

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

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European Technical Assessment

ETA-13/0363
of 31 January 2020

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

"Sika Aer Solid"

Product family
to which the construction product belongs

Elastic micro hollow spheres as concrete admixture

Manufacturer

Sika Services AG
Tüffenwies 16-22
8064 ZÜRICH
SCHWEIZ

Manufacturing plant

Sika Deutschland GmbH
Peter-Schuhmacher-Straße 8
69181 Leimen
DEUTSCHLAND

This European Technical Assessment
contains

6 pages including 2 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 260017-00-0301

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Specific part

1 Technical description of the product

The concrete admixture "Sika Aer Solid" is a concentrated air entraining paste consisting of water and a high number of specifically sized and evenly distributed elastic synthetic micro hollow spheres acting as air voids.

The concrete admixture increases the freeze and freeze-thaw resistance with or without de-icing agents of concrete.

The concrete admixture is free of silicon dioxide.

The concrete admixture "Sika Aer Solid" is produced from specific constituents in a production plant.

2 Specification of the intended use in accordance with the applicable European Assessment Document

"Sika Aer Solid" 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 performances given in Section 3 are only valid if the concrete admixture "Sika Aer Solid" is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of concrete incorporating "Sika Aer Solid" of at least 50 years. 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.

3 Performance of the product and references to the methods used for its assessment

Table 1 Mechanical resistance and stability (BWR 1)

| Essential characteristic | Performance |
|--|--|
| Particle size distribution | (45 ± 10) µm |
| Absolute density | (0,200 ± 0,015) kg/dm ³ |
| Conventional dry material content | (10,0 ± 1,0) % by mass |
| pH value | 7,0 ± 1 |
| Total chlorine | ≤ 0,16 % by mass |
| Water soluble chloride | ≤ 0,10 % by mass |
| Alkali content (Na ₂ O equivalent) | ≤ 0,20 % by mass |
| Corrosion behaviour | contains only active substances according to EN 934-1, A.1 |
| Compressive strength* | ≥ 80 % of control mix |
| Air content and bulk density (fresh concrete)* | ≤ 2 % by volume above control mix |
| Performance test | See Annex A |
| * with the maximum recommended dosage of concrete admixture "Sika Aer Solid" | |

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No. 260017-00-0301 the applicable European legal act is: 1999/469/EC(EU).

The system to be applied is: 2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 31 January 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
 Head of Department

beglaubigt:
 Bahlmann

Tabelle 2 Overview of test results determined on fresh concrete

| Concrete | Cement | Admixture content [kg/m ³] | Water reducing admixture [% by mass] | Mixing time [min] | Flow table consistency [mm] | Volume of elastic micro hollow spheres [% by volume] |
|-------------|------------------|--|--------------------------------------|-------------------|-----------------------------|--|
| I A | CEM I 42,5 R | 3,6* | 0,5 | 2 | 470 | 1,7 |
| I C | | 0,17** | 0,5 | 2 | 470 | -** |
| II A | CEM III/A 42,5 N | 3,5* | 0,2 | 2 | 465 | 1,7 |
| II B | | 3,5* | 0,2 | 10 | 445 | 1,2 |
| II C | | 0,2** | 0,2 | 2 | 470 | -** |

*: Compliance dosage [in kg/m³ concrete]
**: Reference concrete with air entraining admixture acc. to EN 934-2

Tabelle 3 Test results freeze thaw resistance

| Concrete | Freeze thaw cycles | | | | Test |
|-------------|--------------------|-----|-----|------|-----------------------------|
| | 4 | 8 | 14 | 28 | |
| I A | 31 | 59 | 74 | 187 | Scaling [g/m ²] |
| | 97 | 96 | 96 | 95 | RDM [%] |
| I C | 28 | 75 | 127 | 280 | Scaling [g/m ²] |
| | 98 | 98 | 97 | 97 | RDM [%] |
| II A | 172 | 425 | 541 | 1036 | Scaling [g/m ²] |
| | 99 | 100 | 100 | 99 | RDM [%] |
| II B | 234 | 559 | 756 | 1434 | Scaling [g/m ²] |
| | 99 | 98 | 98 | 98 | RDM [%] |
| II C | 218 | 494 | 744 | 1288 | Scaling [g/m ²] |
| | 99 | 100 | 100 | 103 | RDM [%] |

"Sika Aer Solid"

Results of performance assessment – Performance test

Annex A

Installation

"Sika Aer Solid" 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 "Sika Aer Solid" is 3,5 kg per m³ concrete (7,0 kg per m³ for sprayed concrete). The admixture "Sika Aer Solid" is in accordance with EN 206 a liquid 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 test a testing of the freeze-thaw resistance of concrete with elastic micro hollow spheres with CDF-test according to CEN/TS 12390-9, clause 7, is required. The recommended relative dynamic modulus of elasticity according to CEN/TR 15177 is greater or equal than 0,75 and scaling less or equal than 1500 g/m² 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. 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 (cp. EN 206, Table F.1) does not occur.

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.

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|------------------------|---------|
| "Sika Aer Solid" | Annex B |
| Specifications for use | |