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Authorised and notified according to Article 10 of the 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

CERTIFICATIE

MEMBER OF EOTA

European Technical Approval No. ETA-05/0168

Modified April 30, 2009
(This ETA replaces ETA-05/0168 with validity from 01/01/2008 to 01/01/2013)

Trade name:	**Fly Ash SMZ**
Holder of approval:	**Vliegasunie B.V.** **P.O. Box 1072, 3430 BB Nieuwegein,** **The Netherlands** **Tel + 31 30 60 69 526 Fax + 31 30 60 69 563** **E-mail: info@vliegasunie.nl**
Generic type and use of construction product:	**Type II addition for production of concrete, including in particular cast-in-situ or prefabricated structural concrete conforming to European standard EN 206-1. Fly ash according to this ETA may also be used in mortars and grouts.**
Valid from: to:	**30.04. 2009** **01.01. 2013**
Manufacturing plant: (**Fly Ash SMZ**)	**Silo, Meng en Zeefinstallatie Maasvlakte Rotterdam.** **Europaweg 893, 3199 LD Rotterdam.** **The Netherlands**
This European Technical Approval contains:	**9 pages including Annex A which forms an integral part of this document**

1 LEGAL BASIS AND GENERAL CONDITIONS

1 This European Technical Approval is issued by BMC Certificatie, 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 the Council Directive 93/68/EEC of 22 July 1993[2] and regulation (EC) No 1882/2003 of the European Parliament and of the Council[3].
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex of Commission Decision 94/23/EC[4] .

2 BMC Certificatie is authorised 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 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 other manufacturers, agents of manufacturers, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by BMC Certificatie pursuant to Article 5.1 of Council Directive 89/106/EEC.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 BMC Certificatie. 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 should correspond fully to the version used by EOTA for circulation. Translations into other languages have to be designated as such.

[1] Official Journal of the European Communities N° L 40, 11.2.1989, p.12
[2] Official Journal of the European Communities N° L 220, 30.08.1993, p.1
[3] Official Journal of the European Communities L 284, 31.10.2003, p.25
[4] Official Journal of the European Communities L 17, 20. 01.1994, p.34

2 SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

2 Definition of product and intended use

2.1 Definition of the product

Fly ash, a fine powder of mainly spherical, glassy particles, derived from burning of pulverized coal, with or without co-combustion materials, which has pozzolanic properties and consists essentially of SiO_2 and Al_2O_3, the content of reactive SiO_2 as defined and described in EN 197-1 being at least 25 % by mass

Fly ash is obtained by electrostatic or mechanical precipitation of dust-like particles from the flue gases of furnaces fired with pulverized coal, with or without co-combustion materials.

Fly ash may be processed, for example by classification, selection, sieving, drying, blending, grinding or carbon reduction, or by combination of these processes, in adequate production plants. Such processed fly ash may consist of fly ashes from different sources, each conforming to the definition given in this clause. If one or more of incoming fly ashes are obtained from co-combustion, then the processed fly ash shall be considered as fly ash from co-combustion. The incoming fly ashes have to conform to EN 450-2 clause 4.2.1.2 d) (except fineness and carbon content).

There is no limitation to types of co-combustion materials. The maximum percentage of co-combustion material is 40% by mass and the maximum proportion of fly ash derived from co-combustion materials is limited to 35% by mass.

Provided that the biomass used for co-combustion is made from a specific virgin wood, i.e. not recycled wood, the maximum percentage of co-combustion material can be increased to 50% by mass.

Municipal and industrial waste incineration ashes do not conform to the definition given in this clause.

2.2 Intended use of the product

Fly ash, according to this ETA, is used as a type II addition for production of concrete, including in particular cast-in-situ or prefabricated structural concrete conforming to European standard EN 206-1. Fly ash according to this ETA may also be used in mortars and grouts.

The fly ash conforming to this ETA fulfils the specifications of EN 450-1 and therefore it meets the scope of that standard.
Note: Fly ash conforming to this ETA can be used as constituent for the production of EN 197-1 cements where fly ash as defined in EN 450-1 is foreseen.

2.3 Assumed working life

The composition and the performance of the fly ash shall be such that durable concrete (see EN 206-1) may be produced when using the fly ash.

Fly ash conforming to this ETA, fulfilling the chemical requirements in 5.2 of EN 450-1 and the physical requirements in 5.3 of EN 450-1, shall be deemed to satisfy the durability requirements.

In certain applications, particularly for concrete in severe environmental conditions, the choice of fly ash category may have an influence on the durability of concrete, e.g. frost resistance and resistance to alkali aggregate reactions. In such cases the choice of fly ash category shall follow the appropriate standards and/or regulations valid in the place of use.

3 CHARACTERISTICS OF THE PRODUCT AND METHODS OF VERIFICATION

Table 1 Characteristics of the product and methods of verification

ER	Relevant product characteristics	CUAP clause for verification method	CUAP clause for relevant limit value or classification	Performance characteristics
ER 1 Mechanical resistance and stability	Activity Index	4.1.1	5.1.1	At 28 days: ≥ 75%,; At 90 days: ≥ 85%
	Initial setting time*	4.1.2	5.1.2	Not more than twice as long as the initial setting time of a 100% (by mass) test cement paste
	Fineness	4.1.3	5.1.3	Category N
	Soundness			
	- expansion	4.1.4	5.1.4	≤ 10 mm #
	- Free CaO	4.1.5	5.1.5	≤ 1,0% ##
	Loss on ignition	4.1.6	5.1.6	Category A (≤ 5,0% by mass); Category B (between 2,0% and 7,0% by mass) Category C (between 4,0% and 9,0% by mass)
	Composition			
	- Sum of contents of SiO_2, Al_2O_3 and Fe_2O_3	4.1.7 4.1.8	5.1.7 5.1.8	≥ 70% ≤ 5%
	- Total content of alkalis	4.1.9	5.1.9	≥ 25%
	- Reactive SiO_2	4.1.10	5.1.10	≤ 3%
	- SO_3	4.1.11	5.1.11	≤ 0,10%
	- Cl	4.1.12	5.1.12	≤ 10,0 %
	- Reactive CaO	4.1.13	5.1.13	≤ 4,0%
	- MgO	4.1.14	5.1.14	≤ 100 mg/kg
	- Soluble phosphate	4.1.15	5.1.15	≤ ± 200 kg /m^3 from declared value.
	Particle density*			Not applicable for category N fly ash
	Water requirement*	4.1.16	5.1.16	
ER 3 Hygiene, health and the environment	Release of dangerous substances	4.2.1	5.2.1	According to the European Waste Catalogue and requirements of the Dutch Building Materials Decree.
	Emission of radioactivity			According to Dutch Regulations concerning Radioactivity. If there are additional requirements resulting from national laws, regulations and administrative provisions in the place of use of the fly ash these are to be considered with respect to environmental compatibility.
** Working life and Durability	Durability	4.3.1	5.3.1	The chemical and physical requirements are fulfilled.
Durability and serviceability	Suitability of fly ash from co-combustion	4.3.2	5.3.2	Suitability has been established.

* Amendment to the mandate M128 (SCC Working Document SCC04/636 26 February 2004); Amendment A1 to EN 450-1

** Related aspects of durability, serviceability and identification

this only to be tested if free CaO > 1,0% m/m

the amount of free CaO may be >1,0% m/m, if the amount does not exceed 2,5% m/m and if the expansion ≤10 mm.

4 EVALUATION OF CONFORMITY AND CE MARKING

4.1 Attestation of Conformity System

The system of attestation of conformity of the fly ash is in accordance with the Commission decision 1999/469/EC of 25 June 1999 as amended by decision 01/596/EC of 8 January 2001 as given in Annex III of the mandate for "Products related to concrete, mortar and grout". This is shown in Table 2 for the indicated intended use and relevant level(s) or class(es):

Table 2 System of attestation of conformity (Table ZA.3 of EN 450-1)

Product	**Intended use**	**Level(s) or class(es)**	**Attestation of conformity system**
Additions (type II)	For concrete, mortar and grout	-	1+
System 1+: See Directive 89/106/EEC (CPD) Annex III.2.(i) with audit testing of samples.			

The attestation of conformity of the fly ashes in Table ZA.1 ofEN 450-1 is based on the evaluation of conformity procedure indicated in Table ZA.3 of EN 450-1.

The attestation of conformity to the specifications is based on Table 1 of this ETA and on evaluation of conformity which is in accordance with EN 450-2.

5 RESPONSIBILITIES

5.1 Tasks for the producer

Table 3 Tasks for the producer

Tasks		**Content of the task**	**Evaluation of conformity clauses to apply**
Tasks for the producer	Factory production control (F.P.C)	Parameters related to all relevant characteristics of Table ZA.1	EN 450-2, clauses 4.1 and 4.2
	Further testing of samples taken at factory	All relevant characteristics of Table ZA.1	EN 450-2, clause 4.3

The manufacturer, or his agent established in the Community, shall prepare and keep the declaration of conformity authorizing him to affix the CE marking. This declaration shall include:

- Name and address of the manufacturer, or of his agent established in the Community, and place of manufacture
- Description of the product (type, marking, properties, use) and copy of the information accompanying the CE marking
- The ETA which the product is in conformity with
- Particular conditions applicable to the use of the product
- Identification number of all bodies the manufacturer involved in the conformity attestation procedure

– Name and function of the person entitled to sign on behalf of the manufacturer or his agent established in the Community.

The above mentioned declaration shall be presented in the official language or languages of the Member State in which the product is to be used.

5.2 Tasks for the approval body

Table 4 Tasks for the approval body

Tasks		**Content of the task**	**Evaluation of conformity clauses to apply**
Tasks for the approval body	Initial type testing	All relevant characteristics of Table ZA.1, except *-release of dangerous substances and emission of radioactivity*	EN 450-2, clause 5.4 and 5.6
	Initial inspection of factory and of F.P.C	Parameters related to all relevant characteristics of Table ZA.1	EN 450-2, clause 5.5
	Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all relevant characteristics of Table ZA.1	EN 450-2, clauses 5.2 and 5.3
	Audit testing of samples taken at factory	All relevant characteristics of Table ZA.1, except *-release of dangerous substances and emission of radioactivity*	EN 450-2, clause 5.4

The approval body issues a certification of conformity with this European Technical Approval when the provisions of the approval are fulfilled.

6 CE MARKING

The producer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the accompanying commercial documents e.g. a delivery note (bulk fly ash) or on the packaging (packed fly ash). The following information shall accompany the CE marking symbol:

- Identification number of the notified approval body
- Name or identifying mark of the producer
- Registered address of the producer
- Last two digits of the year in which the marking is affixed
- Number of the EC certificate of conformity
- Number of the ETA
- Description of the product: Fly ash for concrete (type ll addition)
- LOI category (A, B or C)
- This ETA refers only to fineness category N fly ash as given in Tabel 1

Information on those relevant requirements listed in Table ZA.1 of EN 450-1 which are to be declared presented as:

- declared values and, where relevant, level or class (including “pass” for pass/fail requirements, where necessary) to declare for each requirement as indicated in Table ZA.1of EN 450-1;

- "No performance determined" for characteristics where this is relevant;
- as an alternative, a standard designation which shows some or all of the relevant characteristics (where the designation covers only some characteristics, it will need to be supplemented with declared values for other characteristics as above.

The producer shall submit a written declaration stating types and percentages of co-combustion materials by the fly ash production as well as their ash content.

The "No performance determined" (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements in the Member State of destination.

7 ASSUMPTIONS UNDER WHICH THE FITNESS OF THE PRODUCT FOR THE INTENDED USE WAS FAVOURABLY ASSESSED

This ETA specifies requirements for the chemical and physical properties as well as quality control procedures for siliceous fly ash, for use as a type II addition for production of concrete, including in particular cast-in-situ or prefabricated structural concrete conforming to EN 206-1. Fly ash according to this standard may also be used in mortars and grouts.

It is, however, beyond the scope of this ETA to specify provisions governing the practical application of fly ash in the production of concrete, i.e. requirements concerning composition, mixing, placing, curing etc. of concrete containing fly ash. As regards such provisions, reference should be made to other European or national standards for concrete, such as EN 206-1.

8 RECOMMENDATIONS FOR THE MANUFACTURER

8.1 Information to be supplied upon request

Information on the properties listed below shall be supplied to the user upon request:

- Characteristics of the test cement.
- Percentages of coal and percentage(s) of ash from co-combustion material(s)*
- This ETA and declarations of conformity to any standards or regulations valid in the place of use, and the results of suitability tests *
- A typical chemical oxide composition of the fly ash comprising the contents of silicon dioxide (SiO_2), aluminium oxide (Al_2O_3), iron oxide (Fe_2O_3), determined in accordance with EN 196-2 (1994).
- The total content of alkalis determined in accordance with EN 196-21 and calculated as Na_2O (equivalent).
- The declared fineness value (category N only).
- The declared value of particle density.
- The water content for standard consistence of a co-combustion fly ash/test cement paste, as determined by EN 196-3 in connection with determining the initial setting time.

* these data are available at the notified body

8.2 Packaging and labelling

Fly ash may be delivered in suitable bulk-delivery transportation systems or in suitable packages.

Packages and documents related to bulk deliveries shall be marked with name or identification mark of the production plant where the fly ash was manufactured.

NOTE For CE marking and labelling see clause 6. of this ETA.

8.3 Sampling

Spot samples, equally distributed over the production period, shall be taken at the point of release into a bulk-delivery transportation system or into packages, or, alternatively, directly from bulk-delivery transportation systems or packages, using the equipment and principles described in EN 196-7.

For the purpose of carrying out all the analyses and tests needed to show conformity or non-conformity to the requirements**,** a representative laboratory sample of dry fly ash of at least 0,5 kg is required. This sample shall be obtained by subdividing, such as quartering, a spot sample of at least 2 kg. The laboratory sample shall be dried in a well-ventilated oven at (105 $\pm$ 5) °C to constant weight and then cooled in a dry atmosphere.

On behalf of

BMC Certificatie, Gouda, The Netherlands

April 30, 2009

dr.ir. H.A.W. Cornelissen
managing director

Annex A

Standards and guidelines referred to in the European Technical approval

CUAP (Common Understanding of Assessment Procedure), final version June 2005, Fly Ash for concrete. Approval Application No 03.01/34

EN 450-1: Fly ash for concrete— Part 1:Definition, specifications and conformity

Amendment A1 to EN 450-1 (2007)

EN 450-2: Fly ash for concrete — Part 2: Conformity evaluation

EN 196-1: 1994, Methods of testing cement — Determination of strength.

EN 196-2: 1994, Methods of testing cement — Chemical analysis of cement.

EN 196-3, Methods of testing cement — Determination of setting time and soundness.

EN 196-6, Methods of testing cement — Determination of fineness.

EN 196-7, Methods of testing cement — Methods of taking and preparing samples of cement.

EN 197-1: 2000, Cement — Part 1: Composition, specification and conformity criteria for common cements.

EN 206-1: 2002, Concrete — Part 1: Specification, production, performance and conformity.

EN 451-1, Methods of testing fly ash — Part 1: Determination of free calcium oxide content.

EN 451-2, Methods of testing fly ash — Part 2: Determination of fineness by wet sieving.

ISO 10694, Soil Quality — Determination of organic and total carbon after dry combustion.

EN 1015-3:1999, Methods of test for mortar for masonry — Part 3: Determination of consistence of fresh mortar (by flow table)

ISO 11885:1998, Water quality: — Determination of 33 elements by inductively coupled plasma emission spectroscopy

CEN CR 1901:1995 — Regional specifications and recommendations for the avoidance of damaging alkali-silica reactions in concrete

CUR Recommendation 94: June 2004, — Use of fly ash in mortar and concrete (in Dutch), Stichting CUR, PO Box 420 2800 AK Gouda, The Netherlands

KEMA Report: 2003, — Effects of co-combustion on the technical and environmental quality of pulverized coal fly ash as pozzolanic filler in concrete. Report 50231102/KPS/MEC 03-6190. KEMA, PO Box 9035 6800 ET Arnhem, The Netherlands

Note: For undated references the latest edition of the publication referred to, applies (including amendments).