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Guide for the use of electronic portable combustion gas analysers for the measurement of carbon monoxide in dwellings and the combustion performance of domestic gas-fired appliances

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 28 February 2015. It was prepared by Panel GSE/30/-/21, *Gas Analysers*, under the authority of Technical Committee GSE/30, *Gas installations (1st, 2nd and 3rd family gases)*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 7967-1:2005, BS 7967-2:2005, BS 7967-3:2005 and BS 7967-4:2007, which are withdrawn. BS 7967-5, which covers the use of electronic portable combustion gas analysers in non-domestic premises, remains current.

Information about this document

This British Standard is intended to be used in conjunction with the gas appliance commissioning, servicing and maintenance instructions and the *Gas Industry Unsafe Situations Procedure* [1].

Its purpose is to provide:

a) information that is intended to assist gas operatives (see **3.12**) in considering all the relevant issues and circumstances relating to the identification of sources of fumes and smells and the cause of carbon monoxide (CO) detector activation, or when spillage/leakage of combustion products is suspected or encountered from an unknown source;

b) information on combustion performance characteristics of a range of gas appliance types and the levels at which remedial action is to be taken;

c) advice on the actions to be taken when elevated concentrations of carbon monoxide (CO) are identified in dwellings;

d) the appropriate method(s) for using an electronic portable combustion gas analyser to:

- check the combustion performance of gas appliances;
- measure the concentrations of CO within a dwelling and, in certain circumstances (see Clause **1**, Notes 4 and 5, and Commentary on **8.1**), detect the presence of carbon dioxide (CO_2); and
- identify sources of the CO spillage/leakage;

e) good practice guidance on the use of electronic portable combustion gas analysers as part of a servicing and/or maintenance procedure for gas appliances in dwellings; and

NOTE Electronic portable combustion gas analysers are often referred to colloquially as "flue gas analysers" (FGAs).

f) guidance on the use of combustion gas analysis as a diagnostic tool to assist a gas operative to confirm the safe and efficient functioning of a gas appliance when work has been done on that appliance.

This standard:

1) is not intended to be an exhaustive step-by-step procedure, and gas operatives need to hold an appropriate certificate of gas safety competence (see Clause **4**) and use sound judgement in deciding how best to respond to individual cases. Where a gas operative is carrying out routine servicing or repair work on an appliance, testing could indicate a spillage/leakage problem. In such cases, there is no obligation to carry out all the considerations, inspections and tests described in this guidance as the gas operative has personally identified the

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issue and the source of spillage/leakage is known. Only those subclauses in this standard that are concerned with the particular appliance involved would be relevant in such circumstances;

2) supplements gas appliance manufacturers' servicing requirements through a generic approach to servicing and maintenance activity and by identifying situations where combustion gas analysis cannot be deployed or is not appropriate;

3) does not intend that a combustion gas analysis be used as a substitute for normal servicing and/or maintenance carried out in accordance with the gas appliance instructions;

4) recognizes that it is important that the gas appliance instructions are followed; and

5) continues to use the term "flue" in its traditional UK sense, as any structure used to conduct the combustion products from an appliance to the outside air; as opposed to the European approach in standards, where a "flue" is only the passageway in the structure through which the combustion products flow.

The documents available as downloads from the sites referenced throughout the document were last accessed on 10 February 2015.

Use of this document

As a guide, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to competent people (see Clause **4** for information on competence), for whose use it has been produced.

Presentational conventions

The guidance in this standard is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is "should". The word "may" is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word "can" is used to express possibility, e.g. a consequence of an action or an event.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Attention is drawn to the following statutory regulations.

- The Gas Safety (Installation and Use) Regulations 1998 [2]
- The Gas Safety (Installation and Use) Regulations (Northern Ireland) 2004 [3]
- The Gas Safety (Application) Order (Isle of Man) 1996 [4]
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 [5]
- The Gas Safety (Management) Regulations 1996 [6]
- The Gas Safety (Management) Regulations (Northern Ireland) 1997 [7]

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1 Scope

1.1 This standard provides guidance for gas operatives on:

a) the general use of an electronic portable combustion gas analyser conforming to BS EN 50379-3 and BS 7927:1998 incorporating Amendment No. 1:1999;

*NOTE 1 This standard assumes that a portable combustion gas analyser [often referred to colloquially as a "flue gas analyser" (FGA)] of the type specified in BS EN 50379-3 or BS 7927:1998 incorporating Amendment No. 1:1999 is available to the gas operative and the operative is competent in its use and the interpretation of any reading obtained. This competence can be demonstrated by satisfactory completion of the relevant ACS assessments, which cover the use of electronic portable combustion gas analysers. See Clause **4** for further information on competence.*

NOTE 2 BS EN 50379-3 superseded BS 7927:1998 incorporating Amendment No. 1:1999 on 1 March 2007. However, electronic portable combustion gas analysers conforming to BS 7927:1998 incorporating Amendment No. 1:1999 remain acceptable for the purposes of this standard.

b) the use of such an electronic portable combustion gas analyser to determine ambient levels of carbon monoxide (CO) and, in certain circumstances (see Notes 4 and 5, and Commentary on **8.1**), detect the presence of carbon dioxide (CO_2) in dwellings;

*NOTE 3 A definition of a dwelling is given in **3.7**.*

NOTE 4 One of the main combustion products from gas appliances is CO_2, which is mainly regarded as an asphyxiant, but it is also a toxic substance which could be present in the air in sufficient quantity to prove harmful. For guidance on the occupational health considerations of CO_2, reference can be made to the HSE Guidance note on Workplace exposure limits, EH40/2005 [8].

NOTE 5 Electronic portable combustion gas analysers that calculate CO_2 levels from an oxygen (O_2) measurement are:

- *well proven for calculating CO_2 levels in combustion gases in the flue of an appliance;*
- *not suitable for measuring ambient levels of CO_2 in dwellings; and*
- *able to detect increases in the ambient CO_2 levels in ambient atmospheres and such increases in CO_2 will provide an early indication of increasing build-up of products of combustion in the room (see Commentary on **8.1**).*

c) the use of an electronic portable combustion gas analyser to measure CO and CO_2 in combustion products from the following types of gas-fired appliances:

1) flueless appliances (type A appliances);
2) open-flue appliances (type B appliances);
3) room-sealed appliances (type C appliances); and
4) all appliances for which the gas appliance manufacturer has provided a purpose-designed sampling point or specific sampling instructions;

*NOTE 6 Type A, type B and type C classification of gas-fired appliances is described in PD CEN/TR 1749 and in **3.21**.*

d) the use of an electronic portable combustion gas analyser as a diagnostic instrument to assist a gas operative:

1) in confirming safe and/or efficient operation at the time of commissioning, in accordance with gas appliance instructions;
2) in determining the level of servicing required for a gas-fired appliance;

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