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Fiber reinforced cement sidings

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Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Classification	2
4 Quality	2
4.1 Materials	2
4.2 Appearance	2
4.3 Warp	3
5 Shapes and dimensions	3
5.1 Shapes	3
5.2 Dimensions and tolerances	5
6 Performances	5
7 Tests	6
7.1 Specimen	6
7.2 Measurement of warp	7
7.3 Measurement of dimensions	8
7.4 Moisture content test	10
7.5 Test of fracture load by bending	11
7.6 Shock resistance test	11
7.7 Test of adhesion of coating	11
7.8 Weather resistance test	12
7.9 Freezing and thawing resistance test	12
7.10 Water permeability test	14
7.11 Test of warp by water absorption	14
7.12 Incombustibility test or heat generation property test	15
8 Inspection	16
9 Designation of product	16
10 Marking	17
Annex A (normative) Test method and evaluation of heat generation property	18
Annex B (informative) Comparison table between previous and current editions of this Standard on technically significant revisions	24

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 Japan Fiber Reinforced Cement Sidings Manufacturers Association (NYG)/Japanese Standards Association (JSA) with a 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 A 5422:2014**), which has been technically revised.

However, **JIS A 5422:2014** 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 21 January 2020.

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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.

Fiber reinforced cement sidings

Introduction

This Japanese Industrial Standard was established in 1976, and has gone through eight revisions including this one. The last revision was made in 2014, and the revision at this time is to respond to the addition of requirements for the depth of surface pattern and the clarification of definition of the moisture content as a performance item. The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex B.

No corresponding International Standard has been established at this point.

1 Scope

This Standard specifies the requirements for the fiber reinforced cement sidings (hereafter referred to as sidings) mainly used for exterior work of buildings.

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 A 1321 *Testing method for incombustibility of internal finish material and procedure of buildings*
- JIS A 1408 *Test methods of bending and impact for building boards*
- JIS A 1415 *Methods of exposure to laboratory light sources for polymeric material of buildings*
- JIS A 1435 *Method of test for resistance of exterior materials of buildings to freezing and thawing*
- JIS B 7502 *Micrometers*
- JIS B 7503 *Mechanical dial gauges*
- JIS B 7507 *Vernier, dial and digital callipers*
- JIS B 7512 *Steel tape measures*
- JIS B 7516 *Metal rules*
- JIS B 7518 *Vernier, dial and digital depth gauges*
- JIS L 0804 *Grey scale for assessing change in colour*
- JIS K 5600-4-5 *Testing methods for paints—Part 4: Visual characteristics of film—Section 5: Colorimetry (Measurement)*
- JIS K 5600-4-6 *Testing methods for paints—Part 4: Visual characteristics of film—Section 6: Colorimetry (Calculation of colour differences)*
- JIS S 6050 *Plastics erasers*
- JIS Z 1522 *Pressure sensitive adhesive cellophane tapes*
- JIS Z 8723 *Methods for visual comparison of surface colours*

3 Classification

The sidings are classified as given in Table 1 according to the necessity of decorative finish at construction site.

Table 1 Classification

Type of siding	Symbol of type	Necessity of decorative finish at construction site	Specifications of product
Decorative siding	D	No	Siding in which decorative finish such as printing and coating (except tile finishing material) is applied to the surface of base material at a factory, including that in which colouring material is added to the raw material at a factory or the substrate is used as it is.
Siding for coating at construction site	S	Yes	Siding in which sealer is applied at a factory in advance and decorative coating (except tile finishing material) is applied at construction site.

4 Quality

4.1 Materials

Materials mainly used as the base material of siding shall be cement, silicic acid material, fibre material, admixture, etc.

4.2 Appearance

The appearance of siding shall conform to Table 2 when examined visually.

Table 2 Appearance

Type of defects	Judgement	Symbol of type	
		D	S
Split, and crack in base material	None.	○	○
Holiday ^{a)}		○	○
Chip, contamination of foreign material, surface crack, surface peel	Not harmful in practical use.	○	○
Unevenness except pattern purpose, stain, score and scratch, twist, roll	Not conspicuous by observation ^{b)} 3 m apart.	○	○
Inequality of gloss and colour tone except decoration purpose		○	—
Notes ^{a)} Not applicable to decorative siding in which “colouring material is added to raw material at a factory” or “the substrate is used as it is”.			
^{a)} Observation shall be conducted under the day-light from northern window or the illumination of at least 500 lx, avoiding the direct sunlight.			
○: Applicable			
—: Not applicable			

4.3 Warp

The warp of siding shall conform to Table 3 when tested in accordance with 7.2.

Table 3 Warp

Unit: mm

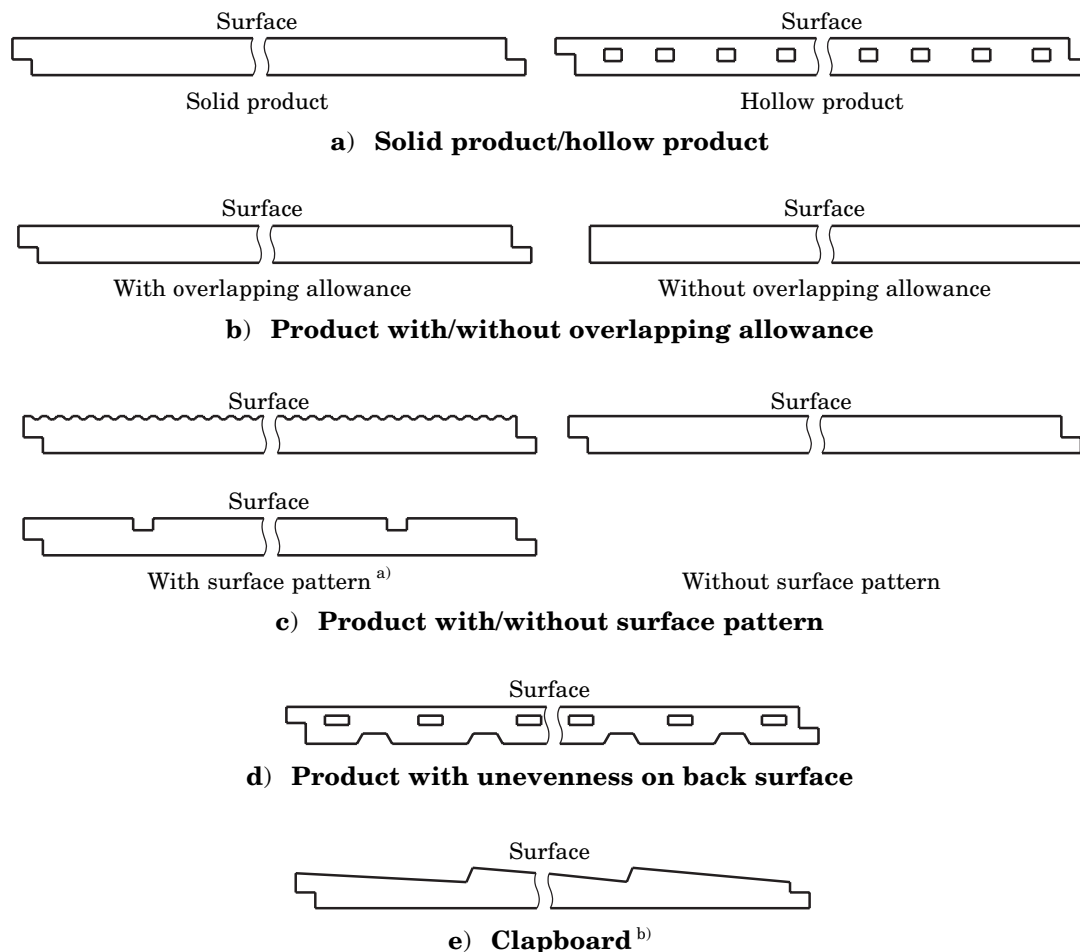
Overall width or effective width ^{a)}	Warp
160 to 378	1 max.
379 to 527	2 max.
528 to 754	3 max.
755 to 1 100	5 max.
Note ^{a)} Refer to Figure 2 for overall width or effective width.	

5 Shapes and dimensions

5.1 Shapes

Four corners of siding shall be a right angle. The perpendicularity shall be 2 mm or under when tested in accordance with 7.3.3.

Solid product/hollow product, product with/without overlapping allowance, with/without surface pattern or with/without unevenness on back surface, and clapboard are available according to the cross-sectional shapes. Examples of cross-sectional shapes are shown in Figure 1. Examples of effective length (or overall length) and effective width (or overall width) are shown in Figure 2.



- Notes ^{a)} The deepest part of surface pattern is called bottom of surface pattern.
^{b)} The deepest part from the top of maximum thickness is called bottom of clapboard.

Figure 1 Examples of cross-sectional shapes

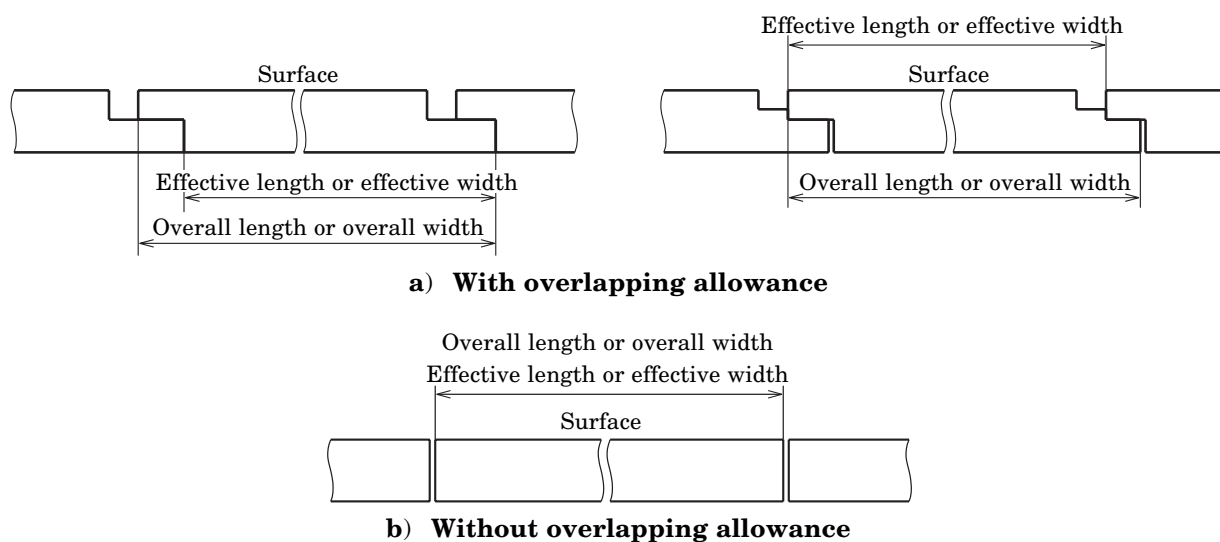


Figure 2 Examples of effective length (or overall length) and effective width (or overall width)

5.2 Dimensions and tolerances

The dimensions and tolerances shall conform to Table 4 when tested in accordance with 7.3. The size (thickness, overall width or effective width, overall length or effective length) of the products having dimensions greater than those in Table 4 may be as agreed between the interested parties; however the dimensional tolerances shall conform to Table 4. For the products having the overall width or effective width exceeding 1 100 mm and those having the overall length or effective length exceeding 3 300 mm, tolerances on the width and the length shall be ± 1 mm. For the products having the thickness exceeding 26 mm, tolerances on the thickness shall be ± 2.0 mm. The depth of surface pattern shall be 12.0 mm or under for both solid products and hollow products.

Table 4 Dimensions and tolerances

Unit: mm

Thickness		Depth of surface pattern ^{a)}		Overall width or effective width ^{b)}		Overall length or effective length ^{c)}	
	Tolerances ^{d)}	Solid product	Hollow product		Tolerances ^{d)}		Tolerances ^{d)}
14	± 1.0	4.5 max.	3.0 max.	160 to 1 100	± 1	910 to 3 300	± 1
15	± 1.2	5.5 max.	4.0 max.				
16		6.5 max.	5.0 max.				
17		7.5 max.	6.0 max.				
18	± 1.4	8.0 max.	7.0 max.				
19			8.0 max.				
20	± 1.6	9.0 max.	8.5 max.				
21		10.0 max.	9.5 max.				
22			10.0 max.				
23		11.0 max.					
24	± 2.0		11.0 max.				
25		12.0 max.	12.0 max.				
26							
Notes ^{a)} Not applicable to the products without the surface pattern.							
^{b)} Refer to Figure 2 for overall width or effective width.							
^{c)} Refer to Figure 2 for overall length or effective length. Overall length or effective length shall be expressed in the unit of 1 mm.							
^{d)} Tolerances on the nominal value.							

6 Performances

The performances of siding shall conform to Table 5 when tested in accordance with Clause 7.

Performances of the products having the thickness exceeding that specified in Table 4 shall conform to Table 5, except the fracture load by bending.

Table 5 Performances

Symbol of type	Thick- ness	Fracture load by bend- ing ^{a)}	Shock resist- ance	Adhe- sion of coating ^{b)}	Weather resistance	Freezing and thawing resistance ^{d)}	Mois- ture content	Water perme- ability	Warp by water absorp- tion	Incombustibility or heat generation property ^{e)}	
	mm	N					%	mm	mm	Incombus- tibility according to JIS A 1321	Heat generation property according to Annex A
D	14 to 17	785 min.	No pene- trating crack	5 % or under in the ratio of peeled area of coating	• 2 % or under in the ratio of peeled and blistered area on the surface • 6.0 or under in the colour difference, or the grey scale No. 2-3 or over in ΔE*ab ^{c)}	2 % or under in the ratio of peeled area on the surface and no remark- able peeling between layers, and 10 % or under in the ratio of thick- ness change	20 max.	10 or under in the height of reduced water	2 max.	Grade 2 or superior	Grade 2 or superior
	18 to 20	900 min.									
	21 to 26	1 000 min.									
S ^{f)}	14 to 17	785 min.			• 2 % or under in the ratio of peeled and blistered area on the surface					—	—
	18 to 20	900 min.									
	21 to 26	1 000 min.									
Notes ^{a)} The fracture load by bending shall be 1 000 N or over for the products when the specimen having the thickness exceeding 26 mm is used in the test of fracture load by bending specified in Table 6.											
^{b)} Not applicable to siding in which “colouring material is added to raw material at a factory” or “the substrate is used as it is”.											
^{c)} Colour difference and grey scale are not applicable to siding in which the substrate is used as it is.											
^{d)} Applicable when the marking of freezing and thawing resistance is required.											
^{e)} Either of the incombustibility test or the heat generation property test shall be conducted. The selection shall be as agreed between the interested parties.											
^{f)} Except the fracture load by bending, shock resistance and moisture content, in the case of siding for coating at construction site (S), the specimen shall be coated according to the typical coating specifications determined by the manufacturer.											

7 Tests

7.1 Specimen

The size of specimen shall conform to Table 6.

Take one specimen from the centre (except the periphery) of siding per one test item.

Table 6 Size of specimen

Unit: mm

Test/measurement item			Size of specimen [length ^{a)} × width]
Measurement of warp			Whole form
Measurement of dimensions			
Moisture content test			100 × 100
Test of fracture load by bending			No. 3 specimen (500 × 400) specified in JIS A 1408 . If No. 3 specimen cannot be taken, the specimen of the largest size among those shown below shall be used. If a siding has a surface pattern, the point near the bottom of surface pattern shall be pressurized. a) No. 3b specimen (400 × 300) b) No. 4 specimen (300 × 250) c) No. 5 specimen (200 × 150)
Shock resistance test			No. 3 specimen (500 × 400) specified in JIS A 1408 . If No. 3 specimen cannot be taken, the specimen of the larger size between those shown below shall be used. If a siding has a surface pattern, the specimen shall be prepared so that the bottom of surface pattern comes the centre of specimen. a) No. 4 specimen (400 × 300), if effective width is 300 or over to and excl. 400 b) Specimen (300 × total width), if effective width is 160 or over to and excl. 300
Test of adhesion of coating			200 × 100
Weather resistance test			150 × 50
Freezing and thawing resistance test			200 × 100
Water permeability test			200 × 200
Test of warp by water absorption			320 × 150
Incombustibility test	Test according to JIS A 1321	Base material	Height 50, other sides 40
		Surface	220 × 220
Heat generation property test			Square of 99 ± 1 in one side
Note ^{a)} Length shall be measured in the forming (sheet making/extruding) direction.			

7.2 Measurement of warp

Measure the warp by applying the supporting points of a warp measuring instrument to three positions at both ends (●: measuring position at end) and the centre (■: measuring position at centre) as shown in Figure 3 and Figure 4, facing the back surface of the specimen upward. Use the dial gauge of 0.01 mm scale interval specified in **JIS B 7503** or a measuring instrument having the accuracy equivalent to this. Express the state of warp by plus (+) when the surface is convex and minus (−) when the surface is concave. Take the largest absolute value among three as the measurement result.

Round the obtained value to the integer.

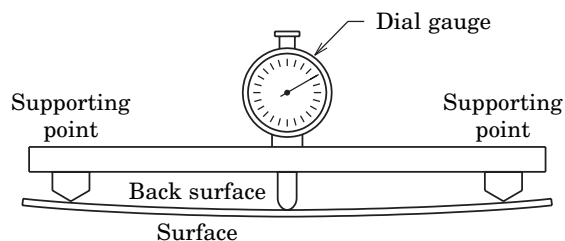


Figure 3 Warp measuring instrument (example)

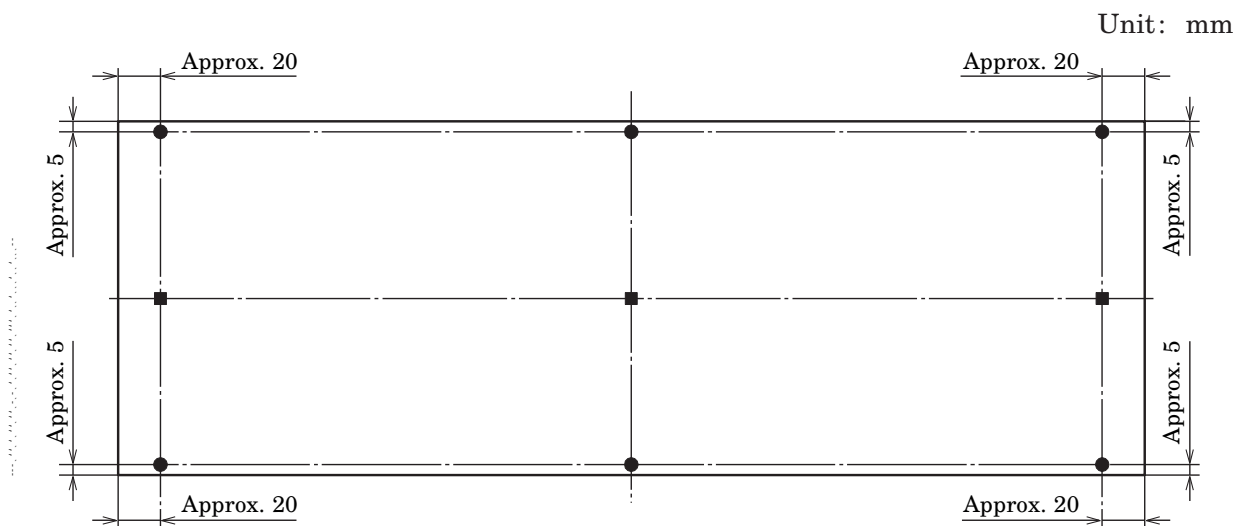


Figure 4 Measuring position of warp

7.3 Measurement of dimensions

7.3.1 Measurement of thickness

Measure the thickness at two positions at centre and three positions at both ends as shown in Figure 5. Use the measuring instrument having an accuracy of 0.05 mm or better. Average the measured values and round to the first decimal place. If the surface is patterned, measure the thickest position nearby (periphery), respectively. If the back surface is uneven, measure the thickness of the convex part. In the case of the clapboard, measure at four maximum thickness positions and minimum thickness positions at both ends of the specimen shown in Figure 6 respectively. Average the measured values and round to the first decimal place. In the case of the clapboard having four or more bevels, measure four positions at top and at bottom, respectively.

Use a dial gauge specified in **JIS B 7503**, vernier callipers specified in **JIS B 7507** or a micrometer specified in **JIS B 7502**.