SLOVENSKI STANDARD

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Specifikacije za prenosne električne naprave za merjenje parametrov vnetljivosti izpušnega plina grelnih naprav - 1. del: Splošne zahteve in preskusne metode

Specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances – Part 1: General requirements and test methods

ICS 13.040.40; 91.140.10

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English version

Specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances
Part 1: General requirements and test methods

Spécification pour les appareils électriques portatifs conçus pour mesurer les paramètres des gaz de combustion dans les conduits d'évacuation des appareils de chauffage
Partie 1: Prescriptions générales et méthodes d'essai

Anforderungen an tragbare elektrische Geräte zur Messung von Verbrennungsparametern von Heizungsanlagen
Teil 1: Allgemeine Anforderungen und Prüfverfahren

This European Standard was approved by CENELEC on 2004-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 216, Gas detectors.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50379-1 on 2004-03-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2005-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2007-03-01

Contents

Introduction

This European Standard covers apparatus for measuring gas concentrations and other combustion parameters, as used in the installation and maintenance of heating appliances. It forms a specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances, and includes the following parts:

Part 1: General requirements and test methods;

Part 2: Performance requirements for apparatus used in statutory inspections and assessments;

Part 3: Performance requirements for apparatus used in non-statutory servicing of gas fired heating appliances.

EN 50379-1 specifies general requirements for the construction, testing and performance of portable spot reading apparatus designed to give an assessment of specific combustion flue gas parameters, such as concentrations of gaseous compounds, temperature and/or pressure, to check the combustion performance of heating appliances for domestic residential and commercial applications, using commercially available fuels.

EN 50379-2 is for apparatus intended to be used for statutory measurement. In several European countries, legal requirements exist for the performance of heating appliances (see Annex A). Authorised inspectors use these apparatus to measure the flue gas parameters, in order to test compliance with national regulations. Due to the legal consequences resulting from the measurement, there are strict requirements regarding the measuring uncertainty of these apparatus, and EN 50379-2 therefore includes maximum values for measuring uncertainty. Tests with real flue gases form a key part of the verification of the performance of the apparatus for statutory measurement. Measuring uncertainty has to be justified by internationally accepted methods over the whole measuring range. The determination of measuring uncertainty is described in Annex C.

EN 50379-3 is for apparatus intended to be used for non-statutory applications. There are reduced performance requirements, because the apparatus are designed to decide whether maintenance for a gas fired appliance is required, and for adjusting the appliance during maintenance. There will be no determination of the measuring uncertainty for the apparatus.

1 Scope

This European Standard covers apparatus for measuring gas concentrations and other combustion parameters, as used in the installation and maintenance of heating appliances. Such apparatus may be used for testing the performance of appliances for different types of fuels, either by the installer, maintenance engineer or inspector.

The apparatus may consist of different functional modules, which may be tested separately for complying with this standard and will be combined in different ways according to the different applications. The apparatus shall comply with requirements as specified in EN 50379-2 and/or EN 50379-3.

This European Standard specifies general requirements for the construction, testing and performance of portable spot reading apparatus designed to give an assessment of specific combustion flue gas parameters, such as concentration of gaseous compounds, temperature and/or pressure, to check the combustion performance of heating appliances for domestic residential and commercial applications, using commercially available fuels.

This standard excludes apparatus for

– continuous emission, safety monitoring and control, and

– use in vessels with an international load line.

NOTE 1 When this apparatus is used in industrial premises national regulations may apply.

NOTE 2 Apparatus may contain functional modules which are not covered by this standard e.g. measurement of smoke spot number (see Annex A of EN 267).

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 267	Atomising oil burners of monobloc type - Testing
EN 297	Gas-fired central heating boilers - Type B11 and B11BS boilers fitted with atmospheric burners of nominal heat input not exceeding 70 kW
EN 676	Forced draught burners for gaseous fuels
EN 50270	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 50271	Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirements and tests for apparatus using software and/or digital technologies
EN 50379-2	Specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances - Part 2: Performance requirements for apparatus used in statutory inspections and assessment
EN 50379-3	Specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances - Part 3: Performance requirements for apparatus used in non-statutory servicing of gas fired

EN 60068-2-6		Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)
EN 60335-1	1994	Safety of household and similar electrical appliances - Part 1: General requirements
EN 60359		Electrical and electronic measurement equipment - Expression of performance
EN 60529	1991	Degrees of protection provided by enclosures (IP Code)
CR 1404	1994	Determination of emissions from appliances burning gaseous fuels during type testing
ISO Guide GUM		Guide to the expression of uncertainty in measurement

3 Definitions

For the purposes of this European Standard, basic definitions for statistical analyses are in line with those given in Subclause 2.1 of EN 60359. In addition, the following definitions apply.

3.1
domestic residential and commercial premises
any place of residence of a household, family or person (whether temporary or permanent) and commercial premises whether residential or not and including recreational boats, caravans and mobile homes

3.2
ambient air
normal atmosphere surrounding the apparatus

3.3
clean air
ambient air which is essentially free of flue gas and of interfering or contaminating substances

3.4
sensor
assembly in which the sensing element is housed and which may contain associated circuit components

3.5
sensing element
device, the output of which will change with variation of the parameter of interest

3.6
spot reading
apparatus intended to be used for short periods of time in the range of minutes, as required

3.7
volume ratio (V/V)
ratio of the volume of a component to the volume of the gas mixture under specified conditions of temperature, pressure and relative humidity

3.8
mains powered apparatus
apparatus designed to be powered by the domestic mains electrical supply with or without an additional power source

3.9
battery powered apparatus
apparatus designed to be energised from batteries alone, whether disposable or rechargeable

3.10
probe
part of the apparatus that is placed in the stack or flue of the heating appliance, for the purpose of sampling the gas and/or for measuring temperature or pressure

3.11
initial start up delay
time taken for the apparatus to reach the operating mode from switch-on, or after replacing batteries, or following power failure in the case of mains powered equipment

3.12
calibration
process of determining the deviation of an apparatus relative to a reference

3.13
reference
in laboratory tests, a reference gas will be a certified calibration gas cylinder. For real gas measurement, the reference is a measuring device with high accuracy (e.g. as specified in EN 267). For temperature and pressure measurement, the reference is a measuring device with certification proving traceability to a national or international metrology institute

3.14
adjustment
process of tuning the apparatus, in order to return the deviation found in calibration to within the admissible error

3.15
functional module
all components required for one measurement task, including both hardware and software. A functional module may consist of one or more separate pieces of equipment or may be completely integrated with the apparatus

3.16
response time (t_{90})
time interval with the apparatus in a warmed-up condition, between the time when an instantaneous variation of the parameter to be measured is produced at the apparatus inlet, and the time when the response reaches and remains beyond 90 % of the final indication

4 General requirements

4.1 General

The apparatus shall reliably measure specific combustion flue gas parameters and shall clearly display the result. If the apparatus is equipped with a sampling system (probe) the gas sample shall be drawn into the unit for analysis via the sampling system for all tests. All parts of the apparatus shall conform to the construction requirements of 4.2 and the performance requirements in EN 50379-2 and/or EN 50379-3.

4.2 Construction

4.2.1 General

All parts of the apparatus, including the sensor(s), shall be constructed of materials that will not be adversely affected by vapours and gases or chemical substances to be expected during normal operation of the apparatus, see 4.3.2 g). Similar consideration shall also be given to the sampling system and components that can be in contact with the gas, as appropriate. The probe shall be constructed of materials that will not be adversely affected by environmental conditions found in heating appliances within the scope of this standard.

4.2.2 Sampling system

The sampling system of the apparatus shall be so constructed as to prevent damage to the sensor(s) and pump by particulate matter and liquids that may be expected during normal operation of the apparatus. Means shall be provided to recognise and/or indicate the working mode of the pump by, for example

- pump noise,
- visual indication, or
- flow measurement.

Condensation or absorption effects have to be considered, and shall have no significant influence on the indicated values, particularly when determining SO_2 and NO. The probe shall be constructed in such a manner that droplets of condensation will not influence the result of temperature measurements even when the probe is held vertically. In addition the temperature sensing element shall not touch the probe outer sheath. If simultaneous recording of temperature and gaseous compounds is required, the probe shall be constructed such that the distance between the sensing element for temperature and the gas inlet, is less than 8 mm. If probes of different lengths are provided the shortest and the longest shall be tested with the instrument.

NOTE For apparatus intended to measure heating combustion efficiency (see Annex A) reference shall be made to national regulations where appropriate. Typically the following dimensions have been shown to be suitable:

- sampling probe immersion depth of at least 150 mm;
- probe external diameter between 6 mm and 13 mm (required for the measurement of heat loss only); and
- adjustable depth stop to be provided, to fix probe position and cover measuring aperture up to 21 mm diameter, to prevent air ingress.

The method of testing tightness of the complete gas sampling system, as specified by the manufacturer, shall be checked and verified for use in practice.

4.2.3 Adjustments

Access to sensitivity controls shall only be possible by the use of special tool or a software passcode or by destroying a special seal. Any regular checks shall be performed automatically or by access as described above.

4.2.4 Power supply

Apparatus which derives its power from internal batteries may give a visual warning before the battery capacity falls to a point where either the apparatus sensitivity or the stated display accuracy falls outside the requirements. When this point is actually reached, a clear indication shall be given to alert the user and the display shall switch out of normal operational mode.