

Gypsum plasterboards — Definitions, requirements and test methods

ICS 01.040.91; 91.100.10

National foreword

This British Standard is the UK implementation of EN 520:2004+A1:2009. It supersedes BS EN 520:2004, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted by Technical Committee B/544, Plastering, rendering, dry lining, to Subcommittee B/544/2, Gypsum based boards and ancillaries.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 22 November 2004

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ISBN 978 0 580 63867 1

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
16421 Corrigendum No. 1	31 July 2006	Supersession details added.
	28 February 2010	Implementation of CEN amendment A1:2009

English Version

Gypsum plasterboards - Definitions, requirements and test methods

Plaques de plâtre - Définitions, spécifications et méthodes d'essai

Gipsplatten - Begriffe, Anforderungen und Prüfverfahren

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Foreword

This document (EN 520:2004+A1:2009) has been prepared by Technical Committee CEN/TC 241 “Gypsum and gypsum based products”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2009-07-20.

This document supersedes EN 520:2004.

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This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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Introduction

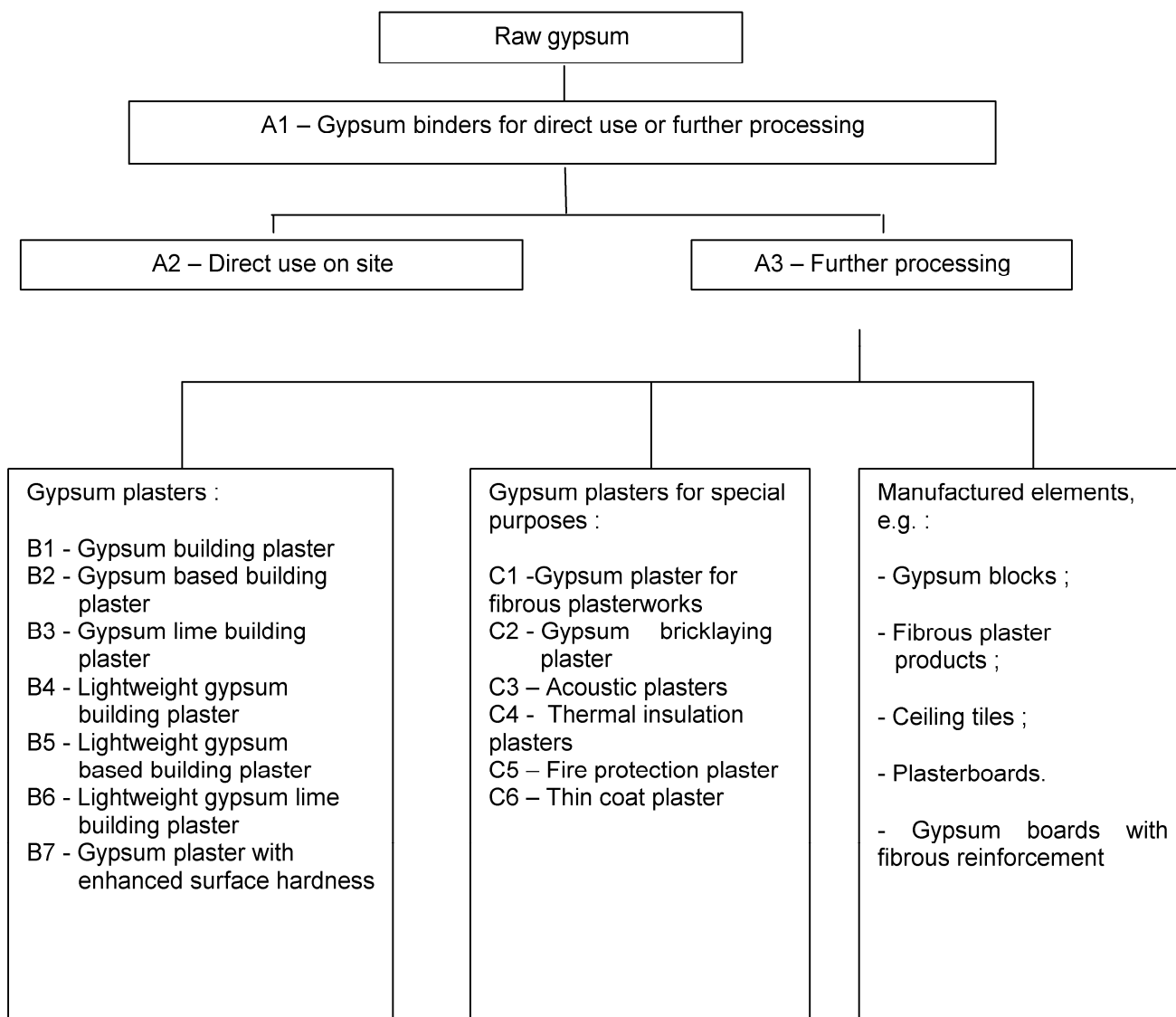
Gypsum plasterboards are composed of a plaster core encased in, and firmly bonded to paper liners to form flat rectangular boards.  This composition allows them properties which make gypsum plasterboards particularly suitable for use in situations where fire protection, sound and thermal insulation are required. 

Gypsum plasterboards may be fixed by various methods e.g. nailing, screwing or sticking with gypsum based or other adhesives. They may also be inserted in a suspended ceiling system.

Gypsum plasterboards are selected for use according to their type, size, thickness and edge profile. The boards may be used for example to provide dry lining finishes to walls, to fixed and suspended ceilings, to partitions, or as cladding to structural columns and beams. Other uses may be for flooring and sheathing application.

Diagrams 1 and 2 show the relationship between this standard and the package of standards prepared to support the families of gypsum and ancillary products.

A1



A1

Diagram 1 — Family of gypsum products

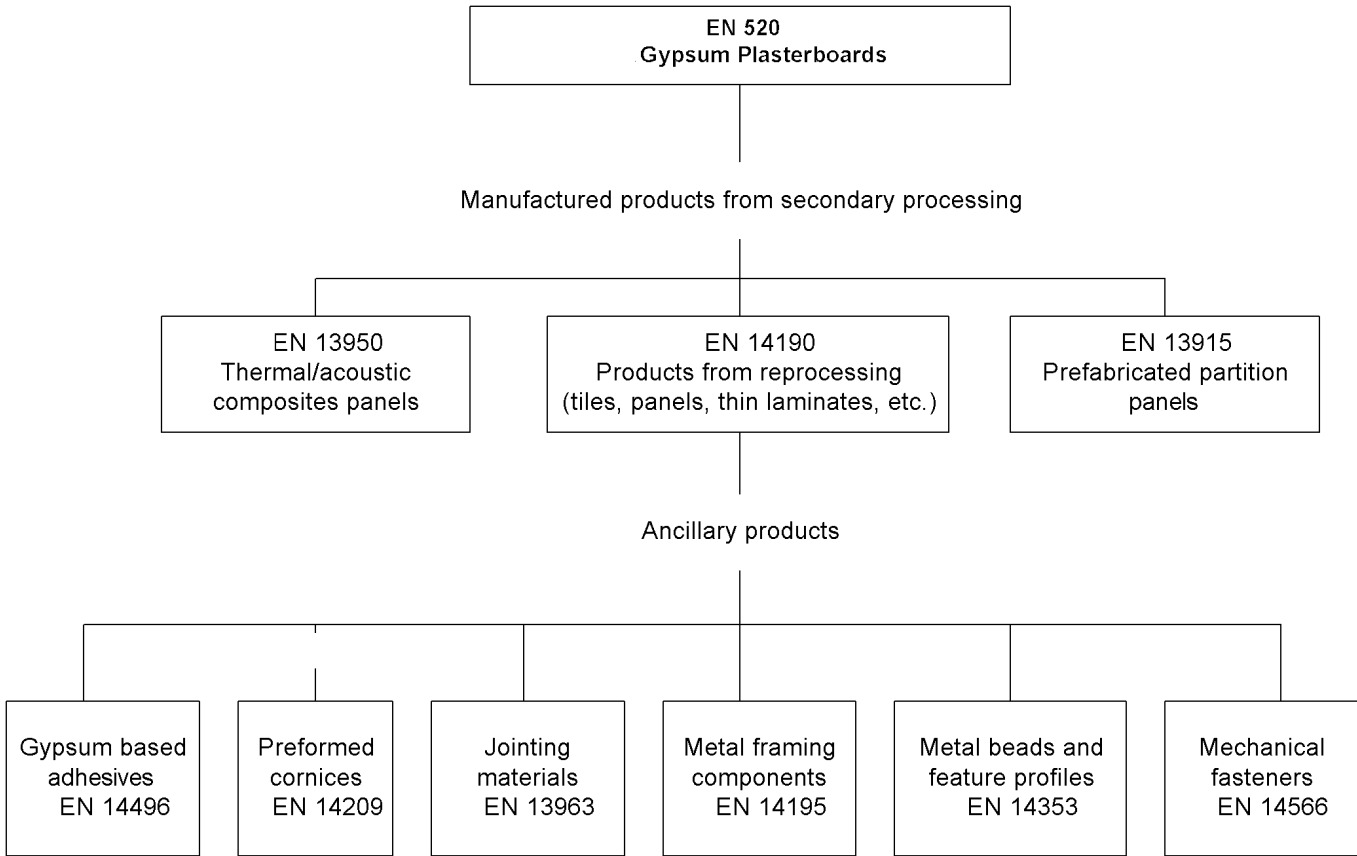


Diagram 2 — Family of ancillary products

1 Scope

This document specifies the characteristics and performance of gypsum plasterboards intended to be used in building construction works including those intended for secondary manufacturing operations. It includes boards designed to receive either direct surface decoration or gypsum plaster.

This document covers the following product performance characteristics: reaction to fire, water vapour permeability, flexural strength (breaking load), impact resistance and thermal resistance.

The following performance characteristics are linked to systems assembled with plasterboards: shear strength, fire resistance, impact resistance $\square_{A1}$, $\square_{A1}$ direct airborne sound insulation and acoustic absorption to be measured according to the corresponding European test methods. If required, tests should be done on assembled systems simulating the end use conditions.

This document covers also additional technical characteristics that are of importance for the use and acceptance of the product by the Construction Industry and the reference tests for these characteristics.

It provides for the evaluation of conformity of the product to this document.

This document does not cover plasterboards, which have been subject to any secondary manufacturing operations (e.g. insulating composite panels, plasterboards with thin lamination, etc.).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 336, *Structural timber — Sizes, permitted deviations*

EN 338, *Structural timber — Strength classes*

EN 1995-1-1, *Eurocode 5 — Design of timber structures*

EN 12114, *Thermal performance of buildings — Air permeability of building components and building elements — Laboratory test method*

EN 12524, *Building materials and products — Hygrothermal properties — Tabulated design values*

EN 12664, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Dry and moist products of medium and low thermal resistance*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

$\square_{A1}$ EN 13963 $\square_{A1}$, *Jointing materials for gypsum plasterboards — Definitions, requirements and test methods*

EN 14195, *Metal framing components for gypsum plasterboard systems — Definitions, requirements and test methods*

EN 14566 ^(A1), *Mechanical fasteners for gypsum plasterboard systems — Definitions, requirements and test methods*

EN ISO 140-3, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995)*

EN ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room (ISO 354:2003)*

EN ISO 536, *Paper and board — Determination of grammage (ISO 536:1995)*

EN ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation (ISO 717-1:1996)*

EN ISO 12572, *Hygrothermal performance of building materials and products — Determination of water vapour transmission properties (ISO 12572:2001)*

EN ISO 20535, *Paper and board — Determination of water absorptiveness — Cobb method (ISO 535:1991)*

ISO 7892, *Vertical building elements — Impact resistance tests — Impact bodies and general test procedures*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 gypsum plasterboard

product composed of a plaster core encased in, and firmly bonded to strong durable paper liner to form a flat rectangular board. The paper surfaces may vary according to the use of the particular type of board and the core may contain additives to impart additional properties. The longitudinal edges are paper-covered and profiled to suit the application

3.1.2

edge

paper-covered longitudinal side

3.1.3

end

side transverse to the edges, showing exposed core

3.1.4

face

surface on which the paper extends continuously to cover the edges

3.1.5

back

surface opposite to the face

3.1.6

width

shortest distance between the edges of the board

3.1.7

nominal width (w)

width stated by the producer

3.1.8

length

shortest distance between the ends of the board

3.1.9

nominal length (*l*)

length stated by the producer

3.1.10

thickness

distance between the face and the back, excluding edge profiles

3.1.11

nominal thickness (*t*)

thickness stated by the producer

3.1.12

squareness (*s*)

rectangularity of the board

3.2 Types of gypsum plasterboards

3.2.1 General

The performance of the types of gypsum plasterboards defined below may be combined in one board in which case the letter identifying each type of performance satisfied shall be given in the designation.

3.2.2

gypsum plasterboard Type A

plasterboard with a face to which suitable gypsum plasters or decoration may be applied. For the purposes of identification these boards are designated Type A

3.2.3

gypsum plasterboard Type H (plasterboard with reduced water absorption rate)

types of boards which have additives to reduce the water absorption rate. They may be suitable for special applications in which reduced water absorption properties are required to improve the performance of the board. For the purposes of identification, these boards are designated Type H1, H2 and H3, with different water absorption performance

3.2.4

gypsum plasterboard Type E (gypsum sheathing board)

boards specially manufactured to be used as sheathing board in external walls. They are not intended to receive decoration. They are not designed to be permanently exposed to external weather conditions. This type of wallboard has reduced water absorption rate. They shall have a minimum water vapour permeability. For the purposes of identification these boards are designated Type E

3.2.5

gypsum plasterboard Type F (gypsum plasterboard with improved core adhesion at high temperature)

plasterboard with a face to which suitable gypsum plasters or decoration may be applied. These boards have mineral fibres and/or other additives in the gypsum core to improve core cohesion at high temperatures. For the purposes of identification these boards are designated Type F

3.2.6

gypsum plasterboard Type P

boards which have a face intended to receive gypsum plaster or to be combined by collage with other materials in form of boards or panels. In case of boards intended to receive gypsum plaster, the edges are either square or round

NOTE For the purpose of identification these boards are designated Type P. 

3.2.7

gypsum plasterboard Type D (gypsum plasterboard with controlled density)

These boards have a controlled density, with a face to which suitable gypsum plasters or decoration may be applied. This enables improved performance in certain applications to be obtained. For the purposes of identification these boards are designated Type D

3.2.8

gypsum plasterboard Type R (gypsum plasterboard with enhanced strength)

These boards for special applications where higher strength is required have both increased longitudinal and transverse breaking loads. They have a face to which suitable gypsum plasters or decoration may be applied. For the purposes of identification these boards are designated Type R

A1 3.2.9

gypsum plasterboard Type I (gypsum plasterboard with enhanced surface hardness)

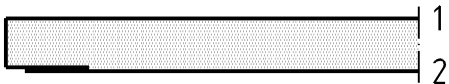
boards which are used for applications where higher surface hardness is required. They have a face to which suitable gypsum plasters or decoration may be applied. For the purposes of identification these boards are designated Type I

3.3 Edge and end profiles of gypsum plasterboards **A1**

The paper-covered edges of gypsum plasterboard are square, bevelled, tapered, half-rounded or rounded, or a combination of each (see examples in Figures 1 to 6).

A1 *deleted text* **A1**

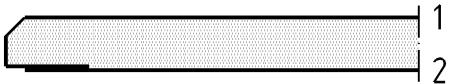
A1



Key

- 1 face
- 2 back

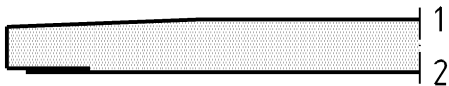
Figure 1 — Square edge



Key

- 1 face
- 2 back

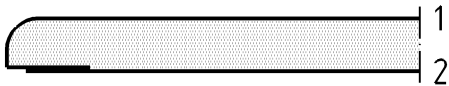
Figure 2 — Bevelled edge



Key

- 1 face
- 2 back

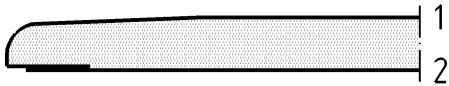
Figure 3 — Tapered edge



Key

- 1 face
- 2 back

Figure 4 — Half-rounded edge



Key

- 1 face
- 2 back

Figure 5 — Half-rounded tapered edge



Key

- 1 face
- 2 back

Figure 6 — Rounded edge A_1

3.4 A_1 Symbols and abbreviations

For the purpose of simplification in product marking and performance information characteristics may be identified through the symbols and abbreviations given in Table 1.

Table 1 — Symbols and abbreviations

Requirement	Sub-clause	Symbol or abbreviation
Reaction to fire	4.2.1	R2F
Shear strength	4.1.1	$\uparrow\downarrow$
Water vapour factor	4.4	μ
Thermal conductivity	4.7	λ
Fire resistance	4.2.2	FR
Impact resistance	4.3	$\rightarrow I$
Flexural strength	4.1.2	F
Acoustic absorption	4.6.2	α
Sound insulation	4.6.1	R
See literature		 www.company.com



4 Requirements

4.1 Mechanical characteristics

4.1.1 Shear strength (strength of board/substructure connection)

When the intended use of plasterboards is for stiffening timber framed building assemblies (i.e. walls, partitions, roof truss structures, etc.), the conventional shear strength of the plasterboard shall be determined in accordance with the test method described in 5.13.

NOTE It should be noted that this test does not measure the actual shear strength of the board but rather the strength of the board/substructure connection that is the relevant property for this application.

4.1.2 Flexural strength (expressed as flexural breaking load)

4.1.2.1 The flexural breaking load of gypsum plasterboard types A, D, E, F, H, I determined in accordance with the test method described in 5.7, shall not be less than the values given in  Table 2 .

Additionally, no individual test shall demonstrate the product to be more than 10 % below the values given in  Table 2 .

Table 2 — Flexural breaking load of gypsum plasterboards (Types A, D, E, F, H, I)

Thickness	Nominal board thickness mm	Flexural breaking load	
		Transverse direction	Longitudinal direction
Common	9,5	160	400
	12,5	210	550
	15,0	250	650
Other thickness	t	$16,8 \cdot t$	$43 \cdot t$

4.1.2.2 The flexural breaking load of enhanced strength gypsum plasterboard type R, or combined determined in accordance with the test method described in 5.7, shall not be less than the values given in Table 3.

Additionally, no individual test shall demonstrate the product to be more than 10 % below the values given in Table 3.

Table 3 — Flexural breaking load of enhanced strength gypsum plasterboards (Type R or combined)

Thickness	Nominal board thickness mm	Flexural breaking load	
		Transverse direction	Longitudinal direction
Common	12,5	300	725
	15,0	360	870
Other thickness	t	$24 \cdot t$	$58 \cdot t$

4.1.2.3 The flexural breaking load of gypsum baseboards (type P) determined as described in 5.7, shall not be less than the values given in Table 4.

In addition, no individual test shall demonstrate the product to be more than 10 % below the values given in Table 4.

Table 4 — Flexural breaking load of gypsum baseboards (Type P)

Nominal board thickness mm	Flexural breaking load	
	Transverse direction	Longitudinal direction
9,5	125	180
12,5	165	235

4.1.3 Deflection under load

When required, the deflection under load shall be determined in accordance with the test method described in 5.8.

4.2 Fire behaviour

4.2.1 Reaction to fire

Where subject to regulatory requirements, the plasterboard shall either be Classified Without Further Testing according to the provisions of Annex B or it shall be tested and classified according to EN 13501-1.

Plasterboards tested according to EN 13823 (SBI test) shall be mounted and fixed in accordance with Annex C or when the producer wishes to claim performance for a specific intended use, the mounting and fixing shall be representative of that intended use.

When required, the paper grammage shall be determined according to EN ISO 536.

4.2.2 Resistance to fire

NOTE Resistance to fire is a characteristic dependent on an assembled system and not of the product in isolation.

When required, the fire resistance of a system including gypsum plasterboard shall be classified in accordance with EN 13501-2.

4.3 Impact resistance

NOTE Impact resistance is a characteristic dependent on an assembled system and not of the product in isolation.

When required, the impact resistance of a system including gypsum plasterboard shall be determined in accordance with ISO 7892.

4.4 Water vapour permeability (expressed as water vapour resistance factor)

When the intended use of gypsum plasterboards is for moisture diffusion control, tabulated design values of water vapour resistance factor for gypsum plasterboards given in EN 12524 may be used.

Alternatively, the water vapour resistance factor shall be determined using the method given in EN ISO 12572.

4.5 Air permeability

When the intended use of gypsum plasterboards is sheathing in external walls, a design value of $1,4 \times 10^{-6} \text{ m}^3/\text{m}^2 \cdot \text{s} \cdot \text{Pa}$ may be used for air permeability of gypsum plasterboards.

When required, air permeability shall be determined in accordance with EN 12114.

4.6 Acoustic properties

4.6.1 Direct airborne sound insulation

NOTE Direct airborne sound insulation is a characteristic dependent on an assembled system and not of the product in isolation.

When required, the direct airborne sound insulation of a system including gypsum plasterboard shall be determined in accordance with EN ISO 140-3 and EN ISO 717-1.

4.6.2 Acoustic absorption

NOTE Acoustic absorption is a characteristic dependent on an assembled system and not of the product in isolation.

When plasterboards are intended to be used for acoustic conditioning, acoustic absorption shall be measured according to EN ISO 354.

4.7 Thermal resistance (expressed as thermal conductivity)

When the intended use of plasterboards is to contribute to thermal resistance in building construction works (walls, partitions, ceilings, etc.), the design values of thermal conductivity for gypsum plasterboards given in EN 12524 may be used.

When required, thermal conductivity shall be determined in accordance with EN 12664.

4.8 Regulated substances

Materials used in products shall not release any regulated substances in excess of the maximum permitted levels specified in a relevant document for the material or permitted in the national regulations of the member state of destination.

4.9 Dimensions and tolerances

4.9.1 Gypsum plasterboards (Type P)

4.9.1.1 Width

NOTE Common nominal widths are 400 mm, 600 mm, 900 mm and 1 200 mm. Other widths are also possible.

The width shall be measured as described in 5.2 and compared to the nominal width.

The tolerance shall be $\begin{smallmatrix} 0 \\ -8 \end{smallmatrix}$ mm.

4.9.1.2 Length

NOTE Common nominal lengths are 1 200 mm, 1 500 mm, 1 800 mm and 2 000 mm. Other lengths are also possible.

The length shall be measured as described in 5.3 and compared to the nominal length.

The tolerance shall be $\begin{smallmatrix} 0 \\ -6 \end{smallmatrix}$ mm.

4.9.1.3 Thickness

NOTE The nominal thicknesses are normally 9,5 mm and 12,5 mm.

The thickness shall be measured as described in 5.4 and compared to the nominal thickness.

 The tolerance shall be $\begin{smallmatrix} +0,6 \\ -0,6 \end{smallmatrix}$ mm. 

4.9.2 Gypsum plasterboards Types A, H, D, E, F, I, R or combined

4.9.2.1 Width

NOTE Common nominal widths are 600 mm, 625 mm, 900 mm, 1 200 mm and 1 250 mm. Other widths are also possible.

The width shall be measured as described in 5.2 and compared to the nominal width.

The tolerance shall be $\begin{smallmatrix} 0 \\ -4 \end{smallmatrix}$ mm for each individual measurement.

4.9.2.2 Length

The length shall be measured as described in 5.3 and compared to the nominal length.

The tolerance shall be $\begin{smallmatrix} 0 \\ -5 \end{smallmatrix}$ mm for each individual measurement.

4.9.2.3 Thickness

NOTE Common nominal thicknesses are 9,5 mm, 12,5 mm and 15 mm. Other nominal thicknesses are also possible.

The nominal thickness shall be at least 6,0 mm.

The thickness shall be measured as described in 5.4 and compared to the nominal thickness.

[A1] Tolerances for nominal thicknesses below 18 mm shall be $\begin{smallmatrix} +0,5 \\ -0,5 \end{smallmatrix}$ mm. **[A1]**

[A1] For boards of nominal thickness equal to or greater than 18 mm, the tolerance shall be $\begin{smallmatrix} +0,04 \\ -0,04 \end{smallmatrix} \times \text{thickness in mm}$ rounded to the nearest 0,1 mm. **[A1]**

The difference between individual thickness measurements on any individual board shall not exceed 0,8 mm.

4.9.2.4 Squareness of ends

The deviation from squareness measured as described in 5.5 shall not exceed 2,5 mm per metre of width.

4.9.2.5 Edge and end profiles

The edge and end profiles may vary widely depending upon the jointing system and decorative and aesthetic considerations. The exception is the tapered edge and the half-rounded tapered edge profile.

For the tapered edge and the half-rounded tapered edge profile, when measured as described in 5.6, each individual reading shall be between the following limits:

- depth of taper: between 0,6 mm and 2,5 mm;
- width of taper: between 40 mm and 80 mm.

4.10 Additional requirements for gypsum plasterboards Types H1, H2, H3 (with reduced water absorption)

[A1] The surface water absorption of the board determined by the method described in 5.9.1 for the face of the board shall not be greater than the values shown in Table 5.

The total water absorption of boards, determined by the method described in 5.9.2, shall not be greater than the values shown in Table 5.

Table 5 — Water absorption classes

Water absorption classes	Surface water absorption g/m ²	Total water absorption %
H1	180	≤ 5
H2	220	≤ 10
H3	300	≤ 25

[A1]

4.11 Additional requirements for gypsum plasterboards Type E (sheathing boards)

This type of boards shall conform to type H1, H2 or H3 requirements.

The water vapour resistance factor of boards type E determined in accordance with the method described in EN ISO 12572 shall not be greater than 25.