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

Kolonnenstraße 30 B
D-10829 Berlin
Tel.: +49 30 78730-0
Fax: +49 30 78730-320
E-Mail: dibt@dibt.de
www.dibt.de

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-13/0391

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*		"Micro Air 150 MHK"
Zulassungsinhaber *Holder of approval*		BASF Construction Polymers GmbH Dr.-Albert-Frank-Straße 32 83308 Trostberg DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*		Elastische Mikrohohlkugeln als Betonzusatzmittel *Elastic micro hollow spheres as concrete admixture*
Geltungsdauer: *Validity:*	vom *from* bis *to*	20 June 2013 20 June 2018
Herstellwerk *Manufacturing plant*		BASF Construction Polymers GmbH 39443 Staßfurt DEUTSCHLAND

Diese Zulassung umfasst *This Approval contains*	8 Seiten *8 pages*

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.

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 the product and intended use

1.1 Definition of the construction product

The concrete admixture "Micro Air 150 MHK" is a concentrated paste consisting of water and a high number of correctly sized and evenly distributed elastic synthetic micro hollow spheres acting as air voids. The admixture is free of silicon dioxide. It increases the freeze/thaw resistance with or without de-icing agents of concrete.

1.2 Intended use

"Micro Air 150 MHK" is an admixture for plain, reinforced and pre-stressed concrete used as site-mixed, ready-mixed concrete or concrete for precast products as well as an admixture for sprayed concrete.

The provisions made in this European technical approval are based on an assumed working life of concrete incorporating "Micro Air 150 MHK" for the intended use of 50 years, provided that the conditions laid down in sections 4.2 and 5 for packaging, transport, storage and installation 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 product and methods of verification

2.1 Particle size distribution

The particle size distribution shall be analyzed by laser diffraction method. The medium value of particle diameter d_{50} shall be (44 ± 5) µm.

2.2 Colour

The colour shall be determined visually. The colour of the concrete admixture shall be uniform and similar to the description declared by the manufacturer.

2.3 Absolute density

The absolute density shall be determined in accordance with ISO 758[7] and must vary more than ± 0,015 kg/dm^3 from 0,137 kg/dm^3.

In deviation Nitrogen shall be used.

2.4 Conventional dry material content

The conventional dry material content shall be determined in accordance with EN 480-8[8] and must vary more than ± 1,0 % from 10,5 % by mass.

2.5 pH-value

The pH-value of liquid admixtures shall be determined in accordance with ISO 4316[9].

The determined value must vary by more than ± 1,5 from 9,5.

7	ISO 758	Liquid chemical products for industrial use; Determination of density at 20 degrees C
8	EN 480-8	Admixtures for concrete, mortar and grout - Test methods - Part 8: Determination of the conventional dry material content
9	ISO 4316	Surface active agents; Determination of pH of aqueous solutions; Potentiometric method

2.6 Total chlorine

The total chlorine content of the admixture shall be determined according to EN ISO 1158[10] and must not be greater than 0,20 % by mass.

In deviation the sample size in method B shall be increased to 0,1 g of dry admixture. Furthermore silver nitrate and ammonium thiocyanate solutions shall be used at 0,01 N.

2.7 Water soluble chloride

The water soluble chloride content of the admixture, expressed as Cl^-, shall be determined in accordance with EN 480-10[11] and must not be greater than 0,10 % by mass.

2.8 Alkali content (Na_2O equivalent)

The alkali content of the admixture, expressed as Na_2O equivalent, shall be determined in accordance with EN 480-12[12] and must exceed 0,10 % by mass.

2.9 Corrosion behaviour

Maximum corrosion current density shall be determined in accordance with EN 480-14[13]. In compliance with the requirements given in EN 934-1[14], 5.2, it must not exceed 10 µA/cm². In addition there shall be a similar trend in the progression of the current density vs. time curves for the control mix and the test mix.

2.10 Compressive strength

The compressive strength of concrete with and without elastic micro hollow spheres "Micro Air 150 MHK" shall be determined by the method described in EN 12390-3[15] using a reference concrete on the basis of EN 480-1[16]. Also the bulk density of the hardened concrete shall be determined.

At 28 days the compressive strength of the test mix shall be at least 80 % of the compressive strength of the control mix.

2.11 Air content and bulk density of fresh concrete

The air content and bulk density of fresh concrete with and without elastic micro hollow spheres "Micro Air 150 MHK" shall be determined according to EN 12350-7[17] and EN 12350-6[18] using a reference concrete III in compliance with EN 480-1[14]. The air content shall be determined 5 min. after mixing.

The air content of the test mix must not be greater than 2,0 % by volume above control mix.

10	EN ISO 1158	Plastics - Vinyl chloride homopolymers and copolymers - Determination of chlorine content
11	EN 480-10	Admixtures for concrete, mortar and grout - Test methods - Part 10: Determination of water soluble chloride content
12	EN 480-12	Admixtures for concrete, mortar and grout - Test methods - Part 12: Determination of the alkali content of admixtures
13	EN 480-14	Admixtures for concrete, mortar and grout - Test methods - Part 14: Determination of the effect on corrosion susceptibility of reinforcing steel by potentiostatic electro-chemical test
14	EN 934-1	Admixtures for concrete, mortar and grout - Part 1: Common requirements
15	EN 12390-3	Testing hardened concrete - Part 3: Compressive strength of test specimens
16	EN 480-1	Admixtures for concrete, mortar and grout - Test methods - Part 1: Reference concrete and reference mortar for testing
17	EN 12350-7	Testing fresh concrete - Part 7: Air content - Pressure methods
18	EN 12350-6	Testing fresh concrete - Part 6: Density

2.12 Effectiveness test

2.12.1 General

The effectiveness test shall be carried out with a concrete composition in compliance with a reference concrete III acc. to EN 480-1[14], but with a given w/c-value of 0,50. To reach the given consistency, a water reducing admixture shall be used.

Table 1 shows the different cement types, admixture contents and mixing times for the effectiveness test.

Table 1: Concrete characteristics

Concrete	Cement	Admixture content [kg/m^3]	Mixing time [min]	Flow table Consistency [mm]
I A	CEM I 42,5 R	*	2	420 ± 50
I B		*	10***	
I C		-**	2	
II A	CEM III/A 42,5 N	*	2	
II B		*	10***	
II C		-**	2	

*: Compliance dosage in kg/m^3 concrete
**: Reference concrete with air entraining admixture acc. to EN 934-2[19]
***: Only concrete I B or II B is necessary.

2.12.2 Volume of elastic micro hollow spheres in concrete

The volume of the elastic micro hollow spheres in fresh concrete shall be determined with a Roll-a-Meter in accordance with ASTM C173/C173M-01[20] (see clause 4.2).

2.12.3 Freeze-thaw resistance

The test of freeze-thaw resistance of concrete with and without elastic micro hollow spheres "Micro Air 150 MHK" shall be done (see clause 4.2).

[19] EN 934-2 Admixtures for concrete, mortar and grout - Part 2: Concrete admixtures - Definitions, requirements, conformity, marking and labelling

[20] ASTM C173/C173M-01 Standard Test Method of Air Content of Freshly Mixed Concrete by the Volumetric Method (2001)

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the communication of the European Commission[21] system 2+ of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:

(1) initial type–testing of the product;

(2) factory production control;

(3) testing of samples taken at the factory in accordance with a prescribed test plan.

(b) Tasks for the approved body:

(4) certification of factory production control on the basis of:

- initial inspection of factory and of factory production control;
- continuous surveillance, assessment and approval of factory production control.

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

3.2 Responsibilities

3.2.1 Tasks for 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 constituents 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.[22]

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 elastic micro hollow spheres as concrete admixture 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 involved.

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

21 Letter of the European Commission of 13/05/2011 to EOTA

22 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

- initial inspection of factory and of factory production control
- continuous surveillance, assessment and approval of factory production control

in accordance with the provisions laid down in the control plan.

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.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on the packaging and the accompanying commercial document respectively. The letters ”CE” shall be followed by the identification number of the approved certification body and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control
- the number of the European technical approval,
- recommended maximum dosage: 5,0 kg/m^3
- the maximum chloride content: 0,20 % by mass
- the maximum alkali content: 0,10 % by mass
- the corrosion behaviour: maximum corrosion current density 2,24 µ A/cm^2 and in conformity to EN 934-1, 5.2.

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

4.1 Manufacturing

The admixture "Micro Air 150 MHK" is produced from specific constituents in the production plant in Staßfurt, Germany.

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

"Micro Air 150 MHK" is an admixture for plain, reinforced and pre-stressed concrete used as site-mixed, ready-mixed concrete or concrete for precast products as well as an admixture for sprayed concrete.

The use of concrete admixtures may cause adverse effects on the properties of concrete, which may be determined.

The recommended maximum dosage of the admixture "Micro Air 150 MHK" is 5,0 kg per m^3 concrete. The admixture "Micro Air 150 MHK" is in accordance with EN 206-1[23] a iquid admixture (water content of 90 %). Its water content shall be taken into account when calculating the water/cement ratio.

For each case of application initial tests shall be carried out with the intended concrete composition and the intended addition of the admixture to demonstrate that the concrete can be processed reliably with the intended consistency provided under the conditions of the site and that the required properties are achieved.

In the context of this initial tests a testing of the freeze-thaw resistance of concrete with ŧ elastic micro hollow spheres with CDF-test according to CEN/TS 12390-9[24], clause 7, is required. The recommended relative dynamic modulus of elasticity according to CEN/TR 15177[25] is greater or equal than 0,75 and scaling less or equal than 1500 g/m^2 after 28 freeze-thaw cycles.

The elastic micro hollow spheres in fresh concrete shall be verified by washing-out according to ASTM C173/C173M-01[20]. The Roll-a-Meter value corresponding with the dosage verified by testing the freeze-thaw resistance shall be established in the initial test.

A typical reduction of the strength class as for concrete with air entraining admixtures (see Table F.1, EN 206-1[23]) does not occur.

5 Indications to the manufacturer for packaging, transport and storage

Materials shall be handled and stored with care according to EN 934-6.

The bags shall be stored sheltered from desiccation.

In the production plant the admixture shall be stored in delivery packaging, suitable silos or containers.

The admixture may be delivered in suitable transport containers, which shall be clean and free of other materials. During transportation the admixture shall be prevented from pollution.

It is the responsibility of the manufacturer of the product to ensure that the information on these provisions is given to those who are concerned.

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Hintzen

23	EN 206-1	Concrete - Part 1: Specification, performance, production and conformity
24	CEN/TS 12390-9	Testing hardened concrete - Part 9: Freeze-thaw resistance - Scaling
25	CEN/TR 15177	Testing the freeze-thaw resistance of concrete - Internal structural damage