International Standard

ISO 19743

Solid biofuels — Determination of content of heavy extraneous materials larger than 3,15 mm

Biocombustibles solides — Détermination de la teneur en matériaux lourds exogènes de dimension supérieure à 3,15 mm

Second edition
2026-01

Reference number
ISO 19743:2026(en)

© ISO 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **2**
5 Apparatus **2**
5.1 Water container 2
5.2 Balances 2
5.3 Sieve 2
5.4 Drying oven 2
5.5 Dishes or trays 2
6 Sample preparation **2**
7 Procedure **3**
8 Calculation **4**
9 Performance characteristics **4**
10 Test report **4**
Bibliography **5**

© ISO 2026 – All rights reserved

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 238, *Solid biofuels and pyrogenic biocarbon,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 335, *Solid Biofuels and Pyrogenic Biocarbon,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 19743:2017), which has been technically revised.

The main changes are as follows:

— introduction has been extended with a specification of where heavy extraneous materials can enter the fuel. It has also been elucidated that HEM most often are found in wood hogfuel;

— procedure has been updated and clarified;

— calculation has been updated.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© ISO 2026 – All rights reserved

Introduction

Determination of the content of heavy extraneous materials (HEM) larger than 3,15 mm is important when evaluating the suitability of using biomass as biofuel. The presences of heavy extraneous materials lowers the energetic value of the fuel and increases the residue after burning, thus increasing the costs of disposal.

Stones and other impurities contained in biomass from stumps, roots, mill residue and harvest and landscape management residues can cause problems during size reduction, as well as during combustion.

Impurities smaller than 3,15 mm are not considered as part of this testing method but can still contribute to the ash content.

The contents of heavy extraneous materials larger than 3,15 mm are not part of the ash content.

NOTE There are three main sources of heavy extraneous materials:

— they can be contained in the base material from which the biofuel (e.g. hog fuel) is produced;

— they can unintentionally be added to the fuel while loading from the ground, by digging too low;

— they can be residues from former loads in the transport vehicle.

The last two categories of heavy extraneous materials mentioned in the NOTE cannot be determined by the method described in this document, because it is unlikely that the incidental impurities can be found in the random sample on which this method is based. If such incidental impurities are found during visual inspection of the delivered fuel, then this can be documented by pictures and contact can be sought with the supplier to make sure that these incidents are avoided in the future.

© ISO 2026 – All rights reserved

Solid biofuels — Determination of content of heavy extraneous materials larger than 3,15 mm

1 Scope

This document specifies a method for the determination of the content of heavy extraneous materials (HEM) larger than 3,15 mm by the use of sink-and-float separation combined with elutriation. This document is applicable to woody biomass in accordance with ISO 17225-1, and especially for hogfuel in accordance with ISO 17225-9.

NOTE 1 This method is designed to determine the level of impurities larger than 3,15 mm with a specific density >1 g/cm^3, such as stones, glass, rubber, metal and certain types of plastics.

NOTE 2 During the processing of the sample, hand sorting of light impurities with a specific density ≤1 g/cm^3 (e.g. plastic foil) can also be done.

NOTE 3 Some heavy extraneous materials (e.g. lumps of clay) can fall apart when submerged in water.

NOTE 4 Heavy extraneous materials smaller than 3,15 mm can damage milling equipment, when reducing the material in size to produce laboratory samples.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3310-2, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate*

ISO 14780, *Solid biofuels — Sample preparation*

ISO 16559, *Solid biofuels — Vocabulary*

ISO 18134-1, *Solid biofuels — Determination of moisture content — Part 1: Reference method*

ISO 18134-2, *Solid biofuels — Determination of moisture content — Part 2: Simplified method*

ISO 18135, *Solid Biofuels — Sampling*

ISO 21945, *Solid biofuels — Simplified sampling method for small scale applications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16559 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
sedimentation
tendency for particles in suspension to settle out of the fluid in which they are entrained due to gravity and come to rest against a barrier

© ISO 2026 – All rights reserved

3.2
elutriation
process for separating particles based on their size, shape and density using a stream of liquid that is flowing opposite to the usual direction of *sedimentation* (3.1)

4 Principle

Heavy extraneous materials larger than 3,15 mm can be separated from the sample by using the sink-and-float separation, combined with elutriation in water if needed. The content of heavy extraneous materials is calculated by dividing the dry weight of the obtained material by the dry weight of the original sample and is thus expressed as a percentage on dry weight basis.

5 Apparatus

5.1 Water container

The water container shall have a volume of at least 30 l (0,03 m^3) but shall be small enough to allow tilting of the water-filled container. The container shall be smooth surfaced and waterproof. The height-to-diameter ratio shall be within 1,0 and 1,3. The container shall have a circular bottom to enable the free movement of the particles in the flow of water when stirred. The container shall be cylindrical or with conical sidewalls with a maximum inclination of 15° to facilitate the overflow of the biomass particles. The water container volume shall exceed the sample volume by minimum of 50 % to enable proper stirring of the sample.

NOTE Usually, off-the-shelf 30 l plastic buckets will be satisfactory.

5.2 Balances

5.2.1 Balance 1, capable of reading to the nearest 1 g.

5.2.2 Balance 2, capable of reading to the nearest 0,1 g.

5.3 Sieve

The sieve shall have a screen with 3,15 mm diameter round holes according to ISO 3310-2 and suitable for manual screening.

5.4 Drying oven

Drying oven, capable of being controlled at a temperature within the range of (105 ± 2) °C and moderate air exchange. The air velocity should be such that the sample particles are not dislodged from their tray.

5.5 Dishes or trays

Dishes or trays of non-corrodible and heat-resistant material. The surface of the trays shall be such that the possibility to adsorption/absorption is minimized (clean and even surface).

6 Sample preparation

The minimum test sample for the determination of the content of heavy extraneous materials shall be 20 l and shall be obtained in accordance with ISO 18135 or ISO 21945 and prepared in accordance with ISO 14780. The test sample shall be divided into four equal sub-portions.

One sub-portion shall be used for determination of the moisture content, M_{ar}, in accordance with ISO 18134-1 or ISO 18134-2, simultaneously to the determination of the content of heavy extraneous materials.

© ISO 2026 – All rights reserved