International Standard

ISO 13610

Sludge recovery, recycling, treatment and disposal — Determination of calorific value of sludge

Valorisation, recyclage, traitement et élimination des boues — Détermination du pouvoir calorifique des boues

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Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Principle **2**
4.1 Gross calorific value 2
4.2 Net calorific value 2

5 Reagents **3**

6 Apparatus **3**
6.1 Overview 3
6.2 Calorimeter with thermostat 4
6.3 Crucible, of silica, nickel-chromium, platinum or similar non-reactive material 4
6.4 Ancillary pressure equipment 4
6.5 Timer 5
6.6 Balances 5
6.7 Pellet press 5

7 Procedure **5**
7.1 General 5
7.2 Sample preparation 5
7.3 Preparation of the bomb 6
7.4 Assembling the calorimeter 7
7.5 Combustion reaction and temperature measurements 7
7.6 Disassembling the calorimeter 7

8 Corrections **8**
8.1 Reference temperature 8
8.2 Corrected temperature rise θ 8
8.2.1 General 8
8.2.2 Isoperibol and static jacket calorimeters 8
8.2.3 Adiabatic calorimeters 10
8.2.4 Correction due to the combustion of the ignition wire 10

9 Calibration **10**

10 Gross calorific value **11**
10.1 General 11
10.2 Calculation of gross calorific value 11
10.3 Expression of results 12

11 Calculation of net calorific value **12**
11.1 General 12
11.2 Net calorific value at constant volume after hydrogen determination 12
11.3 Net calorific value at constant pressure 13
11.4 Expression of results 13

12 Precision **13**
12.1 General 13
12.2 Repeatability limit 13
12.3 Reproducibility limit 13

13 Test report **13**

Annex A (informative) **Example of a calorimeter** **14**

Annex B (informative) **Results of the interlaboratory comparison** **15**

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Bibliography **16**

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Foreword

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This document was prepared by the European Committee for Standardization as EN 15170:2008 and was adopted, without modification other than those given below, by Technical Committee ISO/TC 275, *Sludge recovery, recycling, treatment and disposal*.

— mercury-in-glass thermometers are replaced by resistance thermometers;

— subclause 7.7 was renumbered as Clause 8, and subsequent Clauses and subclauses were renumbered accordingly;

— the calculation of the net calorific value at constant volume after determination of water amount in the test (subclause 10.3 in EN 15170:2008) was removed;

— Annex B was removed, and Figure 1 was added in 8.2.2 instead;

— Annex C in EN 15170:2008 is Annex B in this document.

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.

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Introduction

The method specified in this document is a simple way to evaluate the amenability of sludge and sludge products to be treated by thermal processes. In this document, some thermo-chemical corrections are not considered. For detailed descriptions of analytical procedures and theoretical background see ISO 1928.

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 derived from the gross calorific value. For this the hydrogen content of the sludge is determined.

Sludge usually contains much water and (un-burnable) solids. Therefore, the calorific value – especially on the “as received” basis – is quite low. For many purposes it can 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 only is described here; for calculation at constant pressure refer to ISO 1928.

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Sludge recovery, recycling, treatment and disposal — Determination of calorific value of sludge

1 Scope

This document 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, sludge is 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. The net calorific value at constant volume can also be used, equations for the calculation are given only as this requires less additional determinations.

This method is applicable to all kinds of sludge.

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 11465, *Sludge and solid environmental matrices — Determination of dry residue or water content and calculation of the dry matter fraction on a mass basis*[1)]

ISO 16720, *Soil quality — Pretreatment of samples by freeze-drying for subsequent analysis*

ISO 29541, *Coal and coke — Determination of total carbon, hydrogen and nitrogen — Instrumental method*

3 Terms and definitions

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

Note 1 to entry: 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.

1) Under preparation. Stage at the time of publication: ISO/FDIS 11465.

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