

**Characterization of sludges - Determination of
calorific value**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 15170:2008 sisaldab Euroopa standardi EN 15170:2008 ingliskeelset teksti.

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English Version

Characterization of sludges - Determination of calorific value

Caractérisation des boues - Détermination du pouvoir
calorifique

Charakterisierung von Schlämmen - Bestimmung des
Brenn- und Heizwertes

This European Standard was approved by CEN on 11 October 2008.

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Foreword

This document (EN 15170:2008) has been prepared by Technical Committee CEN/TC 308 "Characterization of sludges", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

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.

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Introduction

This method is a simple way to evaluate the amenability of sludge and sludge products to be treated by thermal processes. In this European Standard some thermo-chemical corrections are not considered. For detailed descriptions of analytical procedures and theoretical background see ISO 1928 or CEN/TS 14918.

The result obtained is the gross calorific value of the sample at constant volume with both the water of the combustion products and the moisture of the sludge as liquid water. The net calorific value can be obtained by calculation from the gross calorific value. For this either the hydrogen content of the sludge or the amount of water found in the combustion test has to be determined.

Sludges usually contain much water and (un-burnable) solids. Therefore their calorific value – especially on the “as received” basis – is quite low. For many purposes it may be sufficient to determine the gross calorific value only, and not the net calorific value for which additional determinations are necessary. The calculation of the net calorific value at constant volume is described here only, for calculation at constant pressure refer to either ISO 1928 or CEN/TS 14918.

1 Scope

This European Standard specifies a method for the determination of the gross calorific value of sludge at constant volume and at the reference temperature 25 °C in a bomb calorimeter calibrated by combustion of certified benzoic acid.

The result obtained is the gross calorific value of the sample at constant volume with both the water of the combustion products and the moisture of the sludge as liquid water. In practice, sludges are burned at constant (atmospheric) pressure and the water is not condensed but is removed as vapour with the flue gases. Under these conditions, the operative heat of combustion to be used is the net calorific value of the fuel at constant pressure. In this European Standard the net calorific value at constant volume is described as it requires less additional determinations.

This method is applicable to all kinds of sludges.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 12832:1999, *Characterization of sludges — Utilization and disposal of sludges — Vocabulary*

EN 12880, *Characterization of sludges — Determination of dry residue and water content*

EN ISO 16720, *Soil quality — Pretreatment of samples by freeze-drying for subsequent analysis (ISO 16720:2005)*

ISO 651, *Solid-stem calorimeter thermometers*

ISO 652, *Enclosed-scale calorimeter thermometers*

ISO 1770, *Solid-stem general purpose thermometers*

ISO 1771, *Enclosed-scale general purpose thermometers*

ISO/TS 12902, *Solid mineral fuels — Determination of total carbon, hydrogen and nitrogen — Instrumental methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12832:1999 and the following apply.

3.1

gross calorific value (at constant volume)

absolute value of the specific energy of combustion, in Joules, for unit mass of a solid sludge burned in oxygen in a calorimetric bomb under the conditions specified. The products of combustion are assumed to consist of gaseous oxygen, nitrogen, carbon dioxide and sulfur dioxide, of liquid water (in equilibrium with its vapour) saturated with carbon dioxide under the conditions of the bomb reaction, and of solid ash, all at the reference temperature

3.2

net calorific value (at constant volume)

absolute value of the specific energy of combustion, in Joules, for unit mass of a solid sludge burned in oxygen under conditions of constant volume and such that all the water of the reaction products remains as