

BS EN 126:2012



BSI Standards Publication

# Multifunctional controls for gas burning appliances

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**National foreword**

This British Standard is the UK implementation of EN 126:2012. It supersedes BS EN 126:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GSE/22, Safety and control devices for gas and oil burners and gas burning appliances.

A list of organizations represented on this committee can be obtained on request to its secretary.

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|------|---------------|

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English Version

## Multifunctional controls for gas burning appliances

Equipements multifonctionnels pour les appareils à gaz

Mehrfachstellgeräte für Gasgeräte

This European Standard was approved by CEN on 30 December 2011.

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## Foreword

This document (EN 126:2012) has been prepared by Technical Committee CEN/TC 58 "Safety and control devices for burners and appliances burning gaseous or liquid fuels", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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

This document supersedes EN 126:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This document refers to clauses of EN 13611:2007+A2:2011 or adapts it by stating "with the following modification", "with the following addition", "is replaced by the following" or "is not applicable" in the corresponding clause. This Document adds clauses or sub-clauses to the structure of EN 13611:2007+A2:2011 which are particular to this standard, i.e. sub-clauses or annexes which are additional to those in EN 13611:2007+A2:2011 are numbered starting from 101 or are designated as Annex AA, BB, CC etc. It should be noted that these clauses and sub-clauses are not indicated as an addition.

It should be noted that the following significant technical changes have been made to the document since the previous edition:

- a) alignment with EN 13611:2007+A2:2011;
- b) the maximum inlet pressure is increased to 50 kPa (500 mbar);
- c) it is no longer necessary for at least one of the control functions to be a shut-off function but combinations of electronic controls only are excluded;
- d) introduction of Application Control Function in the scope (see 3.103, 6.103);
- e) referencing the control standards as shown in Figure 1 in total, instead of referencing these standards clause by clause.

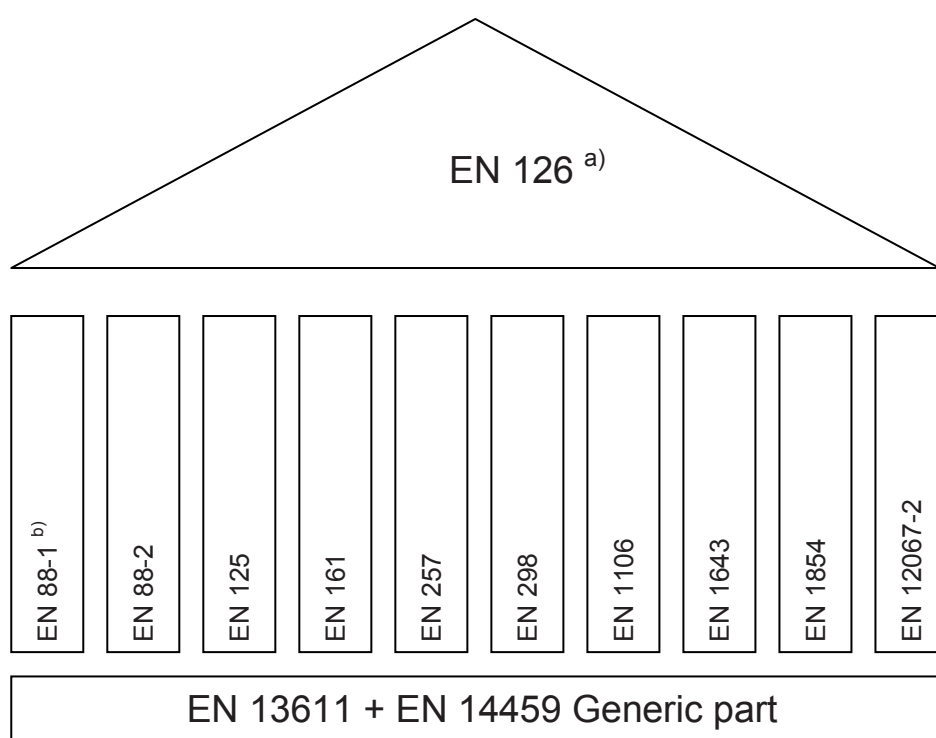
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## Introduction

The general requirements for controls are given in EN 13611:2007+A2:2011 and methods for classification and assessment for new controls and control functions are given in EN 14459:2007, Clauses 1 up to and including 7.13 (see Figure 1).

The requirements for controls are given in the specific control standard

EN 126 (see Figure 1) specifies multifunctional controls with two or more controls and Application Control Functions, e.g. the Gas Shut-off Control Function, being inherently multifunctional controls, see 6.103.



### Key

- a) This European Standard specifies '*automatic water operated gas valves*' in Annex AA
- b) EN 12067-1 (Gas/air ratio controls) and EN 12078 (Zero governors) were merged into the new EN 88-1 (pressure regulators).

**Figure 1 — Standards house**

Each control integrated in the MFC shall meet the applicable requirements of the relevant control standard(s). In addition, this standard covers requirements for the safety related interactions between the different devices.

## 1 Scope

This European Standard specifies the safety, construction and performance requirements for multifunctional controls intended for use with gas burners, gas appliances and similar use, hereafter referred to as "MFC".

This European Standard is applicable to MFC with declared maximum inlet pressures up to and including 50 kPa (500 mbar) of nominal connection sizes up to and including DN 150 for use with one or more fuel gases in accordance with EN 437.

MFC consist of two or more functions, at least one of which is a mechanical control, as specified in the relevant control standards (see Figure 1). MFC consisting only of electronics are not covered by EN 126 (an example is a combination of functions according to EN 298 and EN 1643).

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 26:1997, *Gas-fired instantaneous water heaters for the production of domestic hot water, fitted with atmospheric burners*

EN 88-1, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 125, *Flame supervision devices for gas burning appliances — Thermoelectric flame supervision devices*

EN 161, *Automatic shut-off valves for gas burners and gas appliances*

EN 257, *Mechanical thermostats for gas-burning appliances*

EN 298, *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans*

EN 437, *Test gases — Test pressures — Appliance categories*

EN 1106, *Manually operated taps for gas burning appliances*

EN 1643, *Valve proving systems for automatic shut-off valves for gas burners and gas appliances*

EN 1854, *Pressure sensing devices for gas burners and gas burning appliances*

EN 12067-2, *Gas/air ratio controls for gas burners and gas burning appliances — Part 2: Electronic types*

EN 13611:2007+A2:2011, *Safety and control devices for gas burners and gas-burning appliances — General requirements*

EN 14459:2007, *Control functions in electronic systems for gas burners and gas burning appliances — Methods for classification and assessment*

ISO 262, *ISO general purpose metric screw threads -- Selected sizes for screws, bolts and nuts*



### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2007+A2:2011 and the following apply.

**3.101  
control**

device which provides functionality as described in the specific control standard

**3.102  
multifunctional control  
MFC**

combination of two or more controls and/or Application Control Function(s) whereby the functional parts cannot operate if separated

**3.103  
application control function  
ACF**

function to protect against harm(s) originating from a specific hazard by providing safe operation of gas burners and gas burning appliances

Note 1 to entry: The assembly to provide this function may consist of a combination of controls and/or multifunctional control(s) (e.g. actuators, sensors and control electronics).

**3.104  
gas shut-off function**

Appliance Control Function which switches the gas flow off

Note 1 to entry: The assembly to provide this Application Control Function may consist of a combination of the following parts: closure members, actuators, sensors and the control electronics.

**3.105  
automatic shut-off valve**

valve which opens when energized and closes automatically when de-energized

**3.106  
closing mechanism**

part of the actuating mechanism that operates the closure member to the closed position guaranteeing the gas shut-off function with the required tightness

### 4 Classification

#### 4.1 Classes of control

Shall be according to EN 13611:2007+A2:2011, 4.1 with the following addition:

The MFC is classified according to the classification of the standards as listed in 6.102.1.

#### 4.2 Groups of control

Shall be according to EN 13611:2007+A2:2011, 4.2.

#### 4.3 Classes of control functions

Shall be according to EN 13611:2007+A2:2011, 4.3 with the following addition:

Applicable classifications for MFCs are derived from the classification of the respective controls and/or ACF's, as listed in 6.102.1 and 6.103, that are defined to be part of the MFC..

## 5 Units of measurement and test conditions

Shall be according to EN 13611:2007+A2:2011, Clause 5.

## 6 Construction requirements

EN 13611:2007, Clause 6 is replaced with the following:

### 6.101 General

MFC consist of:

- a combination of controls according to 6.102;
- a single ACF (see definition 3.103);
- a combination of Control(s) and/or Application Control Function(s) according to 6.103.

Requirements for construction of the controls incorporated in the MFC are covered in the relevant control standards. Where no control standard is available the requirements of EN 13611:2007+A2:2011 and EN 14459:2007 are applicable.

In addition, this standard covers in 6.102.2 requirements for the safety related interactions between the different functions of the MFC.

Where there are no requirements for these interactions between two or more controls, a risk assessment shall be performed as given in 6.102.2.2 to identify additional requirements.

MFCs shall be designed such that access to internal parts requires the use of tools.

Blockage of auxiliary canals and orifices shall not lead to an unsafe situation otherwise they shall be protected against blockage by suitable means.

### 6.102 MFC based on combination of controls

#### 6.102.1 General

MFC are based on a combination of the functionality provided by the controls as given by the following list:

- automatic shut-off valves according to EN 161;
- pressure regulators according to EN 88-1, including previous requirements from EN 12078 – Zero pressure regulators and EN 12067-1 – Pneumatic gas/air ratio controls;
- manually operated taps according to EN 1106;
- thermo electric flame supervision devices according to EN 125;
- mechanical thermostats according to EN 257;
- pressure switches and electronic pressure sensing devices according to EN 1854;

- electronic gas/air ratio control systems according to EN 12067-2;
- automatic burner control system according to EN 298;
- valve proving systems according to EN 1643;
- water operated gas valves according to Annex AA.

## **6.102.2 Interaction between Controls**

### **6.102.2.1 Closing mechanism for closure member**

Each automatic shut-off valve shall consist of a separate, independent closing mechanism controlling only one closure member. A check of internal leak-tightness shall be possible on each of the automatic shut-off valves. If two or more closure members are controlled by one closing mechanism the valve is considered as one automatic shut-off valve.

### **6.102.2.2 Interactions between functions**

The MFC shall provide the same overall safety level as the individual functions would have provided for the complete application.

This shall be shown by a risk assessment, taking into account the failure modes of each function that interacts with other function(s).

Any interference between functions shall be assessed with respect to both, the functional condition and any fault conditions.

Mechanical functions shall not affect the safety level of electronic functions and vice versa.

The interaction of an electronic control function with other electronic control functions shall be assessed for interference taking into account the amount of faults related to the safety class of that control function. These fault(s) are introduced in the interface of interacting control functions.

The result of the assessment shall provide a set of conditions under which the new combination of functions can be used.

NOTE 1 These conditions involve construction requirements, safety requirements, performance requirements and test methods, and additional information regarding marking, installation and operating instructions.

NOTE 2 For combinations that are certified, this requirement is considered to be met.

### **6.102.3 Alternative gas connections**

Connections of controls according to EN 1106 and EN 125 can alternatively be made according to the following requirements:

- the joint can only be removed with tools;
- the complete connection including fixing part is tested and;
- the joint is inaccessible to the end user.

For flange or saddle-clamp joints, screws in accordance with ISO 262:1998 shall be used.

## 6.103 MFC based on Application Control Functions

### 6.103.1 Assessment for ACFs in gas appliances

Shall be according to EN 14459:2007, 6.6.6.

### 6.103.2 Gas shut-off control function

Shall be according to EN 14459:2007, Annex L.

## 7 Performance

EN 13611:2007+A2:2011, Clause 7 is replaced by the following:

### 7.101 General

Requirements for performance of MFC are covered in the relevant control standards, see list in 6.102.1. Where no control standard is available the requirements of EN 13611:2007+A2:2011 and EN 14459:2007 are applicable.

### 7.102 External leak-tightness of MFC

MFC shall be leak-tight in accordance with the leakage rate given in Table 1. The test is performed according to EN 13611:2007+A2:2011, 7.3.2.

Table 1 — External leakage rate

| Nominal inlet size | External leakage rates    |
|--------------------|---------------------------|
| DN                 | cm <sup>3</sup> /h of air |
| DN < 10            | 60                        |
| 10 ≤ DN            | 120                       |

### 7.103 Thermostat function

If the MFC incorporates a pressure regulator and an independent mechanical thermostat function, the pressure regulator shall be put out of action for the tests of the thermostatic function.

### 7.104 Internal leak tightness of MFC

The leak-tightness of the closure member(s) of each function shall be tested independently.

## 8 EMC/Electrical requirements

EN 13611:2007+A2:2011, Clause 8 is replaced by the following:

EMC/Electrical requirements of MFC are covered in the relevant control standards.

Where no control standard is available the requirements of EN 13611:2007+A2:2011 and EN 14459:2007 are applicable.

## **9 Marking, installation and operating instructions**

### **9.1 Marking**

EN 13611:2007+A2:2011, 9.1 is replaced by the following:

Marking of MFC are covered in the relevant control standards as listed under 6.102.1.

### **9.2 Installation and operating instructions**

Shall be according to EN 13611:2007+A2:2011, 9.2 with the following addition.

Instructions of MFC are covered in the relevant control standards as listed under 6.102.1.

They shall include all the information of the relevant control standard on use, installation, operation and servicing. Furthermore, they shall also include:

- a) gas and if applicable water connection(s);
- b) a statement to the effect that the functions of the MFC have to be verified as being suitable for their application.

### **9.3 Warning notice**

Shall be according to EN 13611:2007+A2:2011, 9.3.

**Annex A**  
(informative)

**Gas connections in common use in the various countries**

Shall be according to EN 13611:2007+A2:2011, Annex A.

**Annex B**  
(informative)

**Leak-tightness test — volumetric method**

Shall be according to EN 13611:2007+A2:2011, Annex B.

**Annex C**  
(informative)

**Leak-tightness test — pressure loss method**

Shall be according to EN 13611:2007+A2:2011, Annex C.



**Annex D**  
(normative)

**Conversion of pressure loss into leakage rate**

Shall be according to EN 13611:2007+A2:2011, Annex D.

**Annex E**  
(normative)

**Electrical/electronic component fault modes**

Shall be according to EN 13611:2007+A2:2011, Annex E.

**Annex F**  
(normative)

**Additional requirements for safety accessories and pressure  
accessories as defined in EU Directive 97/23/EC**

EN 13611:2007+A2:2011, Annex F is not applicable.

**Annex G**  
(normative)

**Materials for pressurized parts**

EN 13611:2007+A2:2011, Annex G is not applicable.

**Annex H**  
(informative)

**Additional materials for pressurized parts**

EN 13611:2007+A2:2011, Annex H is not applicable.

**Annex I**  
(normative)

**Requirements for controls used in DC supplied gas burners and gas  
burning appliances**

Shall be according to EN 13611:2007+A2:2011, Annex I.

## **Annex AA (normative)**

### **Automatic water operated gas valve**

#### **AA.1 Construction requirements**

In the event of leakage at the joint sealing of the water circuit, it shall not be possible for water to penetrate into the gas circuit. To this end, there shall be a space between the gas carrying and water carrying parts of the automatic water-operated gas valve. This space shall be ventilated to atmosphere by a vent having an area of at least 19 mm<sup>2</sup>. It may consist of one or more orifices of which the smallest transverse dimension shall not be less than 3,5 mm.

#### **AA.2 Performance requirements**

##### **AA.2.1 Sealing force**

The air leakage shall not exceed 40 cm<sup>3</sup>/h when the closing mechanism of the automatic water operated gas valve shall be subjected to a pressure of 15 kPa (see EN 26:1997, 7.8.3.1).

##### **AA.2.2 Endurance**

The automatic water operated gas valve that operates each time when water is drawn shall be subjected to an endurance test of 50 000 cycles (see EN 26:1997, 7.8.3.4).

##### **AA.2.3 Test of automatic water-operated gas valves**

Carry out the tests given in EN 26:1997, 7.8.3.4.2.

##### **AA.2.4 Flow rate and leak-tightness after endurance**

After the endurance test of the water-operated gas valve there should be no external water leakage (see EN 26:1997, 7.2.3). External leak-tightness of gas parts shall be according to EN 13611:2007+A2:2011, 7.2 and tested according to EN 13611:2007+A2:2011, 7.3.

## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 2009/142/EC relating to appliances burning gaseous fuels

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2009/142/EC relating to appliances burning gaseous fuels.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

**Table ZA — Correspondence between this European Standard and Directive 2009/142/EC relating to appliances burning gaseous fuels (1 of 2)**

N/A = Not applicable

| Essential requirement (ERs) of Directive 2009/142/EC |   | Clause(s)/subclause (s) of this European Standard |
|--|---|---|
| <b>1</b>   | <b>GENERAL CONDITIONS</b>                   |   |
| 1.1  | Safety of operation                         | 1, 6, 7, 8  |
| 1.2  | Instructions                                | 9.2, 9.3  |
| 1.2.1  | Installation instructions                   | 9.2   |
| 1.2.2  | User instructions                           | 9.2   |
| 1.2.3  | Warning notices                             | 9.3   |
| 1.3  | Correct operation                           | 7, 9.2  |
| <b>2</b>   | <b>MATERIAL</b>                             |   |
| 2.1, 2.2   | Suitability for safety and intended purpose | 6, 7  |



**Table ZA — Correspondence between this European Standard and Directive 2009/142/EC relating to appliances burning gaseous fuels (2 of 2)**

|              |   |                        |
|--------------|---|------------------------|
| <b>3</b>     | <b>DESIGN AND CONSTRUCTION</b>                        |                        |
| 3.1          | General   |                        |
| 3.1.1        | Mechanical stability                                  | 6                      |
| 3.1.2        | Condensation  | N/A                    |
| 3.1.3        | Risk of explosion                                     | 6, 7                   |
| 3.1.4        | Water/air penetration into gas circuit                | AA                     |
| 3.1.5        | Normal fluctuation of auxiliary energy                | 7                      |
| 3.1.6        | Abnormal fluctuation or failure of auxiliary energy   | 8                      |
| 3.1.7        | Hazards of electrical origin                          | 8                      |
| 3.1.8        | Pressurized parts                                     | N/A                    |
| 3.1.9        | Failure of safety, controlling and regulating devices | 6                      |
| 3.1.10       | Safety/adjustment                                     | 6, 7                   |
| 3.1.11       | Protection of parts set by the manufacturer           | 6                      |
| 3.1.12       | Controlling and setting devices                       | 6, 7                   |
| 3.2          | Unburned gas release                                  |                        |
| 3.2.1        | Gas leakage   | 6, 7.101, 7.102, 7.104 |
| 3.2.2, 3.2.3 | Gas accumulation                                      | N/A                    |
| 3.3          | Ignition  | N/A                    |
| 3.4          | Combustion  | N/A                    |
| 3.5          | Rational use of energy                                | N/A                    |
| 3.6          | Temperatures  | 7                      |
| 3.7          | Foodstuffs and water used for sanitary purposes       | Annex AA               |

**WARNING —** Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

## Bibliography

Shall be according to EN 13611:2007+A2:2011, Bibliography



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