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Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-03/0050

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*	FERMACELL - Gipsfaserplatte *FERMACELL Fibre gypsum boards*
Zulassungsinhaber *Holder of approval*	Xella Trockenbau-Systeme GmbH Dammstraße 25 47119 Duisburg
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	Gipsfaserplatten für die Beplankung und Bekleidung von Bauteilen *Fibre gypsum boards for planking and lining of building components*
Geltungsdauer: vom *Validity: from*	14 November 2006
bis *to*	10 February 2009
verlängert vom *extended from*	23 February 2009
bis *to*	22 February 2014
Herstellwerk *Manufacturing plant*	Werk 1, Werk 2, Werk 3, Werk 4 Plant 1, plant 2, plant 3, plant 4

Diese Zulassung umfasst *This Approval contains*	10 Seiten einschließlich 2 Anhänge *10 pages including 2 annexes*

I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by law of 31 October 2006[5];
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6].

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated in EOTA. Translations into other languages have to be designated as such.

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1 Official Journal of the European Communities N° L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities N° L 220, 30 August 1993, p. 1
3 Official Journal of the European Union N° L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2006*, p.2407, 2416
6 Official Journal of the European Communities N° L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the construction product and intended use

1.1 Definition of the construction product

FERMACELL Gypsum-Fibreboard are special building boards made of gypsum and cellulose fibres.

They will be produced for the intended use after section 1.2 with a range of thickness between 10 mm and 25 mm.

Length and width of the boards are at least 500 mm.

The edges of the Gypsum-Fiberboards may be sharp edged or formed, e.g. "FERMACELL Trockenbau-Kante" (TB-Kante). The FERMACELL TB-Kante consists of a 40 mm broad, to the edge of the board running flattening, whereby the largest reduction of the nominal thickness of the board is 2,5 mm. At the edge is additionally one chamfer.

The FERMACELL Gypsum-Fibreboard meets the class A2-s1, d0 according to EN 13501-1[7].

1.2 Intended use

1.2.1 FERMACELL Gypsum-Fibreboard are used for the planking (structural) and lining (non-structural) of building components. They may be used both as loadbearing and as stiffening boards.

The FERMACELL Gypsum-Fibreboard may be used in the service classes 1 and 2 according to EN 1995-1-1[8].

1.2.2 The provisions made in this European technical approval are based on an assumed intended working life of the Gypsum-Fibreboard of at least 50 years, provided that the conditions laid down in sections 4 and 5 for the packaging, transport, storage, installation, use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of the construction product and methods of verification

2.1 Characteristics of the construction product

2.1.1 Mechanical resistance and stability

2.1.1.1 For bending strength perpendicular to the board plane, tested according to section 3.2.1.2, the following minimum value is required:

$$f_{m,90} \geq 5{,}8 \text{ N/mm}^2.$$

This value has to be kept in tests for each board thickness as follows:

From 100 samples in sequence not more than 5 samples are allowed to remain under the minimum value. No sample is allowed to remain more than 10 % under the minimum value.

2.1.1.2 The density of the FERMACELL Gypsum-Fibreboard, tested according section 3.2.1.2, shall be at least 1000 kg/m³ and must not exceed 1250 kg/m³.

2.1.1.3 The characteristic values for strength and stiffness of the FERMACELL Gypsum-Fibreboard were determined in consensus with CUAP 05.04/04 "Large-sized fibre gypsum panels used for walls of prefabricated houses"[9].

The values are indicated in Annex 1, table 1.

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7 EN 13501-1:2002 - Fire classification of construction products and building elements; part 1 -

8 EN 1995-1-1 - Eurocode 5; Design of timber structures; Part 1-1: General -

9 The CUAP 05.04/04 is deposited with the DIBt.

2.1.2 **Reaction to fire**

Based on tests carried out to EN 13823 (SBI) in combination with EN ISO 1716 the FERMACELL Gypsum-Fibreboard meets the class A2-s1, d0 according to EN 13501-1.

Fire protection clothing out FERMACELL Gypsum-Fibreboard with a thickness at least 10 mm fulfills the requirements of the class K 10 according to EN 13501-2[10].

2.1.3 **Hygiene, health and environment**

The ETA is issued for the product with the chemical composition and other characteristics as deposited with the issuing Approval Body. Changes of materials, of composition or characteristics, should be immediately notified to the Approval Body, which will decide whether a new assessment will be necessary.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.1.4 **Safety in use**

The value of the impact resistance of the FERMACELL Gypsum-Fibreboard, tested according to EN 1128, is at least IR = 11 mm/ mm thickness of the board.

2.1.5 **Protection against noise**

Not relevant.

2.1.6 **Energy economy and heat retention**

2.1.6.1 The value of thermal conductivity λ of the FERMACELL Gypsum-Fibreboard, tested according to EN 12664, is $\lambda \leq 0.32$ W/mK.

2.1.6.2 The FERMACELL Gypsum-Fibreboard are airtight.

2.1.6.3 The value of the water vapour diffusion resistance of the FERMACELL Gypsum-Fibreboard, tested according to EN ISO 12572, is $\mu = 13$.

2.1.7 **Aspects of durability, serviceability and identification**

2.1.7.1 The thickness of the FERMACELL Gypsum-Fibreboard for the intended use after section 1.2 must be between 10 mm and 25 mm.

Length and width of the boards must be at least 500 mm.

The dimensional tolerances are $\pm$ 0.5 mm for the thickness, $\pm$ 3 mm for the length and $\pm$ 2 mm for the width of the boards.

2.1.7.2 The moisture content of the FERMACELL Gypsum-Fibreboard in normal climate (20 °C/ 65 % humidity), tested according to EN 322, ranges between 1.0 and 1.5 %. In this case the boards are dried up by 40 °C to mass constancy.

2.1.7.3 The value for swelling and shrinkage in plane of the board, tested according to EN 318, does not exceed 0.25 mm/m with a change in the relative air moisture by 30 %.

2.1.7.4 The chemical composition of the FERMACELL Gypsum-Fibreboard shall correspond to the details deposited with the Deutsches Institut für Bautechnik.

3 Evaluation of conformity and CE marking

3.1 System of attestation of conformity

In its Decision 95/467/EC the European Commission has specified system 3 for the attestation of conformity of gypsum products (in the present case: fibre gypsum boards). The system is described in the Council Directive (89/106/EEC) in Annex III, 2 (ii), second possibility and provides for the following:

10 EN 13501-2:2003 - Fire classification of construction products and building elements; part 2 -

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks of the manufacturer:

(1) factory production control;

(b) Tasks of the approved body:

(2) initial type-testing of the product.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European Technical Approval.

The manufacturer may only use raw and constituent materials in consensus to the details deposited by the Deutsches Institut für Bautechnik.

The factory production control shall be in accordance with the "Control Plan", which is part of the technical documentation of this European Technical Approval. The "Control Plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited at the Deutsches Institut für Bautechnik.[11]

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the "Control Plan".

3.2.1.2 Other tasks of manufacturer

The manufacturer shall control in each manufacturing plant compliance with the requirements given in section 2.1 of the present ETA for the bending strength and the density as well as with the requirements given in section 3.3 of the present ETA for the CE marking.

- The bending strength perpendicular to the plane of the board has to be tested according to EN 310 on samples which are dried by 40 °C to mass constancy. Deviating from EN 310, the test specimen may have the following dimensions:

  W = 300 mm Width

  L = 400 mm Length

  The support distance for all thicknesses must be l_A = 350 mm.

  The tests shall be performed by one sample per work shift as follows: per sample four tests: parallel and perpendicular to manufacturing direction of the boards and when loading each side of the board (top and bottom side).

- The density shall be verified in accordance with EN 323 on two samples per work shift which are dried by 40 °C to mass constancy. The dimensions W x L x t differ from this standard as follows:

  W = 300 mm Width

  L = 400 mm Length

  t = Thickness of the board.

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of Gypsum-Fibreboards in order to undertake the actions laid down in section 3.3. For this purpose, the "control plan" referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer must give an attestation of conformity for his product. So he declares, that the FERMACELL Gypsum-Fibreboard is in accordance with this ETA 03/0050.

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11 The "control plan" is a confidential part of the European technical approval and only handed over to the approved body/bodies involved in the procedure of attestation of conformity. See section 3.2.2.

3.2.2 Tasks of approved bodies

The approved body shall perform the

- initial type-testing of the product,

in accordance with the provisions laid down in the "Control Plan" (see section 3.2.1.1)

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

3.3 CE marking

The CE marking shall be affixed on the product itself, on the label attached to it, on the packaging or on the accompanying commercial documents.

The letters „CE" shall be followed by the following additional information:

- the name and address of the manufacturer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the European Technical Approval,
- the trading name (FERMACELL Gypsum-Fibreboard)
- class A2-s1, d0,
- the thickness of the board

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The manufacturing procedure for the FERMACELL Gypsum-Fibreboard has been deposited by the Deutsches Institut für Bautechnik.

The European Technical Approval is issued for the product on the basis of tested data and informations, deposited with the Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Deutsches Institut für Bautechnik before the changes are introduced. The Deutsches Institut für Bautechnik will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Design, calculation and execution of building components

The design, calculation and execution of building components which are manufactured using the present FERMACELL Gypsum-Fibreboard can take place according to Annex 2 or accomplish the standards EN 1995-1-1[8] and EN 1993-1-1[12].

The data of this European technical approval including Annex 1 and if necessary the references in valid additional national regulations are to be considered.

4.3 Installation

As connectors for the FERMACELL Gypsum-Fibreboard with the substructure can be used zinc-coated and/or stainless nails, screws or staples. Following conditions must be considered:

- The nails must have a diameter 2.0 mm $\leq$ d $\leq$ 3.0 mm and a diameter of the nail heat at least $\geq 1.8 \cdot d$.
  The characteristic tensile strength of the nail steel must be at least 600 N/mm^2.
- The staples must have a wire diameter d $\geq$ 1.5 mm. The back width b_R of the staples shall be $b_R \geq 6$ d.

12 EN 1993-1-1 - Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings

- The screws must have an outside diameter of the screw thread d ≥ 3.5 mm.

Tips for calculation of connecting systems contain Annex 2.

The distances of the connectors from the unstressed edge of the fibre gypsum board shall be at least 4 · d, from the stressed edge at least 7 · d.

If an TB-Kante is implemented at the Gypsum-Fibreboard, the distances of the connectors from the unstressed edge shall be at least 7 · d, from the stressed edge at least 10 · d.

5 Indications for the manufacturer and user

5.1 Packaging, transport and storage

During transport and storage the FERMACELL Gypsum-Fibreboard and the components manufactured by using the present boards shall be protected against damaging and inadequate moisture, e. g. due to precipitation or high construction moisture (all-round covering of the boards or components by means of a foil).

5.2 Use, maintenance and repair

Damaged FERMACELL Gypsum-Fibreboards or components manufactured by using the present boards must not be used or installed.

Where components are produced on site by using fibre gypsum boards the moisture of the wood substructure must not increase inadequately until installation of the fibre gypsum boards (protection against precipitation or very high construction moisture).

Dipl.-Ing. E. Jasch
President of Deutsches Institut für Bautechnik
Berlin, 23 February 2009

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Annex 1:

Characteristic strength and stiffness values of the FERMACELL Gypsum-Fibreboard, which are to be used during design and calculation

Table 1: Characteristic strength and stiffness values of the FERMACELL Gypsum-Fibreboard in N/mm²

Type of stress		Thickness of boards in mm				
		10	2,5	15	18	25
Characteristic strength values						
Perpendicular to the plane of the board						
Bending	$f_{m,k}$	**4,6**	**4,3**	**4,0**	**3,6**	**3,0**
Shear	$f_{v,k}$	**1,9**	**1,8**	**1,7**	**1,6**	**1,4**
In plane of the board						
Bending	$f_{m,k}$	**4,3**	**4,2**	**4,1**	**4,0**	**3,8**
Tension	$f_{t,k}$	**2,5**	**2,4**	**2,4**	**2,3**	**2,1**
Compression	$f_{c,k}$	**8,5**				
Shear	$f_{v,k}$	**3,7**	**3,6**	**3,5**	**3,4**	**3,2**
Stiffness values						
Perpendicular to the plane of the board						
Modulus of elasticity	$E_{m,mean}$	**3800**				
Shear modulus	G_{mean}	**1600**				
In plane of the board						
Bending, Tension, Compression Modulus of elasticity	$E_{m,t,c,mean}$	**3800**				
Shear modulus	G_{mean}	**1600**				
Value of density (in kg/m³)						
Density	ρ_k	**1150**				

Annex 2 (informative)

Describing notes for design and calculation

1. Design, calculation and execution of building components which are manufactured by using the present FERMACELL Gypsum-Fibreboard can take place considering the table 1 in Annex 1 and the regulations in mark 3 according to EN 1995-1-1:2004-12.
   Additional national regulations are to be considered.

2. Design, calculation and execution of the building components which are manufactured by using FERMACELL Gypsum-Fibreboard can also take place according to the German standard DIN 1052:2004-08[13].
   For this calculation the characteristic strength values and values of stiffness indicated in table 1 and the regulations in mark 3 are relevant.

3. As design data of the modification factor k_{mod} the following values are valid:

Class of load action duration	service class 1	service class 2
permanent	**0,20**	**0,15**
long	**0,40**	**0,30**
average	**0,60**	**0,45**
shortterm	**0,80**	**0,60**
verry short	**1,10**	**0,80**

As design data of the deformation parameter k_{def} the following values are valid:

Class of load action duration	service class 1	service class 2
permanent	**3,0**	**4,0**
long	**2,0**	**2,5**
average	**1,0**	**1,25**
shortterm	**0,35**	**0,5**

As partial safety factor of fibre gypsum boards $\gamma_m = 1{,}3$ is recommended.

The characteristic embedding strength of the face of the hole can be determined as follows:

$$f_{h,1,k} = 7 \cdot d^{-0,7} \cdot t^{0,9} \qquad (N/mm^2)$$

with d = nominal diameter of the connector (mm)

t = thickness of board (in the range of the TB-Kante is the reduced board thickness to set) (mm)

The characteristic value of the load-bearing capacity of connecting devices for each shear joint R_k can be determined for board thickness $t \geq 7d$ (within the range of the TB-Kante is the reduced board thickness to set) simplifying as follows:

$$R_k = 0.7 \cdot \sqrt{2 \cdot M_{y,k} \cdot f_{h,1,k} \cdot d} \qquad (N)$$

with $M_{y,k}$ = characteristic value of the flow moment of the connecting device (Nmm).
If the board thickness t is smaller than 7d, R_k is to be reduced in the relationship t / 7d.

If the characteristic load-bearing capacity R_k will be determined for boards with TB-Kante, for staples connections with demand perpendicular to edge of the board the characteristic load-bearing capa city R_k is to reduce in the relationship 1.5 : d. For nailed connections the

13 DIN 1052:2004-08 - Design of timber structures; General rules and rules for buildings -

characteristic load-bearing capacity R_k is always to reduce in the relationship 2.5 : d by a thickness of the board t ≤ 12.5 mm and a nail diameter d > 2.5 mm.

By one set connections with predominantly short actions on structures parallel to the edge of the gypsum fiber board the determined characteristic load-bearing capacity R_k can be increased by a share ΔR_k as follows:

$\Delta R_k = \min\{0{,}5 \cdot R_k ; 0{,}25 \cdot R_{ax,k}\}$

with $R_{ax,k} = \min\{2 \cdot f_{1,k} \cdot d \cdot l_{ef} ; f_{2,k} \cdot d \cdot b_r\}$ (N) for staples

$R_{ax,k} = \min\{f_{1,k} \cdot d \cdot l_{ef} ; f_{2,k} \cdot d^2\}$ (N) for nails (not for boards with TB-Kante with thickness t ≤ 12,5 mm !).

$f_{1,k}$ = characteristic value of the pull-out resistance

$f_{2,k}$ = characteristic value of the head pulling through parameter = 15 N/mm²

l_{ef} = effective impact depth

d, b_R see section 4.3

As design data for the module of displacement for each shear joint k_{ser} of connecting devices can be set k_{ser} = 545 N/mm.