
**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 document 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).

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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.

This document was prepared by Technical Committee ISO/TC 161, *Controls and protective devices for gaseous and liquid fuels*.

This second edition cancels and replaces the first edition (ISO 23551-8:2016), which has been technically revised. It also incorporates the Amendment ISO 23551-8:2016/Amd. 1:2019.

The main changes are as follows:

- the document has been updated to align technically and with the revised format of ISO 23550:2018;
- the document has been updated to align technically and with the relevant latest editions of ISO 23551 series, referenced herein;
- specific regional requirements have been moved from annexes into the main body of the document.

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.

Introduction

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

Where needed, this document adapts ISO 23550 by stating the corresponding clause number and adding:

- “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 contains certain 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.”

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, construction, performance and testing requirements of multifunctional controls (MFC) intended for use with gas burners, gas appliances and appliances of similar use.

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](#) include optional type testing and evaluation of these components.

This document is applicable to:

- water-operated gas valves (see [Annex I](#));
- overheating safety devices (OSDs) (see [Annex I](#)); 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 and/or oil burners and 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 shut-off 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*

IEC 60730-1:2020, *Automatic electrical controls — Part 1: General requirements*

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

3 Terms and definitions

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

ISO and IEC maintain terminology 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 General terms

3.1.1

multifunctional control MFC

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

3.1.2

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

3.1.3

water operated gas valve

device that uses flow of water to control the flow of gas

3.1.4

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

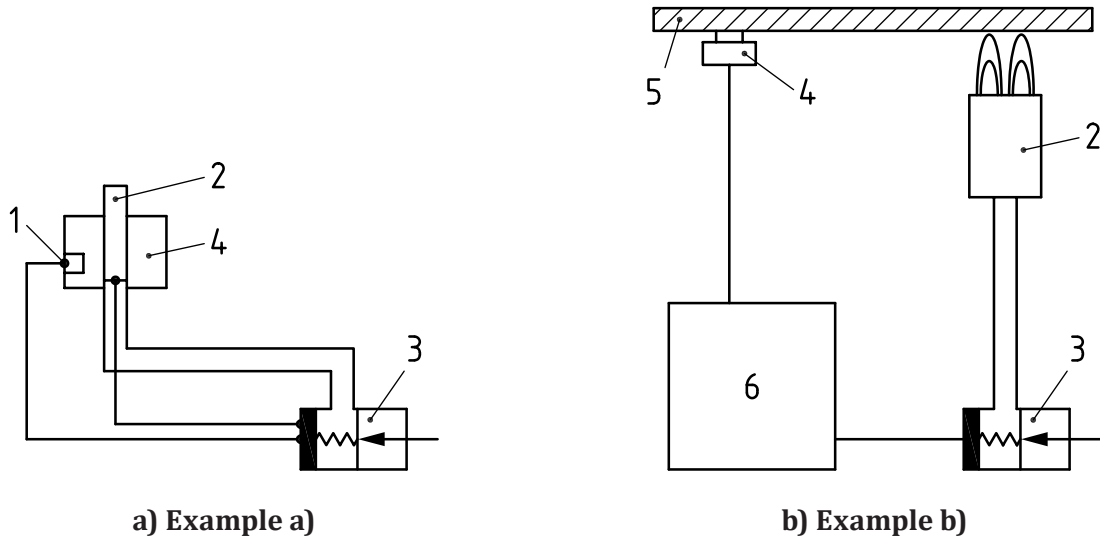
Note 1 to entry: These devices usually use a thermistor or a bimetal sensing part (element).

3.1.5

OSD sensor

part of the overheating safety device control 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 | OSD 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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3.1.6**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 23551-8:2023](https://standards.iteh.ai/catalog/standards/sist/78f92792-019d-4148-8e30-7db1686e23b2/iso-23551-8-2023)

3.1.7**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 60730-1:2020, J.2.15.1]

3.1.8**bimetal**

object that is composed of two separate metals joined together

3.2 Definitions pertaining to component parts of burner control systems**3.2.1****pilot burner**

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

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

3.2.2**sensing element temperature limit**

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

3.2.3

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 can 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.

EXAMPLE A clothes dryer.

3.2.4

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

EXAMPLE An example a gas range top or oven burner ignition operation.

3.2.5

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

3.2.6

thermocouple

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

3.2.7

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.

4 Classes of control

4.1 Classes of controls

Shall be according to ISO 23550:2018, 4.1, and the relevant specific part of the ISO 23551 series as defined in [6.2.1](#).

4.2 Groups of controls

Shall be according to ISO 23550:2018, 4.2, and the relevant specific part of the ISO 23551 series as defined in [6.2.1](#).

5 Test conditions

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

6 Construction

6.1 General

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

Subclauses specific to this document.

An MFC shall consist 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 are applicable.

In addition, this document covers requirements for the safety-related interactions between the different functions of the MFC (see [6.2.2](#)).

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

MFCs 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 I](#).
- 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

7.1 Overview

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

Subclauses specific to this document.

7.2 General

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

7.3 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 ³ /h of air
DN < 10	60
10 ≤ DN	120

7.4 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.

7.5 Internal leak-tightness of MFC

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

7.6 Endurance test for combined functions

For an 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.

7.7 Components of burner control systems

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

8 Electrical equipment

Shall be according to ISO 23550:2018, Clause 8.