BRITISH STANDARD

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Gypsum boards with fibrous reinforcement — Definitions, requirements and test methods —

Part 1: Gypsum boards with mat reinforcement

ICS 91.100.10

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 15283-1:2008+A1:2009. It supersedes BS EN 15283-1:2008 which is withdrawn.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 committee can be obtained on request to its secretary.

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Gypsum boards with fibrous reinforcement - Definitions, requirements and test methods - Part 1: Gypsum boards with mat reinforcement

Plaques de plâtre armées de fibres - Définitions, spécifications et méthodes d'essai - Partie 1: Plaques de plâtre armées d'un tissu

Faserverstärkte Gipsplatten - Begriffe, Anforderungen und Prüfverfahren - Teil 1: Gipsplatten mit Vliesarmierung

This European Standard was approved by CEN on 28 December 2007 and includes Amendment 1 approved by CEN on 20 July 2009.

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Foreword

This document (EN 15283-1:2008+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of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

This document includes Amendment 1, approved by CEN on 2009-08-19.

This document supersedes EN 15283-1:2008.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

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 standard includes two parts:

— *Part 1: Gypsum boards with mat reinforcement*

— *Part 2: Gypsum fibre boards*

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 89/106.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

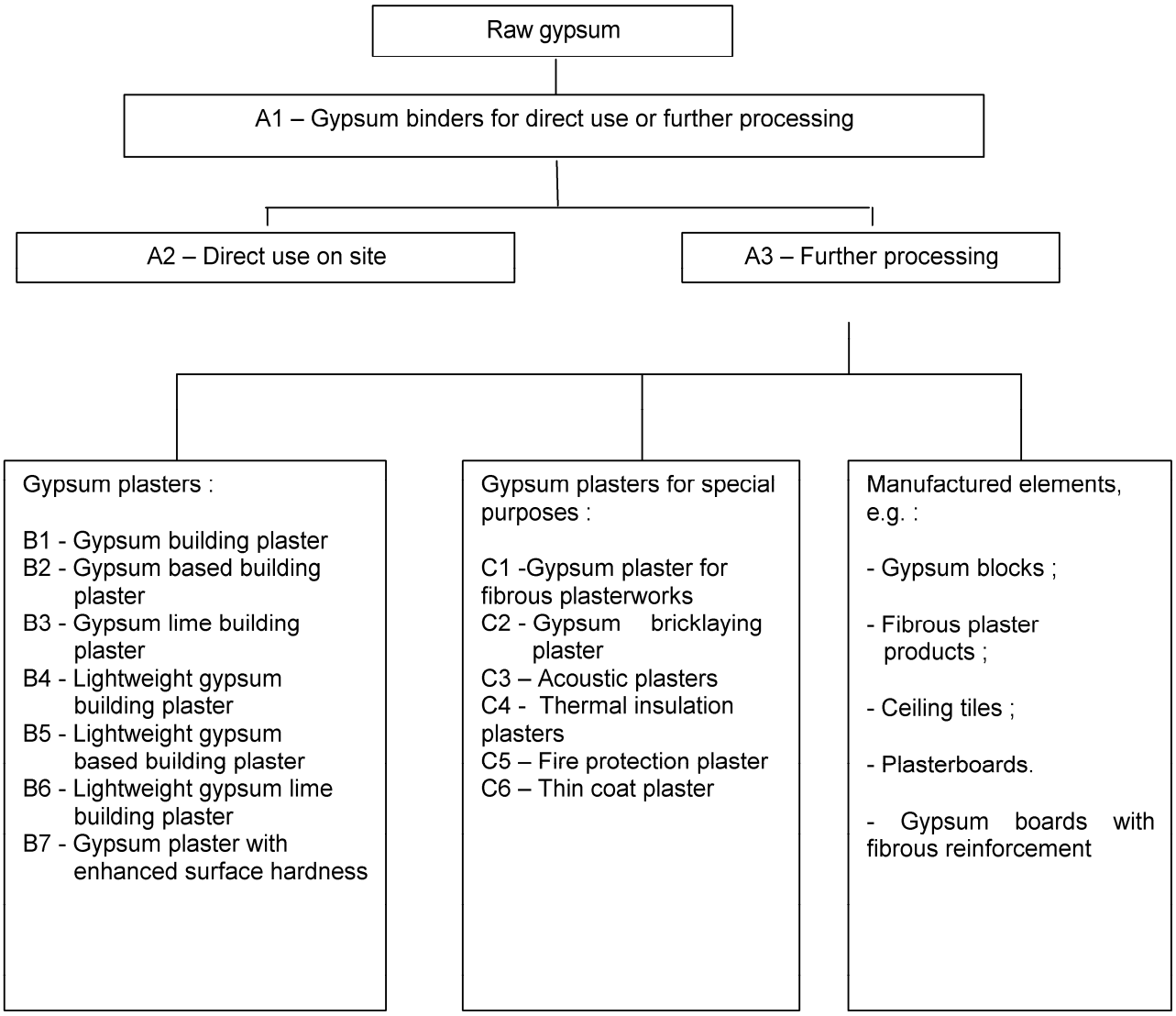


Diagram 1 — Families of gypsum products

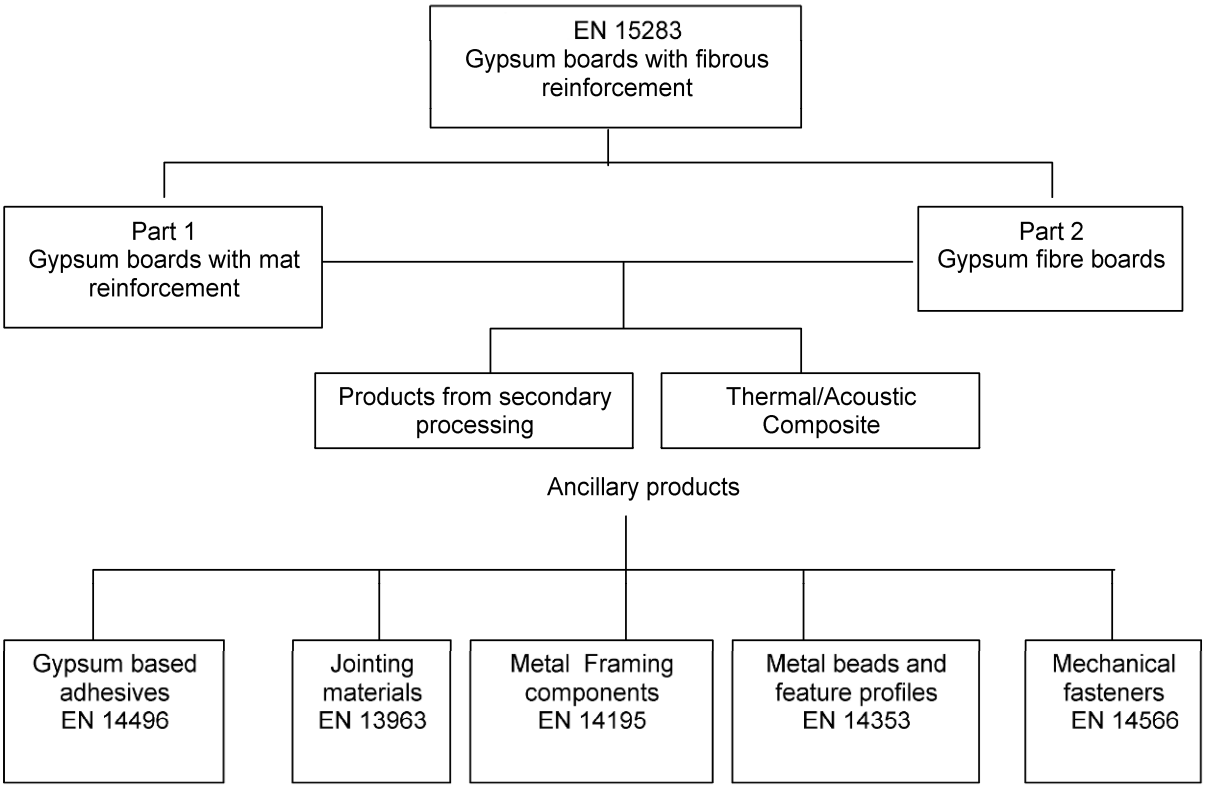


Diagram 2 — Family of ancillary products

Introduction

Gypsum boards with mat reinforcement are composed of set gypsum plaster core reinforced with fibres which may be inorganic and/or organic, and are arranged in a woven or non-woven mat to form flat rectangular boards. Admixtures, fillers and fibres dispersed in the core may also be present. They are usually continuously produced on an industrial scale.

The properties of gypsum boards with mat reinforcement make them particularly suitable for use in situation where there are requirements for fire protection, sound, thermal insulation or racking strength.

Gypsum boards with mat reinforcement can be fixed by various methods e.g. nailing, screwing, stapling or sticking with gypsum based or other adhesives. They can also be inserted in a suspended ceiling system or laid in floor constructions.

Gypsum boards with mat reinforcement can be finished with direct surface decoration or gypsum plaster.

They can be further processed into a range of other products.

1 Scope

This European Standard specifies the characteristics and performance of gypsum boards with mat reinforcement 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.

Gypsum boards with mat reinforcement are selected for use according to their type, size, thickness and edge profile. The boards can 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 can be for floors, ventilation and smoke extraction ducts, cable trays and sheathing applications.

This European Standard covers the following product performance characteristics: reaction to fire, water vapour permeability, flexural strength, and thermal resistance.

The following performance characteristics are linked to systems assembled with gypsum boards with mat reinforcement: shear strength, fire resistance, impact resistance, direct airborne sound insulation, acoustic absorption. If required, tests should be done according to the corresponding European test methods on assembled systems simulating the end use conditions.

This European Standard also covers additional technical characteristics that are of importance for the use and acceptance of the product and the reference tests for these characteristics. It provides for the evaluation of conformity of the product to this EN.

This European Standard does not cover gypsum boards with mat reinforcement which have been subject to any secondary manufacturing operations (e.g. insulating composite panels, boards with thin lamination etc.).

Products covered by EN 520 or EN 13815 are excluded.

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 520:2004, *Gypsum plasterboards — Definitions, requirements and test methods*

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 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*

EN 13963, *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 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 717-1, *Acoustics - Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation (ISO 717-1:1996)*

EN ISO 9001, *Quality management systems — Requirements (ISO 9001:2000)*

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

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 boards with mat reinforcement
board composed of a gypsum core firmly bonded to a woven or non-woven sheet of inorganic or organic fibres located on or just below the surfaces. The sheet may consist of single or multiple layers and may be reinforced by filaments or webs of fibre strands. The surfaces may vary according to the use and the core can also contain fibres, additives and/or fillers to impart additional properties. Gypsum boards with fibrous mat reinforcement are usually continuously produced on an industrial scale.

The surfaces and edge profiles vary according to the use of the particular type of board.

For the purposes of identification these boards receive the designation GM

3.2
Additional features of gypsum fibre boards

3.2.1
additional features of gypsum boards with mat reinforcement
performance of the types of gypsum boards with mat reinforcement defined below can be combined in one board in which case the letter identifying each type of performance satisfied is given in the designation

3.2.2
gypsum boards with mat reinforcement with reduced water absorption rate
gypsum boards with mat reinforcement can have additives to reduce the water absorption rate which make them suitable for special applications in which reduced water absorption properties are required to improve the performance of the board. For the purpose of identification these boards are designated GM-H1, GM-H2 with different water absorption performance

3.2.3
gypsum boards with mat reinforcement with enhanced surface hardness
boards can have enhanced surface hardness for special applications. For the purpose of identification these boards receive the designation GM-I

3.2.4
gypsum boards with mat reinforcement with enhanced strength
boards can have enhanced strength for special applications. For the purpose of identification these boards receive the designation GM-R

3.2.5
gypsum boards with mat reinforcement with improved core adhesion at high temperature
these boards can have mineral fibres and/or other additives in the gypsum core to improve core cohesion at high temperatures. For the purpose of identification these boards receive the designation GM-F

3.3 General terms

3.3.1
edge
longitudinal side of the board

3.3.2
end
side transverse to the edges

3.3.3
face
surface intended to be exposed in use

3.3.4
back
surface opposite to the face

3.3.5
width
shortest distance between the edges of the board

3.3.6
nominal width (w)
width stated by the manufacturer

3.3.7
length
shortest distance between the ends of the board

3.3.8
nominal length (l)
length stated by the manufacturer

3.3.9
thickness
distance between the face and the back, excluding edge profiles

3.3.10
nominal thickness (t)
thickness stated by the manufacturer

3.3.11
squareness (s)
rectangularity of the board

3.4 Edge and end profiles of gypsum boards with mat reinforcement

The edges may be square, tapered, bevelled, half-rounded, rounded, skewed or tongue and grooved, or a combination of each. Sketches of some common edge profiles are given in EN 520.

The ends of gypsum boards with mat reinforcement are usually square.

Other types of profile may be produced for special applications.

3.5 〈A1〉 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	4.1.3	↑↓
Water vapour resistance factor	4.4	μ
Thermal conductivity	4.5	λ
Fire resistance	4.2.2	FR
Impact resistance	4.11	→I
Flexural strength	4.1.1	F
Acoustic absorption	4.3.2	α
Sound insulation	4.3.1	R
See literature		www.company.com

〈A1〉

4 Requirements

4.1 Mechanical characteristics

4.1.1 Flexural strength

The flexural strength shall be expressed as the breaking load in Newtons.

The flexural breaking load of gypsum boards with mat reinforcement determined in accordance with the test method described in 5.6 shall not be less than the values given below, where t is the thickness of the board in mm.

〈A1〉 Table 2 〈A1〉 — Flexural breaking load in Newtons

Type	Nominal board thickness mm	Flexural breaking load N	
		Transverse direction	Longitudinal direction
GM, GM-H1, GM-H2, GM-I, GM-F	t	$16{,}8 \cdot t$	$43 \cdot t$
GM-R	t	$24 \cdot t$	$58 \cdot t$

Additionally, no individual result shall be more than 10 % below these values.

4.1.2 Deflection under load

When required and subject to regulatory requirements, the deflection under load shall be determined in accordance to the test method described in 5.7.

4.1.3 Shear strength (strength of bond/substructure connection)

When the intended use of gypsum boards with mat reinforcement is stiffening building assemblies (i.e. walls, partitions, roof truss structures) the conventional shear strength of the boards shall be determined in accordance with the test method given in EN 520.

NOTE 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.

4.2 Fire behaviour

4.2.1 Reaction to fire

When the intended use of gypsum boards with mat reinforcement is for exposed situations in building construction works, gypsum boards with mat reinforcement shall be classified in accordance with EN 13501-1.

When testing the gypsum boards with mat reinforcement in the EN 13823 test according to the provisions of EN 13501-1 is required, the product shall be mounted in a manner which is representative of end use applications. The method for mounting shall be as Annex B.

4.2.2 〚A1〛 Fire resistance 〚A1〛

〚A1〛 Fire resistance 〚A1〛 is a property of an assembled system and not of a product in isolation.

When required and subject to regulatory requirement, the fire resistance of a system including gypsum boards with mat reinforcement shall be classified in accordance with EN 13501-2.

4.3 Acoustic properties

4.3.1 Direct airborne sound insulation

Direct airborne sound insulation is a property of an assembled system and not of the product in isolation.

When required and subject to regulatory requirement, the direct airborne sound insulation of a system including gypsum boards with mat reinforcement shall be determined in accordance with EN ISO 140-3 and EN ISO 717-1.

4.3.2 Acoustic absorption

Acoustic absorption is a property of an assembled system and not of the product in isolation.

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

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

When the intended use of gypsum boards with mat reinforcement is for moisture diffusion control, tabulated values of water vapour resistance factor for gypsum products given in EN 12524 shall be used.

When required and subject to regulatory requirement, the boards shall be tested in accordance with the method for water vapour resistance given in EN ISO 12572.

4.5 Thermal resistance (expressed as thermal conductivity)

When the intended use of boards is to contribute to thermal resistance in building construction works (walls, partitions, ceilings), the tabulated values of thermal conductivity for gypsum products given in EN 12524 shall be used.

When required and subject to regulatory requirement, thermal resistance shall be determined in accordance with the test method given in EN 12664.

4.6 Dangerous substances

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

4.7 Dimensions and tolerances

4.7.1 Width

NOTE Common nominal widths are: 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 +0/ - 4 mm.

4.7.2 Length

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

The tolerance shall be +0/- 5 mm for each individual measurement.

4.7.3 Thickness

NOTE The common nominal thicknesses are 12,5 mm, 15 mm, 20 mm and 25 mm.

Other nominal thicknesses are also possible and shall be at least 6,0 mm nominal.

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

Tolerances for thickness below 18 mm shall be $\pm$ 0,7 mm.

For boards of thickness equal to or greater than 18 mm, the tolerance shall be $\pm$ (0,04 x thickness) (in mm).

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

4.7.4 Squareness

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

4.7.5 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.

When measured as described in 5.6 of EN 520:2004, 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.

4.8 Additional requirements for gypsum boards with mat reinforcement with reduced water absorption rate Type H1 and H2

The total water absorption of boards, determined by the method described in 5.8, shall not be greater than 5 %. for type H1 and 10 % for type H2.

4.9 Additional requirements for gypsum boards with mat reinforcement with enhanced surface hardness Type I

The surface hardness of board is characterised by the diameter of the depression produced in the surface according to the test method described in 5.9.

The diameter of the depression shall not be more than 15 mm.

4.10 Additional requirements for gypsum boards with mat reinforcement with improved core cohesion at high temperature Type F

When a type F board (or combined) is subjected to the test described in 5.10 of EN 520:2004, none of the six specimens shall break.

4.11 Impact resistance

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

When required and subject to regulatory requirements, the impact resistance of a system including gypsum boards with mat reinforcement shall be determined in accordance with ISO 7892.

5 Test methods

5.1 Sampling

Testing shall require three boards of each type and thickness on which tests 5.2 to 5.5 shall be carried out.

Tests 5.6 to 5.9 shall be carried out on specimens cut out from the same three boards.

The Annex A gives an example of sampling procedure.

5.2 Determination of width

5.2.1 Principle

The width is measured at three points.

5.2.2 Apparatus

A metal rule or tape graduated in millimetres and permitting a reading to 1 mm.

5.2.3 Procedure

Take three measurements between the extremities of the boards (see Figure 1) to the nearest millimetre, one near each end and one near the middle of the board.

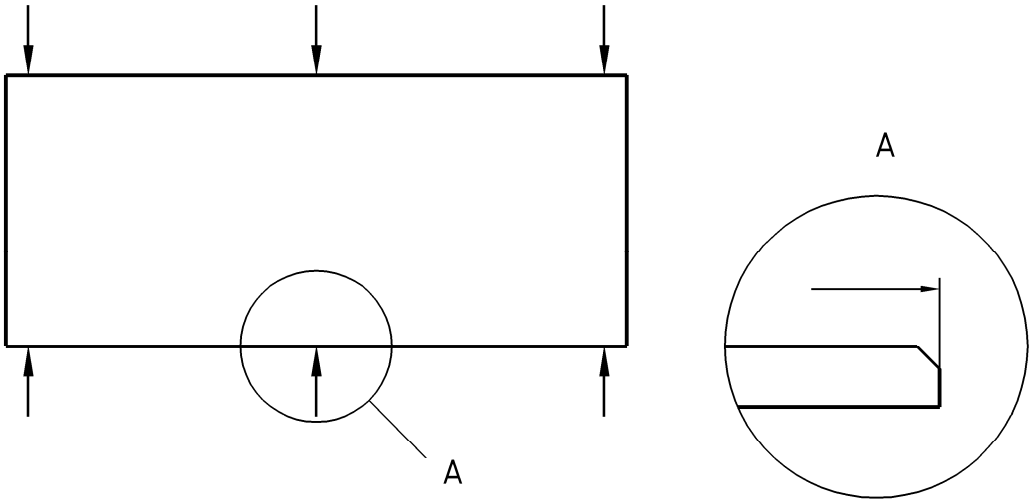


Figure 1 — Determination of width

5.2.4 Expression of results

Each measured value expressed in millimetres is recorded.

5.3 Determination of length

5.3.1 Principle

The length is measured at three points.

5.3.2 Apparatus

A metal rule or tape with reading to 1 mm divisions.

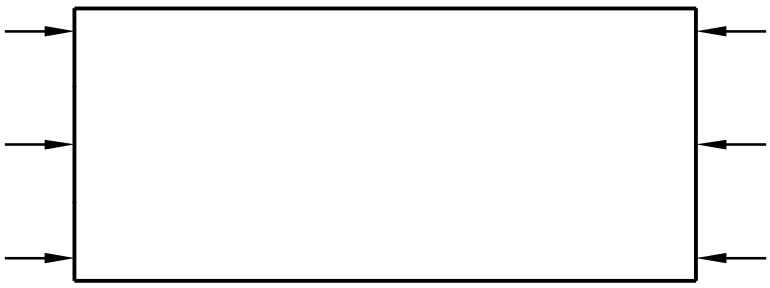


Figure 2 — Determination of length

5.3.3 Procedure

Take three measurements between the extremities of the board (see Figure 2) to the nearest millimetre, one near each edge and one near the middle.

5.3.4 Expression of results

Each measured value expressed in millimetres is recorded and compared to the nominal length of the board.

5.4 Determination of thickness

5.4.1 Principle

The thickness of the board is measured at six points near to one end of the board.

5.4.2 Apparatus

A micrometer, dial gauge, or callipers with an anvil diameter not less than 10 mm and permitting a reading to 0,05 mm.

5.4.3 Procedure

Take six measurements (see Figure 3) to the nearest 0,05 mm across one end at approximately equal intervals across the width and at least 25 mm from the end and 100 mm from the edges. For boards of nominal width not greater than 600 mm, three measurements are sufficient.

Dimensions in millimetres

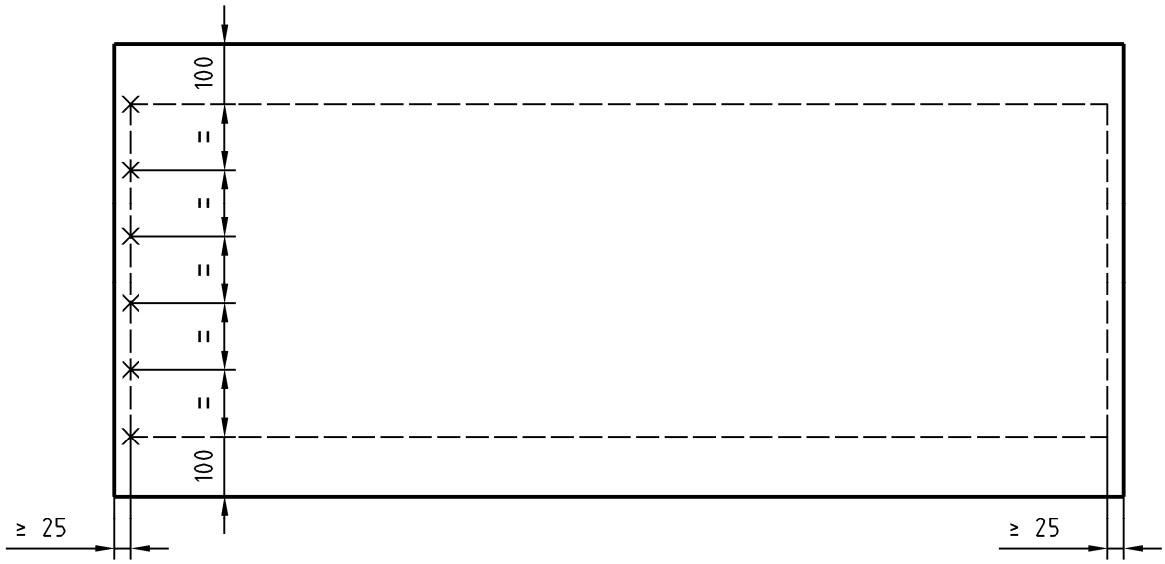


Figure 3 — Determination of thickness

5.4.4 Expression of results

Record each individual measurement.

Record to the nearest 0,1 mm the thickness as the average of the values obtained for each board.

5.5 Determination of squareness

5.5.1 Principle

Method a: Two boards are compared with each other and the squareness measured.

Method b: The two diagonals of a board are measured.

5.5.2 Apparatus

A metal rule or tape with 1 mm divisions.

5.5.3 Procedure

Method a: Place one board on top of another so that they coincide along one edge and at one corner (circled in Figure 4.).

Measure to the nearest 1 mm the distance $\Delta 1$ (see Figure 4) between the ends of the opposite edges.

Turn the top board over so that the same ends coincide as for the first measurement and ensure that the corner of the top board coincides with that corner of the lower board used in the first measurement (circled in Figure 4). Measure the new distance $\Delta 2$ between the ends of the opposite edges.

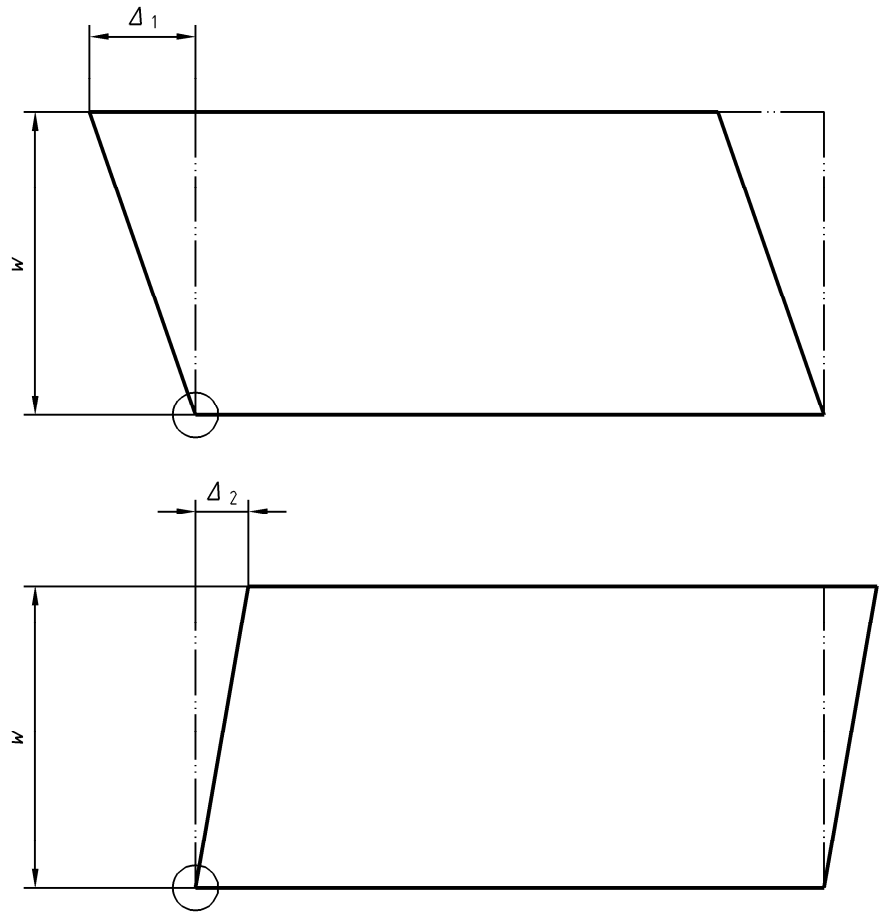


Figure 4 — Determination of squareness of ends

Method b: Measure the length (l) and the width (w) of the board and the lengths of the two diagonals $d1$ and $d2$ to the nearest mm.

5.5.4 Expression of results

Method a: The squareness is characterised for one of the boards by the half sum $\frac{\Delta 1 + \Delta 2}{2w}$ and for other by the half difference $\frac{\Delta 2 + \Delta 1}{2w}$ expressed in millimetres per metre.

Method b: The squareness S is expressed by the result of the expression:

$$S = \frac{(d1 + d2) \cdot (d1 - d2)}{4 \cdot l \cdot w} \quad (1)$$

For the calculations, the width (w) shall be expressed in metres, all other parameters in millimetres.

5.6 Determination of flexural breaking load

5.6.1 Principle

The flexural strength of boards is characterised by the flexural breaking load.

Specimens 400 mm x 300 mm cut off the boards are subjected to a known load which is increased at a controlled rate until failure occurs.

5.6.2 Apparatus

A loading machine capable of being read to 2 % and capable of applying the necessary load with a rate of 250 N/min ± 125 N/min.

5.6.3 Procedure

5.6.3.1 Preparation of specimens

Cut two specimens from each board with all edges square (as shown in Figure 5).

One specimen is taken in the longitudinal direction (designated L) and the other in the transverse direction (designated T) (see Figure 5).

Cut the specimens at least 100 mm from the ends and edges of the board, except in the case of boards of less than 600 mm width where the distance from the edge can be reduced and should be equal on either side of the sample.

Dry the specimens to constant mass[1)] at (40 ± 2) °C and perform the test within 10 min of removing it from the drying oven.

5.6.3.2 Testing

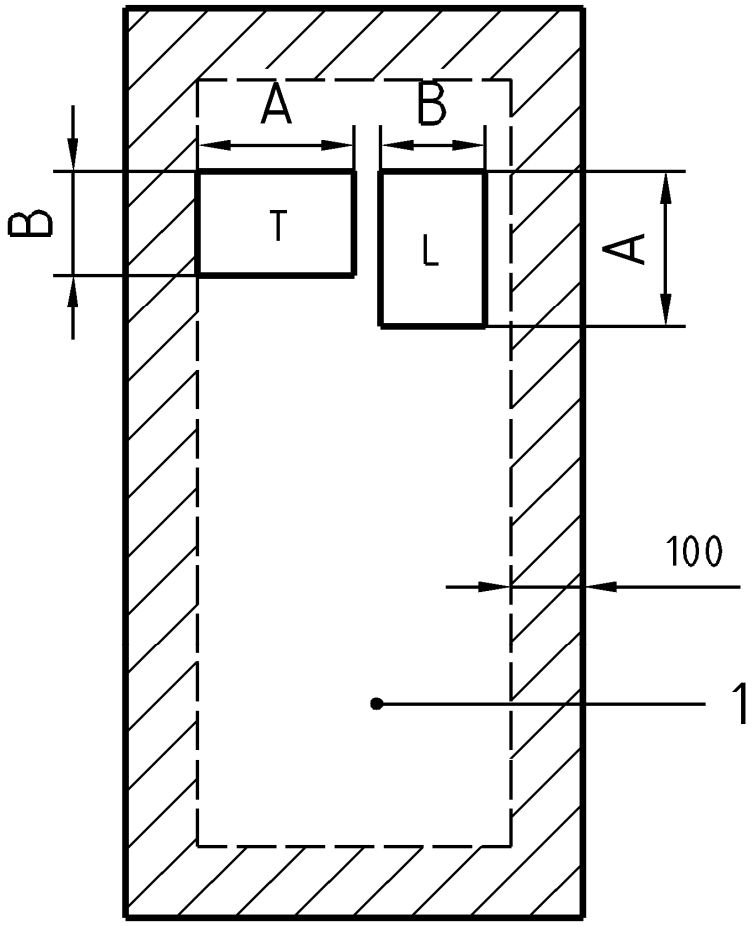
Place each specimen into the loading machine, face down in the case of longitudinal specimens and face up in the case of transverse specimens, on two parallel supports rounded to a radius of between 3 mm and 15 mm, with the centres 350 mm ± 1 mm apart.

Apply the load at a rate of 250 N/min ± 125 N/min at the centre ± 2 mm of the span parallel to the supports, by means of a platen with a rounding radius between 3 mm and 15 mm. Record each failure value to the nearest Newton.

The time from the application of the load to the failure of the specimen shall exceed 20 s.

1) Constant mass is defined as two successive weighings 24 h apart, differing by less than 0,1 %.

Dimensions in millimetres



Key

1 zone for sampling other specimens

A = (400 ±1,5)

B = (300 ±1,5)

Figure 5 — Sampling of specimens for the determination of flexural breaking load (example for 1 200 mm wide board)

5.6.3.3 Expression of results

Record each individual flexural breaking load and calculate the mean flexural breaking load of the three longitudinal specimens (L) and of the three transverse specimens (T).

5.7 Determination of deflection under load

The test is the same as the one used for flexural breaking load (5.6 above) but a continuous record of deflection produced by the applied load is made.

Calculate the mean deflection under load of the three longitudinal specimens (L) and also the three transverse specimens (T) as the average of the recorded values for any given load.

5.8 Determination of total water absorption

5.8.1 Principle

Conditioned specimens are immersed in water at (23 ± 2) °C and the percentage increase in mass is determined.

5.8.2 Apparatus

a) Balance with an accuracy of 0,1 g;

b) water bath at (23 ± 2) °C large enough to hold the specimen;

c) clock or watch with accuracy of 1 min.

5.8.3 Procedure

Cut a specimen measuring (300 mm ± 1,5 mm) × (300 mm ± 1,5) mm from each board, approximately half-way between the edges and at least 150 mm from the ends. Do not treat the edges of the specimen or damage the surface.

Condition the specimens to constant mass[2)] at (23 ± 2) °C and (50 ± 5) % relative humidity, weigh to the nearest 0,1 g and carry out the test immediately.

Immerse the specimen in a water bath at (23 ± 2) °C covered with 25 mm to 35 mm of water for 2 h ± 2 min.

Place the specimen horizontally but not resting flat on the bottom of the container.

After removal from the bath, wipe excess water from the surface and edges of the specimen and weigh immediately to the nearest 0,1 g.

5.8.4 Expression of results

Calculate the percentage increase in mass of each specimen in relation to the starting mass. Record the mean percentage increase in mass as the water absorption of the Gypsum boards with mat reinforcement.

5.9 Determination of surface hardness of the board

5.9.1 Principle

The surface damage caused by of a small steel sphere dropped from a predetermined height is measured.

5.9.2 Apparatus

a) 50 mm diameter steel sphere of 510 g ± 10 g mass;

b) rigid, flat and horizontal table to support the whole surface of the specimen with an inertia enough for the impact (e.g. steel table 20 mm thick);

2) Constant mass is defined as two successive weighings 24 h apart, differing by less than 0,1 %.

c) carbon paper;

d) graduated rule with 0,5 mm accuracy;

e) support for the steel sphere.

5.9.3 Procedure

5.9.3.1 Preparation of specimen

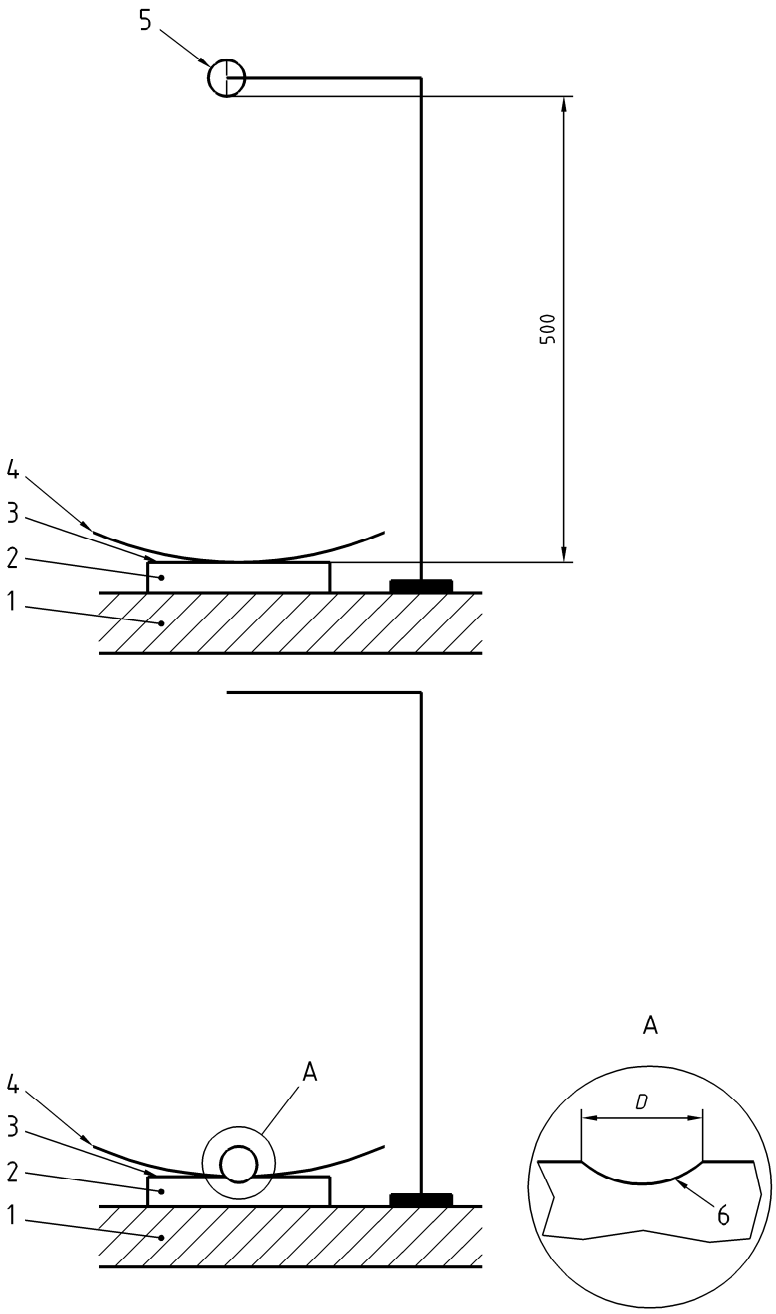
Cut one specimen measuring 300 mm × 400 mm from a board type I. Condition the specimens to constant mass according to 5.8.3.

5.9.3.2 Testing (see Figure 6)

Place the specimen, face up, on the rigid table and cover it with the carbon paper. Then place the sphere between the clamps of the support with a distance of 500 mm from the board surface to the underside of the sphere.

Let the sphere fall down onto the board. Then take off the carbon paper and measure to the nearest mm, the diameter (*D*) of the coloured impact onto the board.

Dimensions in millimetres



Key

1 rigid table
2 specimen (board)
3 face of the board
4 carbon paper
5 steel sphere
6 coloured impact

Figure 6 — Surface hardness test procedure

Repeat this test, three times on the same specimen.

5.9.4 Expression of results

Calculate the mean of the three measured values.

The surface hardness of the board is characterised by this mean value.

6 Evaluation of conformity

6.1 General

The compliance of gypsum board with mat reinforcements with the requirements of this European Standard and with the stated values (including classes) shall be demonstrated by:

— initial type testing (ITT);

— factory production control by the producer (FPC).

For the purposes of testing, gypsum board with mat reinforcements may be grouped into families, where it is considered that the selected property is common to all gypsum board with mat reinforcements within that family.

The decision on those product or properties which fall within in a family shall be made by the producer, who is responsible for the declaration of conformity.

6.2 Initial type testing

Initial type testing shall be performed to show conformity with this European Standard.

Initial type testing shall be performed at the beginning of the production of a new gypsum board with mat reinforcement type (unless it is a member of a family previously tested) or at the beginning of a new method of production (where this may affect the stated properties).

Tests previously performed in accordance with the provisions of this European Standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity etc.) may be taken into account.

All product characteristics in Clause 4 applicable to the intended uses shall be subject to initial type testing, with the following exceptions:

— release of regulated substances may be assessed indirectly by controlling the content of the substance concerned;

— when tabulated values are used.

Whenever a change occurs in the gypsum board with mat reinforcement design, the raw material or supplier of the components, or the production process (subject to the definition of a family), which would significantly change one or more of the characteristics, the type tests shall be repeated for the appropriate characteristic(s).

Sampling shall be in accordance with 5.1.

The results of all type tests shall be recorded and held by the producer for at least five years.

6.3 Factory production control

6.3.1 General

The producer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform to the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

A FPC system conforming to the requirements of EN ISO 9001, and made specific to the requirements of this European Standard shall be considered to satisfy the above requirements.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded and retained for the period specified in the producer's FPC procedures.

6.3.2 Equipment

a) Testing

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

b) Manufacturing

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the producer's written procedures and the records retained for the period defined in the producer's FPC procedures.

6.3.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity.

6.3.4 Product testing and evaluation

The producer shall establish procedures to ensure that the stated values of all the product characteristics are maintained.

6.3.5 Non-conforming products

The producer shall have written procedures which specify how non-conforming products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the producer's written procedures.

6.3.6 Other test methods

For factory production control, other test methods may be used provided that:

a) they can show a correlation to exist between the results from the EN reference test and those of the alternative test;

b) information on which the correlation is based is available for inspection.

7 Designation of gypsum boards with mat reinforcement

Gypsum boards with mat reinforcement shall be designated as follows:

a) wording "Gypsum boards with mat reinforcement";

b) reference to this European Standard, i.e. EN 15273-1;

c) Board type as defined in 3.1, 3.2.2, 3.2.3 and 3.2.4

- GM
- GM-H1, GM-H2
- GM-I
- GM-R
- GM-F

Features may be combined as appropriate.

NOTE 1 It is recommended that the designation letters are given in alphabetical order.

d) dimensions in millimetres in the order:

- width;
- length;
- thickness.

e) edge profile:

NOTE 2 National abbreviations may be used for edge profiles.

For example

- Square: SE
- bevelled: BE
- tapered: TE
- half-round: HRE
- half-rounded tapered: HRTE
- rounded: RE
- Inclined (skewed) edge: IE

EXAMPLES OF DESIGNATION:

Gypsum boards with mat reinforcement EN 15283-1 GM/1200 / 2400 / 15 / TE

Gypsum boards with mat reinforcement EN 15283-1 GM-H1/ 1250 / 3000 / 12,5 / SE

8 Marking, labelling and packaging

Gypsum boards with mat reinforcement complying with this European Standard shall be clearly marked on the board or on the accompanying label or on the packaging or on the accompanying commercial documents (e.g. a delivery note) with the following items:

a) reference to this European Standard, i.e. EN 15283-1;

b) name, trademark or other means of identification of the manufacturer of the boards;

c) date of production;

d) means of identifying the boards and relating them to their designation according to Clause 7.

NOTE For CE marking purposes see Annex ZA.

Annex A
(informative)

Sampling procedure for testing

A.1 General

The required number of gypsum board with mat reinforcement to determine the compliance with specification should be sampled from a delivery consignment of boards.

The appropriate consignment size should be agreed between representatives of any involved parties who should have the opportunity to be present at the time of sampling.

A.2 Sampling procedure

A.2.1 General

The choice of the method of sampling should be as defined in A.2.2 and A.2.3 as appropriate.

A.2.2 Random sampling[3)]

Whenever possible, the random sampling method should be used, in which every boards in the consignment has an equal chance of being selected for the sample.

Three boards of each type should be selected from positions throughout the consignment without any consideration given to the condition or quality of the selected boards.

A.2.3 Representative sampling

A.2.3.1 General

When random sampling is impracticable or not convenient, e.g. when the boards form a large stack or stacks with ready access to only a limited number of boards, a representative sampling procedure should be used.

A.2.3.2 Sampling from a stack

The consignment should be divided into at least three real or imaginary sections, each of a similar size. One board should be selected at random from within each section in order to give the required number of samples as indicated in 5.1.

It will be necessary to remove some sections of the stack or stacks in order to gain access to boards within the body of such stacks when taking samples.

---

3) In practice, random sampling is normally only convenient either when the boards forming the consignment are being moved in a loose (unpacked) form from one place to another or when they have been split into a large number of small stacks awaiting installation.

A.2.3.3 Sampling from a consignment formed of banded or wrapped packs

At least three packs should be selected at random from the consignment. The packaging around each of the selected packs should be removed and one board should be sampled at random from within each pack in order to give the required number of samples without any consideration given to the condition or quality of the selected boards.

Annex B
(normative)

Mounting and fixing for testing according to EN 13823 (SBI test)

B.1 General applications

Gypsum boards with mat reinforcement shall be mounted and fixed using the following method. This provides the most onerous conditions and the resulting classification shall be applied to all end use applications. Results obtained for a given thickness of board apply for all thicker boards.

The boards shall be mechanically fixed to a metal sub-structure (made from components detailed in EN 14195) as shown in Figures B.1a to B.1c.

The structure shall be vertical steel studs with a web width of 70 mm to 80 mm and a metal thickness of 0,5 mm to 0,6 mm positioned as shown in Figure B.1b.

The mechanical fixings shall be screws, which shall be fixed through the thickness of the boards into the sub-structure at (300 $\pm$ 30) mm centres measured along the length of each supporting member.

Both vertical and horizontal joints shall be included positioned as shown in Figure B.1a. All joints between adjoining boards shall be butted and unfilled.

The cavity formed behind the boards by the sub-structure shall be filled with a non-fire resistant treated polyurethane (PUR) of (35 $\pm$ 5) kg/m^3 density. The thickness shall be 10 mm to 15 mm less than the web width.

A 40 mm air gap shall be left between the PUR and the calcium silicate boards.

Dimensions in millimetres

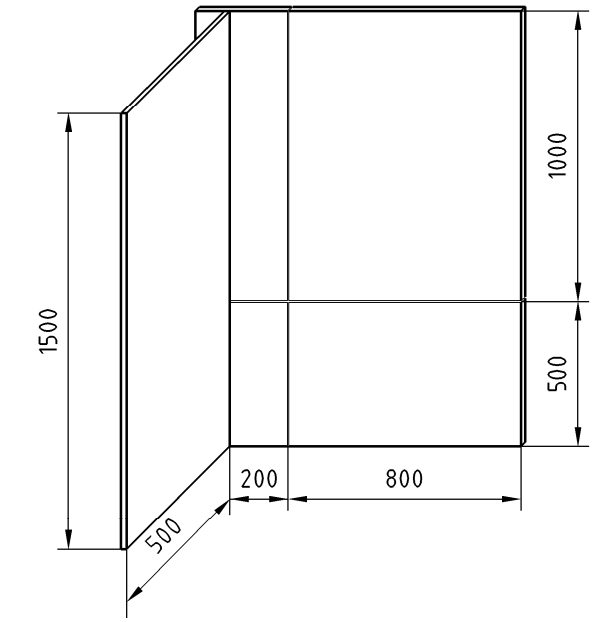
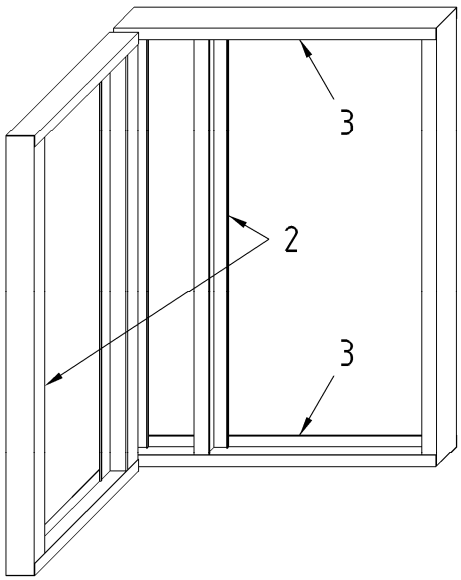


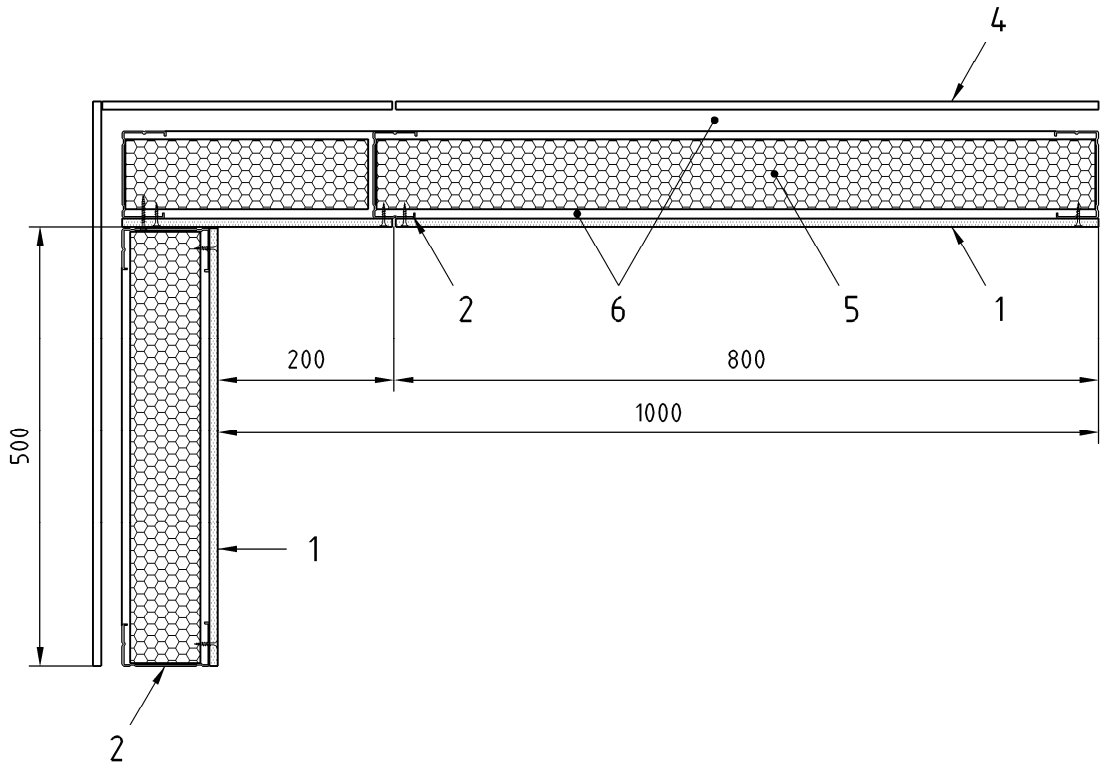
Figure B.1a — Joints



Key
2 metal stud
3 U-channel

Figure B.1b — Sub-structure

Dimensions in millimetres



Key

1 gypsum board with mat reinforcement
2 metal stud
3 U-channel
4 calcium silicate baseboard
5 PUR panel
6 air gap

Figure B.1c — Mounting and fixing to a metal sub-structure

B.2 Limited applications regarding joint filling

The gypsum boards shall be mounted and fixed and the cavity shall be filled in the same way as described in B.1 above, but the joints shall be treated with jointing materials complying with EN 13963.

The results obtained shall apply to all end use applications provided the joints are treated with jointing materials complying with EN 13963. Results obtained for a given thickness of board shall apply for all thicker boards.

B.3 Limited applications regarding wood based substrates

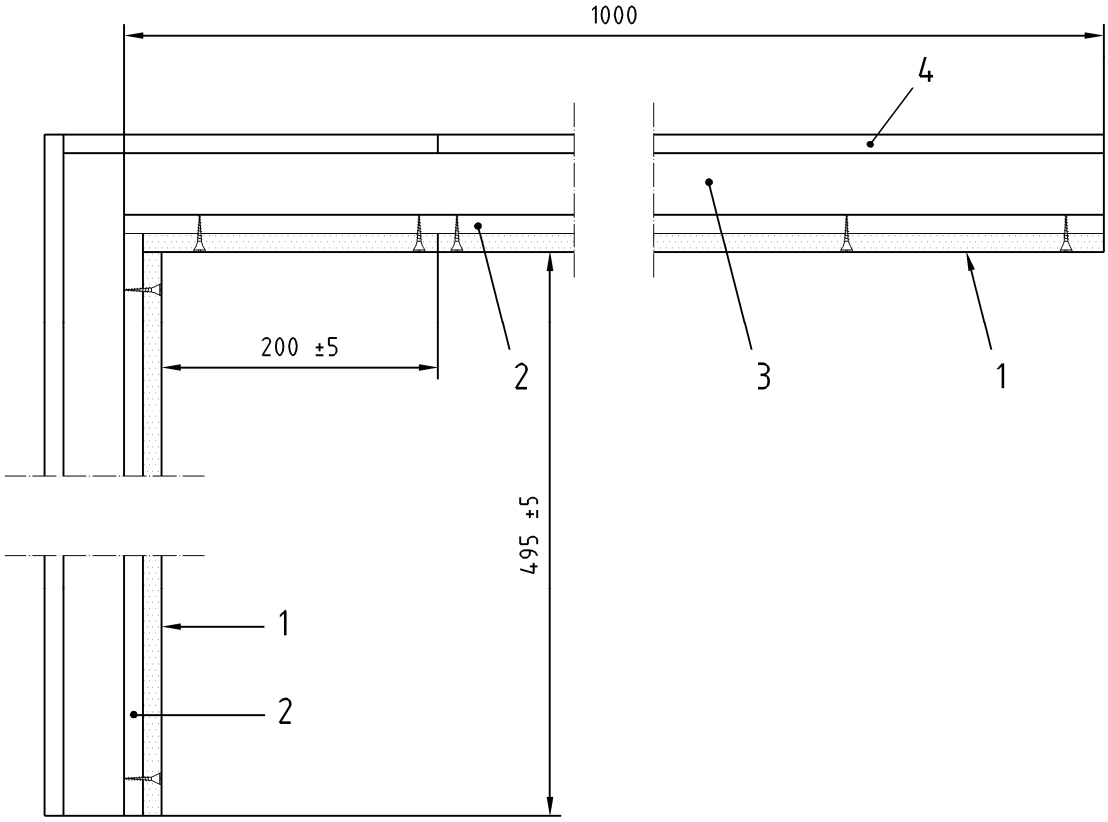
The gypsum boards with mat reinforcement shall be mounted and fixed using the following method. The resultant classification may be applied to any wood based substrate with a density of at least 350 kg/m3 as stated below and also any end use substrate of Class A1 and A2-s1,d0. Results obtained for a given thickness of board shall apply for all thicker boards.

The boards shall be mechanically fixed to a (15 to 20) mm ± 2 mm thick non-fire resistant treated continuous timber background, with a density of (350 ± 50) kg/m^3 (see Figure B.3).

The mechanical fixings shall be screws, which shall be fixed through the thickness of the boards into the substrate at 300 mm ± 30 mm centres around all perimeters of the boards.

Both vertical and horizontal joints shall be included positioned as shown in Figure B.1a. All joints between adjoining boards shall be butted and unfilled.

Dimensions in millimetres



Key

1 gypsum board with mat reinforcement
2 timber sheet
3 air gap
4 calcium silicate baseboard

Figure B.2 — Board fixing in wood based substrates

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under mandate M/106 as amended “Gypsum products” given to CEN by the European Commission and European Free Trade Association.

The clauses of this European Standard, shown in this annex, meet the requirements of the Mandate given under EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the gypsum board with mat reinforcement with the essential requirements of the EU Construction Products Directive.

WARNING — Other requirements and other EU Directives, not affecting the fitness of intended use(s), can be applicable to the gypsum board with mat reinforcement falling within the scope of this European Standard.

NOTE 1 Regarding dangerous substances, there may be other requirement applicable to the products falling in the scope of this European standard (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU CPD, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (access through: http://ec.europa.eu/enterprise/construction/internal/dangsub/dangmain_en.htm).

This annex establishes the conditions for the CE marking of the gypsum boards with mat reinforcement intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as Clause 1 of this European Standard and is defined by Table ZA.1.

Table ZA.1 — Relevant clauses

Product: **Gypsum boards with mat reinforcement** **Intended use(s) :** **see Clause 1**			
Requirements/ Characteristics from the Mandate	Requirements Clause in this European Standard	Mandated level and/or class	Notes
Flexural strength (Flexural breaking load)	4.1.1		N (Newtons) Threshold values
Shear strength (for stiffening timber framed external walls and timber roof truss structures)	4.1.3		N (Newtons)
Reaction to fire (for exposed situations)	4.2.1	A1 to F	
Direct air borne sound insulation (in end use conditions) [a]	4.3.1		dB Performance declared is for the system of which the product is a part
Acoustic absorption (in end use conditions) [a]	4.3.2		dimensionless Performance declared is for the system of which the product is a part
Water vapour permeability (for moisture diffusion control)	4.4		Expressed as water vapour resistance factor dimensionless
Thermal resistance	4.5		Expressed as thermal conductivity in W/m·K
Impact resistance (in end use conditions) [a]	4.11		kJ Performance declared is for the system of which the product is a part
[a] These characteristics are system dependent and should be provided in producer's literature based upon intended use.			

The requirement on a characteristic does not apply in those Member States where there are no regulations for that characteristic for the intended use of the product. In this case, producers willing to place their products on the market of those Member States are not obliged to determine nor to declare the performance of their products with regard to this characteristic and the option “No Performance Determined” in the CE marking may be used.

The “No Performance Determined” (NPD) option may not be used where the characteristic is subject to a threshold level (from the mandate or from the related clause in the standard).

ZA.2 Procedure of attestation of conformity of gypsum boards with mat reinforcement

ZA.2.1 Systems of attestation of conformity

The system of attestation of conformity of gypsum boards with mat reinforcement in accordance with the decision of the Commission of 95/467/EC as amended by 01/596/EC and 02/592/EC and as given in the Annex 3 of the mandate M/106 “Gypsum products” is shown in Table ZA.2.

Reaction to fire performance is not susceptible to change during the production process for a given product. Therefore only Attestation of Conformity systems 3 and 4 are applicable.

Table ZA.2 — Systems of attestation of conformity (AoC)

Product	Intended use	Characteristics	AoC system
Gypsum boards with mat reinforcement	In all uses where the board is subject to reaction to fire requirements	Reaction to fire	3
		Others	4
	For stiffening timber framed wind load bearing walls or timber roof structures	Shear strength	3
		Others	4
	For situations and uses not mentioned above	Others All	4
System 3: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Second possibility. System 4: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Third possibility.			

The attestation of conformity of gypsum board with mat reinforcement in Table ZA.1 shall be according to evaluation of conformity procedure indicated in Tables ZA.3.1, ZA.3.2 and ZA.3.3 resulting from application of the clauses of this European Standard indicated therein.

Table ZA.3.1 — Assignment of evaluation of conformity for gypsum boards with mat reinforcement intended to be used where the board is subject to reaction to fire requirements (system 3)

Tasks		Content of the task		Clauses of this standard to apply
Tasks for the producer	Factory Production Control (FPC)	All relevant characteristics of Table ZA.1	Reaction to fire is ensured by controlling: — the thickness of the board; — the grammage, thickness and organic additive content of the mat; — the density of the board; — organic additive content of the core.	6.3
			Water vapour permeability is ensured by controlling the thickness and the density of the board;	
			Flexural strength	
			Thermal resistance is ensured by controlling the thickness and the density of the board;	
	Initial Type Testing (ITT)	Those relevant characteristics of Table ZA.1 not tested by the approved body	Water vapour permeability (moisture diffusion control) [a]	6.2
			Flexural strength	
			Thermal resistance [a]	
Tasks for the approved body	Initial Type Testing (ITT)	Reaction to fire		

[a] Testing is not necessary if tabulated values are used.

Table ZA.3.2 — Assignment of evaluation of conformity for gypsum boards with mat reinforcement for stiffening timber framed wind load bearing walls or timber roof truss structures (system 3)

Tasks		Content of the task	Clauses of this European Standard to apply
Tasks for the Producer	Factory Production Control (FPC)	Shear strength by controlling: — density — flexural bending strength	6.3
		Flexural bending strength	
		Water vapour resistance by controlling thickness and density	
		Thermal resistance by controlling density	
	Initial Type Testing (ITT)	Flexural bending strength	6.2
		Water vapour resistance [a]	
		Thermal resistance [a]	
Tasks for the Notified body	Initial Type Testing (ITT)	Shear strength	
[a] Testing is not necessary if tabulated values are used.			

Table ZA.3.3 — Assignment of evaluation of conformity for gypsum boards with mat reinforcement intended to be used in situations not mentioned above (system 4)

Tasks		Content of the task		Clauses of this European Standard to apply
Tasks for the Producer	Factory Production Control (FPC)	All relevant characteristics of Table ZA.1	Water vapour permeability is ensured by controlling the thickness and the density of the board;	6.3
			Flexural strength	
			Thermal resistance is ensured by controlling the thickness and the density of the board;	
	Initial Type Testing (ITT)	All relevant characteristics of Table ZA.1	Water vapour permeability (moisture diffusion control) [a]	6.2
			Flexural strength	
			Thermal resistance[a]	
[a] Testing is not necessary if tabulated values are used.				

ZA.2.2 EC certificate and declaration of conformity

(In case of products under system 3): When compliance with the conditions of this annex is achieved, the producer or his authorised representative established in the EEA, shall prepare and retain a declaration of conformity (EC declaration of conformity) which entitles the producer to affix the CE marking. This declaration shall include:

— name and address of the producer, or his authorised representative established in the EEA;

— description of the product (type, identification, intended use, etc.) and a copy of the information accompanying the CE marking;

— provisions to which the product conforms (i.e. Annex ZA of this document);

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

— name and address of the approved body;

— name of, and position held by, the person empowered to sign the declaration on behalf of the producer or of his authorised representative.

(In case of products under system 4): When compliance with this annex is achieved, the producer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which entitles the producer to affix the CE marking. This declaration shall include:

— name and address of the producer, or his authorised representative established in the EEA;

— description of the product (type, identification, intended use, etc.) and a copy of the information accompanying the CE marking;

— provisions to which the product conforms (i.e. Annex ZA of this document);

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

— name of, and position held by, the person empowered to sign the declaration on behalf of the producer or of his authorised representative.

NOTE Duplication of information between the declaration and certificate should be avoided. To avoid duplication of information, cross-reference between documents may be made when one contains more information than the other.

The above mentioned declaration and certificate shall be presented in the official language or languages of the Member State of the EU in which the product is to be used.

ZA.3 CE marking and labelling

ZA.3.1 General

The producer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the gypsum board with mat reinforcement (or when not possible it may be on the accompanying label, the packaging or on the accompanying commercial documents e.g. a delivery note). The following information shall accompany the CE marking symbol:

— name or identifying mark and registered address of the producer;

— the last two digits of the year in which the marking is affixed;

— reference to this document;

— description of the product: generic name, material, dimensions and intended use;

— information on those relevant essential characteristics listed in Table ZA.1 which are to be declared presented as:

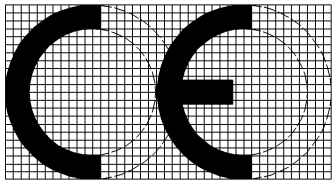
— declared values and, where relevant, level or class (including "pass" for pass/fail requirements where necessary) to declare for each essential characteristic as indicated in the footnote(s) in Table ZA.1;

— "no performance determined" for characteristics where this is relevant;

— as an alternative, a standard designation which shows some or all of the relevant characteristics (where the designation covers only some characteristics, it will need to be supplemented with declared values for other characteristics as above).

The "no performance determined" (NPD) option may not be used when the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements in the Member State of destination.

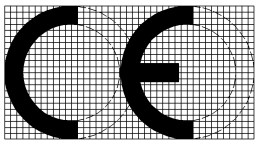
The CE conformity marking shall consist of the initials "CE" taking the following form:



— if the CE marking is reduced or enlarged the proportions given in the above graduated drawing must be respected;

— various components of the CE marking must have substantially the same vertical dimension, which may not be less than 5 mm.

ZA.3.2 Example for CE marking on boards

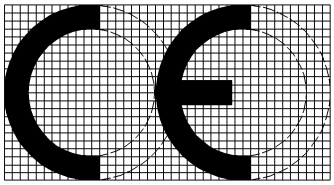


AnyCo Ltd	**EN 15283-1 /GM- H1**	**A1**	
CE conformity marking	*Name or identifying mark of the producer*	*Number and part of the European Standard /Board type*	*Reaction to fire*

The entire CE marking (see ZA.3.3) needed for CE marking and defined in ZA.3 should be given on the board or packaging or on the accompanying commercial documents

ZA.3.3 Example of entire CE marking

If not on the board, the entire CE marking shall be given on the accompanying label, or on the packaging or on the accompanying commercial documents. An example is given below:

	*CE conformity marking, consisting of the "CE"-symbol given in directive 93/68/EEC*
Any Co Ltd **PO Box 21, B-1050**	*Name or identifying mark of the producer and its registered address*
A1 09 A1	*The last two digits of the year in which the CE marking was affixed or a reference to the date stamped*
EN 15283–1 / GM-H1	*Number of the European Standard and board type*
Shear strength: NPD **Reaction to fire : A1** **Water vapour resistance factor : 10** **Thermal conductivity: 0,25 W/(m·K)**	*Information on regulated characteristics*
Airborne sound insulation: **Acoustic absorption:** **Impact resistance:**	**See producer`s literature**

In addition to the specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on regulated substances for which compliance is claimed, together with any information required by that legislation. European legislation without national derogation need not be mentioned.

NOTE 2 When marking is carried out as describe above, the full requirements for CE marking are complied with and no further documentation is necessary.

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