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Standards

Irish Standard  
I.S. EN 450-1:2012

# Fly ash for concrete - Part 1: Definition, specifications and conformity criteria

## I.S. EN 450-1:2012

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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English Version

**Fly ash for concrete - Part 1: Definition, specifications and  
conformity criteria**

Cendres volantes pour béton - Partie 1: Définition,  
spécifications et critères de conformité

Flugasche für Beton - Teil 1: Definition, Anforderungen und  
Konformitätskriterien

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## Contents

	Page
Foreword.....	3
Introduction .....	4
1 Scope .....	5
2 Normative references .....	5
3 Terms and definitions .....	6
4 Specific provisions for fly ash from co-combustion.....	7
4.1 Co-combustion materials.....	7
4.2 Establishment of suitability of fly ash from co-combustion .....	8
5 Specifications.....	8
5.1 General.....	8
5.2 Chemical requirements .....	8
5.3 Physical requirements .....	10
5.4 Other requirements.....	11
5.5 Information to be supplied upon request.....	12
6 Packaging and labelling.....	12
7 Sampling.....	12
8 Conformity criteria.....	12
8.1 General requirements.....	12
8.2 Statistical conformity criteria .....	14
8.3 Single result conformity criteria.....	17
Annex A (normative) Release of dangerous substances and emission of radioactivity.....	18
Annex B (normative) Determination of the water requirement for Category S fly ash .....	19
Annex C (normative) Determination method on the content of soluble phosphate (expressed as P <sub>2</sub> O <sub>5</sub> ).....	21
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Product Directive.....	23
Bibliography .....	30

## **Foreword**

This document (EN 450-1:2012) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2013, and conflicting national standards shall be withdrawn at the latest by February 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 450-1:2005+A1:2007.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 89/106/EEC.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This document is supported by standards of the series EN 451 for test methods for the determination of free calcium oxide content and of the fineness by sieving.

The main changes with respect to the previous edition are listed below:

- extension of the permissible content of solid co-combustion materials;
- extension of the permissible content of liquid and gaseous co-combustion materials;
- fixed limits for loss on ignition;
- incorporation of the specifications from EN 450-1+A1:2007;
- general editorial revision.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## **Introduction**

The use of coal for electricity production results in the generation of large quantities of fly ash.

Different types of coal and the type of boiler used in this process produce different fly ashes, such as siliceous, silico-calcareous, or calcareous fly ashes with pozzolanic and/or latent hydraulic properties. All these types of fly ash are used in concrete production in some European countries, based on national experience and tradition.

Before use, fly ash may be subject to processing, for example by classification, selection, sieving, drying, blending, grinding or carbon reduction, to optimize its fineness, reduce its water demand or to improve other properties. Such processed fly ashes may conform to this document to which reference is made in such case. If they are out of the scope of this document, their suitability for use as Type II additions in concrete according to EN 206-1 may also be established from national standards or provisions or European Technical Approvals valid in the place of use of the concrete and which refer specifically to the use of the addition in concrete conforming to EN 206-1.

When using fly ashes conforming to this document, it should be noted that, apart from the effect from the pozzolanicity of the fly ash, certain properties of fresh and hardened concrete may be affected. Where relevant, such effects need to be considered in concrete mix design (see EN 206-1).

## 1 Scope

This European Standard specifies requirements for the chemical and physical properties as well as quality control procedures for siliceous fly ash, as defined in 3.2, for use as a type II addition for production of concrete conforming to EN 206-1. Fly ash according to this document may also be used in mortars and grouts.

Fly ash produced with other types or higher percentages of co-combustion materials than those provided for in Clause 4 is outside the scope of this European Standard.

It is beyond the scope of this European Standard 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. Regarding such provisions, reference should be made to other European or national standards for concrete, such as EN 206-1.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 196-1:2005, *Methods of testing cement — Part 1: Determination of strength*

EN 196-2:2005 *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 196-7, *Methods of testing cement — Part 7: Methods of taking and preparing samples of cement*

EN 197-1:2011, *Cement — Part 1: Composition, specification and conformity criteria for common cements*

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

EN 450-2:2005, *Fly ash for concrete — Part 2: Conformity evaluation*

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

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

EN 933-10, *Tests for geometrical properties of aggregates — Part 10: Assessment of fines — Grading of filler aggregates (air jet sieving)*

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

EN 1097-7, *Tests for mechanical and physical properties of aggregates — Part 7: Determination of the particle density of filler — Pyknometer method*

EN ISO 11885, *Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICPOES) (ISO 11885)*

EN 14588:2010, *Solid biofuels — Terminology, definitions and descriptions*

ISO 10694, *Soil quality — Determination of organic and total carbon after dry combustion (elementary analysis)*

ISO 29581-2, *Cement — Test methods — Part 2: Chemical analysis by X-ray fluorescence*

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