BS EN 1744-7:2012

BSI Standards Publication

Tests for chemical properties of aggregates

Part 7: Determination of loss of ignition of Municipal Incinerator Bottom Ash Aggregate (MIBA Aggregate)

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 1744-7:2012.

The UK participation in its preparation was entrusted to Technical Committee B/502/6, Test methods.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 71034 6

ICS 91.100.15

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2012.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1744-7

February 2012

ICS 91.100.15

English Version

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

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

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

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

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of an identical text or by endorsement, at the latest by August 2012, and conflicting national standards shall be withdrawn at the latest by August 2012.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

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

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.

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) ºC.

NOTE Drying at a higher temperature will oxidise any sulfides.

Table 1 — Minimum mass of laboratory sample

Upper (*D*) 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.

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:

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

Where

X_M is the mean loss on ignition, (in %).

Record the result as X_M, to the nearest 0,1 %.

8.2 Precision check

Check the range of the individual values for loss on ignition using the following criteria:

If X_M ≤ 3,0 %, the difference between X_1 and X_2 shall be ≤ 0,6 %

If X_M > 3,0 %, the difference between X_1 and X_2 shall be ≤ 1,0 %

If the precision check criteria are not complied with, repeat the test procedure using two more test portions taken from the crushed and sieved sub-sample (**6.2**).

Record each result as X_3 and X_4, to the nearest 0,01 %.

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

$$X_M \frac{X_1 + X_2 + X_3 + X_4}{4} \quad (3)$$

Where

X_M is the mean loss on ignition, (in %).

Record the result as X_M, to the nearest 0,1 %.

9 Test report

The test report shall confirm that the loss on ignition test was carried out in accordance with this European Standard and include the following information:

a) source of sample;

b) designation of the sample;

c) aggregate size of the sample;

d) mass of the laboratory sample;

e) individual values of loss on ignition;

f) mean value of loss on ignition;

g) date of test;

h) reference to this test standards (EN 1744-7);

i) identification of the testing laboratory.

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™