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## Safety and control devices for gas burners and gas-burning appliances — Particular requirements —

### Part 8: Multifunctional controls

*Dispositifs de commande et de sécurité pour les brûleurs et les appareils à gaz — Exigences particulières —  
Partie 8: Equipements multifonctionnels*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 161, *Control and protective devices for gas and/or oil burners and appliances*.

This second edition cancels and replaces the first edition (ISO 23551-8:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

- a) Updated to align technically and with the revised format of the latest edition of ISO 23550, General requirements.
- b) Updated to align technically and with the relevant latest editions of ISO 23551 series, referenced herein.
- c) Relocation of specific regional requirements into the main body of the standard that were previously contained in regional Annexes.
- d) Incorporation of amendment ISO 23551-8:2016/Amd 1:2019 and draft ISO 23551-8:2016/DAmD 2.

A list of all parts in the ISO 23551 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is designed to be used in combination with ISO 23550 and relevant parts of the ISO Series 23551. Together with both ISO 23550 and 23551, this document establishes the full requirements as they apply to the product covered by this

Where needed, this document adapts ISO 23550 by stating in the corresponding clause:

- “with the following modification”;
- “with the following addition”;
- “is replaced by the following”; or
- “is not applicable”.

In order to identify specific requirements that are particular to this document, that are not already covered by ISO 23550, this document can contain clauses or subclauses that are additional to the structure of ISO 23550. These subclauses are indicated by the introductory sentence: “Subclause (or Annex) specific to this document.I

To ensure global relevance of this document, the differing requirements resulting from practical experience and installation practices in various regions of the world have been taken into account. The variations in basic infrastructure associated with gas controls and appliances have also been recognized, some of which are addressed in [Annexes F, G and H](#). This document intends to provide a basic framework of requirements that recognize these differences

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# Safety and control devices for gas burners and gas-burning appliances — Particular requirements —

## Part 8: Multifunctional controls

### 1 Scope

This document specifies safety, constructional and performance and testing requirements of multifunctional controls intended for use with gas burners, gas appliances and appliances of similar use, hereafter referred to as “MFC”.

This document applies to an 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 on burners or in appliances using gases such as natural gas, manufactured gas or liquefied petroleum gas (LPG).. It is not applicable to corrosive and waste gases.

An MFC consists of two or more functions, at least one of which is a mechanical control, as specified in the relevant control standards.

This document is also applicable to construction and performance requirements for components of burner ignition systems as specified in [Annex K](#). The requirements and test methods in [Annex K](#) includes optional type testing and evaluation of these components.

This document is applicable to

- water operated gas valves (see [Annex I](#)),
- OSDs (see [Annex J](#)) and
- Optional Requirements for Components of Burner Control Systems (see [Annex K](#)).

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 23550:2018, *Safety and control devices for gas burners and gas-burning appliances — General requirements*

ISO 23551-1, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 1: Automatic and semi-automatic valves*

ISO 23551-2, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 2: Pressure regulators*

ISO 23551-4, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 4: Valve-proving systems for automatic shut-off valves*

ISO 23551-5, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 5: Manual gas valves*

ISO 23551-6, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 6: Thermoelectric flame supervision controls*

ISO 23551-9, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 9: Mechanical gas thermostats*

ISO 23551-10, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 10: Vent valves*

ISO 23552-1, *Safety and control devices for gas and/or oil burners and gas and/or oil appliances — Particular requirements — Part 1: Fuel/air ratio controls, electronic type*

IEC 60730-2-5, *Automatic electrical controls — Part 2-5: Particular requirements for automatic electrical burner control systems*

### 3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 23550 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

**3.1 multifunctional control**  
combination of two or more controls, at least one of this is a mechanical control, whereby the functional parts cannot operate if separated

**3.2 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

**3.3 water operated gas valve**  
device that uses flow of water to control the flow of gas

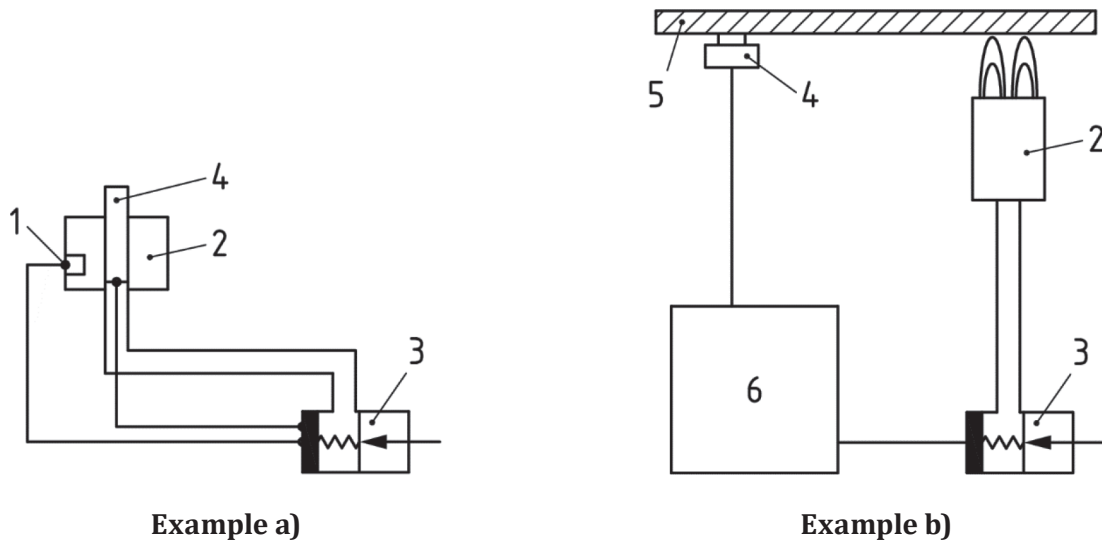
**3.4 overheating safety device OSD**  
temperature-sensing device which is intended to keep temperature below one particular value during abnormal operating conditions of the appliance and which has no provision for setting by the end user

Note 1 to entry: These devices usually use a thermistor or a bimetal sensing part (element).

**3.5 sensing part**  
part of the OSD which is intended to be exposed to the influences of the activating quantity to which the automatic action of a sensing control responds

Note 1 to entry: Examples of OSDs are shown in [Figure 1](#).



**Key**

- |   |   |   |  |
|---|---|---|--|
| 1 | thermo-electric flame supervision control | 4 | sensor                                   |
| 2 | burner                                    | 5 | object to be measured (heated by burner) |
| 3 | gas shut-off valve                        | 6 | burner control unit                      |

**Figure 1 — Examples of OSDs**  
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**3.6****overheating temperature**

temperature at which the OSD functions to turn off the gas supply to the burner during abnormal operating conditions of the appliance [ISO/PRF 23551-8](https://standards.iteh.ai/catalog/standards/sist/78f92792-019d-4148-8e30-7db1686e23b2/iso-prf-23551-8)

**3.7****thermistor**

thermally sensitive semiconductor resistor, which shows over at least part of its resistance/temperature ( $R/T$ ) characteristic a significant non-linear change in its electrical resistance with a change in temperature

[SOURCE: IEC 60730-1, Ed. 5.2:2020, J.2.15.1]

**3.8****bimetal**

object that is composed of two separate metals joined together

**3.9 Definitions pertaining to component parts of burner control systems****3.9.1****pilot burner**

burner which provides a flame to ignite a main burner(s)

Note 1 to entry: Herein after referred to as a pilot.

**3.9.2****sensing element temperature limit**

temperature below which the sensing element will act to shut off the fuel supply

### 3.9.3

**intermittent/continuous ignition**

type of ignition which is ignited or energized upon equipment user initiation of the operational cycle and which remains continuously ignited or energized during the operational cycle then extinguished or de-energized when the operational cycle is completed

Note 1 to entry: In this type of system, the main burner may cycle on and off multiple times during the complete equipment use cycle, but the intermittent pilot remains continuously ignited throughout the full cycle even when the main burner is extinguished. An example would be a clothes dryer.

### 3.9.4

**intermittent/interrupted ignition**

type of ignition which is ignited or energized upon equipment user initiation of the operational cycle and which is extinguished or de-energized after the equipment use cycle has been initiated

Note 1 to entry: An example would be a gas range top or oven burner ignition operation.

### 3.9.5

**oxygen depletion safety shutoff system**

**ODS**

system designed to shut off the main burner and pilot gas to the equipment when the oxygen content of the room in which the equipment is installed is reduced below a predetermined level

### 3.9.6

**millivoltage circuit**

circuit which receives its electrical energy by means of a thermocouple(s) or photovoltaic device(s)

### 3.9.7

**thermocouple**

flame sensing device consisting of two dissimilar metal wires joined at one end so that when heat is applied to the joined end form an electrical junction that generates electrical energy and when the heat is removed the voltage will decay over time

### 3.9.8

**fast acting thermocouple**

flame sensing thermoelectric generating device whose voltage output decays more rapidly than a common thermocouple

Note 1 to entry: In applications where these devices are used the decay rate does not exceed 30 s.

### 3.9.9

**flame failure lock-out time**

period of time between the signal indicating absence of flame and lock-out

[SOURCE: IEC 60730-2-5, Ed. 4.2:2021, 2.3.107]

## 4 Classes of control

### 4.1 Classes of controls

Shall be according to ISO 23550:2018 and relevant 23551, 4.1.

### 4.2 Groups of controls

Shall be according to ISO 23550:2018 and relevant 23551, 4.2.

## 5 Test conditions

Shall be according to ISO 23550:2018, Clause 5.

## 6 Construction

ISO 23550:2018, Clause 6 is replaced by the following.

Subclauses specific to this document.

### 6.1 General

An MFC consists of a combination of controls according to [6.2](#).

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 ISO 23550:2018 are applicable.

In addition, this part of ISO 23551 covers in [6.2.2](#) 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. MFCs shall be designed such that access to internal parts requires the use of tools.

### 6.2 MFC based on combination of controls

#### 6.2.1 General

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

- automatic shut-off valves according to ISO 23551-1;
- pressure regulators according to ISO 23551-2;
- valve proving systems according to ISO 23551-4;
- manual gas valves according to ISO 23551-5;
- thermo electric flame supervision devices according to ISO 23551-6;
- mechanical gas thermostats according to ISO 23551-9;
- vent valves according to ISO 23551-10;
- electronic fuel/air ratio controls according to ISO 23552-1;
- automatic electrical burner control system according to IEC 60730-2-5;
- water operated gas valves according to Annex II.
- OSDs (see [Annex J](#)).

#### 6.2.2 Interaction between Controls

##### 6.2.2.1 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.

**6.2.2.2 Interactions between functions**

The interactions between the functions of the MFC shall not interfere with the safety of the individual functions. Mechanical functions shall not affect the safety of electronic functions and vice versa.

**6.3 Components of burner control systems**

When specified by the manufacturer, components of burner control systems shall meet the construction requirements specified in [Annex K](#).

**7 Performance**

ISO 23550:2018, Clause 7 is replaced by the following.

Subclauses specific to this document.

**7.1 General**

Requirements for performance of MFC's are covered in the relevant control standards (see list in [6.2.1](#)). Where no control standard is available, the requirements of ISO 23550:2018 are applicable.

**7.2 External leak-tightness of MFC**

An MFC shall be leak-tight in accordance with the leakage rate given in [Table 1](#). The test is performed according to ISO 23550:2018, 7.2.2.1 and 7.2.2.2.

**Table 1 — External leakage rate**

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

**7.3 Mechanical thermostat function**

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

**7.4 Internal leak tightness of MFC**

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

**7.5 Endurance test for combined functions**

For MFC which uses a single closure member to perform more than one function, the test conditions and number of cycles for endurance testing shall be applied by the function having the most severe combination.

**7.6 Components of burner control systems**

When specified by the manufacturer, components of burner control systems shall meet the performance requirements specified in [Annex K](#).