be expressed by nominal thickness and width in millimetres. However, when the mass of coils is expressed as theoretical mass, the length shall be given in metres.

8 Standard dimensions

The standard dimensions of the sheets and coils shall be as given below. However,

the standard nominal thickness of corrugated sheets and the standard widths and lengths of corrugated sheets prior to corrugation shall comply with Annex JB of JIS G 3317. Further, the standard lengths and widths after corrugation for corrugated sheet shall comply with JIS G 3316.

- a) **Standard nominal thickness** The standard nominal thickness of flat sheets and coils shall be as given table 6.

Table 6 Standard nominal thickness

														Unit : mm	
0.25	0.27	0.30	0.35	0.40	0.50	0.60	0.80	1.0	1.2	1.4	1.6	1.8	2.0	2.3	

- b) **Standard width and length** The standard width of flat sheets and coils and the standard lengths of flat sheets shall be as given in table 7.

Table 7 Standard width and length

Unit : mm							
Standard width	Standard length of flat sheet						
762	1 829	2 134	2 438	2 743	3 048	3 353	3 658
914	1 829	2 134	2 438	2 743	3 048	3 353	3 658
1 000	2 000						
1 219	2 438	3 048	3 658				
As for the coil, 610 mm may be adopted as the standard width.							

9 Dimensional tolerances

9.1 Tolerances on product thickness

Tolerances on product thickness for the sheets and coils shall be as follows:

- a) Tolerances on product thickness shall be applied to nominal thickness rounded to three decimal places plus the equivalent thickness of coating given in table 8, which is further rounded to two decimal places according to Rule A of JIS Z 8401.

NOTE : The symbols of coating mass given in table 8 are in accordance with JIS G 3317.

- b) Tolerances on product thickness shall be as given in tables 9 and 10.
- c) The product thickness of the sheets and coils shall be measured at any inner point not less than 25 mm from the edge (across-the-width).

Table 8 Equivalent coating thickness

Unit : mm

Symbol of coating mass	Y06	Y08	Y10	Y12	Y18	Y20	Y22	Y25	Y27	Y35	Y45	Y60
Equivalent coating thickness	0.014	0.018	0.023	0.028	0.037	0.043	0.046	0.053	0.058	0.069	0.086	0.110

Table 9 Tolerances on product thickness (applicable for paint coating durability classes “10”, “11”, “20” and “21”)

Unit : mm

Nominal thickness	Width		
	Under 630	630 or over to and excl. 1 000	1 000 or over to and excl. 1 250
Under 0.25	+0.08	+0.08	+0.08
	−0.03	−0.03	−0.03
0.25 or over to and excl. 0.40	+0.09	+0.09	+0.09
	−0.04	−0.04	−0.04
0.40 or over to and excl. 0.60	+0.10	+0.10	+0.10
	−0.05	−0.05	−0.05
0.60 or over to and excl. 0.80	+0.11	+0.11	+0.11
	−0.06	−0.06	−0.06
0.80 or over to and excl. 1.00	+0.11	+0.11	+0.12
	−0.06	−0.06	−0.07
1.00 or over to and excl. 1.25	+0.12	+0.12	+0.13
	−0.07	−0.07	−0.08
1.25 or over to and excl. 1.60	+0.13	+0.14	+0.15
	−0.08	−0.09	−0.10
1.60 or over to and excl. 2.00	+0.15	+0.16	+0.17
	−0.10	−0.11	−0.12
2.00 or over up to and incl. 2.30	+0.17	+0.18	+0.19
	−0.12	−0.13	−0.14

Table 10 Tolerances on product thickness (applicable for paint coating durability classes other than “10”, “11”, “20” and “21”)

Unit : mm

Nominal thickness	Width		
	Under 630	630 or over to and excl. 1 000	1 000 or over to and excl. 1 250
Under 0.25	+0.10 −0.02	+0.10 −0.02	+0.10 −0.02
0.25 or over to and excl. 0.40	+0.11 −0.03	+0.11 −0.03	+0.11 −0.03
0.40 or over to and excl. 0.60	+0.12 −0.04	+0.12 −0.04	+0.12 −0.04
0.60 or over to and excl. 0.80	+0.13 −0.05	+0.13 −0.05	+0.13 −0.05
0.80 or over to and excl. 1.00	+0.13 −0.05	+0.13 −0.05	+0.14 −0.06
1.00 or over to and excl. 1.25	+0.14 −0.06	+0.14 −0.06	+0.15 −0.07
1.25 or over to and excl. 1.60	+0.15 −0.07	+0.16 −0.08	+0.17 −0.09
1.60 or over to and excl. 2.00	+0.17 −0.09	+0.18 −0.10	+0.19 −0.11
2.00 or over up to and incl.2.30	+0.19 −0.11	+0.20 −0.12	+0.21 −0.13

9.2 Tolerances on width and length

Tolerances on width of the sheets and coils and length of the sheets shall be as given in table 11. However, tolerances on the width for corrugated sheet after corrugation shall conform to **JIS G 3316**.

In addition, tolerances on width and length may be moved to the minus side in the same range as the total tolerance range specified in table 11 in accordance with the agreement between the purchaser and the supplier. However, the upper limit of tolerance agreed shall not be below 0.

Table 11 Tolerances on width and length

Unit : mm

Division	Tolerances
Width	+7 0
Length	+15 0

10 Shape

10.1 Camber

For the camber of flat sheets and coils, figure 1 shall apply. The maximum camber

values for the flat sheets and coils shall be as given in table 12. However, camber shall not be applied to the abnormal part of coils.

In addition, the measurement of camber may be omitted³⁾. However, when especially specified by the purchaser, the measurement shall be performed.

Note ³⁾ Though the omission of the measurement based on the judgment of the manufacturer is permissible, this does not exempt the sheets and coils from the camber requirements.

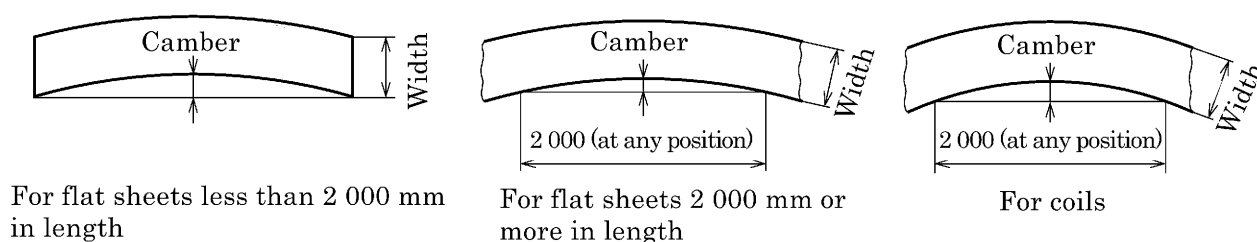


Figure 1 Application of camber

Table 12 Maximum camber values

			Unit : mm
Width	Flat sheet		Coil
	Length		
	Under 2 000	2 000 or over	
Under 630	4	4 in any 2 000 length	
630 or over	2	2 in any 2 000 length	

Unit : mm

10.2 Squareness

The squareness tolerance of flat sheets shall be expressed by $\frac{l}{b} \times 100$ (%) in figure 2 and shall not exceed 1 %.

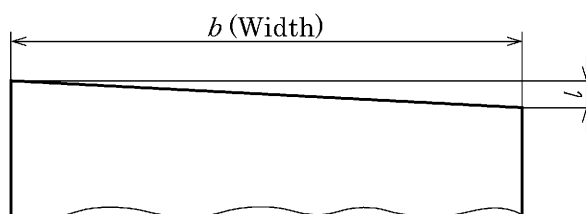


Figure 2 Squareness of flat sheet

10.3 Flatness

Flatness of flat sheets shall be as given in table 13. Flatness shall be measured by laying a sheet under its own mass on a flat surface sheet as shown in figure 3, and the value of flatness shall be determined as the difference between the maximum deviation

of convex from the flat surface and the product thickness of the sheet. This shall apply to the upper face of the flat sheet.

Table 13 Flatness of flat sheet

Unit : mm

Width	Classes		
	Warp	Edge wave ^{a)}	Centre buckle ^{b)}
Under 1 000	12 max.	8 max.	6 max.
1 000 or over to and excl. 1 250	15 max.	9 max.	8 max.
Notes ^{a)} It refers to the state that a wave appears in the edge (across-the-width) of the sheet and coil.			
^{b)} It refers to the state that a wave appears in the central part of the sheet and coil.			

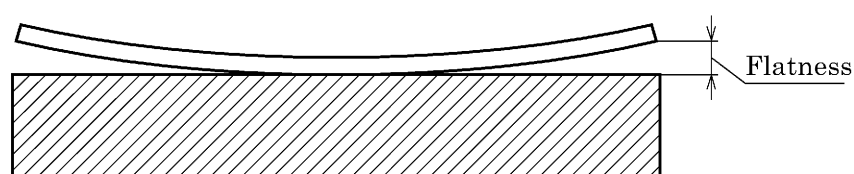


Figure 3 Measurement of flatness (case of warp)

11 Mass and tolerances

11.1 Mass of sheet

The mass of sheets shall be as a rule given in theoretical mass in kilograms.

11.2 Mass of coil

The mass of coils shall be given in either actual or theoretical mass in kilograms.

11.3 Calculation of mass

The calculation of mass of the sheet and coil shall comply with table 14.

Table 14 Calculation of mass

Calculation order		Calculation method	Rounding ^{e)}
Basic mass of substrate ^{a)} kg/mm · m ²		7.85 (thickness 1 mm, area 1 m ²)	—
Unit mass of substrate kg/m ²		Basic mass of substrate (kg/mm · m ²) × nominal thickness (mm)	Round off to 4 significant figures
Unit mass after coating kg/m ²		Basic mass of substrate (kg/m ²) + coating mass constant ^{d)} (kg/m ²)	Round off to 4 significant figures
Sheet	Area of sheet ^{b)} m ²	Width (mm) × length (mm) × 10 ⁻⁶	Round off to 4 significant figures
	Mass of a single sheet kg	Unit mass after coating (kg/m ²) × area (m ²)	Round off to 3 significant figures
	Mass of single bundle ^{c)} kg	Mass of a single sheet (kg) × number of sheets in a single bundle of the same dimensions	Round off to integral number of kg
	Total mass kg	Total mass of each bundle (kg)	Integral number of kg
Coil	Unit mass of coil kg/m	Unit mass after coating (kg/m ²) × width (mm) × 10 ⁻³	Round off to 3 significant figures
	Mass of a single coil kg	Unit mass of coil (kg/m) × length (m)	Round off to integral number of kg
	Total mass kg	Total mass of coils (kg)	Integral number of kg
Notes a) Substrate refers to cold-reduced base metal before coating the substrate for pre-painting. b) The width dimension to be used for calculating the area of corrugated sheet shall be that prior to corrugation. c) The number of sheets, when the bundle mass is specified, shall be obtained by dividing the specified mass by the mass of a single sheet of the same shape, dimensions and coating mass, and rounded off to an integral number. d) The coating mass constants shall be in accordance with table 15. e) Rounding of values shall be in accordance with Rule A prescribed in JIS Z 8401 .			

Table 15 Coating mass constants for mass calculation

Unit : kg/m ²												
Symbol of coating mass	Y06	Y08	Y10	Y12	Y18	Y20	Y22	Y25	Y27	Y35	Y45	Y60
Coating mass constant	0.090	0.120	0.150	0.183	0.244	0.285	0.305	0.350	0.381	0.458	0.565	0.722

11.4 Tolerances on theoretical mass of sheet

When specified by the purchaser, the tolerances on theoretical mass of sheet shall be expressed as the percentage of the difference between the theoretical mass and the actual mass divided by the theoretical mass and shall be in accordance with table 16.

Table 16 Tolerances on theoretical mass of sheet

Theoretical mass of a single lot kg	Tolerance %
Under 600	± 10
600 or over to and excl. 2 000	± 7.5
2 000 or over	± 5
Calculation shall be made by regarding as one lot a group of sheets that are equivalent in the class of the substrate for prepainting and the coating mass, as well as having the same shape and dimensions.	

12 Appearance

The sheets and coils shall be free from defects that are detrimental to practical use. However, the surface defects, unless otherwise specified, shall be applied to the side ⁴⁾ which guarantees durability of the sheets and coils.

In addition, the coil, since there is no chance to remove defects by general inspections, may include irregular portions such as welds and floating.

Note ⁴⁾ In the case where the single side is guaranteed, normally, for the sheet, the upper side in packaging shall be the guaranteed side, and for the coil, the internal side of coil shall be the guaranteed side.

13 Tests

13.1 Endurance tests for paint coatings

Endurance tests for paint coatings shall be as follows. The test shall be the type test, and not performed at every delivery, but performed when the stabilized manufacturing condition is established, or when the manufacturing condition which affects durability is changed, etc.

In addition, for corrugated sheets, test specimens shall be taken from flat sheets prior to corrugation.

13.1.1 Salt spray test

The salt spray test method shall be in accordance with **JIS Z 2371**. However, the solution of which pH is adjusted in accordance with 7.2.1 of **JIS Z 2371** shall be used.

13.1.2 Dew-cycle type accelerated weathering test

The dew-cycle type accelerated weathering test shall comply with the method specified in 7.5 (1) of **JIS Z 9117**.

13.1.3 Cycle corrosion test

The cycle corrosion test shall be in accordance with the method of either clause 8 of **JIS H 8502** or Annex 1 of **JIS K 5600-7-9**.

In addition, this test shall be applied in accordance with the agreement between the

purchaser and the supplier, and the evaluation criteria (setting of reference value and characteristics value) may be as agreed between the purchaser and the supplier.

13.2 Tests for physical properties of paint coating

13.2.1 Sampling of test specimens

For use in the bend, pencil hardness, impact and cross-scoring tests, one test specimen shall be sampled from every 50 t or fraction of products of the same class of substrate for prepainting, the same coating mass and the same dimensions and colour.

For corrugated sheets, test specimens shall be taken from flat sheets prior to corrugation.

13.2.2 Bend test

The bend test shall be as follows :

- a) The test piece shall have a width of 75 mm to 125 mm and a length suited for the test. Unless otherwise specified, one test piece shall be cut out of each test specimen paralleled to the rolling direction of the substrate for prepainting.
- b) By referring to the internal spacing of bend shown in table 17, the test piece shall be bent manually with a vise as the test side is adjusted to the outside 180 ° longitudinal direction of the test piece, as shown in figure 4. When a hand vise is not available, other suitable means of testing may be adopted.
- c) The bend test shall be applied to the products of coating mass symbol Y27 as given in JIS G 3317 or under. However, in the case of the products of coating mass symbol Y35, Y45 and Y60 given in JIS G 3317, the bend test may be performed according to the internal spacing of bend agreed between the purchaser and the supplier.

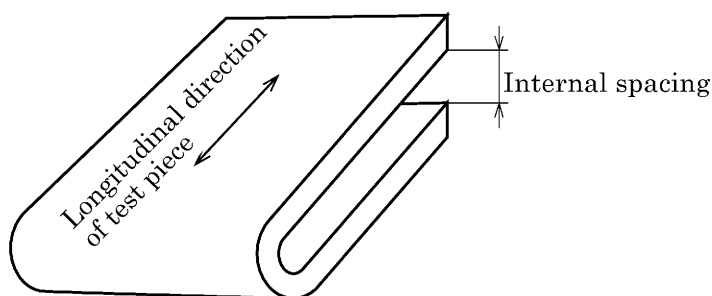


Figure 4 Direction of bend test

Table 17 Internal spacing of bend

Symbol of class	Bend angle	Nominal thickness mm	Internal spacing of bend
CZACC	180 °	0.40 or under	2 sheets of nomonal thickness
		Over 0.40 up to and incl. 2.3	3 sheets of nomonal thickness
CZACH	—	—	—
CZACD1, CZACD2, CZACD3	180 °	0.40 or over up to incl. 2.3	2 sheets of nomonal thickness
CZAC340		0.40 or under	2 sheets of nomonal thickness
		Over 0.40 up to and incl. 1.6	3 sheets of nomonal thickness
CZAC400		1.6 or under	3 sheets of nomonal thickness
CZAC440		0.40 or under	4 sheets of nomonal thickness
CZAC490		Over 0.40 up to and incl. 1.6	5 sheets of nomonal thickness
CZAC570	—	—	—

13.2.3 Pencil hardness test

The pencil hardness test shall be as follows:

- a) Lead of the pencil (wick) of one of the hardness symbols in table 18 shall be used according to the durability classification of the paint film. The hardness symbol in table 18 is shown in **JIS S 6006**. For commercial and drawing qualities, pencil and lead of other hardness symbols than those given above may be used as agreed upon between the purchaser and the supplier.

Table 18 Symbols for pencil hardness

Durability classification	Hardness symbol
Class 1	H
Class 2	H
Class 3	F

- b) The pencil hardness test is done by using pencil or lead holder. The pencil shall be sharpened so as to expose about 3 mm point of the lead or fixed to the holder. While being held at right angles to an abrasive paper of No. P400 or finer as specified in **JIS R 6252** which has been laid on a hard and flat surface, the point of the lead shall be made to draw a continuous circle gently and thus be ground down so as to obtain a flat surface with sharp edges at the tip.

The tip of the lead shall be ground flat before reuse for each test.

- c) Holding the pencil or lead holder prepared by b) at an angle of about 45 ° to the surface of the test specimen, straight lines shall be drawn with it in the direction shown in figure 5, with the load of about 10 N being applied. The lines shall be not less than 20 mm in length and not less than three in number.

- d) The existence of scratches on the surface of the test specimen shall be visually checked.

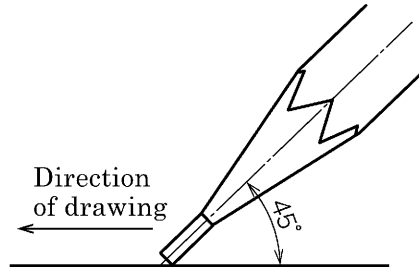


Figure 5 Pencil hardness testing method

13.2.4 Impact test

The impact test shall be as follows :

- A weight shall be dropped onto a test face from a Du Pont type impact tester, as shown in figure 6.
- The mass of the weight shall be $500\text{ g} \pm 1\text{ g}$, and the radius of the impact point shall be $6.35\text{ mm} \pm 0.03\text{ mm}$.
- The weight shall be dropped from a height of 500 mm above the test piece.
- The existence of peeling of paint coatings of the test piece at the location where the weight drops shall be visually checked.

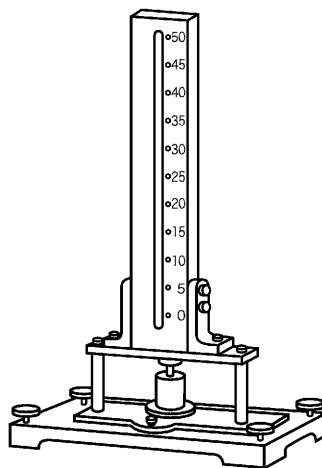


Figure 6 Du Pont impact-deformation tester

13.2.5 Cross-scoring test

The cross-scoring test shall be as follows :

- a) Straight lines shall be scored with a cutter knife or other pointed objects so as to reach the surface of the coating through the paint film and to form squares.
- b) Eleven straight lines shall be scored crosswise at right angles, at intervals of 1 mm.
- c) The existence of peeling of paint coatings of the test piece at the squares which are formed by scoring the paint coatings crosswise at right angles shall be visually checked.

13.3 Caution for testing

The tests require the following cautions:

- a) Since the durability and physical properties of the sheets and coils are affected by paint coating flaws incurred in handling, hair cracks on processed surfaces, etc., testing shall be conducted on flat sheets with normal surfaces.
- b) The temperature for tests on physical properties shall be the normal temperatures (5 °C to 35 °C) specified in **JIS Z 8703**.

14 Inspection and reinspection

14.1 Inspection

The inspection shall be in accordance with **JIS G 0404**, and shall be as follows :

- a) The durability of paint coating shall conform to the requirements specified in clause 5.
- b) The physical properties of paint coating shall conform to the requirements specified in clause 6.
- c) The dimensions shall conform to the requirements specified in clause 9.
- d) The shape shall conform to the requirements specified in clause 10.
- e) The mass shall conform to the requirements specified in clause 11.
- f) The appearance shall conform to the requirements specified in clause 12.

14.2 Reinspection

When any test results of the physical properties of sheets and coils fail to meet the specified requirements, a retest relevant to the failed requirement may be performed in accordance with 9.8 of **JIS G 0404** so that a further judgment for acceptance may be made.

15 Marking

15.1 Package marking

The sheets and coils which have passed the inspection shall be marked on each package or each bundle by a suitable method with the following items :

- a) Symbol of class (including shape symbol for corrugated sheets)
- b) Symbol of coating mass
- c) Colour name or colour symbol
- d) Dimensions (see clause 7)
- e) Number of sheets or mass
- f) Manufacturer's name or its identifying brand
- g) Identification number of product

15.2 Reverse side marking

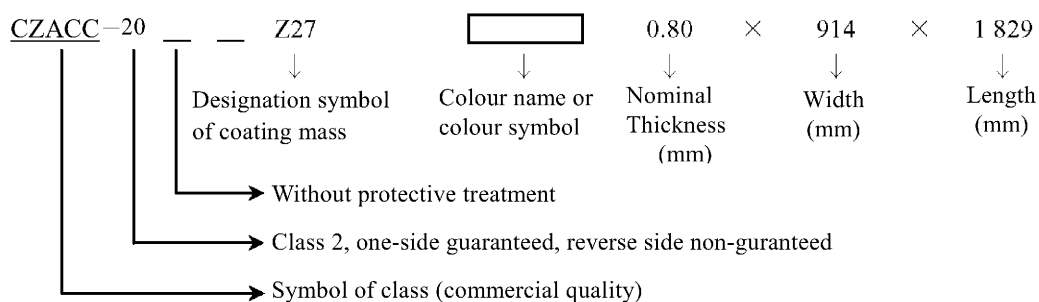
For the sheets and coils which have passed the inspection and the quality of which is guaranteed for one side only, the reverse (non-guaranteed) side markings shall be as shown below. For both-side guarantees, the sheet and strip shall be marked only when so specified.

The markings shall be made by a suitable means for each sheet or coil (at specific intervals for roofing).

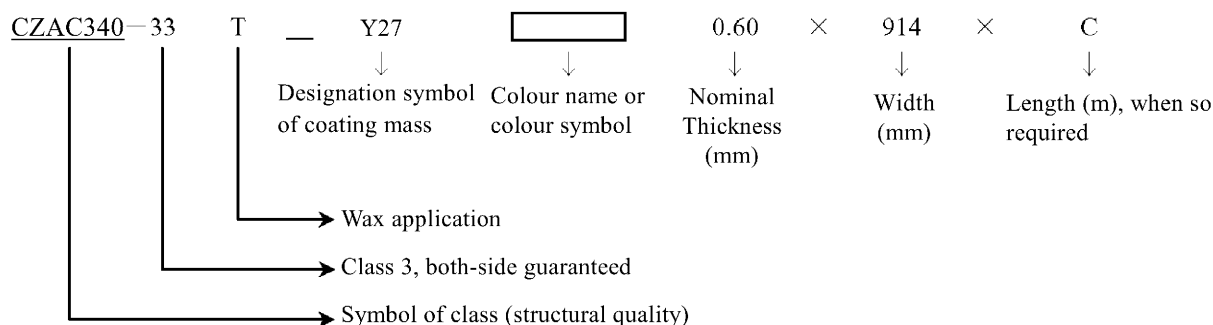
- a) **For roofing** The following items shall be marked.
 - 1) Nominal thickness
 - 2) Symbol of class (including shape symbol for corrugated sheets)
 - 3) Application [marking of the word "YANE", meaning "roof"]
 - 4) Manufacturer's name or its identifying brand
- b) **For other than roofing** The following items shall be marked. However, the markings may be omitted as agreed upon between the purchaser and the supplier.
 - 1) Nominal thickness
 - 2) Symbol of class (including shape symbol for corrugated sheets)
 - 3) Manufacturer's name or its identifying brand

Examples of reverse side markings are shown in the following.

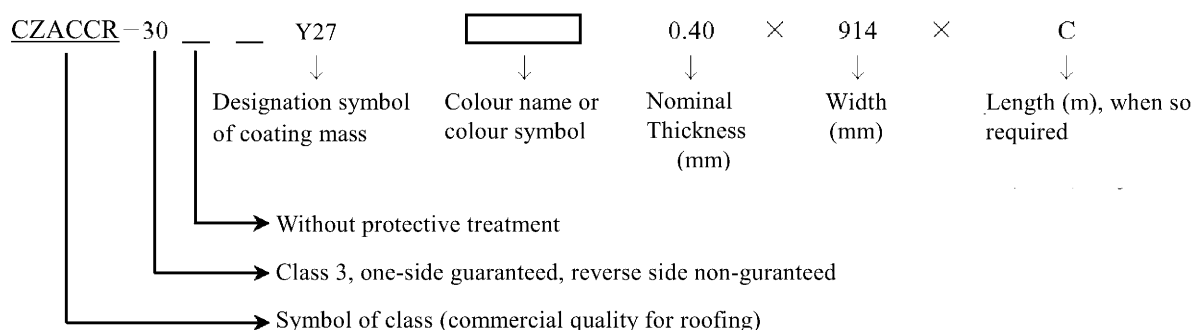
Example 1 Marking for sheet



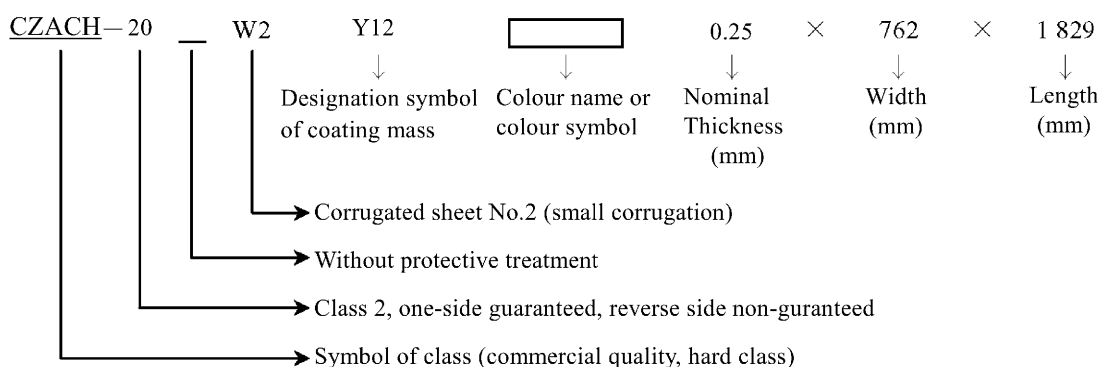
Example 2 Marking for coil



Example 3 Marking for roofing (coil)



Example 4 Marking for corrugated sheet using commercial, hard quality



16 Storage, transportation and fabrication

Storage, transportation and fabrication shall be carried out as follows :

- a) For the storage of the sheets and coils, at a well-ventilated indoor place virtually free from dust and moisture should be specified.
- b) Every precaution shall be taken against paint coating damage and contact with water during transportation and transfer and mixed loading with corrosive substances such as chemicals shall be avoided.

- c) The fabricability of paint coatings deteriorates with the decrease of temperature. When the sheet and coil stored in a low-temperature warehouse are to be fabricated, the temperature of the material should be elevated to normal temperature.

17 Items to be confirmed at the time of order

The purchaser and the supplier should include the following information in an inquiry sheet and an order sheet in order to specify the matter according to this Standard appropriately.

- a) Class of durability of paint coating and its symbol (see table 1)
- b) Class and symbol of sheet and coil (see table 2)
- c) With and without surface protective treatment (see table 3 in the case of with surface protective treatment)
- d) Symbol of coating mass
- e) Product name
- f) Colour name or colour symbol
- g) Dimensions (see table 6 for standard nominal thickness, see table 7 for standard width and length)
- h) Winding direction, in the case of coil (surface internal winding, surface external winding)
- i) Maximum mass and minimum mass of one bundle or one coil of a product
- j) Total mass ordered
- k) Internal diameter or external diameter (in the case of a coil)
- l) Application, processing method, etc. (when possible)

18 Report

When there is a request of the purchaser beforehand, the manufacturer shall submit the inspection document to the purchaser. In this case, the report shall comply with the requirements of clause 13 in **JIS G 0404**. Unless otherwise specified, the specification of inspection document shall be symbol 2.3 or 3.1.B in table 1 of **JIS G 0415**.

Bibliography

JIS G 3312 *Prepainted hot-dip zinc-coated steel sheet and strip*

JIS G 3322 *Prepainted hot-dip 55 % aluminium — zinc alloy-coated steel sheet and strip*

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