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English Version

**Backgrounds to the revision of EN 450-1:2005+A1:2007 - Fly
ash for concrete**

Contexte de la révision de l'EN 450-1:2005+A1:2007 -
Cendres volantes pour béton

Hintergründe zur Überarbeitung der EN 450-
1:2005+A1:2007 - Flugasche für Beton

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Foreword

This document (CEN/TR 16443:2013) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

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Introduction

Following five years of experience using EN 450-1, it was clear that some clauses need improvement within the standards. In the existing standards the maximum amount of fly ash from co-combustion was limited to certain proportions. Experience gained with fly ashes conforming to a European Technical Approval (ETA), where higher co-combustion amounts were permitted, showed that the requirements in the corresponding Common Understanding of Assessment Procedure (CUAP) were sufficient guarantee for fly ashes to produce excellent performance in concretes, mortars, grouts and cements. As agreed in CEN/TC 104, the experience gained with ETA fly ashes should be incorporated in the revision of EN 450-1.

In this background report it is proved that wider ranging limits and types of co-combustion materials can be safely applied in the revised EN 450-1. It is also shown that in practice some requirements in EN 450-1 have been proven to be unrealistic. Improvements have been proposed for the definition of fly ash, the loss on ignition, free calcium oxide, reactive silicon dioxide and the limits for phosphate.

The conformity procedures have also been evaluated, especially the assessment procedure for inspection by variables. Based on this evaluation work, modifications are needed for the LOI¹⁾ classes B and C.

The revised version of the standard incorporates the European Technical Approvals (ETA) and EU members experience gained with fly ash in concrete. The requirements of the revised standard will result in fly ashes which will perform similarly to those conforming to EN 450-1:2005.

1) LOI – Loss on ignition.

1 Scope

This Technical Report describes the backgrounds to the revision on EN 450-1:2005+A1:2007, *Fly ash for concrete — Part 1: Definition, specifications and conformity criteria*.

2 List of relevant references

The following references are covered by the present document:

- EN 450-1:2005+A1:2007, *Fly ash for concrete — Part 1: Definition, specifications and conformity criteria*;
- EN 450-1:2012 (revised EN 450-1²⁾), *Fly ash for concrete — Part 1: Definition, specifications and conformity criteria*;
- EN 450-2:2005, *Fly ash for concrete — Part 2: Conformity evaluation*;
- EN 196-2, *Methods of testing cement — Part 2: Chemical analysis of cement*;
- EN 197-1:2000, *Cement — Part 1: Composition, specifications and conformity criteria for common cements*;
- EN 14588:2010, *Solid biofuels — Terminology, definitions and descriptions*.

3 General

3.1 General and objective

Fly ash has been used for many decades in concrete as an addition for its positive influence on workability, heat of hydration, strength development and durability. After the encouraging pilot projects some decades ago with positive results, licenses for regular use and later on technical approvals were granted by the national building authorities, certificates and standards. Today, regulations and standards exist for the use of fly ash in mortar and concrete.

In 1995, the first EU standard was published, namely EN 450, *Fly ash for concrete — Definitions, requirements and quality control*. This edition was followed up by a harmonised standard based on Mandate M 128 in 2005 (EN 450-1:2005), together with a second standard (EN 450-2:2005), specific for conformity evaluation.

The scope of EN 450-1:2005 states that fly ashes with percentages of co-combustion material higher than those covered in EN 450-1:2005, Clause 4 or with other types of co-combustion material are outside the scope of EN 450-1:2005.

In some countries, the use of fly ash with a higher percentage of co-combustion material was already common practice and it was not accepted by these countries that these fly ashes, containing higher amounts of co-combustion and other co-combustion materials, were excluded from CE marking.

It was agreed that European Technical Approvals (ETAs) could be granted for this product according to Article 8.2 of the Construction Products Directive. The mandate M 128 was updated with the clarification that fly ash produced with other types than those covered by EN 450-1 and fly ash produced with a percentage of co-combustion material outside the limits defined in EN 450 (all parts), can be subject to ETAs, in order to allow these products to be CE marked. The experience gained with the fly ashes conforming to these ETAs has been used for the next revision of EN 450-1.

Due to the regular five-year revision, WG 4 of CEN TC 104 incorporated the knowledge gained with the fly ashes conforming to these ETAs with EN 450-1. Other issues for the revision were identified as a lack of clarity regarding the conformity evaluation and some of the other requirements.

2) In this present Technical Report a reference to the revised EN 450-1 always refers to EN 450-1:2012.