

TAHKED MINERAALSED KÜTUSED

Ülemise kütteväärtuse määramine kalorimeetrilise pommi meetodil ja alumise kütteväärtuse arvutamine

Solid mineral fuels

Determination of gross calorific value by the bomb calorimetric method and calculation of net calorific value

(ISO 1928:2009, modifitseeritud)

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

<p>See Eesti standard EVS-ISO 1928:2016 „Tahked mineraalsed kütused. Ülemise kütteväärtuse määramine kalorimeetrilise pommi meetodil ja alumise kütteväärtuse arvutamine“ sisaldab rahvusvahelise standardi ISO 1928:2009 „Solid mineral fuels – Determination of gross calorific value by the bomb calorimetric method and calculation of net calorific value“ modifitseeritud ingliskeelset teksti.</p>	<p>This Estonian Standard EVS-ISO 1928:2016 consists of the modified English text of the International Standard ISO 1928:2009 „Solid mineral fuels – Determination of gross calorific value by the bomb calorimetric method and calculation of net calorific value“.</p>
<p>Ettepaneku rahvusvahelise standardi ümbertrüki meetodil ülevõtuks on esitanud EVS/TK 57, standardi avaldamist on korraldanud Eesti Standardikeskus.</p>	<p>Proposal to adopt the International Standard by reprint method has been presented by EVS/TK 57, the Estonian standard has been published by the Estonian Centre for Standardisation.</p>
<p>Standard EVS-ISO 1928:2016 on jõustunud sellekohase teate avaldamisega EVS Teataja 2016. aasta maikuu numbris.</p>	<p>Standard EVS-ISO 1928:2016 has been endorsed with a notification published in the May 2016 issue of the official bulletin of the Estonian Centre for Standardisation.</p>
<p>Standard on kättesaadav Eesti Standardikeskusest.</p>	<p>The standard is available from the Estonian Centre for Standardisation.</p>

Käsitlusala

See rahvusvaheline standard käsitleb meetodit mineraalsete kütuste ülemise põlemissoojuse määramiseks konstantse ruumala ja etalontemperatuuri 25 °C juures kalorimeetrilises pommis, mis on kalibreeritud sertifitseeritud bensoehappe põletamisega.

Saadud tulemus on analüüsitava proovi ülemine põlemissoojus konstantsel ruumalal koos kõigi põlemisproduktide veega vedela vee kujul. Praktikas on kütus põletatud konstantsel (atmosfääri) rõhul ja vesi ei kondenseeru, vaid eraldub auruna koos suitsugaasidega. Nendes tingimustes on tegelik põlemise soojus kütuse ülemine põlemissoojus konstantsel rõhul. Võib kasutada ka ülemist põlemissoojust konstantse ruumala juures, võrrandid on antud mõlema väärtuse arvutamise jaoks.

Üldised põhimõtted ja kalibreerimisprotseduurid ning kütuste testid on esitatud põhitekstis, samal ajal kui eri tüüpi kalorimeetrilise aparatuuri kasutamisse puutuv on kirjeldatud lisades A kuni C. Lisa D sisaldab loendeid kirjeldatud kalorimeetrite tüüpidel kalibreerimise ja kütuste testimise läbiviimiseks. Lisa E annab näiteid mõnede arvutuste illustreerimiseks.

MÄRKUS Märksõnad: tahked kütused, süsi, koks, [MOD] põlevkivi [MOD], testid, määramine, põlemissoojus, arvutusmeetodid, kalorimeetria.

Sellesse standardisse on sisse viidud täiendused, mis võimaldavad standardi alusel määrata põlevkivide (sh kukersiidi) kütteväärtust ja arvestada Eesti põlevkivi eripäradega, mis on vajalikud nii korrektseks põlevkivide kvaliteedi määramiseks kui ka põlevkivide kasutusvõimaluste hindamiseks. Täiendused, mille algus ja lõpp on tähistatud märgisega **[MOD]**, on sisse viidud järgmistesse jaotistesse:

- peatükk 1, märkus;
- peatükk 2;
- peatükk 7;
- jaotis 8.1;
- jaotis 10.2a;
- jaotis 10.4.2a;
- jaotis 12.2.1.1a;
- jaotis E.3.3a.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 75.160.10

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1928 was prepared by Technical Committee ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 5, *Methods of analysis*.

This third edition cancels and replaces the second edition (ISO 1928:1995), which has been technically revised.

Solid mineral fuels — Determination of gross calorific value by the bomb calorimetric method and calculation of net calorific value

WARNING — Strict adherence to all of the provisions prescribed in this International Standard should ensure against explosive rupture of the bomb, or a blow-out, provided that the bomb is of proper design and construction and in good mechanical condition.

1 Scope

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

The result obtained is the gross calorific value of the analysis sample at constant volume with all the water of the combustion products as liquid water. In practice, fuel 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 is the net calorific value of the fuel at constant pressure. The net calorific value at constant volume can also be used; equations are given for calculating both values.

General principles and procedures for the calibrations and the fuel tests are presented in the main text, whereas those pertaining to the use of a particular type of calorimetric instrument are described in Annexes A to C. Annex D contains checklists for performing calibration and fuel tests using specified types of calorimeters. Annex E gives examples illustrating some of the calculations.

NOTE Descriptors: solid fuels, coal, coke, [MOD] oil shale [MOD], tests, determination, calorific value, rules of calculation, calorimetry.

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.

ISO 651, *Solid-stem calorimeter thermometers*

ISO 652, *Enclosed-scale calorimeter thermometers*

ISO 687, *Solid mineral fuels — Coke — Determination of moisture in the general analysis test sample*

ISO 1770, *Solid-stem general purpose thermometers*

ISO 1771, *Enclosed-scale general purpose thermometers*

ISO 5068-2, *Brown coals and lignites — Determination of moisture content — Part 2: Indirect gravimetric method for moisture in the analysis sample*

ISO 11722, *Solid mineral fuels — Hard coal — Determination of moisture in the general analysis test sample by drying in nitrogen*

ISO 17247, *Coal — Ultimate analysis*

[MOD] EVS 664, *Solid fuels — Sulphur content — Determination of total sulphur and its bonding forms*

EVS 668, *Kukersite oil shale — Determination of moisture*