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Fiberboards

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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 Fiberboard and Particleboard Manufacturers Association (JFPMA)/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 5905 : 2014**), which has been technically revised.

However, **JIS A 5905 : 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 20 November 2023.

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Fiberboards

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 16895** : 2016, Edition 1, and **ISO 27769** : 2016, Edition 1, with some modifications of the technical contents to reflect the local condition in Japan.

The dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA. The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex JB.

1 Scope

This Standard specifies requirements for the fiberboards which are formed mainly from plant fibers of woods or the like.

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

ISO 16895 : 2016 *Wood-based panels — Dry-process fibreboard*

ISO 27769 : 2016 *Wood-based panels — Wet process fibreboard* (Overall evaluation : 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

Part or all of the provisions of the following standards, 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 1412-1 *Test method for thermal resistance and related properties of thermal insulations — Part 1 : Guarded hot plate apparatus*

JIS A 1412-2 *Test method for thermal resistance and related properties of thermal insulations — Part 2 : Heat flow meter apparatus*

JIS A 1415 *Methods of exposure to laboratory light sources for polymeric material of buildings*

JIS A 1460 *Determination of the emission of formaldehyde from building boards —*

Desiccator method

JIS A 5508... *Nails*

JIS B 1112... *Cross-recessed head wood screws*

JIS B 7512... *Steel tape measures*

JIS B 7526... *Squares*

JIS K 3302... *Laundry bar soaps*

JIS K 7102... *Testing method for colour fastness of plastics upon exposure to light of the carbon arc*

JIS K 8355... *Acetic acid (Reagent)*

JIS K 8594... *Petroleum benzine (Reagent)*

JIS K 8624... *Sodium carbonate decahydrate (Reagent)*

JIS K 8625... *Sodium carbonate (Reagent)*

JIS K 8886... *Acetic anhydride (Reagent)*

JIS L 0804... *Grey scale for assessing change in colour*

JIS L 0805... *Grey scale for assessing staining*

JIS S 6026... *Crayons and oil pastels*

JIS Z 8781-6... *Colorimetry — Part 6 : CIEDE2000 Colour-difference formula*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1

sheet making

forming pulp or fibers into a mat-shaped sheet or a mat

3.2

wet process

method of producing fiberboards with a forming line moisture content, as a mass fraction, of 20 % or greater

Note 1 to entry The primary bonding of wet-process fiberboards results from the felting of the fibers, their inherent adhesive properties or resins.

3.3

dry process

method of producing fiberboards with a forming line moisture content, as a mass fraction, of less than or equal to 20 %

Note 1 to entry The primary bonding of dry-process fiberboards results from applied adhesives or resins.

3.4**raw**

board that is yet to be given decorative coatings such as an overlay or painting on its front and back surfaces

3.5**structural**

fiberboards to be used mainly as load-bearing members of buildings

3.6**pretreatment**

pre-test treatment performed on a test piece until it reaches the moisture content of air-dried state or a constant mass

4 Types and symbols

Fiberboards are classified into insulation fiberboards (hereafter referred to as Insulation board), medium density fiberboards (hereafter referred to as MDF), and hard fiberboards (hereafter referred to as Hardboard) according to the density, use and manufacturing process, as shown in Table 1.

Table 1 Types and symbols

Type	Classification	Symbol	Density	Main use	Manufacturing process	
					Wet process	Dry process
Insulation board	Straw mat (TATAMI) board	T-IB	Under 0.27 g/cm ³	For straw mat (TATAMI) base	○	
	Class A insulation board	A-IB	Under 0.35 g/cm ³	For substrate for interior finish For heat insulation	○	
	Sheathing board	S-IB	Under 0.40 g/cm ³	For sheathing of outside walls	○	
MDF	General purpose MDF	G-MDF	0.35 g/cm ³ or over	Furniture, fixtures, etc.	—	○
	Structural MDF	S-MDF	0.70 g/cm ³ or over to and excl. 0.85 g/cm ³	For structures	—	○
Hardboard		HB	0.80 g/cm ³ or over	For architecture, packaging, etc.	○	

a) **Insulation board** Insulation boards are classified according to incombustibility as shown in Table 2.

Table 2 Classification according to incombustibility

Classification	Symbol
Incombustibility grade 3	Incombustibility 3

- b) **MDF** General purpose and structural MDFs are classified according to the conditions of front and back surfaces, bending strength, moisture resistance, formaldehyde emission and incombustibility as given in the following.

- 1) **Classification according to conditions of front and back surfaces**, as shown in Table 3.

Table 3 Classification according to conditions of front and back surfaces

Classification			Symbol	Conditions of front and back surfaces
General purpose MDF	Raw MDF	Unsanded board	RN	Both surfaces are in raw condition and unsanded.
		Sanded board	RS	Both surfaces are in raw condition and sanded.
	Decorative MDF	Veneer overlay	DV	One or both surface(s) of the raw MDF is/are bonded to decorative veneer.
		Plastic overlay	DO	One or both surface(s) of the raw MDF is/are bonded to synthetic resin sheet, film, synthetic resin impregnated paper, coat paper, after-coat paper and the like. The decorative surface is plain with monochromatic finishing, or patterned with grain pattern, abstract pattern or the like.
		Coating	DC	One or both surface(s) of the raw MDF is/are hardened by thermosetting with synthetic resin paint or printed. The decorative surface is plain with monochromatic finishing or patterned with grain pattern, abstract pattern or the like.
Structural MDF	Unsanded board		RN	Both surfaces are in raw condition and unsanded.
	Sanded board		RS	Both surfaces are in raw condition and sanded.

- 2) **Classification according to bending strength**, as shown in Table 4.

Table 4 Classification according to bending strength

Classification	Symbol	Bending strength
Type 30	30	30.0 N/mm ² or over
Type 25	25	25.0 N/mm ² or over
Type 15	15	15.0 N/mm ² or over
Type 5	5	5.0 N/mm ² or over

- 3) **Classification according to moisture resistance**, as shown in Table 5.

Table 5 Classification according to moisture resistance

Classification	Symbol	Moisture resistance test method			Main use (informative)
		Bending strength in wet condition		Thickness swelling after immersion in water	
		Test A	Test B		
Regular (Type U)	REG (U)	—	—	—	Furniture, cabinets or the like
Moisture resistance 1 (Type M)	MR1 (M)	○	—	○	Sheathing (floor, wall, roof), members of fixtures or the like
Moisture resistance 2 (Type P)	MR2 (P)	—	○	○	Sheathing (floor, wall, roof), members of fixtures or the like required to be highly moisture resistant

4) **Classification according to formaldehyde emission**, as shown in Table 6.

Table 6 Classification according to formaldehyde emission

Classification	Symbol	Formaldehyde emission	
		mean	maximum
F☆☆☆☆	F☆☆☆☆	0.3 mg/L or under	0.4 mg/L or under
F☆☆☆	F☆☆☆	0.5 mg/L or under	0.7 mg/L or under
F☆☆	F☆☆	1.5 mg/L or under	2.1 mg/L or under

5) **Classification according to incombustibility**, as shown in Table 7.

Table 7 Classification according to incombustibility

Classification	Symbol
Incombustibility grade 2	Incombustibility 2
Incombustibility grade 3	Incombustibility 3

- c) **Hardboard** Hardboards are classified according to special processing by oil, resin or the like, the surface condition, bending strength and incombustibility as given in the following.

1) **Classification according to special processing by oil, resin or the like, and surface condition**, as shown in Table 8.

Table 8 Classification according to special processing by oil, resin or the like, and surface condition

Classification according to special processing by oil, resin or the like		Classification according to surface condition		
Classification	Symbol	Classification		Symbol
Standard board (unprocessed)	S	Raw hardboard	Unsanded board	RN
			Sanded board	RS
		Decorative hardboard for interior finish		DI
Tempered board (processed)	T	Raw hardboard	Unsanded board	RN
			Sanded board	RS
		Decorative hardboard for exterior finish		DE
NOTE 1 Raw hardboards include those with single smooth surface (S1S), and those with both smooth surfaces (S2S). NOTE 2 The decorative hardboards for interior finish are made by bonding synthetic resin sheets, films, cloth/papers to the surface of a standard board or by giving printing or coating of synthetic resin paint or the like on the surface of a standard board. The surface can be flat, or decorated with uneven patterns by embossing. Their decorative surface is either plain with monochromatic finishing or patterned with grain pattern or abstract pattern, and they are mainly used for the materials for interior finish and wooden works for furniture. NOTE 3 The decorative hardboards for exterior finish are made by printing or coating the surface of the tempered board with the weather resistant synthetic resin paint and hardening by heating, light irradiation or the like. They have surfaces that are either flat, decorated with embossed pattern, or with grooves of U-shape or V-shape. Their decorative surface is either plain with monochromatic finishing or patterned with grain pattern or abstract pattern, and they are mainly used for the materials for exterior finish.				

2) **Classification according to bending strength**, as shown in Table 9.

Table 9 Classification according to bending strength

Classification		Symbol	Bending strength
Standard board (unprocessed)	Type 35	35	35.0 N/mm ² or over
	Type 25	25	25.0 N/mm ² or over
	Type 20	20	20.0 N/mm ² or over
Tempered board (processed)	Type 45	45	45.0 N/mm ² or over
	Type 35	35	35.0 N/mm ² or over

3) **Classification according to incombustibility**, as shown in Table 10.

Table 10 Classification according to incombustibility

Classification	Symbol
Incombustibility grade 2	Incombustibility 2
Incombustibility grade 3	Incombustibility 3

5 Shape, dimensions and tolerances

- a) The dimensions shall be as specified in Table 11 and Table 12. However, if there is a special request, dimensions outside the ranges indicated in the tables may be used upon agreement between the parties concerned with delivery.

Table 11 Thickness

Unit: mm

Type	Classification	Range of thickness
Insulation board	Straw mat (TATAMI) board (T-IB)	10 to 20
	Class A insulation board (A-IB)	9 to 18
	Sheathing board (S-IB)	
MDF	General purpose MDF (G-MDF)	2.5 to 30
	Structural MDF (S-MDF)	9
Hardboard	Raw hardboard (RN-HB, RS-HB)	2.5 to 7
	Decorative hardboard for interior finish (DI-HB)	
	Decorative hardboard for exterior finish (DE-HB)	5 to 7

Table 12 Width and length

Unit: mm

Type	Classification	Range of width	Range of length
Insulation board	Straw mat (TATAMI) board (T-IB)	910 to 1 000	1 820 to 2 000
	Class A insulation board (A-IB)	900 to 1 820	1 820 to 3 030
	Sheathing board (S-IB)		
MDF	General purpose MDF (G-MDF)	458 to 2 495	1 010 to 5 005
	Structural MDF (S-MDF)	600 to 1 820	1 820 to 4 000
Hardboard	Raw hardboard (RN-HB, RS-HB)	900 to 1 820	1 820 to 4 000
	Decorative hardboard for interior finish (DI-HB)		
	Decorative hardboard for exterior finish (DE-HB)	450 to 910	2 730 to 4 000

- b) Unless otherwise specified, the dimensional tolerances and squareness shall be as specified in Table 13. The tolerances may be allocated to the plus or minus side, only if the total tolerance range does not exceed the value given in Table 13.

In Table 13, the thickness of the decorative board shall be the thickness of the raw board plus the thickness of the decorative layer. The tolerance on thickness of the dec-

orative hardboard under 3.5 mm shall be the same as that of the sanded product. The tolerance on thickness of the decorative hardboard for exterior finish shall be the same as that of the unsanded board. Squareness shall be measured by Method A or Method B.

Table 13 Dimensional tolerances and squareness

Unit: mm

Type	Classification	Thick- ness	Tolerance on thickness ^{a)}			Tolerance on width and length ^{a)}	Squareness		
			Un- sanded board	Sanded board	Deco- rative board		Method A	Method B	
Insu- lation board	Straw mat (TATAMI) board (T-IB)	Under 10	±1.0	—	—	±4.0	2 or under	3 or under	
		10 or over	±1.2						
	Class A insulation board (A-IB) Sheathing board (S-IB)	Under 12	±1.0						
		12 or over	±1.2						
MDF	General purpose MDF (G-MDF)	Under 7	±0.5	±0.3	±0.5	±3.0			
		7 or over to and excl. 15	±1.0		±0.5				
		15 or over	±1.5		±0.6				
		Structural MDF (S-MDF)	9	±0.5		—	±3.0		
Hardboard		Under 3.5	±0.4	±0.3	±10 % of nom- inal thick ness	±3.0			
		3.5 or over to and excl. 5.0	±0.5						
		5.0 or over to and excl. 7.0	±0.7						
		7.0 or over	±0.9						
Note ^{a)} Tolerance on the nominal value.									

6 Quality

6.1 Appearance

Appearance shall be as follows.

- a) The surface of the fiberboard shall be free from unevenness, stains, separation, etc. that are noticeable when visually inspected, and moreover, free from twists, warps, etc. that are detrimental to use. The decorative boards shall be free from defects specified in Table 14.

Table 14 Appearance of decorative board

Defects	Requirement
Chipping ^{a)} , cracks or separation	No such defects.
Twists, warps	No such defects that are detrimental to use.
Unevenness not of decorative purpose, dents, stains, flaws, presence of foreign matters	No such defects that are noticeable when viewed from the distance of 60 cm.
Patterns not of decorative purpose, irregular gloss and colour tone	No such defects that are noticeable when viewed from the distance of 2 m ^{b)} .
Note ^{a)} Chipping on the raw board and decorative layer.	
Note ^{b)} Inspected on several boards at the same time by placing them side by side.	

- b) The side surfaces of the fiberboard shall be cut orthogonal to the plane of the board, and their cut sections shall be free from such unevenness as may influence the product dimensions. This does not apply to fiberboards with their side surfaces machined for a special purpose.

6.2 Performance

The fiberboard shall be tested on the quality requirements as indicated in Table 15 in accordance with the methods described in Clause 7, and shall comply with the requirements in Table 16 to Table 23.

Table 15 Quality requirements

Quality		Insulation board			MDF								Hardboard				Applicable sub-clause	
					General purpose MDF						Structural MDF							
		T — IB	A — IB	S — IB	Raw			Decorative			Moisture resistance 1 (Type M)	Moisture resistance 2 (Type P)	S — H B	T — H B	DI — H B	DE — H B		
Dimensions and squareness		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	7.3
Density		○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—	7.4
Moisture content		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	7.5
Breaking load		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	7.6
Bending strength		○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	—	7.7
Bending Young's modulus		—	—	—	△ ^{a)}	△ ^{a)}	△ ^{a)}	△ ^{a)}	△ ^{a)}	△ ^{a)}	△ ^{a)}	△ ^{a)}	△ ^{a)}	—	—	—	—	7.8
Bending strength in wet condition ^{b)}	(Test A)	—	—	—	—	○	—	—	○	—	○	—	—	—	—	—	—	7.9
	(Test B)	—	—	—	—	—	○	—	—	○	—	○	—	—	—	—	—	
Water absorption		—	—	—	—	—	—	—	—	—	—	—	—	○	○	—	○	7.10
Thickness swelling after immersion in water ^{b)}		○	○	○	—	○	○	—	○	○	○	○	○	—	—	—	—	7.11
Linear expansion after immersion in water		—	—	○	—	—	—	—	—	—	—	—	—	—	—	—	○	7.12
Internal bond		—	—	—	○	○	○	○	○	○	○	○	○	—	—	—	—	7.13
Wood screw withdrawal ^{c)}		—	—	—	○	○	○	○	○	○	—	—	—	—	—	—	—	7.14
Nail withdrawal		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	7.15
Nail-head pull-through force		—	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	7.16
Lateral nail resistance		—	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	7.17
Formaldehyde emission		△ _{a) d)}	△ _{a) d)}	△ _{a) d)}	○	○	○	○	○	○	○	○	○	△ _{a) d)}	△ _{a) d)}	△ _{a) d)}	△ _{a) d)}	7.18
Thermal insulation (thermal conductivity)		○	○	○	—	—	—	—	—	—	—	—	—	—	—	—	—	7.19
Out-of-plane tensile strength of decoration		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	—	7.20
Impact resistance		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	○	7.21
Acid resistance ^{e)}		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	—	7.22
Alkali resistance ^{e)}		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	—	7.23
Stain resistance ^{e)}		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	—	7.24
Change in colour resistance ^{e)}		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	—	7.25
Scratch resistance ^{e)}		—	—	—	—	—	—	○	○	—	—	—	—	—	—	○	—	7.26
Coating adhesion		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	7.27
Washability		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	7.28
Weatherability		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	7.29
Incombustibility ^{f)}		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—	7.30

Table 15 (concluded)

Note ^{a)}	Tests to be performed for informative purposes.
Note ^{b)}	Not applicable to Type 5 of MDF (see Table 4).
Note ^{c)}	Applicable to thickness of 15 mm or over.
Note ^{d)}	Applicable to products to be marked with formaldehyde emission grade.
Note ^{e)}	Not applicable to the decorative hardboards bonded with cloths or papers, veneer overlays, or after coat papers.
Note ^{f)}	Applicable to incombustible fiberboards.

Table 16 Quality of insulation board

Classification	Density	Moisture content	Bending strength	Thickness swelling after immersion in water	Linear expansion after immersion in water	Formaldehyde emission ^{a)}		Thermal conductivity
	g/cm ³	%	N/mm ²	%	%	mg/L		W/(m·K)
						F☆☆☆☆	F☆☆☆	
Straw mat (TATAMI) board T-IB	Under 0.27	5 or over up to and incl. 13	1.0 or over	10 or under	—	Average : 0.3 or under Maximum : 0.4 or under	Average : 0.5 or under Maximum : 0.7 or under	0.056 or under
Class A insulation board A-IB	Under 0.35		2.0 or over					0.058 or under
Sheathing board S-IB	Under 0.40		3.0 or over	10 or under	0.5 or under			0.067 or under
Note ^{a)} Applicable to products to be marked with formaldehyde emission grade.								

Table 17 Quality of general purpose MDF

Classification		Density	Mois- ture content	Bending strength	Bending strength in wet condition ^{a)}	Thickness swelling after immersion in water ^{a)}	Inter- nal bond	Wood screw with: drawal ^{b)}	Formalde- hyde emission	(informa- tive) Bending Young's modulus ^{c)}
		g/cm ³	%	N/mm ²	N/mm ²	%	N/mm ²	N	mg/L	N/mm ²
Type 30	F☆☆☆☆	0.35 or over	5 or over up to and incl. 13	30.0 or over	15.0 or over	17 or under for thickness 7 mm or under	0.5 or over	500 or over	Average : 0.3 or under Maximum : 0.4 or under	2 500 or over
	F☆☆☆								Average : 0.5 or under Maximum : 0.7 or under	
	F☆☆								Average : 1.5 or under Maximum : 2.1 or under	
Type 25	F☆☆☆☆			25.0 or over	12.5 or over	12 or under for thickness over 7 mm up to and incl. 15 mm	0.4 or over	400 or over	Average : 0.3 or under Maximum : 0.4 or under	2 000 or over
	F☆☆☆								Average : 0.5 or under Maximum : 0.7 or under	
	F☆☆								Average : 1.5 or under Maximum : 2.1 or under	
Type 15	F☆☆☆☆			15.0 or over	7.5 or over	10 or under for thickness over 15 mm	0.3 or over	300 or over	Average : 0.3 or under Maximum : 0.4 or under	1 300 or over
	F☆☆☆								Average : 0.5 or under Maximum : 0.7 or under	
	F☆☆								Average : 1.5 or under Maximum : 2.1 or under	