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TYPE I ADDITION FOR CONCRETE, MORTAR, AND SCREED MATERIALS - AQUEOUS SOLUTION -

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1 SCOPE OF THE EAD

1.1 Description of the construction product

The Type I addition is an aqueous solution and free of particulate and except a dye free of organic matter.

NOTE The dye serves to colour the Type I addition and not concrete, mortar, or screed material.

According to EN 206¹ a Type I addition is a “nearly inert addition” for concrete.

The product is not covered by a harmonised European standard (hEN).

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer’s instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer’s stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use of the construction product

The Type I addition is intended to be used in concrete, mortar, and screed material.

1.3 Specific terms used in this EAD

Symbols:

$R_{c, c1}^{mean}$ MPa..... Mean compressive strength of prisms with cement and de-ionised water

$R_{c, c2}^{mean}$ MPa..... Mean compressive strength of prisms with cement and Type I addition and de-ionised water

$R_{c, s1}^{mean}$ MPa..... Mean compressive strength of prisms with calcium sulfate binder and de-ionised water

$R_{c, s2}^{mean}$ MPa..... Mean compressive strength of prisms with calcium sulfate binder and Type I addition and de-ionised water

f_c—..... Prisms with cement, ratio of mean compressive strength with and without Type I addition

f_s—..... Prisms with calcium sulfate binder, ratio of mean compressive strength with and without Type I addition

¹ Standards and other documents referred to in the European Assessment Document are listed in Clause 0.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the Type I addition for concrete, mortar and screed materials – Aqueous solution is assessed in relation to the essential characteristics.

Table 1 Essential characteristics of the Type I addition for concrete, mortar and screed materials – Aqueous solution and methods and criteria for assessing the performance of the product in relation to those essential characteristics

Nº	Essential characteristic	Assessment method	Type of expression of product performance level, class, description
Basic requirement for construction works 1: Mechanical resistance and stability			
1	Harmful content – Colour	2.2.1	Description
2	Harmful content – Suspended matter	2.2.2	Description
3	Harmful content – Odour	2.2.3	Description
4	pH-value	2.2.4	Level
5	Chlorides	2.2.5	Level
6	Sulphates	2.2.6	Level
7	Lead	2.2.7	Level
8	Zinc	2.2.8	Level
9	Equivalent Na ₂ O content	2.2.9	Level
10	Total carbon	2.2.10	Level
11	Setting time	2.2.11	Level
12	Compressive strength	2.2.12	Level
Basic requirement for construction works 4: Safety and accessibility in use			
—	Same as for basic requirement for construction works 1	—	—

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

2.2.1 Harmful content – Colour

Colour is determined according to EN 1008, clause 6.1.1.

2.2.2 Harmful content – Suspended matter

Suspended matter is determined according to EN 1008, clause 6.1.1.

2.2.3 Harmful content – Odour

Odour is determined according to EN 1008, clause 6.1.1.

2.2.4 PH-value

PH-value is determined according to ISO 4316.

2.2.5 Chlorides

Chlorides are determined according to EN 196-2.

2.2.6 Sulphates

Sulphates are determined according to EN 196-2.

2.2.7 Lead

Lead is determined according to EN ISO 17294-2.

2.2.8 Zinc

Zinc is determined according to EN ISO 17294-2.

2.2.9 Equivalent Na₂O content

Equivalent Na₂O content is determined according to EN 196-2.

2.2.10 Total carbon

Total carbon is determined according to EN 1484.

2.2.11 Setting time

Setting time is determined on cementitious and calcium sulfate binder according to

- EN 196-3 where the mix is composed of a cement CEM II/A-M (S-L) 42,5 N according to EN 197-1 and
- EN 13454-2, clause 4.3, where the mix is composed of a calcium sulfate binder CAB – 30 according to EN 13454-1.

For both binders, one mix is made

- with de-ionised water and

a second mix

- with de-ionised water, where 3 g of water is replaced by the Type I addition. The amount of 3 g refers to the mix specified in EN 196-3.

Type I addition, de-ionised water, cement, and calcium sulfate binder are taken from the same quantities to prepare the four mixes.

Further specimen preparation and testing is according to EN 196-3 and EN 13454-2.

According to EN 12878, clause 4.1.2.1, initial setting time obtained on specimens made with the Type I addition shall not differ by more than 60 minutes from the initial setting time obtained on specimens made with de-ionised water. Final setting time shall according to EN 12878, clause 4.1.2.2, not differ by more than 120 minutes from the final setting time obtained on specimens made with de-ionised water.

2.2.12 Compressive strength

Compressive strength is determined on cementitious and calcium sulfate binder according to

- EN 196-1 where the mortar prisms are composed of a cement CEM II/A-M (S-L) 42,5 N according to EN 197-1 and
- EN 13454-2, clause 4.4, where the mortar prisms are composed of a calcium sulfate binder CAB – 30 according to EN 13454-1.

For both binders, one set of three prisms is made

- with de-ionised water and

a second set of three prisms

- with de-ionised water, where 3 g of water is replaced by the Type I addition. The amount of 3 g refers to the mix specified in EN 196-1.

Type I addition, de-ionised water, cement and calcium sulfate binder are taken from the same quantities to prepare the four sets of prisms.

Further specimen preparation and testing is according to EN 196-1 and EN 13454-2. After 7 days all specimens are tested for compressive strength according to EN 196-1 and EN 13454-2. With the mean compressive strengths of the four sets of prisms, i.e. $R_{c, c1}^{mean}$, $R_{c, c2}^{mean}$, $R_{c, s1}^{mean}$, and $R_{c, s2}^{mean}$, the ratios

$$f_c = \frac{R_{c, c2}^{mean}}{R_{c, c1}^{mean}}$$

$$f_s = \frac{R_{c, s2}^{mean}}{R_{c, s1}^{mean}}$$

are calculated. Where:

- $R_{c, c1}^{mean}$ Mean compressive strength of prisms with cement and de-ionised water
- $R_{c, c2}^{mean}$ Mean compressive strength of prisms with cement and Type I addition and de-ionised water
- $R_{c, s1}^{mean}$ Mean compressive strength of prisms with calcium sulfate binder and de-ionised water
- $R_{c, s2}^{mean}$ Mean compressive strength of prisms with calcium sulfate binder and Type I addition and de-ionised water
- f_c Prisms with cement, ratio of mean compressive strength with and without Type I addition
- f_s Prisms with calcium sulfate binder, ratio of mean compressive strength with and without Type I addition

according to EN 12620, clause 6.4.1, the ratios shall be $f_c \geq 0.80$ and $f_s \geq 0.80$.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System of assessment and verification of constancy of performance to be applied

For the product covered by the EAD the applicable European legal act is: Decision 1999/469/EC

The system is: 2+

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the Type I addition for concrete, mortar and screed materials – Aqueous solution in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

Table 2: Control plan for the manufacturer – Cornerstones

No	Subject of control	Test or control method	Criteria	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) including testing of samples taken at the factory in accordance with the prescribed test plan					
1	Harmful content – Colour	2.2.1	1)	1	One per charge
2	Harmful content – Suspended matter	2.2.2	1)	1	One per charge
3	Harmful content – Odour	2.2.3	1)	1	One per charge
4	pH-value	2.2.4	2)	1	One per charge
5	Chlorides	2.2.5	3)	1	Once per 2 years
6	Sulphates	2.2.6	3)	1	Once per 2 years
7	Lead	2.2.7	3)	1	Once per 2 years
8	Zinc	2.2.8	3)	1	Once per 2 years
9	Equivalent Na ₂ O content	2.2.9	3)	1	Once per 2 years
10	Total carbon	2.2.10	3)	1	Once per 2 years
11	Setting time	2.2.11	2.2.11 ³⁾	1	Once per 2 years
12	Compressive strength	2.2.12	2.2.12 ³⁾	1	Once per 2 years

1) All test results shall conform to the specification of the Type I addition.

2) pH-value shall not differ by more than ± 2 .

3) All test results shall be equal or smaller than the specified value of the Type I addition.

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for Type I addition for concrete, mortar and screed materials – Aqueous solution are laid down in Table 3.

Table 3 Control plan for the notified body – Cornerstones

№	Subject of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control					
1	The notified factory production control certification body shall verify the ability of the manufacturer for a continuous and orderly manufacturing of the product. In particular, the following items shall be appropriately considered <ul style="list-style-type: none"> – personnel and equipment – the suitability of the factory production control established by the manufacturer – full implementation of the prescribed test plan 				—
Continuing surveillance, assessment and evaluation of factory production control					
2	The notified factory production control certification body shall verify that <ul style="list-style-type: none"> – the manufacturing process – the system of factory production control – the implementation of the prescribed test plan are maintained.				Once per year

4 REFERENCE DOCUMENTS

As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment, is of relevance.

EN 196-1	Methods of testing cement – Part 1: Determination of strength
EN 196-2	Methods of testing cement – Part 2: Chemical analysis of cement
EN 196-3	Methods of testing cement – Part 3: Determination of setting times and soundness
EN 197-1	Cement – Part 1: Composition, specifications and conformity criteria for common cements
EN 206	Concrete – Specification, performance, production and conformity
EN 1008, 06.2002	Mixing water for concrete – Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete
EN 1484	Water analysis – Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)
EN 12620+A1, 04.2008	Aggregates for concrete
EN 12878, 04.2014	Pigments for the colouring of building materials based on cement and/or lime – Specifications and methods of test
EN 13454-1	Binders, composite binders and factory made mixtures for floor screeds based on calcium sulfate – Part 1: Definitions and requirements
EN 13454-2+A1, 07.2007	Binders, composite binders and factory made mixtures for floor screeds based on calcium sulfate – Part 2: Test methods
EN ISO 17294-2	Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements
ISO 4316	Surface active agents – Determination of pH of aqueous solutions – Potentiometric method
1999/469/EC	Commission Decision 1999/469/EC of 25 June 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/106/EEC as regards products related to concrete, mortar and grout, OJ L 184 of 17 July 1999, p. 27, amended by Commission Decision 2001/596/EC of 8 January 2001, OJ L 209 of 2 August 2001, p. 33