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Particleboard

刨花板

[ISO 16893-2:2010, Wood-based panels - Particleboard –

Part 2: Requirements, MOD]

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009 and GB/T 20000.2-2009.

This Standard is an amendment to GB/T 4897.1~4897.7-2003. Compared with GB/T 4897.1~4897.7-2003, the major technical changes in this Standard are as follows:

— COMBINE the standard divided into seven parts into one.

— The particleboards are divided into six types of panels based on the applications in previous edition, while they are divided into twelve types of panels in this Standard. Furthermore, ADD the property requirements of six types of panels.

— MODIFY the classification and symbols.

— MODIFY the determination method.

— ADD the testing method of moisture resistance.

— The testing method and limit requirements of formaldehyde release use the provisions of GB 18580.

— ADD the verticality measurement. DELETE the diagonal measurement.

— ADD the flatness measurement. DELETE the warpage measurement.

— ADD the following terms and definitions: “specification limit” and “high humid conditions”.

— As additional property indicators, dimensional stability and sand content’s requirements shall be determined after consultation between supplier and demander.

This Standard was redrafted by reference to ISO 16893-2:2010 *Wood-based panels - Particleboard - Part 2: Requirements (EN)* after modification. Compared with ISO 16893-2:2010, the major differences between this Standard and ISO 16893-2:2010 are as follows:

— MODIFY some expressions applicable to the international standards to those applicable to China’s national standards.

— ADD the method for determining the properties of individual panel.

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Particleboard

1 Scope

This Standard specifies the terms and definitions, classification, requirements, measurement and test methods, inspection rules, symbols, packaging, transportation and storage of the particleboards.

This Standard **is applicable to** the general purpose particleboards, furniture grade particleboards, load bearing particleboards and heavy-duty load bearing particleboards.

This Standard **is not applicable to** the oriented strand boards.

2 Normative references

The following documents are essential to the application of this document. For dated references, only the editions with the dates indicated are applicable to this document. For undated references, only the latest editions (including all the amendments) are applicable to this document.

GB/T 2828.1-2012 *Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (ISO 2859-1:1999, IDT)*

GB/T 17657-2013 *Test methods of evaluating the properties of wood-based panels and surface decorated wood-based panels*

GB/T 18259-2009 *Terms of wood-based panel and its surface decoration*

GB 18580 *Indoor decorating and refurbishing materials - Limit of formaldehyde emission of wood-based panels and finishing products*

GB/T 19367-2009 *Wood-based panels - Determination of dimensions of panels*

LY/T 1717-2007 *Guide for sampling inspection of wood-based panels*

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4 Classification

4.1 Classification in accordance with the applications:

Type P1: General purpose particleboard for use in dry conditions;

Type P2: Furniture grade particleboard for use in dry conditions;

Type P3: Load bearing particleboard for use in dry conditions;

Type P4: Heavy-duty load bearing particleboard for use in dry conditions;

Type P5: General purpose particleboard for use in humid conditions;

Type P6: Furniture grade particleboard for use in humid conditions;

Type P7: Load bearing particleboard for use in humid conditions;

Type P8: Heavy-duty load bearing particleboard for use in humid conditions;

Type P9: General purpose particleboard for use in high humid conditions;

Type P10: Furniture grade particleboard for use in high humid conditions;

Type P11: Load bearing particleboard for use in high humid conditions;

Type P12: Heavy-duty load bearing particleboard for use in high humid conditions.

4.2 Classification in accordance with the functions:

Flame retardant particleboard;

Pest control particleboard;

Antifungal particleboard, etc.

5 Specification limits

5.1 The specification limits of the products specified in this Standard are used for determining whether the unit product is conforming.

5.2 For the dimensional deviation, the numerical values in Table 1 refer to its specification limits. For the mid-panel density deviation and moisture content, the numerical values required in Sections 6.3.1.1 and 6.3.1.2 refer to their

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Static bending strength (MOR)	MPa	12.0	11.0	11.0	10.5	9.5	7.0
Modulus of elasticity (MOE)	MPa	1,900	1,800	1,600	1,500	1,350	1,050
Internal bonding strength	MPa	0.45	0.40	0.35	0.30	0.25	0.20
Surface bonding strength	MPa	0.8	0.8	0.8	0.8	0.8	0.8
Water-absorbent thickness expansion ratio in 2h	%	8.0					

6.3.2.3 Load bearing particleboard for use in dry conditions (Type P3)

Other physical and mechanical properties of Type P3 shall conform to the provisions of Table 5.

Table 5 Requirements for Other Physical and Mechanical Properties of Load Bearing Particleboard for Use in Dry Conditions

Item	Unit	Specification limits (μ_U and μ_L)					
		Basic thickness range mm					
		≤ 6	> 6 ~ 13	> 13 ~ 20	> 20 ~ 25	> 25 ~ 34	> 34
Static bending strength (MOR)	MPa	15	15	15	13	11	8
Modulus of elasticity (MOE)	MPa	2,200	2,200	2,100	1,900	1,700	1,200
Internal bonding strength	MPa	0.45	0.40	0.35	0.30	0.25	0.20
Water-absorbent thickness expansion ratio in 24h	%	22.0	19.0	16.0	16.0	16.0	15.0

6.3.2.4 Heavy-duty load bearing particleboard for use in dry conditions (Type P4)

Other physical and mechanical properties of Type P4 shall conform to the provisions of Table 6.

Table 6 Requirements for Other Physical and Mechanical Properties of Heavy-duty Load Bearing Particleboard for Use in Dry Conditions

Item	Unit	Specification limits (μ_U and μ_L)				
		Basic thickness range mm				
		> 6 ~ 13	> 13 ~ 20	> 20 ~ 25	> 25 ~ 34	> 34
Static bending strength (MOR)	MPa	20	18	16	15	13
Modulus of elasticity (MOE)	MPa	3,100	2,900	2,550	2,400	2,100
Internal bonding strength	MPa	0.60	0.50	0.40	0.35	0.25
Water-absorbent thickness expansion ratio in 24h	%	16.0	15.0	15.0	15.0	14.0

6.3.2.5 General purpose particleboard for use in humid conditions (Type P5)

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Surface bonding strength		MPa	0.8	0.8	0.8	0.8	0.8	0.8
Water-absorbent thickness expansion ratio in 24h		%	20.0	16.0	14.0	13.0	13.0	12.0
Moisture resistance	Option 1: Internal bonding strength after cyclic test Water-absorbent thickness expansion ratio after cyclic test	MPa %	0.18 20.0	0.15 18.0	0.13 16.0	0.12 14.0	0.10 13.0	0.09 11.0
	Option 2: Internal bonding strength after boiling	MPa	0.09	0.09	0.08	0.07	0.07	0.06
	Option 3: Static bending strength after the immersion treatment in 70°C water	MPa	5.6	4.9	4.5	4.2	3.9	3.2
	Note: SELECT the method after agreed upon by the supplier and demander. It is only necessary to select one of the three test items (options 1, 2 and 3).							

6.3.2.7 Load bearing particleboard for use in humid conditions (Type P7)

Other physical and mechanical properties of Type P7 shall conform to the provisions of Table 9.

Table 9 Requirements for Other Physical and Mechanical Properties of Load Bearing Particleboard for Use in Humid Conditions

Item		Unit	Specification limits (μ_U and μ_L)					
			Basic thickness range mm					
			≤ 6	> 6 ~ 13	> 13 ~ 20	> 20 ~ 25	> 25 ~ 34	> 34
Static bending strength (MOR)		MPa	18	17	16	14	12	9
Modulus of elasticity (MOE)		MPa	2,450	2,450	2,400	2,100	1,900	1,550
Internal bonding strength		MPa	0.50	0.45	0.40	0.35	0.30	0.30
Water-absorbent thickness expansion ratio in 24h		%	16.0	13.0	11.0	11.0	11.0	10.0
Moisture resistance	Option 1: Internal bonding strength after cyclic test Water-absorbent thickness expansion ratio after cyclic test	MPa %	0.23 16.0	0.20 15.0	0.20 13.0	0.18 12.0	0.16 11.0	0.14 10.0
	Option 2:	MPa	0.15	0.14	0.14	0.12	0.10	0.09

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Surface bonding strength		MPa	0.8	0.8	0.8	0.8	0.8	0.8
Water-absorbent thickness expansion ratio in 24h		%	14.0	12.0	12.0	10.0	10.0	10.0
Moisture resistance	Option 1: Internal bonding strength after cyclic test Water-absorbent thickness expansion ratio after cyclic test	MPa %	0.28 13.0	0.22 12.0	0.18 11.0	0.16 10.0	0.14 9.0	0.12 8.0
	Option 2: Internal bonding strength after boiling	MPa	0.25	0.22	0.20	0.17	0.15	0.12
	Option 3: Static bending strength after the immersion treatment in 70°C water	MPa	11.2	9.6	9.0	7.8	7.2	6.0
	Note: SELECT the method after agreed upon by the supplier and demander. It is only necessary to select one of the three test items (options 1, 2 and 3).							

6.3.2.11 Load bearing particleboard for use in high humid conditions (Type P11)

Other physical and mechanical properties of Type P11 shall conform to the provisions of Table 13.

Table 13 Requirements for Other Physical and Mechanical Properties of Load Bearing Particleboard for Use in High Humid Conditions

Item		Unit	Specification limits (μ_U and μ_L)					
			Basic thickness range mm					
			≤ 6	> 6 ~ 13	> 13 ~ 20	> 20 ~ 25	> 25 ~ 34	> 34
Static bending strength (MOR)		MPa	19	18	16	15	14	12
Modulus of elasticity (MOE)		MPa	2,600	2,600	2,400	2,100	1,900	1,700
Internal bonding strength		MPa	0.55	0.50	0.45	0.40	0.35	0.30
Water-absorbent thickness expansion ratio in 24h		%	13.0	12.0	10.0	10.0	10.0	9.0
Moisture resistance	Option 1: Internal bonding strength after cyclic test Water-absorbent thickness expansion ratio after cyclic test	MPa %	0.30 10.0	0.25 10.0	0.22 9.0	0.20 9.0	0.17 8.0	0.15 8.0
	Option 2:	MPa	0.30	0.28	0.20	0.17	0.15	0.12

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The screw holding force of all the other panel (except Type P1 particleboards) surfaces shall not be less than 900N. The screw holding force of the panel edges shall not be less than 600N.

Note: For the test pieces with the thicknesses of not less than 15mm, it is allowed to directly determine the screw holding forces of panel surfaces and edges. If the thicknesses of the test pieces are less than 15mm, only DETERMINE the screw holding force of panel surfaces. In the meantime, it is allowed to combine two or more test pieces into one so that the total thickness is not less than 15mm.

6.3.4 Additional properties

Dimensional stability and sand content are additional properties of the particleboards. When the demander has requirements for the dimensional stability and sand content, the property indicators shall be determined after consultation between supplier and demander.

7 Measurement and test methods

7.1 Specification measurement

7.1.1 Measuring tools

— Micrometer, with a division value of 0.01mm;

— Steel ruler, with a division value of 0.5mm;

— Steel tape, with a division value of 1.0mm;

— Metal wire (such as steel wire, etc.), with a diameter of not greater than 0.5mm.

7.1.2 Length, width and thickness measurement of panels

The measurement shall be carried out according to relevant provisions in GB/T 19367-2009.

7.1.3 Verticality measurement

The measurement shall be carried out according to relevant provisions in GB/T 19367-2009.

7.1.4 Flatness measurement

The measurement shall be carried out according to relevant provisions in GB/T 19367-2009.

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7.3 Test methods

7.3.1 Determination of the density deviation

7.3.1.1 The density determination shall be carried out according to the provisions of Section 4.2 in GB/T 17657-2013.

7.3.1.2 The mid-panel density deviation $\triangle \rho$ (%) shall be calculated according to the Equation (1). ACCURATE to 0.1%.

$$\Delta\rho = \frac{\rho_{max}\ (\text{or}\ \rho_{min}) - \rho}{\rho} \times 100 \qquad \cdots\cdots(1)$$

Where:

ρ_{max} - Maximum density, in unit of gram per cubic centimeter (g/cm^3);

ρ_{min} - Minimum density, in unit of gram per cubic centimeter (g/cm^3);

ρ - Mean density, in unit of gram per cubic centimeter (g/cm^3).

7.3.2 Determination of the moisture content

The moisture content shall be determined according to the provisions of Section 4.3 in GB/T 17657-2013.

7.3.3 Determination of the formaldehyde release

The formaldehyde release shall be determined according to the provisions of GB 18580.

7.3.4 Determination of the static bending strength and modulus of elasticity

The static bending strength and modulus of elasticity shall be determined according to the provisions of Section 4.7 in GB/T 17657-2013.

The 5-percentile values $x_{5\%}$ of the sample panels in batches shall be calculated in accordance with the Equation (A.7) in Annex A.

The 5-percentile values $x_{5\%}$ of the individual sample panels shall be calculated in accordance with the Equation (A.9) in Annex A.

During re-inspection, the 5-percentile values $x_{5\%}$ of three sample panels shall be calculated in accordance with the Equation (A.11) in Annex A.

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The 5-percentile values $x_{5\%}$ of the sample panels in batches shall be calculated in accordance with the Equation (A.7) in Annex A.

The 5-percentile values $x_{5\%}$ of the individual sample panels shall be calculated in accordance with the Equation (A.9) in Annex A.

During re-inspection, the 5-percentile values $x_{5\%}$ of three sample panels shall be calculated in accordance with the Equation (A.11) in Annex A.

7.3.9 Determination of the screw holding force

The screw holding force shall be determined according to the provisions of Section 4.21 in GB/T 17657-2013.

7.3.10 Determination of the dimensional stability

The dimensional stability shall be determined according to the provisions of Section 4.33 in GB/T 17657-2013.

7.3.11 Determination of the sand content

The sand content shall be determined according to the provisions of Section 4.27 in GB/T 17657-2013.

8 Inspection rules

8.1 Inspection types

The product inspection is divided into exit-factory inspection and type inspection.

8.1.1 Exit-factory inspection

The exit-factory inspection includes the following items:

a) Appearance quality inspection;

b) Inspection of specifications and dimensional deviations;

c) Inspection of physicochemical properties: formaldehyde release, density deviation, moisture content, water-absorbent thickness expansion ratio, internal bonding strength and static bending strength.

8.1.2 Type inspection

Besides all of the exit-factory inspection items, the items of the modulus of elasticity, surface bonding strength, moisture resistance and screw holding

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this Standard. For the quality supervision inspection, the samples shall be taken from the products manufactured within six months prior to the inspection.

8.3 Product measurement

The products shall use cubic meter (m^3) as unit of measurement (the permissible error shall not be taken into account). During the delivery in batches, the measurements shall be accurate to 0.01 m^3. When measuring the individual panels, ACCURATE to 0.000 1m^3.

9 Symbols, packaging, transportation and storage

9.1 Symbols

The products shall be stamped with the symbols indicating the product types, specifications, production date and formaldehyde release.

9.2 Packaging

The products shall be respectively packed properly in accordance with different types and specifications. Each package shall be attached with an inspection label that gives clear indication of the product name, type, grade, manufacturing plant's name, trademark, format dimensions, quantity, product standard number and formaldehyde release limit sign.

9.3 Transportation and storage

During transportation and storage, the products shall be protected from moisture, rain, sunlight and deformation.

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