



## European Technical Approval ETA-10/0421

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung <i>Trade name</i>	"Centrilit NC - Pulver" "Centrilit NC - Powder"
Zulassungsinhaber <i>Holder of approval</i>	MC Bauchemie Müller GmbH & Co. Am Kruppwald 46238 Bottrop DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck <i>Generic type and use of construction product</i>	Calciniertes Schichsilikat als Typ II Betonzusatzstoff  <i>Calcined Layer Silicate Based Type II Addition</i>
Geltungsdauer: <i>Validity:</i>	vom <i>from</i> 19 January 2011 bis <i>to</i> 19 January 2016
Herstellwerk <i>Manufacturing plant</i>	101

Diese Zulassung umfasst  
*This Approval contains*

8 Seiten  
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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<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - 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<sup>4</sup>, as amended by law of 31 October 2006<sup>5</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 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.
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- 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.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12  
<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1  
<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25  
<sup>4</sup> *Bundesgesetzblatt Teil I 1998*, p. 812  
<sup>5</sup> *Bundesgesetzblatt Teil I 2006*, p. 2407, 2416  
<sup>6</sup> 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 calcined layer silicate "Centrilit NC - Powder" is a fine-grained powder. The calcined layer silicate is produced from layer silicate by a specific thermal and mechanical process. It consists essentially of  $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3$ . The content of reactive  $\text{SiO}_2$ , as defined and described in EN 197-1<sup>7</sup>, being at least 25 % by mass.

The chemical composition of the calcined layer silicate "Centrilit NC - Powder" is shown in table 1.

Table 1: Chemical composition of calcined layer silicate "Centrilit NC - Powder" (the parameters are related to the substance dried at 105 °C)

Parameter	Composition			
$\text{SiO}_2$	53	to	55	% by mass
$\text{Al}_2\text{O}_3$	42	to	44	% by mass
$\text{Fe}_2\text{O}_3$	0,38	to	0,58	% by mass
CaO				≤ 0,01 % by mass
MgO	0,14	to	0,26	% by mass
$\text{SO}_3$	0,04	to	0,05	% by mass
$\text{K}_2\text{O}$	0,53	to	0,74	% by mass
$\text{Na}_2\text{O}$	0,01	to	0,06	% by mass
$\text{Cl}^-$				< 0,01 % by mass
Loss on ignition <sup>*)</sup>	1,05	to	1,52	% by mass
*) Determined under argon atmosphere				

#### 1.2 Intended use

The calcined layer silicate "Centrilit NC - Powder" is a type II addition (pozzolanic) for production of concrete, including in particular cast-in-situ or prefabricated structural concrete conforming to European standard EN 206-1<sup>8</sup>. Calcined layer silicate "Centrilit NC - Powder" according to this ETA may also be used in mortars and grouts.

From EN 206-1<sup>8</sup> all strength classes and consistency classes apply. All exposure classes are included. Calcined layer silicate "Centrilit NC - Powder" is intended to be used in combination with Portland cement (CEM I) or Portland-composite cement (CEM II/A-S, CEM II/B-S; CEM II/A-LL) or blastfurnace cement (CEM III/A).

<sup>7</sup> EN 197-1 Cement — Part 1: Composition, specification and conformity criteria for common cements

<sup>8</sup> EN 206-1 Concrete — Part 1: Specification, production, performance and conformity

The provisions made in this European Technical Approval are based on an assumed working life of concrete incorporating "Centrlit NC - Powder" of 50 years, provided that the conditions laid down in sections 4.2 and 5 for the packaging / transport / storage / application 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 General

The properties in 2.2 to 2.13 are specified as proportions by mass of dry calcined layer silicate. The laboratory samples shall be dried in a ventilated oven at  $(105 \pm 5) ^\circ\text{C}$  to constant mass and then cooled in a dry atmosphere.

### 2.2 Sulfate content

The sulfate content expressed as  $\text{SO}_3$  shall be determined by the method described in EN 196-2<sup>9</sup> and shall not be greater than 2,0 % by mass.

### 2.3 Silicon dioxide content

The silicon dioxide content, expressed as  $\text{SiO}_2$ , shall be determined in accordance with EN 196-2<sup>9</sup> and shall be at least 50 % by mass.

### 2.4 Aluminium dioxide content

The aluminium dioxide content, expressed as  $\text{Al}_2\text{O}_3$ , shall be determined in accordance with EN 196-2<sup>9</sup> and shall be at least 40 % by mass.

### 2.5 Chloride content

The chloride content, expressed as  $\text{Cl}^-$ , shall be determined in accordance with EN 196-2<sup>9</sup> and shall not be greater than 0,10 % by mass.

NOTE: If the  $\text{Cl}^-$  content is above 0,10 % by mass, the upper limit value shall be declared by the manufacturer.

### 2.6 Loss on ignition

The loss on ignition shall be determined in accordance with the principles of the method described in EN 196-2<sup>9</sup> but using an ignition time of 1 hour and shall not be greater than 3,0 % by mass.

### 2.7 Total content of alkalis

The total content of alkalis shall be determined in accordance with EN 196-2<sup>9</sup> and calculated as  $\text{Na}_2\text{O}$  (equivalent) and shall not exceed 0,50 % by mass.

### 2.8 Content of soluble alkalis

The content of soluble alkalis shall be determined in accordance with EN 196-2<sup>9</sup> with the exception that the chemical pulping is done in accordance with EN 1744-1<sup>10</sup>, clause 7. The content of soluble alkalis is calculated as  $\text{Na}_2\text{O}$  (equivalent) and shall not exceed 0,2 % by mass.

<sup>9</sup> EN 196-2  
<sup>10</sup> EN 1744-1

Methods of testing cement — Chemical analysis of cement  
Tests for chemical properties of aggregates — Part 1 Chemical analysis

## 2.9 Sieve residue on 200 µm sieve

The dried sample shall be sieved according to EN 933-10<sup>11</sup> on a 200 µm sieve according to ISO 3310-1<sup>12</sup>. Agglomerates, which can not be crushed between one's fingers, and impurities shall be specified as sieve residue on the 200 µm sieve. The use of a brush is not allowed. The sieve residue on the 200 µm sieve shall not exceed 3,0 % by mass.

## 2.10 Specific surface

The specific surface shall be determined by nitrogen adsorption according to the method given in ISO 9277<sup>13</sup> and shall be declared. The declared value shall be at least 10,75 m<sup>2</sup>/g. The specific surface shall not vary by more than ± 0,75 m<sup>2</sup>/g from the declared value.

## 2.11 Fineness

The fineness shall be expressed as the mass proportion in percent of the addition retained when sieved on a 0,045 mm sieve and determined in accordance with EN 450-1<sup>14</sup>, clause 5.3.1, and shall not exceed 10 % by mass.

## 2.12 Initial setting time

The initial setting time shall be determined on a cement paste prepared with 10 % addition plus 90 % test cement by mass in accordance with EN 196-3<sup>15</sup> and shall not be more than 120 minutes longer than the initial setting time of a 100 % by mass test cement paste. The requirements regarding initial setting time specified in EN 197-1<sup>7</sup> shall be met by the test cement when tested alone.

NOTE: The test cement shall be a Portland cement CEM I 42,5 R acc. to EN 197-1<sup>7</sup>.

The test cement shall fulfil the following requirements:

- Tricalcium aluminate content: 8 to 12 % by mass
- Alkali content (Na<sub>2</sub>O eqv): 0,6 % to 1,2 % by mass
- Fineness: 300 m<sup>2</sup>/kg to 400 m<sup>2</sup>/kg

## 2.13 Soundness

The soundness shall be determined by the expansion of a cement paste prepared with 10 % addition plus 90 % test cement by mass cement paste in accordance with EN 196-3<sup>15</sup> and shall not exceed 10 mm.

NOTE: For test cement see clause 2.12.

11	EN 933-10	Tests for geometrical properties of aggregates - Part 10: Assessment of fines - Grading of filler aggregates (air jet sieving)
12	ISO 3310-1	Test sieves – Technical requirement and testing - Part 1: Test sieves of metal wire cloth
13	ISO 9277	Determination of the specific surface area of solids by gas adsorption using the BET method
14	EN 450-1	Fly ash concrete – Part 1: Definition, specifications and conformity criteria
15	EN 196-3	Methods of testing cement — Determination of setting time and soundness

## 2.14 Relative compressive strength at 28 days

The relative compressive strength is determined as the ratio (in percent) of the compressive strength of standard mortar bars, prepared with 10 % addition plus 90 % cement by mass of total binder, to the compressive strength of standard mortar bars prepared with 100 % cement, when tested at the same age<sup>16</sup>. The relative compressive strength shall be at least 100 % when tested at 28 days.

## 3 Evaluation and attestation of conformity and CE marking

### 3.1 System of attestation of conformity

According to the Decision 1999/469/EC of the European Commission<sup>18</sup> system 1+ of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1+: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
  - (1) factory production control;
  - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks for the approved body:
  - (3) initial type-testing of the product;
  - (4) initial inspection of factory and of factory production control;
  - (5) continuous surveillance, assessment and approval of factory production control;
  - (6) audit-testing of samples taken at the factory.

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 raw materials stated in the technical documentation of this European technical approval.

<sup>16</sup> Preparation of mortar, preparation and curing of the mortar prisms and determination of the compressive strength shall be carried out in accordance with EN 196-1<sup>17</sup>. For the tests 3 Portland cements (CEM I), 1 Portland-slag cement (CEM II/B-S) and 1 blastfurnace cement (CEM III/A) shall be used. The selection of the cements shall fulfil the following requirements:

- One CEM I 42,5 R, one CEM II/B-S 32,5 R with a blast-furnace slag content of around 30 % by mass and one CEM III/A 32,5 N with a blast-furnace slag content of around 60 % by mass shall be from the same production plant. Furthermore the used Portland cement clinker and blast-furnace slag of the three cements shall be identical.
- One CEM I 42,5 R shall fulfil the requirements in clause 2.12.
- One CEM I 42,5 N with Na<sub>2</sub>O eqv ≤ 0,60 % by mass shall be used.

The two CEM I 42,5 R shall have significantly different alkali contents calculated as Na<sub>2</sub>O (equivalent).

<sup>17</sup>

EN 196-1

Methods of testing cement - Determination of strength

<sup>18</sup>

Official Journal of the European Communities L 184/27 of 17.07.1999

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.<sup>19</sup>

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 calcined layer silicate 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.

#### 3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,
- audit-testing of samples taken at the factory,

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 product 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 packages and on the accompanying commercial documents respectively. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, 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 of conformity for the product,
- product identification (trade name): Centrlit NC - Powder
- if so maximum chloride content<sup>20</sup>:
- declared value of the specific surface:
- pore solution: pass
- Ca(OH)<sub>2</sub>-content: pass
- Concrete compressive strength: pass
- Carbonation resistance: pass
- Freeze-thaw resistance: pass
- Chloride penetration resistance: pass
- Shrinkage: pass

<sup>19</sup> 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.

<sup>20</sup> If the chloride content is greater than 0,10 % by mass (see 2.5).

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

##### **4.1 Manufacturing**

The calcined layer silicate "Centrilit NC - Powder" is manufactured according to a specific procedure from layer silicate of a special natural mineral deposit.

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 Application**

The calcined layer silicate "Centrilit NC - Powder" is intended to be used as a type II addition for production of concrete, including in particular cast-in-situ or prefabricated structural concrete conforming to EN 206-1, and for mortars and grouts.

The maximum content of calcined layer silicate "Centrilit NC - Powder" is 11 % by mass of the cement content.

The calcined layer silicate "Centrilit NC – Powder" can be used in concrete with all types of cement acc. to EN 197-1.

The calcined layer silicate "Centrilit NC - Powder" can be used too with verified k-value concept in concrete made of Portland cement CEM I acc. to EN 197-1, Portland-slag cements CEM II/A-S, CEM II/B-S acc. to EN 197-1, Portland-limestone cement CEM II/A-LL acc. to EN 197-1 and blastfurnace cement CEM III/A acc. to EN 197-1. Therefore the types of cements for which the suitability of the k-value concept is verified are only CEM I, CEM II/A-S, CEM II/B-S, CEM II/A-LL and CEM III/A acc. to EN 197-1. The k-value concept can be used for all exposure classes acc. to EN 206-1 except XF2 and XF4. The k-value is 1,0.

#### **5 Indications to the manufacturer for packaging, transport and storage**

In the production plant the calcined layer silicate "Centrilit NC - Powder" shall be stored in silos.

"Centrilit NC - Powder" should be conveyed, stored and transported in the same way as silica fume.

The manufacturer shall ensure that the requirements given in sections 1, 2 and 4 are made known to those involved. This can be implemented by, for example, handing over copies of the appropriate sections of the European Technical Approval.

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*beglaubigt:*  
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