SLOVENSKI STANDARD
SIST-TS CLC/TS 50612:2014

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Prenosni električni aparati za meritve parametrov zgorevalnih dimnih plinov - Uporaba pri izročanju v obratovanje, servisiranju in vzdrževanju plinskih kotlov

Portable electrical apparatus for the measurement of combustion flue gas parameters - Use in the process of commissioning, servicing and maintaining gas fired boilers

Tragbare elektrische Geräte zur Messung von Verbrennungsparametern - Einsatz für Inbetriebnahme, Wartung und Instandsetzung
von gasbefeuerten Heizungsanlagen

Appareils électriques portatifs pour la mesure des paramètres des gaz de combustion dans les conduits d'évacuation - Utilisation dans le processus de mise en service, entretien et maintenance des chaudières à gaz

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TECHNICAL SPECIFICATION

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Portable electrical apparatus for the measurement of combustion flue gas parameters - Guide to their use in the process of commissioning, servicing and maintaining gas fired central heating boilers

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CENELEC

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

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Contents

Page

Foreword

This document (CLC/TS 50612:2013) has been prepared by CLC/TC 216 "Gas detectors" together with CEN/TC 109 "Central heating boilers using gaseous fuels".

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

NOTE Commentary text is presented in *italic* type. It gives background information and does not constitute a normative element.

Introduction

This Technical Specification is intended as a guide for operatives who, in the course of their professional activities, are required to measure combustion parameters of gas-fired central heating boilers using combustion flue gas analysers during any or all of the commissioning, servicing and maintenance of such appliances.

It is intended to complement the following through a generic approach:

a) the appliance commissioning, servicing and maintenance instructions, and/or

b) national or local regulations or standards.

NOTE 1 A Technical Specification is announced and made available at national level, but conflicting national standards may continue to exist.

NOTE 2 Existing national or local regulations or standards conflicting with the guidance in this Technical Specification have precedence over this guidance.

It is not intended that a combustion gas analysis be used as a substitute for commissioning, servicing and/or maintenance carried out in accordance with the appliance instructions. It is to be regarded and used as a diagnostic tool to confirm satisfactory combustion to help in the process of carrying out these activities to ensure the safe and efficient operation of the boiler installation.

In the preparation of this Technical Specification, it has been assumed that the execution of its provisions will be entrusted to competent operatives, (see Clause 4) for whose use it has been produced.

1 Scope

This Technical Specification provides guidance on the selection, use and maintenance of portable electrical apparatus conforming to EN 50379-1 [4] and EN 50379-2 [5] or EN 50379-3 [6] designed to measure combustion flue gas parameters of Type B and Type C gas-fired central heating boilers (hereafter referred to as boilers) using 1st, 2nd or 3rd family gases in domestic premises as a diagnostic instrument to assist an operative:

a) in confirming satisfactory combustion at the time of commissioning, in accordance with appliance instructions or national or local regulations or standards;

b) in confirming satisfactory combustion at the time of servicing in accordance with national or local regulations or standards or following servicing in accordance with appliance instructions;

c) in confirming satisfactory combustion following maintenance, in accordance with appliance instructions or national or local regulations or standards.

NOTE 1 Type B and Type C classification of gas-fired appliances are described in CEN/TR 1749 [1].

NOTE 2 Existing national or local regulations or standards conflicting with the guidance in this Technical Specification have precedence over this guidance.

NOTE 3 It is not the intention of this Technical Specification to suggest that portable electrical combustion flue gas analysers are to be used as a substitute for normal service and maintenance carried out in accordance with the appliance instructions. Clause 9 describes how analysers can be used in conjunction with the appliance instructions.

NOTE 4 EN 50379-1 [4] specifies general requirements for the construction, testing and performance of portable spot reading apparatus designed to check the combustion performance of heating appliances in domestic premises, using commercially available fuels.

NOTE 5 EN 50379-2 [5] is for apparatus intended to be used for statutory measurements. In several European countries, legal requirements exist for the performance of heating appliances (see informative Annex A of EN 50379-1:2012 [4]). Legal consequences resulting from performance measurements makes for strict requirements for the apparatus used (see normative Annexes B and C of EN 50379-1:2012 [4]).

NOTE 6 EN 50379-3 [6] is for apparatus intended to be used for non-statutory applications, which allows for reduced performance requirements for the portable electrical apparatus.

NOTE 7 This Technical Specification deals with the determination of levels of combustion gases such as carbon monoxide (CO) and carbon dioxide (CO_2) in combustion products from boilers. Combustion products from boilers will contain nitrogen oxides (NO_X), predominantly nitrogen monoxide (nitric oxide, NO) and nitrogen dioxide (NO_2). This Technical Specification does not deal with the measurement of combustion products such as NO_X and aldehydes.

2 Normative references

Not applicable.

3 Terms and definitions

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

3.1 Type of equipment

3.1.1

portable electrical combustion flue gas analyser
apparatus that will detect and measure the concentrations of components in combustion gases and clearly display the result

Note 1 to entry: Clause 5 and Annex A provide information on suitable portable electrical combustion flue gas analysers.

3.1.2
boiler
unit placed on the market as a complete appliance designed to deliver safely and effectively the heating service claimed from burning gaseous fuel

3.2 Place of installation

3.2.1
domestic premises
any house or building, or part thereof, being the place of residence or home of a household, family or person

3.2.2
appliance compartment
enclosure specifically constructed or adapted to accommodate one or more gas-burning appliances

3.3 Type of person

3.3.1
customer
occupier of the domestic premises, the owner of the domestic premises and any person with authority for the time being to take appropriate action in relation to any gas appliance/fitting therein

3.3.2
operative
person who is **competent** (as described in 3.4.8 and Clause 4) in respect of **work** (3.4.1) associated with the inspection, commissioning, servicing or maintenance of a boiler and the use of a portable electrical combustion flue gas analyser

3.4 Action of the operative

3.4.1
work
installation, commissioning, maintenance, servicing, removal, permanent adjustment, repair, changing the position, alteration or renewal of a gas appliance or fitting or purging of air or gas

3.4.2
servicing
regular and planned (usually annual) activity carried out on an appliance to check and ensure that it is working safely and correctly

3.4.3
maintenance
unplanned work carried out on an appliance to repair any defect

3.4.4
safety check
examinations and tests to ensure that an appliance and any associated chimney operate safely

Note 1 to entry: Some countries have mandatory safety checks written into their national or local regulations.

3.4.5
full strip and clean
work involving, but not exclusively, the gaining of access to the heat exchanger and burner assemblies and the removal of any corrosion products (such as shale) or debris, which might impair the safe and efficient operation of the boiler

3.4.6
satisfactory combustion
appliance combustion measured values that meet the requirements detailed in the appliance instructions and/or national or local regulations or standards

3.4.7
action levels
boiler measured combustion values as detailed in the appliance instructions and/or national or local regulations or standards, at which corrective action should be taken

Note 1 to entry: See Clause 8.

3.4.8
competence
ability gained by appropriate training, knowledge and experience to supervise or carry out the work being undertaken in a safe and appropriate manner

Note 1 to entry: See Clause 4.

3.5 Condition of the boiler

3.5.1
shaling
progressive corrosion of the flueways of a cast iron heat exchanger, leading to the development of rust flakes

Note 1 to entry: Shaling can block the heat exchanger in time.

3.5.2
gas family
group of gaseous fuels with similar burning behaviour linked together by a range of Wobbe indices

Note 1 to entry: See Clause 8, f), and EN 437:2003+A1:2009, Table 1 [2].

3.5.3
gas quality
stated composition and energy content of the gas supplied, where the energy content is expressed as a range of Wobbe indices

Note 1 to entry: See Clause 8, f) and Commentary on Clause 8.

4 Competence

For the scope of this Technical Specification, competence shall include, as a minimum:

a) access to, and appropriate understanding of, the appliance instructions specific to the boiler being worked on;

b) knowledge of any relevant national or local regulations and standards pertaining to the work being undertaken;

c) knowledge regarding the selection (Clause 5), care, use and maintenance (Clause 6) of portable electrical combustion flue gas analysers;

d) knowledge of the properties of the fuel gas for the boiler, the resulting combustion process, the possible dangers resulting from the combustion process and the precautions to take;

e) knowledge of the electrical services associated with the installation and operation of the boiler being worked on, the dangers they can give rise to and the precautions to take.

***Commentary on Clause 4**: Competence requires sufficient knowledge, practical skill and experience to carry out the job in hand safely, with due regard to good working practice. The installation should be left in a safe condition for use. Knowledge should be kept up-to-date with changes in law, technology and safe working practice.*

Some countries require independently assessed and documented proof of competence in accordance with national or local regulations.

5 Selection of portable electrical combustion flue gas analyser

For the determination of CO and CO_2 in the combustion products from boilers, an analyser should conform to

a) EN 50379-2 [5] for statutory inspections and assessment of combustion performance,

b) EN 50379-2 [5] or EN 50379-3 [6] for non-statutory assessment of combustion performance during commissioning and following servicing and maintenance.

NOTE 1 To provide proof of compliance with EN 50379 series, EN 50379-1 requires that the analyser manufacturer provide a durable label on the apparatus, or moulded into the casing, carrying either the number of the European Standard or the third party certification.

The analyser should have as a minimum the following measuring capabilities:

— oxygen (O_2) and/or CO_2, and

— CO.

NOTE 2 To determine CO_2 levels, some analysers measure O_2 and calculate CO_2 (see Annex A).

Where appliance instructions require oxygen measurement for the excess air factor, the analyser should use an O_2 sensor. In this case, the analyser manufacturer should be consulted to establish that the O_2 sensor is either insensitive to CO_2 or compensated for CO_2.

***Commentary on Clause 5**: Appliance manufacturers can require the measurement of room temperature, flue gas temperature, air inlet temperature, heating water flow temperature and chimney draught when measuring combustion values in order to provide "benchmark" reference conditions for comparison purposes in the event of subsequent investigation.*

Consequently, the analyser should have the ability to

— *measure temperature,*

— *measure pressure (draught),*

— *automatically record measured values (see Clause 10).*

National or local regulations or standards can also require the ability to measure flue gas temperature and/or other parameters.

6 Care, use and maintenance of portable electrical combustion flue gas analyser

6.1 Before use

Analysers should be treated with care, and used and maintained in accordance with the analyser instructions.

Analysers should only be used by a person who

— is competent in their use, and

— has an understanding of the results obtained and an awareness of the necessary safety actions detailed in the appliance instructions and/or national or local regulations or standards.

Before using the analyser, it is essential to read operator manuals and, as appropriate, ensure that

a) the batteries are correctly inserted, charged and not leaking,

b) the analyser has a current proof of calibration,

Some analysers are designed to accept pre-calibrated sensor modules; however, it should not be assumed that fitting a pre-calibrated sensor module would automatically guarantee accurate calibration of the complete instrument, i.e. in combination with the probe.

NOTE The analyser instructions or specific national or local regulations or standards will identify requirements for verifying the proof of calibration of the analyser.

c) the display is functioning correctly;

d) the analyser is zeroed and purged in accordance with the analyser instructions;

e) the pump is working;

f) filters and water traps are clean and dry;

g) the sensor is working correctly, see 6.2;

h) the sample tubing from the sample probe to the analyser is free from leaks and damage.

6.2 Sensor check

Analysers read very low levels, near to zero. Since they can fail to give any reading due to sensor failure, the sensor should be checked in accordance with the analyser instructions to determine whether it is operating correctly.

6.3 Safety warning

An analyser should only be used in well-ventilated locations.

Commentary on 6.3: *An analyser extracts combustion gases that can be toxic in relatively low concentrations. These gases are exhausted from the instrument. Operatives should consider their own safety as well as that of the occupants and ensure they are not in atmospheres in which potentially dangerous levels of CO are present.*