
Preskusi kemičnih lastnosti agregatov - 7. del: Ugotavljanje žarilne izgube agregata iz pepela iz sežigalnic komunalnih odpadkov

Tests for chemical properties of aggregates - Part 7: Determination of loss of ignition of Municipal Incinerator Bottom Ash Aggregate (MIBA Aggregate)

Prüfverfahren für chemische Eigenschaften von Gesteinskörnungen - Teil 7: Bestimmung des Glühverlustes von Hausmüllverbrennungssasche (HMMV-Asche)

Essais pour déterminer les caractéristiques chimiques des granulats - Partie 7: Détermination de la perte au feu des mâchefers d'incinération d'ordures ménagères (MIOM)

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Ash Aggregate (MIBA Aggregate)

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Gesteinskörnungen - Teil 7: Bestimmung des Glühverlustes
von Hausmüllverbrennungssasche (HMV-Asche)

This European Standard was approved by CEN on 7 January 2012.

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Foreword

This document (EN 1744-7:2012) has been prepared by Technical Committee CEN/TC 154 "Aggregates", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by August 2012, and conflicting national standards shall be withdrawn at the latest by August 2012.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European Standard forms part of a series of tests for chemical properties of aggregates. Test methods for other properties of aggregates will be covered by the following European Standards:

- EN 932 (all parts), *Tests for general properties of aggregates*;
- EN 933 (all parts), *Tests for geometrical properties of aggregates*;
- EN 1097 (all parts), *Tests for (mechanical and physical) properties of aggregates*;
- EN 1367 (all parts), *Tests for thermal and weathering properties of aggregates*.

The other parts of EN 1744, *Tests for chemical properties of aggregates*, are:

- *Part 1: Chemical analysis*;
- *Part 3: Preparation of eluates by leaching of aggregates*;
- *Part 4: Determination of water susceptibility of fillers for bituminous mixtures*;
- *Part 5: Determination of acid soluble chloride salts*;
- *Part 6: Determination of the influence of recycled aggregate extract on the initial setting time of cement*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, 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.

EN 1744-7:2012 (E)**1 Scope**

This European Standard specifies the test method used for the determination of the loss on ignition (LOI) of aggregates (MIBA Aggregates) produced by processing Municipal Incinerator Bottom Ash (MIBA).

This European Standard describes the reference method for LOI of MIBA Aggregates For the purpose of type testing and in case of dispute only the reference method should be used. For other purposes, in particular factory production control, other methods may be used provided that an appropriate working relationship with the reference method has been established.

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 932-1, *Tests for general properties of aggregates – Part 1: Methods for sampling*

EN 932-2, *Tests for general properties of aggregates – Part 2: Methods for reducing laboratory samples*

EN 932-5, *Tests for general properties of aggregates – Part 5: Common equipment and calibration*

3 Terms and definitions

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For the purposes of this document, the following terms and definitions apply.

3.1 test specimen

sample used in a single determination when a test method requires more than one determination of a property

3.2 laboratory sample

sample intended for laboratory testing

3.3 constant mass

mass determined by successive weighings performed at least 1 h apart not differing by more than 0,1%

NOTE 1 to entry In many cases constant mass can be achieved after a test portion has been dried for a pre-determined period in a specified oven at (110 ± 5) °C. Test laboratories can determine the time required to achieve constant mass for specific types and sizes of sample dependent upon the drying capacity of the oven used.

3.4 MIBA Aggregate

aggregate produced by processing Municipal Incinerator Bottom Ash

4 Principle

The proportion of unburned residues in MIBA aggregate is determined by measuring the loss on ignition in an oxidizing atmosphere.

The loss on ignition is expressed as the percentage of the dry mass of the initial sample after heating for 4 h at (480 ± 25) °C.

NOTE Because of hydration by weathering, the LOI value of MIBA Aggregates may change during storage.

5 Apparatus

Unless otherwise stated, all apparatus shall conform to the general requirements of EN 932-5.

5.1 Well ventilated drying oven, capable of being controlled to maintain a constant temperature of (110 ± 5) °C, equipped with a heat resistant tray made of non-corrodible material.

5.2 Electric muffle furnace capable of being controlled to maintain a constant temperature in the range (480 ± 25) °C.

5.3 Container and cover grid with 2 mm size apertures, suitable for use at a temperature of up to 550 °C.

NOTE Porcelain, quartz glass or platinum are appropriate materials for containers.

5.4 Crushing and grinding equipment to reduce aggregates to sizes that pass a 4 mm size test sieve while producing a minimum of fines.

5.5 Balance, capable of weighing up to 10 kg, readable to the nearest 1 g.

5.6 Balance, capable of weighing up to 300 g, readable to the nearest 0,01 g.

5.7 Test sieve, 4 mm size.

5.8 Desiccator with desiccant.

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6 Sampling and preparation of test specimens

6.1 Laboratory sample

The laboratory sample shall be taken in accordance with the procedures specified in EN 932-1. The mass of the laboratory sample shall be not less than the mass specified in **Table 1** appropriate to the upper (*D*) sieve size of the aggregate.

Dry the sample to constant mass, at a temperature of (110 ± 5) °C.

NOTE Drying at a higher temperature will oxidise any sulfides.

Table 1 — Minimum mass of laboratory sample

Upper (<i>D</i>) sieve size of the aggregate, mm	Minimum mass of laboratory sample, kg
63	50
45	35
31,5	15
22,4 or less	5

Record the laboratory sample mass.

EN 1744-7:2012 (E)**6.2 Test specimens**

Stepwise mix, crush and reduce the laboratory sample using the procedures specified in EN 932-2 to produce a sub-sample of approximately 400 g of aggregate that passes the 4 mm size test sieve.

Reduce this sub-sample further to produce two test specimens, each with a mass between 50 g and 100 g. Retain the rest of the sub-sample (8.2).

7 Procedure

Pre-ignite the container in the muffle furnace at (480 ± 25) °C. Allow the container to cool in the desiccator and weigh (M_c) it

Place the first test specimen in the container. The thickness of the layer of particles shall be less than 15 mm. Weigh the test specimen in the container and record the mass, M_0 , to the nearest 0,01 g

Cover the container with the cover grid.

NOTE The grid prevents the loss of any fragments from particles that may break down during heating.

Place the container in the muffle furnace controlled at (480 ± 25) °C. Leave the container in the furnace for at least 240 min.

Remove the container from the furnace and place it in the desiccator. Allow it to cool to room temperature.

Weigh the ignited test specimen in the container, M_1 , to the nearest 0,01 g.

Repeat for the second test specimen.

8 Calculation and expression of results**8.1 Calculation**

For each test specimen, calculate the loss on ignition using the following formula:

$$X = \frac{M_0 - M_1}{M_0 - M_c} \times 100 \quad (1)$$

Where

X is the loss on ignition of the test specimen, (in %);

M_0 is the weight of the test specimen with the container;

M_1 is the weight of the ignited test specimen with the container;

M_c is the weight of the pre-ignited container.

Record each result as X_1 and X_2 , to the nearest 0,01%.

Calculate the mean value of the two results using the following formula:

$$X_M = \frac{X_1 + X_2}{2} \quad (2)$$