

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

FINAL DRAFT
prEN 50379-3

September 2003

ICS 13.040.40; 91.140.10

English version

**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 heating appliances**

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 3: Prescriptions des
caractéristiques des appareils utilisés
dans le service après-vente hors champ
réglementaire des appareils de chauffage
à gaz

Anforderungen an tragbare elektrische
Geräte zur Messung von
Verbrennungsparametern von
Heizungsanlagen
Teil 3: Anforderungen an das
Betriebsverhalten von Geräten für den
Einsatz im nicht-geregelten Bereich bei
Wartungen von gasbefeuelten
Heizungsanlagen

This draft European Standard is submitted to CENELEC members for formal vote.
Deadline for CENELEC: 2003-12-12

It has been drawn up by Technical Committee CENELEC TC 216.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This draft European Standard was prepared by by the Technical Committee CENELEC TC 216, Gas detectors. It is submitted to the formal vote.

The following dates are proposed:

- latest date by which the existence of the EN has to be announced at national level (doa) dor + 6 months
 - latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
 - latest date by which the national standards conflicting with the EN have to be withdrawn (dow) dor + 36 months
(to be confirmed or modified when voting)
-

Draft for voting

Contents

Introduction	5
1 Scope	5
2 Normative references	6
3 Definitions	6
4 General requirements	6
5 Test methods and performance requirements	6
5.1 General requirements for tests	6
5.1.1 Samples and sequence of tests	6
5.1.2 Preparation of samples	7
5.1.3 Test facility	7
5.2 Normal conditions for tests	7
5.3 Mechanical tests	7
5.3.1 Degree of protection	7
5.3.2 Impact strength	7
5.3.3 Vibration	7
5.3.4 Drop	7
5.3.5 Flow indicator (if fitted)	7
5.3.6 Dust filter and water trap	7
5.4 Electrical and software tests	7
5.4.1 EMC	7
5.4.2 Supply voltage variations (not applicable to battery powered apparatus)	7
5.4.3 Battery fault condition (applicable only to battery powered apparatus)	8
5.4.4 Battery reversal (applicable only to battery powered apparatus)	8
5.4.5 Software and digital techniques	8
5.5 Tests with test gases	8
5.5.1 General	8
5.5.2 Unpowered storage	8
5.5.3 Initial performance	8
5.5.4 Response time	8
5.5.5 Cold start	8
5.5.6 Zero reading	8
5.6 Tests with real flue gases	8
5.6.1 General	8
5.6.2 Measurement uncertainty	8
5.6.3 Low temperature (applicable only to apparatus designed for outdoor use)	8
5.6.4 Stability under practical conditions	8
5.6.5 Test of filter capacity	9
5.6.6 Final test with cylinder gases	9
5.6.7 Sensor replacement (where applicable)	9
5.7 Calculated values	9
5.7.1 General	9
5.7.2 Calculation of CO ₂ gas volume ratio from O ₂ measurement	9
5.7.3 CO/CO ₂ ratio	9

5.8	Temperature	9
5.8.1	Temperature measurement (flue gas).....	9
5.8.2	Flue gas temperature response time	9
5.8.3	Temperature measurement (inlet air)	9
5.8.4	Inlet air temperature response time.....	9
5.8.5	Cold start	9
5.8.6	Thermocouple compensation.....	9
5.8.7	High temperature	9
5.9	Pressure	10
5.9.1	Pressure measurement (draught)	10
5.9.2	Pressure measurement (differential)	10

Draft for VOTE

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 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.

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. Authorised inspectors use these apparatus to measure the flue gas parameters, in order to test the compliance with national regulations. Due to the legal consequences resulting from the measurement there are strict requirements regarding the measuring uncertainty of these apparatus. Therefore EN 50379-2 includes maximum values for measuring uncertainty of the apparatus. Tests with real flue gases form a key part of the verification of the performance of the apparatus for statutory measurement. The measuring uncertainty has to be justified by internationally accepted methods over the whole measuring range.

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 designed for checking the performance of heating appliances by measuring flue gas parameters of gas fired heating appliances for domestic residential and commercial applications.

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 the general requirements as specified in EN 50379-1 and the performance requirements of EN 50379-3.

This European Standard specifies the performance requirements of portable spot reading apparatus designed to detect specific combustion flue gas parameters, such as concentration of gaseous compounds, temperature and/or pressure, to be used to decide if maintenance for the appliance is required and for adjusting the appliance during maintenance.

This standard excludes apparatus for

- checking appliances using fuels other than gas,
- 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 shall be observed.

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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 50379-1	¹⁾	Specification for portable electrical apparatus designed to measure combustion flue gas parameters of heating appliances - Part 1: General requirements and test methods
EN 60335-1	1994	Safety of household and similar electrical appliances - Part 1: General requirements
EN 60359	2002	Electrical and electronic measurement equipment - Expression of performance
EN 60529	1991	Degrees of protection provided by enclosures (IP Code)

3 Definitions

For the purposes of this European Standard, the definitions of EN 50379-1 apply.

4 General requirements

Unless otherwise stated, the general requirements of EN 50379-1 are applicable, and shall be checked by visual inspection.

5 Test methods and performance requirements

5.1 General requirements for tests

The requirements specified in Subclause 5.1 of EN 50379-1 are applicable.

5.1.1 Samples and sequence of tests

For the purposes of type testing, one sample of the apparatus shall be subjected to the relevant tests given in 5.3 and 5.4, but a further sample may be used for the test in 5.3.4. A further sample, or the same if desired, may be used for the tests in 5.5 to 5.8.

The tests in 5.3 to 5.5 may be performed in any sequence, but 5.6 to 5.8 shall be performed in the sequence listed in this standard, where relevant.

¹⁾ At draft stage.

5.1.2 Preparation of samples

The requirements specified in Subclause 5.1.2 of EN 50379-1 are applicable.

5.1.3 Test facility

The requirements specified in Subclause 5.1.3 of EN 50379-1 are applicable.

5.2 Normal conditions for tests

The requirements specified in Subclause 5.2 of EN 50379-1 are applicable.

5.3 Mechanical tests

5.3.1 Degree of protection

The enclosure of the apparatus shall provide at least an IP40 degree of protection when all probes etc. are connected, in accordance with Clauses 12 and 14 of EN 60529. If an apparatus is designed for outdoor use it shall provide at least an IP42 degree of protection when connected similarly.

5.3.2 Impact strength

The apparatus shall meet the requirements specified in Clause 21 of EN 60335-1, as modified by Subclause 5.3.2 of EN 50379-1. The function of the apparatus shall not be affected after the test. Visible damage to parts of the housing are acceptable, providing the functionality remains unimpaired.

5.3.3 Vibration

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.3.4 Drop

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.3.5 Flow indicator (if fitted)

For apparatus fitted with an integral flow proving device, operation of the device shall be checked by inspection.

5.3.6 Dust filter and water trap

After measuring times of 1 h the dust filter shall still be usable, as specified in the manufacturer's instruction manual, and the maximum level of the condensate separator shall not be reached.

5.4 Electrical and software tests

5.4.1 EMC

The apparatus, including the probe and any interconnecting wiring and tubing, shall meet the requirements for electromagnetic compatibility in accordance with EN 50270 for Type 1 (domestic) and shall meet the requirements of EN 50270, Table 6, Subclause 6.10.

5.4.2 Supply voltage variations (not applicable to battery powered apparatus)

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.4.3 Battery fault condition (applicable only to battery powered apparatus)

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.4.4 Battery reversal (applicable only to battery powered apparatus)

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.4.5 Software and digital techniques

Software and digital techniques incorporated into the apparatus shall be in accordance with EN 50271, excluding the watchdog function.

5.5 Tests with test gases

5.5.1 General

The requirements specified in Subclause 5.5.1 of EN 50379-1 are applicable.

5.5.2 Unpowered storage

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.5.3 Initial performance

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.5.4 Response time

The apparatus shall meet the requirements for response time listed in Table 1 of EN 50379-1 for each relevant test gas.

5.5.5 Cold start

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1 for each relevant test gas.

5.5.6 Zero reading

The display reading for each gas (except CO₂ calculation from O₂ measurement) shall be below the detection limit listed in Table 1 of EN 50379-1.

5.6 Tests with real flue gases

5.6.1 General

The requirements specified in Subclause 5.6.1 of EN 50379-1 are applicable.

5.6.2 Measurement uncertainty

Not applicable.

5.6.3 Low temperature (applicable only to apparatus designed for outdoor use)

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1 for each gas the apparatus is intended to measure.

5.6.4 Stability under practical conditions

On completion, the apparatus shall comply with 5.6.5 and 5.6.6.

5.6.5 Test of filter capacity

The display indication(s) for CO shall be within the detection limit(s) listed in Table 1 of EN 50379-1.

5.6.6 Final test with cylinder gases

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.6.7 Sensor replacement (where applicable)

The apparatus shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.7 Calculated values

5.7.1 General

The requirements specified in Subclause 5.7.1 of EN 50379-1 are applicable.

5.7.2 Calculation of CO₂ gas volume ratio from O₂ measurement

If the apparatus is equipped with a calculation of CO₂ concentration from O₂ measurement, the calculation method shall be checked in accordance with EN 50271, and the apparatus shall display the maximum CO₂ value within the accuracies listed in Table 1 of EN 50379-1.

5.7.3 CO/CO₂ ratio

When provided with a facility for displaying the CO/CO₂ ratio, the calculation method shall be checked in accordance with EN 50271, and the results shall be within the accuracies listed in Table 1 of EN 50379-1.

5.8 Temperature

5.8.1 Temperature measurement (flue gas)

In each case, the displayed reading at the end of the exposure period shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.8.2 Flue gas temperature response time

Response time shall be as listed in Table 1 of EN 50379-1.

5.8.3 Temperature measurement (inlet air)

In each case, the displayed reading at the end of the exposure period shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.8.4 Inlet air temperature response time

Response time shall be as listed in Table 1 of EN 50379-1.

5.8.5 Cold start

The displayed reading at the end of the exposure period shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.8.6 Thermocouple compensation

The displayed reading shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.8.7 High temperature

Not applicable.

5.9 Pressure

5.9.1 Pressure measurement (draught)

In each case, the displayed reading at the end of the exposure period shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

5.9.2 Pressure measurement (differential)

In each case, the displayed reading at the end of the exposure period shall meet the requirements for accuracy listed in Table 1 of EN 50379-1.

Draft for Vote