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July 1997

British Standard Specification for Fibre building boards

Panneaux de fibres pour la construction — Spécifications

Faserplatten

Foreword

This British Standard has been prepared under the direction of the Timber Standards Policy Committee and it supersedes BS 1142 : Part 1 : 1971, BS 1142 : Part 2 : 1971 and BS 1142 : Part 3 : 1972, which are withdrawn.

In this revision, which combines the previous separate Parts into one document, a number of important changes have been made and these are summarized as follows.

A new system of board identification has been adopted.

References to processed boards, such as softboard acoustic tiles, have been deleted.

An additional grade of medium density fibreboard (MDF), i.e. moisture resistant type (MDFMR), has been introduced.

The term 'insulating board' has been deleted as an alternative to softboard.

Determination of vapour resistivity, thermal conductivity and a new test, recovery after compression, have been included as tests related to specific end uses.

In appendix A the method of sampling and the acceptance levels for postmanufacture batch testing have been simplified.

Guidance is given on certain common uses of fibre building boards in the construction industry together with recommendations for their transportation, storage and conditioning.

In tables 3 to 6 giving levels of acceptance for fibre building boards, two levels have been set, namely an average value determined from the test samples and an absolute maximum (or minimum) value which no single test is to respectively exceed or fall below.

Wherever practical, the methods of test according to ISO and European (CEN) standards, or British Standard methods of test for plywood, fibre building boards and particleboards, have been adopted. New methods of test for surface absorption and sand/grit content and a revised extractable formaldehyde test have been introduced for MDF.

The question of providing precision data for the methods of test has been considered by the technical committee, but it is deemed that such data are not applicable to non-homogeneous materials.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Amendment No. 1
published and effective from 1 April 1992
to BS 1142 : 1989

Specification for fibre building boards

Revised text

AMD 6970
April 1992

Table 5. Test levels for MDF

In the column headed 'Transverse internal bond', for specified manufacturing thickness '>12≤19' delete the minimum value '0.35' and substitute '0.55'.

AMD 6970
April 1992

Clause A.15.6.3 Extractable formaldehyde by photometric procedure using acetylacetone reagent

Delete the equation and substitute the following.

$$F_e = \frac{4F_s}{M} (100 + \omega)$$

AMD 6970
April 1992

Table 10. Guidance on the use of fibre building boards in the construction industry

In column 3 'Mediumboard' for application 'Internal wall lining', insert above 'LME†' the following.

'HME†
HMN†'

In column 3 'Mediumboard' for application 'Sheathing', insert below 'HME' the following.

'HMN'

In column 4 'Medium density fibreboard (MDF)' for application 'Window boards', delete 'MDF‡'. Delete the associated footnote from the bottom of the table.

Amendment No. 2
published and effective from 15 July 1993
to BS 1142 : 1989

Specification for fibre building boards

Revised text

AMD 7776
July 1993

Contents

In the list of figures, delete the title against figure 14 and substitute '*Figure deleted*'.

AMD 7776
July 1993

Clause A.15 Determination of extractable formaldehyde

Delete the existing text and substitute the following.

'Extractable formaldehyde shall be determined by the
method given in BS EN 120.'

AMD 7776
July 1993

Figure 14. Apparatus for determination of extractable formaldehyde

Delete figure 14 and substitute the following.

'Figure 14. *Figure deleted*'

AMD 7776
July 1993

Publications referred to

Delete the entries for BS 2942 and CEN* EN 120, together with the associated footnote.

Insert the following new entry.

'BS EN 120 Wood based panels—Determination of formaldehyde content—Extraction method called the perforator method.'

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Specification

1 Scope

This British Standard specifies requirements for fibre building boards which are classified by international usage into the following main types, as defined in this standard:

- (a) hardboard;
- (b) mediumboard;
- (c) medium density fibreboard (MDF); and
- (d) softboard.

Manufacturing requirements concerning permissible deviations on the sizes of boards together with requirements for flame retardant and fire retardant boards and marking are specified.

Appendix A describes methods of test for the properties of fibre building boards for which requirements are specified as well as other tests for design data.

Appendix B gives guidance on verifying compliance.

Appendix C gives guidance on the application of fibre building boards for certain common uses in the construction industry.

Appendix D gives recommendations for the transportation, storage and conditioning of fibre building boards.

NOTE. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1 fibre building board*. Wood-based panel product usually exceeding 1.5 mm in thickness, manufactured from fibres of ligno-cellulosic material with the primary bond usually deriving from the felting of the fibres and their inherent adhesive properties. In boards manufactured by a dry process the primary bond is derived from a bonding agent. Bonding, impregnating or other means may be used to modify particular properties.

2.2 standard hardboard (types SHA, SHB and SHC). Fibre building board that has a density exceeding 800 kg/m^3 and has defined minimum properties of strength and dimensional stability.

NOTE. A, B and C denote grades, with A being the highest and C the lowest grade.

2.3 tempered hardboard* (types THE and THN). Hardboard with higher strength and resistance to water absorption than standard hardboard. It has a density usually exceeding 960 kg/m^3 .

NOTE. E (extra) and N (normal) indicate grades.

2.4 low density mediumboard* (types LME and LMN). Mediumboard that has a density usually in the range of 350 kg/m^3 to 560 kg/m^3 .

NOTE. E (extra) and N (normal) indicate grades.

2.5 high density mediumboard* (types HME and HMN). Mediumboard that has a density usually in the range of 560 kg/m^3 to 800 kg/m^3 .

NOTE. E (extra) and N (normal) indicate grades.

2.6 medium density fibreboard* (types MDF and MDFMR). Fibre building board made by a dry process in which the primary bond is derived from a bonding agent that has a density usually exceeding 600 kg/m^3 .

NOTE. MR indicates moisture resistant grade.

2.7 softboard (type SBN). Fibre building board that has a density not exceeding 350 kg/m^3 and a mean thermal conductivity not exceeding $0.055 \text{ W/(m} \cdot \text{K)}$.

2.8 impregnated softboard (types SBI and SBS). Softboard that is modified by impregnation with bitumen and/or other moisture resistant additives during or after manufacture, and that has a density not exceeding 400 kg/m^3 and a mean thermal conductivity not exceeding $0.055 \text{ W/(m} \cdot \text{K)}$.

NOTE. SBS indicates sarking and sheathing grade.

3 Dimensional tolerances

3.1 Boards shall be rectangular with straight square edges. When measured in accordance with A.2 the dimensions shall comply with 3.2 to 3.4.

3.2 The length, width and thickness of boards shall be within the permissible deviations given in table 1.

3.3 Edge deviation from straight shall not exceed 0.125 % of the length of the edge.

3.4 Boards shall not deviate by more than 2 mm from the right angle over a span of 1000 mm.

4 Flame and fire retardant boards

4.1 When tested in accordance with BS 476 : Part 7, flame retardant boards shall be classified as type A boards where both faces have the same surface spread of flame classification and type B boards where one face has a higher classification.

4.2 When tested in accordance with BS 476 : Part 6, fire retardant boards and tiles having an index of performance (*I*) not exceeding 12 and a subindex (*i*) not exceeding 6 and complying with class 1 of BS 476 : Part 7 and having a class 1 surface spread of flame shall be designated class 0 boards.

NOTE. Boards that have been treated or processed to improve their flame retardant properties may require the application of special types of sealers or primers prior to decoration. In common with other flame retardant treated materials, the possible reduction of original flame retardant properties after applying surface treatments should be considered.

*Definition given in BS 6100 : Section 4.3.

Table 1. Permissible deviations in length, width and thickness within and between boards of hardboard, medium density fibreboard (MDF), mediumboard and softboard

Board type	Mean manufacturing thickness	Permissible deviation	
		Thickness	Length and width
Hardboard (all types)	mm Equal to or greater than 2 but less than 3.2	mm ± 0.4	mm ± 5.0
	Equal to or greater than 3.2 but less than 6.4	± 0.5	
	Greater than 6.4	± 0.7	
Mediumboard (all types)	Equal to or greater than 6.4 but less than 9	± 0.6	± 5.0
	Equal to or greater than 9 but less than 13	± 0.7	
	Greater than 13	± 1.0	
MDF (all types)	19 or less	± 0.2	± 2 in 1000 Maximum per board: 10
	Greater than 19	± 0.3	
Softboard (all types)	13 or less	± 0.7	± 5.0
	Greater than 13	± 1.0	

NOTE. For processed products such as tiles and planks and products with specific end uses such as furniture, doors and boards to receive printed surfaces, the permissible deviations may need to be smaller than those given.

5 Physical and mechanical properties

When tested in accordance with the appropriate method described in appendix A and summarized in table 2, fibre building boards shall meet the levels of acceptance for the appropriate properties given in tables 3 to 6.

6 Marking

Boards shall be indelibly marked in the stack or on the exterior wrapping by the manufacturer before dispatch with the following information:

- the number and date of this British Standard, i.e. BS 1142 : 1989*;
- the manufacturer's name, trade mark or identification mark;
- the appropriate code letters and coloured stripes given in table 7.

The stripe(s) shall occur once on each long edge and on diagonally opposite corners and shall be at least 25 mm wide.

NOTE. If boards are dispatched wrapped, the stripe(s) and the code may be applied to the wrapping.

When surfaces of boards have been specially treated during manufacture for industrial painting or a similar process,

an additional yellow stripe shall be added to the colour coding.

In addition, flame retardant boards shall be marked with their type designation as follows.

(1) *Boards giving the same classification (from table 1 of BS 476 : Part 7 : 1987) on both faces*

- Type 1A: both faces comply with class 1
- Type 2A: both faces comply with class 2
- Type 3A: both faces comply with class 3
- Type 4A: both faces comply with class 4.

(2) *Boards giving a higher classification (from table 1 of BS 476 : Part 7 : 1987) on one face than on the other*

- Type 1B: one face complies with class 1
- Type 2B: one face complies with class 2
- Type 3B: one face complies with class 3
- Type 4B: one face complies with class 4.

Each fire rated board shall be marked with the appropriate type designation at least once in each 600 mm x 600 mm area. Where boards have the same classification on both sides, the face to be exposed shall be the unmarked face. Where boards have different classifications on each side, the face having the superior performance shall be the unmarked face.

Boards tested in accordance with BS 476 : Part 6 shall be clearly marked with their designation under that standard.

*Marking BS 1142 : 1989 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Table 2. Summary of test methods and acceptance levels given in tables 3 to 6

Test	Clause reference in appendix A	Board type and acceptance level tables				
		Hardboard	Tempered hardboard	Mediumboard	MDF	Softboard/impregnated softboard
		Table 3		Table 4	Table 5	Table 6
Change in length and width with relative humidity change	A.6	✓	✓	✓	✓	✓
Change in thickness with relative humidity change	A.6	✓	✓	✓	✓	✓
Water absorption after water immersion	A.7	✓	✓	✓	✓	✓ (See note 1)
Thickness swelling after water immersion	A.7	✓	✓	✓	✓	
Determination of vapour resistivity	A.8	(See note 2)	(See note 2)	(See note 2)		(See note 2)
Determination of thermal conductivity	A.9	(See note 2)	(See note 2)	(See note 2)		(See note 2)
Determination of bending strength	A.10	✓	✓	✓	✓	✓
Determination of deflection	A.11					✓
Determination of modulus of elasticity	A.12		✓		✓	
Determination of transverse internal bond	A.13	✓ (See note 3)			✓	
Determination of thickness swelling and transverse internal bond after wet cyclic test	A.14				✓ (See note 4)	
Determination of extractable formaldehyde	A.15	✓ (See note 5)	✓ (See note 5)	✓ (See note 5)	✓ (See note 5)	✓ (See note 5)
Determination of resistance to axial withdrawal of screws	A.16				✓	
Determination of sand/grit content	A.17				✓	
Determination of surface absorption	A.18				✓	
Determination of recovery after weathering and compression	A.19					(See note 2)

NOTE 1. Impregnated softboard only.

NOTE 2. Requirement related to a specific end use. See appendix C.

NOTE 3. Hardboard type SHA only.

NOTE 4. Moisture resistant grade only.

NOTE 5. Not applicable where the board manufacturer does not include formaldehyde generating additives.

Table 3. Test levels for hardboard

Type	Specified manufacturing thickness	Effect of relative humidity change from 35 % to 85 %				Changes after water immersion				Bending strength		Modulus of elasticity		Transverse internal bond		Extractable formaldehyde NOTE. Not applicable where the board manufacturer does not include formaldehyde generating additives.
		Increase in length and width		Increase in thickness		Absorption by mass		Thickness swelling								
		ave.*	max.†	ave.	max.	ave.	max.	ave.	max.	ave.	min.†	ave.	min.	ave.	min.	max.
SHA	mm ≤ 2	%	%	%	%	%	%	%	%	N/mm ²	N/mm ²	N/mm ²	N/mm ²	N/mm ²	N/mm ²	0.04
	> 2 ≤ 2.5	0.30	0.35	7	10	35	40	20	25	45	40	NA±	NA	0.9	0.7	
	> 2.5 ≤ 3.2					25	30	17	22							
	> 3.2 < 8.0					20	25	15	20							
	≥ 8.0 ≤ 10	0.30	0.35	7	10	16	20	13	15	35	31	NA	NA	0.9	0.6	
	> 10.0					12	15	9	11							
SHB	≤ 2					45	52	30	38							
	> 2 ≤ 2.5	0.35	0.42	10	15	35	42	27	35	38	34	NA	NA	NA	NA	
	> 2.5 ≤ 3.2					30	38	25	33							
	> 3.2 < 8.0					26	30	23	27							
	≥ 8.0 ≤ 10	0.35	0.42	10	15	22	27	19	24	30	27	NA	NA	NA	NA	
	> 10.0					18	23	17	22							
SHC	≤ 2					50	57	35	44							
	> 2 ≤ 2.5	0.45	0.52	15	18	40	48	32	42	31	27	NA	NA	NA	NA	
	> 2.5 ≤ 3.2					35	44	30	40							
	> 3.2 < 8.0					31	36	28	32							
	≥ 8.0 ≤ 10.0	0.45	0.52	15	18	27	33	24	30	27	24	NA	NA	NA	NA	
	> 10.0					33	29	22	28							
THE	≤ 2					30	35	15	20			4940	4350			
	> 2 ≤ 2.5	0.30	0.35	7	10	20	25	12	17	54	40			NA	NA	
	> 2.5 ≤ 3.2					15	22	10	15							
	> 3.2 < 8.0					11	17	8	10							
	≥ 8.0 ≤ 10.0	0.30	0.35	7	10	8	12	5	7	45	36	NA	NA			
	> 10.0					6	10	3	6							
THN	≤ 2					35	40	20	25			4350	3750			
	> 2 ≤ 2.5	0.35	0.42	10	15	25	30	17	22	48	36			NA	NA	
	> 2.5 ≤ 3.2					20	25	15	20							
	> 3.2 < 8.0					16	20	13	15							
	≥ 8.0 ≤ 10.0	0.35	0.42	10	15	12	15	9	11	40	33	NA	NA			
	> 10.0					8	12	7	9							

*Ave. (average) value = mean value determined by test samples.

†Max. or min. value = highest or lowest acceptable single value, respectively.

‡NA = not applicable.

Table 4. Test levels for mediumboard

Type	Specified manufacturing thickness	Effect of relative humidity change from 35 % to 85 %				Changes after water immersion				Bending strength		Extractable formaldehyde NOTE. Not applicable where board manufacturer does not include formaldehyde generating additives.
		Increase in length and width		Increase in thickness		Absorption by mass		Thickness swelling				
		ave.*	max.†	ave.	max.	ave.	max.	ave.	max.	ave.	min.†	
HME	mm ≥ 6.4 ≤ 10	0.25	0.30	7	9	20	25	10	12	N/mm ² 20	N/mm ² 18	0.04
	> 10 ≤ 13									17	15	
	> 13 ≤ 16									15	13	
	> 16									13	11	
HMN	≥ 6.4 ≤ 10	0.30	0.40	10	12	40	45	20	23	15	13	
	> 10 ≤ 13									12	10	
	> 13 ≤ 16									10	9	
	> 16									8	7	
LME	6.4	0.30	0.40	5	6	30	35	12	14	14	12	
	> 6.4 ≤ 10					25	30	9	12	11	10	
	> 10					20	25	8	9	9	8	
LMN	6.4	0.40	0.45	5	6	35	45	13	14	12	11	
	> 6.4 ≤ 10					30	35	10	12	10	9	
	> 10					25	30	9	11	8	7	

* Ave. (average) value = mean value determined by test samples.

† Max. or min. value = highest or lowest acceptable single value, respectively.

Table 5. Test levels for MDF

Specified manufacturing thickness	Effect of relative humidity change from 35 % to 85 %				Changes after water immersion				Bending strength		Modulus of elasticity		Transverse internal bond		Changes after wet cyclic test				Extractable formaldehyde*	Screwholding				Sand/grit	Surface absorption	
	Increase in length and width		Increase in thickness		Absorption by mass		Thickness swelling								Thickness swelling		Transverse internal bond strength			Edge		Face				
	ave.†	max.‡	ave.	max.	ave.	max.	ave.	max.	ave.	min.‡	ave.	min.	ave.	min.	ave.	max.	ave.	min.	max.	ave.	min.	ave.	min.	max.	min.	
mm ≤ 6	% 0.40	% 0.50	% 6	% 7	% 40	% 45	% 15	% 17	N/mm ² 35	N/mm ² 30	N/mm ² 2800	N/mm ² 2500	N/mm ² 0.70	N/mm ² 0.64	% 6	% 8	N/mm ² 0.30	N/mm ² 0.25	0.04	%	N	N	N	N	%	mm
> 6 ≤ 12	0.40	0.50	6	7	25	30	10	12	30	26	2500	2200	0.65	0.60	6	8	0.30	0.25		NA §	NA	NA	NA	0.05	150 (both sides)	
> 12 ≤ 19	0.40	0.50	6	7	18	20	6	8	30	26	2500	2200	0.60	0.35	6	8	0.25	0.20		850	750	1050	800			
> 19 ≤ 35	0.35	0.40	5	6	16	18	6	8	28	24	2000	1700	0.60	0.55	5	7	0.20	0.15		650	550	950	800			
> 35	0.35	0.40	5	6	16	18	6	8	25	20	2000	1700	0.55	0.50	5	7	0.15	0.10		650	550	950	800			

*Not applicable where the board manufacturer does not include formaldehyde generating additives.

†Ave. (average) value = mean value determined by test samples.

‡Max. or min. value = highest or lowest acceptable single value, respectively.

§ NA = not applicable.

Table 6. Test levels for softboard

Type	Specified manufacturing thickness	Effect of relative humidity change from 35 % to 85 %				Changes after water immersion		Bending strength		Deflection	Extractable formaldehyde NOTE. Not applicable where board manufacturer does not include formaldehyde generating additives.
		Increase in length and width		Increase in thickness		Absorption by mass					
		ave.*	max.†	ave.	max.	ave.	max.	ave.	min.†	max.	max.
SBN	mm ≤ 10	0.40	0.50	7	10	NA‡	NA‡	N/mm ² 2.0	N/mm ² 1.6	4	0.04
	> 10 ≤ 13							1.8	1.4		
	> 13 ≤ 16							1.7	1.3		
	> 16 ≤ 19							1.5	1.2		
	> 19 ≤ 25							1.0	0.8		
SBI	≤ 10	0.40	0.50	7	10	35	45	2.0	1.6		
	> 10 ≤ 13					28	35	1.8	1.4		
	> 13 ≤ 16							1.7	1.3		
	> 16 ≤ 19							1.5	1.2		
	> 19 ≤ 25							1.0	0.6		
SBS	≤ 10	0.40	0.50	7	10	20	25	2.0	1.6		
	> 10 ≤ 13					13	16	1.8	1.4		
	> 13 ≤ 16							1.7	1.3		
	> 16 ≤ 19							1.5	1.2		
	> 19 ≤ 25							1.0	0.8		

*Ave. (average) value = mean value determined by test samples.

†Max. or min. value = highest or lowest acceptable single value.

‡NA = not applicable. SBN boards should not be used where there is a risk of water absorption.

Table 7. Board identification, types and colours of stripes

Board	Type	Stripe(s)
Standard hardboard	SHA	3 blue stripes
Standard hardboard	SHB	2 blue stripes
Standard hardboard	SHC	1 blue stripe
Tempered hardboard	THE	2 red stripes
Tempered hardboard	THN	1 red stripe
High density mediumboard	HME	2 green stripes
High density mediumboard	HMN	1 green stripe
Low density mediumboard	LME	2 purple stripes
Low density mediumboard	LMN	1 purple stripe
Medium density fibreboard	MDF	1 black stripe
Moisture resistant medium density fibreboard	MDFMR	2 black stripes
Softboard	SBN	1 white stripe
Impregnated softboard	SBI	2 white stripes
Impregnated softboard	SBS	3 white stripes