

Contents

	Foreword
1	Scope
2	Normative references
3	Terms, definitions and symbols
3.1	Terms and definitions
3.2	Symbols
4	Principle
4.1	Gross calorific value
4.2	Net calorific value
5	Reagents
6	Apparatus
7	Preparation of test sample
8	Calorimetric procedure
8.1	General
8.2	Preparing the combustion vessel for measurement
8.2.1	General procedure
8.2.2	Using a combustion aid
8.3	Assembling the calorimeter
8.4	Combustion reaction and temperature measurements
8.5	Analysis of products of combustion
8.6	Corrected temperature rise
8.6.1	Observed temperature rise, $t_f - t_i$
8.6.2	Isoperibol and static-jacket calorimeters
8.6.3	Adiabatic calorimeters
8.6.4	Thermometer corrections
8.7	Reference temperature
9	Calibration
9.1	Principle
9.2	Calibrant
9.2.1	Certification conditions
9.2.2	Calibration conditions
9.3	Valid working range of the effective heat capacity
9.4	Ancillary contributions
9.5	Calibration procedure
9.6	Calculation of effective heat capacity for the individual test
9.6.1	Constant mass-of-calorimeter-water basis
9.6.2	Constant total-calorimeter-mass basis
9.7	Precision of the mean value of the effective heat capacity
9.7.1	Constant value of ϵ
9.7.2	ϵ as a function of the observed temperature rise
9.8	Redetermination of the effective heat capacity
10	Gross calorific value
10.1	General
10.2	Coal combustions

10.3	Coke combustions
10.4	Calculation of gross calorific value
10.4.1	General
10.4.2	Constant mass-of-calorimeter-water basis
10.4.3	Constant total-calorimeter-mass basis
10.4.4	ϵ as a function of the observed temperature rise
10.5	Expression of results
10.6	Calculation to other bases
11	Precision
11.1	Repeatability limit
11.2	Reproducibility limit
12	Calculation of net calorific value
12.1	General
12.2	Calculations
12.2.1	Calculation of net calorific value at constant pressure
12.2.1.1	General
12.2.1.2	Example calculations
12.2.2	Calculation of net calorific value at constant volume
12.2.2.1	General
12.2.2.2	Example calculations
13	Test report
Annex A (informative) Adiabatic calorimeters	
A.1	Principle
A.2	Sources of error for the real calorimeter
A.3	Adiabatic conditions
A.3.1	Thermostat
A.3.2	Adiabatic control
A.4	Initial steady state and length of the main period
A.5	Correction for drift at the final calorimeter temperature
A.6	Strategy for checking on bias
Annex B (informative) Isoperibol and static-jacket calorimeters	
B.1	Principle
B.2	Sources of error for the real calorimeter
B.3	Choice of jacket temperature
B.4	Rating periods
B.4.1	Initial steady state and fore-period
B.4.2	After-period and length of the main period
B.5	Calculation of the corrected temperature rise, θ
B.5.1	General
B.5.2	Regnault-Pfaundler method
B.5.3	Dickinson extrapolation method
Annex C (informative) Automated calorimeters	
C.1	Calorimeter instrumentation
C.2	Calibration
C.3	Precision requirements for calibrations
C.4	Comparability of calibration and fuel tests
C.5	Documentation and print-out
C.6	Precision requirements for fuel tests
Annex D (informative) Checklists for the design of combustion tests and their procedures	
D.1	Overview
D.2	Choice of general parameters
D.2.1	Calibration conditions
D.2.2	Calculation of the combustion vessel condition value of benzoic acid
D.2.3	Certificate value of benzoic acid, expressed in joules per gram
D.2.4	Amount of calorimeter water
D.2.5	Additional parameters
D.3	Adiabatic calorimeters

- D.3.1 Determination of the corrected temperature rise, θ
- D.3.2 Evaluation of the effective heat capacity
- D.3.3 Gross calorific value at constant volume
- D.4 Isoperibol calorimeters
- D.4.1 Determination of the corrected temperature rise
- D.4.1.1 General
- D.4.1.2 Regnault-Pfaundler method
- D.4.1.3 Dickinson extrapolation method
- D.4.2 Evaluation of the effective heat capacity
- D.4.3 Gross calorific value at constant volume
- D.5 Automated combustion vessel calorimeters

Annex E (informative) Examples to illustrate some of the calculations used in this document

- E.1 Gross calorific value at constant volume
- E.1.1 Isoperibol calorimeters
- E.1.1.1 Parameters from a calibration test
- E.1.1.2 Calculation of the corrected temperature rise
- E.1.1.3 Calculation of the effective heat capacity
- E.1.1.4 Calculation of the gross calorific value
- E.1.1.5 Adiabatic calorimeters
- E.1.2 Constant total-calorimeter-mass basis
- E.2 Gross calorific value at constant pressure
- E.3 Net calorific value
- E.3.1 Net calorific value at constant volume
- E.3.2 Net calorific value at constant pressure
- E.3.3 Using an estimate for the hydrogen mass fraction

Annex F (informative) Safe use, maintenance and testing of calorimeter combustion vessels

- F.1 Overview
- F.2 Proving test (pressure test)
- F.2.1 Requirements
- F.2.2 General
- F.2.3 Measurement of body diameter
- F.2.4 Measurement of height of closure ring
- F.3 Gas leakage tests
- F.3.1 Requirements
- F.3.2 Test
- F.4 Safeguarding, periodic re-checking, overhaul, and re-test
- F.5 Method of measurement of slackness of fit of closure ring and body
- F.5.1 Requirements, fit of screw thread
- F.5.2 Preliminaries
- F.5.3 Procedure
- F.6 Materials and minimum dimensions
- F.6.1 Combustion vessel cap and body
- F.6.2 Closure ring
- F.6.3 Wall thickness
- F.7 Safe use of a calorimeter combustion vessel and its ancillary equipment
- F.7.1 Oxygen filling equipment
- F.7.2 Quantity of sample
- F.7.3 Ignition circuit

Page count: 62