Deutsches Institut für Bautechnik
Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt
Eine vom Bund und den Ländern gemeinsam getragene Anstalt des öffentlichen Rechts

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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)

Deutsches Institut für Bautechnik

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-07/0173

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*		AQUAPANEL Cement Board
Zulassungsinhaber *Holder of approval*		KNAUF USG SYSTEMS GmbH & Co. KG Zur Helle 11 58638 Iserlohn
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*		Zementgebundene Bauplatte für nichttragende innere Trennwände, als Bekleidung von Bauteilen im Innenbereich, für abgehängte Decken im Innen- und Außenbereich und als Putzträgerplatte für Fassaden *Cement-bonded board for use in non-load-bearing internal partitions as lining of interior components, for suspended ceilings in indoor/outdoor applications and as lathing board for façades*
Geltungsdauer: *Validity:*	vom *from* bis *to*	4 February 2013 10 October 2017
Herstellwerk *Manufacturing plant*		Herstellwerke AQUAPANEL Cement Boards

Diese Zulassung umfasst *This Approval contains*	10 Seiten einschließlich 1 Anhang *10 pages including 1 annex*
Diese Zulassung ersetzt *This Approval replaces*	ETA-07/0173 mit Geltungsdauer vom 10.10.2012 bis 10.10.2017 *ETA-07/0173 with validity from 10.10.2012 to 10.10.2017*

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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 Article 2 of the law of 8 November 2011[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 within EOTA. Translations into other languages have to be designated as such.

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1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2011*, p. 2178
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of the construction product

1.1 Definition of the construction product

AQUAPANEL® Cement Board Indoor and AQUAPANEL® Cement Board Outdoor are specific boards made of a cement mixture, mineral lightweight and water. The board is reinforced on both sides with alkali-resistant glass fibre fabric.

AQUAPANEL® Cement Board Indoor has an apparent density (dry) of 1050 ±50 kg/m³.

AQUAPANEL® Cement Board Outdoor has an apparent density (dry) of 1150 ± 50 kg/m³. The outdoor boards contain a certain amount of expanded shale.

The thickness of the AQUAPANEL® Cement Board is 12.5 mm.

The length of the boards can amount to 3000 mm and the width to 1250 mm.

1.2 Intended use

AQUAPANEL® Cement Board Indoor is used in non-load bearing internal partitions as lining of interior components and for suspended ceilings. AQUAPANEL® Cement Board Outdoor is used as lathing board for façades (ventilated, too) as well as lining for suspended ceilings.

The AQUAPANEL® Cement Board Indoor shall be used in category C and AQUAPANEL® Cement Board Outdoor shall be used in category B as classified by EN 12467 + A1.

The provisions made in this European technical approval are based on an assumed working life of 50 years for the AQUAPANEL® Cement Board, provided that the conditions laid down in sections 4.2 / 5.1 / 5.2 relating to packaging / transport / storage / installation / use / maintenance / 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 Product characteristics and methods of verification

2.1 Mechanical resistance and stability (ER 1)

Not relevant.

2.2 Reaction to fire (ER 2)

AQUAPANEL® Cement Board has been tested and classified in accordance with EN 13501-1. It is considered to satisfy the requirements for class A1 of EN 13501-1.

Note: A European reference fire scenario for façades has not been laid down. In some Member States, the classification of AQUAPANEL® Cement Board according to EN 13501-1: 2002 might not be sufficient for the use in façades. An additional assessment of AQUAPANEL® Cement Board according to national provisions (e.g. on the basis of a large scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

electronic copy of the eta by dibt: eta-07/0173

2.3 Hygiene, health and the environment (ER 3)

2.3.1 Release of dangerous substances

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

Note: 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.

2.3.2 Vapour permeability

The average water vapour diffusion resistance according to EN ISO 12572 for cement-bonded boards is as follows:

AQUAPANEL® Cement Board Indoor μ = 50,

AQUAPANEL® Cement Board Outdoor μ = 66.

2.4 Safety in use (ER 4)

2.4.1 Impact resistance

The average impact resistance of the cement-bonded boards, tested according to EN 1128, is IR = 16 mm/mm board thickness for AQUAPANEL® Cement Board Indoor when using the intended AQUAPANEL® primer (interior) and AQUAPANEL® Q4 finish (total thickness approx. 1 mm), and IR = 15 mm/mm board thickness when using the intended AQUAPANEL® joint and surface spatula (white) and AQUAPANEL® indoor fabric (total thickness approx. 3 mm).

The AQUAPANEL® Cement Board Outdoor has an impact resistance of IR = 13 mm/mm board thickness when using the intended plaster system.

2.4.2 Strength and stiffness

2.4.2.1 Apparent density

The apparent density of AQUAPANEL® Cement Board Indoor shall amount at least 1000 kg/m³ and may not exceed 1100 kg/m³; the apparent density of AQUAPANEL® Cement Board Outdoor shall amount at least 1100 kg/m³ and shall be a maximum of 1200 kg/m³ (tested according to EN 12467).

2.4.2.2 Bending strength

The bending strength when loading perpendicular to the plane of the board, tested according to EN 12467, results in the following average modulus of rupture values:

AQUAPANEL® Cement Board Indoor: MOR = 8.75 MPa

AQUAPANEL® Cement Board Outdoor: MOR = 9.60 MPa

This corresponds to class 2 specified in EN 12467, table 6 with a minimum modulus of rupture MOR = 7.0 MPa.

2.4.2.3 Tensile strength perpendicular to the plane of the board

The determination of the tensile strength perpendicular to the plane of the board, tested according to EN 319, resulted in the following average values:

AQUAPANEL® Cement Board Indoor: f_t = 0.49 N/mm²

AQUAPANEL® Cement Board Outdoor: f_t = 0.65 N/mm²

electronic copy of the eta by dibt: eta-07/0173

2.4.3 Shear strength

The shear strength was determined according to EN 520.

The average shear strength values (ultimate load) are as follows:

AQUAPANEL® Cement Board Indoor: b = 696 N

AQUAPANEL® Cement Board Outdoor: b = 607 N

2.4.4 Pull through / pull out strength

For applications where the AQUAPANEL® Cement Board Outdoor is used as lathing board for façades, the pull out resistance of the boards against tensile stresses and the pull out resistance against shear stress for various fasteners were determined.

The characteristic ultimate strength of the board was determined for various fasteners when fastened at the corner, at the edge or in the centre, see Annex 1.

The data sheets for the various fasteners are deposited with Deutsches Institut für Bautechnik.

The fastening in the substructure is not a matter for this ETA.

2.5 Protection against noise (ER 5)

Not relevant.

2.6 Energy economy and heat retention (ER 6)

2.6.1 Thermal conductivity

The thermal conductivity of AQUAPANEL® Cement Board Outdoor at a reference temperature of 10 °C is determined in accordance with the EN 12664 standard.

The nominal thermal conductivity, determined as specified in the EN ISO 10456 standard for a moisture content in the AQUAPANEL® Cement Board Outdoor of 23 °C/80 % relative air humidity, is: $\lambda = 0.35$ W/(m· K).

The nominal thermal conductivity applies to the apparent density range of 1100 kg/m³ to 1200 kg/m³ specified in section 2.4.2.1.

2.6.2 Air permeability

AQUAPANEL® Cement Boards are not permeable to air.

2.7 Aspects of durability, serviceability and identification

2.7.1 Durability

<u>Moisture resistance (category B and C)</u>

The bending strength when loading perpendicular to the plane of the board and after pre-storage according to the warm water test according to EN 12467, section 7.3.5, results in the following lower estimated value R_L of the average value for:

AQUAPANEL® Cement Board Indoor: $R_L = 0.56$

AQUAPANEL® Cement Board Outdoor: $R_L = 0.56$

The bending strength when loading perpendicular to the plane of the board and after pre-storage as according to the wet-dry cycle test according to EN 12467, section 7.3.6, results in the following lower estimated value R_L of the average value for:

AQUAPANEL® Cement Board Indoor: $R_L = 1.01$

AQUAPANEL® Cement Board Outdoor: $R_L = 0.99$

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Freeze/thaw resistance (category B)

The freeze-thaw cycle test was performed according to EN 12467, section 7.4.1. This results in a lower estimated value R_L of the average value of 0.97 for the AQUAPANEL® Cement Board Outdoor.

The R_L ratios are not below 0.75 thereby fulfilling the durability requirements.

Heat/rain resistance (categories A and B)

The heat-rain cycle test was performed according to EN 12467, section 7.4.2. The extent of any visible cracks, delamination, deformation, deflection or other deficiencies of the cement-bonded boards is not severe enough to adversely affect their serviceability.

2.7.2 Serviceability

Dimensional stability

The thickness of the AQUAPANEL® Cement Board shall be 12.5 mm.

The length of the boards can amount to 3000 mm and the width to 1250 mm.

The dimensional tolerances may be ± 0.5 mm for the thickness of the board, ± 2 mm for the length of the board and ± 2 mm for the width of the board.

The apparent density was determined according to EN 12467. AQUAPANEL® Cement Board Indoor has an apparent density of 1050 kg/³ and AQUAPANEL® Cement Board Outdoor has an apparent density of 1150 kg/m³. A deviation of ± 50 kg/m³ is allowed.

The relative length changes following a change in relative air humidity (dimensional stability), tested according to EN 318, are given below:

AQUAPANEL® Cement Board Indoor:	0.25 mm/m when the relative air humidity changes from 65 % to 85 % (swelling properties)
	-0.21 mm/m when the relative air humidity changes from 65 % to 30 % (effect of shrinkage)
AQUAPANEL® Cement Board Outdoor:	0.23 mm/m when the relative air humidity changes from 65 % to 85 % (swelling properties)
	-0.21 mm/m when the relative air humidity changes from 65 % to 30 % (effect of shrinkage)

The relative changes in thickness following a change in relative air humidity (dimensional stability), tested according to EN 318, are given below:

AQUAPANEL® Cement Board Indoor:	0.1 % when the relative air humidity changes from 65 % to 85 %
	-0.2 % when the relative air humidity changes from 65 % to 30 %
AQUAPANEL® Cement Board Outdoor:	0.2 % when the relative air humidity changes from 65 % to 85 %
	-0.3 % when the relative air humidity changes from 65 % to 30 %

2.7.3 Identification

According to the classification given in EN 12467+A1, the AQUAPANEL® Cement Board Indoor shall be used in category C, i.e. for indoor applications where they may be exposed to heat and humidity but no frost. The AQUAPANEL® Cement Board Outdoor shall be used in category B, i.e. for applications where they may be exposed to heat, humidity and occasional frost.

The AQUAPANEL® Cement Board is labelled with the CE marking as specified in chapter 3.3.

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3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 98/437/EC of the European Commission[7], system 4 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 4: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks of the manufacturer:

(1) initial type-testing of the product,

(2) factory production control.

In addition, according to the decision of the European Commission[7], system 3 of the attestation of conformity applies to cement-bonded boards with regard to reaction to fire.

This system of attestation of conformity is defined as follows:

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 for the approved body:

(2) initial type-testing of the product.

Note: Approved bodies are also referred to as "notified bodies".

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. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use the raw and constituent materials stated in the technical documentation of this European technical approval.

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 with Deutsches Institut für Bautechnik.[8]

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 for the manufacturer

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 AQUAPANEL® Cement Board in order to undertake the actions laid down in section 3.2.2. 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.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of the European technical approval.

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7 Official Journal of the European Communities L 194/39 of 10.07.1998

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

3.2.2 Tasks for the approved bodies

The approved body shall perform the following tasks in accordance with the control plan:

- initial type-testing of the product.

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 a label attached to it, on its packaging, or on the accompanying commercial documents. The letters "CE" shall be accompanied 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,
- trade name of the construction product: AQUAPANEL® Cement Board Indoor or Outdoor,
- Reaction to fire: Class A1 according to EN 13501-1,
- Board thickness,
- Apparent density.

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

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with 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 Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Installation

If AQUAPANEL® Cement Board is used to construct non-load bearing internal partitions as lining of interior components and for suspended ceilings in indoor/outdoor applications and lathing boards, it shall not be fitted under tension.

The installation instructions specified by the manufacturer shall be taken into consideration.

The fasteners used to attach the AQUAPANEL® Cement Board to the substructure shall be suitable nails, screws, staples or rivets with sufficient corrosion protection.

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5 Indications to the manufacturer

5.1 Packaging, transport and storage

The AQUAPANEL® Cement Board and any components manufactured from it shall be protected during transport and storage against damage or detrimental effects of moisture, for example from precipitation or trapped moisture (by covering all sides of the boards or components with packaging film, for example).

5.2 Use, maintenance, repair

Damaged AQUAPANEL® Cement Boards or any components manufactured from such boards shall not be used or installed.

If the AQUAPANEL® Cement Board is prepared on the construction site (on-site manufacturing), the moisture in the wooden substructure shall not increase detrimentally prior to fixing the cement-bonded board (protection from rain or very high trapped moisture).

Georg Feistel
Head of Department

beglaubigt:
Schröder

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Table 1: Overview of fasteners for fixing AQUAPANEL® Cement Board Outdoor to the intended substructure

Variation	Fasteners	Substructure
1b	AQUAPANEL® Maxi Screw with pinpoint	CW 75/50/06
1d	AQUAPANEL® Maxi Screw with pinpoint	Wood 80/120
2b	AQUAPANEL® Maxi Screw with drill tip	UA 50/40/2.0
3	AQUAPANEL® Façade Screw	Wood 80/120
4	Ejot JT4-STS-3-5.5x32 (screw)	Aluminium
5	Ejot K14 – Al/E – 5.0 x 18.0 (blind rivet)	Aluminium
6b	Haubold 048020 SD 91050 CRF resinated (staple)	Wood 80/120
7b	Haubold 045032 RNC-S 28/45 NS TX 15 RF stainless (drive screw)	Wood 80/120

Table 2: Characteristic ultimate force of the board when fastened at the corner, at the edge or in the centre

Variation	Fixing at the corner		Fixing at the edge		Fixing in the centre
	Edge distance mm	Ultimate force F_{Ic} N	Edge distance mm	Ultimate force F_{Ic} N	Ultimate force F_{Ic} N
1b	23	294	17	428	602
1d	25	303	17	399	529
2b	23	324	17	397	621
3	25	281	18	393	853
4	27	313	19	400	1057
5	25	298	16	447	1160
6b	44	230	33	214	429
7b	43	299	30	526	631

Table 3 Characteristic ultimate force for shear stress

Variation	Edge distance mm	Deformation at maximum load mm	Ultimate force F_{Ic} N
1b	23	2,0	196
1d	23	2,4	118
2b	23	2,6	243
3	24	1,9	124
4	25	3,9	326
5	21	2,2	372
6b	40	6,8	495
7b	42	5,9	496

(The investigations were carried out by Materialprüfungsanstalt Stuttgart, the results are deposited by Deutsches Institut für Bautechnik.)

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"AQUAPANEL Cement Board"	Annex 1 (informative)
Overview of fasteners for fixing "AQUAPANEL Cement Board Outdoor" to the intened substructure	