



International
Standard

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**

*Dispositifs de commande et de sécurité pour brûleurs à gaz et
appareils à gaz — Exigences particulières —*

Partie 1: Robinets automatiques et semi-automatiques

**Third edition
2024-11**

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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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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.

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

This third edition cancels and replaces the second edition (ISO 23551-1:2012), which has been technically revised.

The main changes are as follows:

- definitions for specific valve types have been updated and a flow chart for valve types has been added ([Clause 3](#), [Table 1](#));
- the classification of the valve types has been restructured, including the addition of a new classification Class E and the definition of valves without safety shut-off function as general purpose valve Class D ([Clause 4](#));
- common requirements and tests for specific valve types have been summarized in tabular form (see [Tables 1](#) and [2](#));
- visual indicator (VI), closed position switch (CPS) and proof of closure switch (POC) have been summarized in [6.2.11](#);
- the endurance test has been restructured, with the assignment of the test cycles and tests summarized in tabular form (see [Tables 4](#), [5](#) and [6](#));
- a hydrostatic withstand pressure test has been added;
- a resistance to permanent damage at excessive supply pressure test has been added;
- the document has been updated to align technically and with the revised format of the latest edition of ISO 23550;
- specific regional requirements that were previously contained in regional Annexes have been moved into the main body of the text;

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- the document has been updated to align with the application of Electromagnetic compatibility (EMC) testing from IEC 60730-2-17 (withdrawn 2017-02-20 and replaced by ISO 23551-1);
- the document has been updated and aligned with IEC 60730-1:2022.

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.

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Introduction

This document is designed to be used in combination with ISO 23550. Together, they establish the full requirements as they apply to the product covered by this document.

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 and 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 A](#) and [B](#). 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 1: Automatic and semi-automatic shut-off valves

1 Scope

This document specifies safety, constructional and performance requirements and testing of automatic, semi-automatic shut-off valves and general purpose valves for gas burners, gas appliances and appliances of similar use, hereinafter referred to as valves.

This document applies to normally closed valves and general purpose valves mounted upstream to gas burners and gas appliances with declared maximum operating pressures up to and including 500 kPa, for use on burners or in appliances using fuel gases such as natural gas, manufactured gas or liquefied petroleum gas (LPG). It is not applicable to corrosive and waste gases.

This document applies to:

- valves directly or indirectly actuated, electrically or by mechanical means;
- valves actuated by hydraulic or pneumatic means;
- valves where the flow rate is controlled by external electrical signals, either in discrete steps or proportional to the applied signal; and
- valves fitted with closed position indicator switches.

This document covers type testing only.

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*

IEC 60529, *Degrees of protection provided by enclosures (IP-code)*

IEC 60730-1:2022, *Automatic electrical controls— Part 1: General requirements*

IEC 61058-1, *Switches for appliances — Part 1: General requirements*

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 Terms related to valves

3.1.1

valve

device consisting essentially of a valve body, closure member and *valve actuator* (3.2.18) that controls the flow of gas

Note 1 to entry: The valve actuation can be achieved by gas pressure, electrical, hydraulic, manual or pneumatic energy.

Note 2 to entry: See [Figure 1](#).

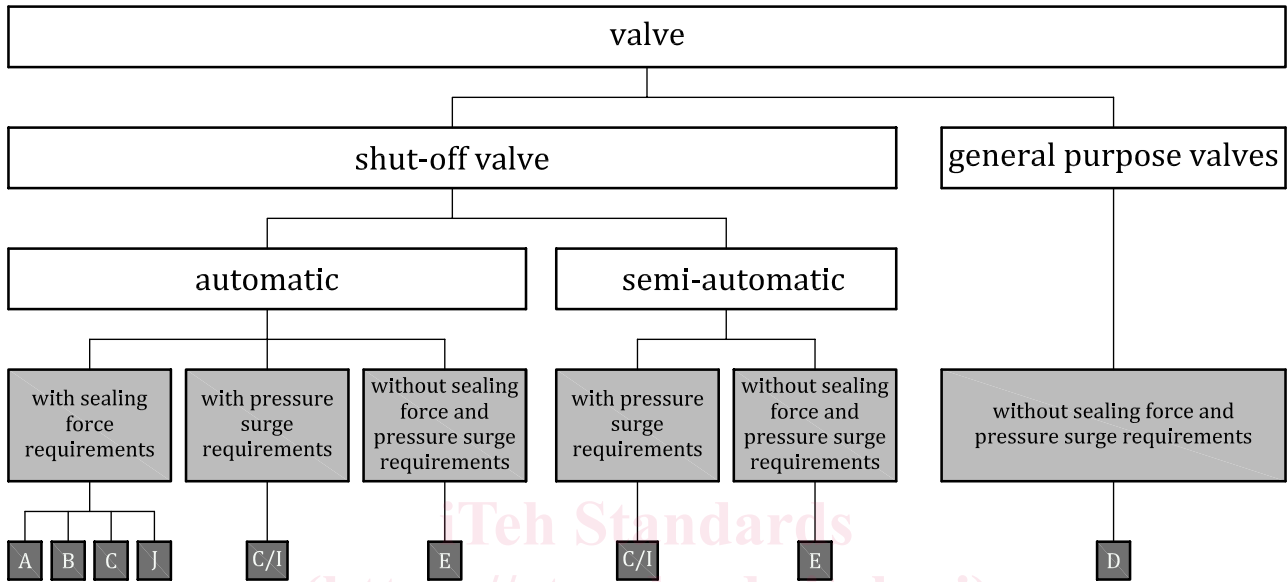


Figure 1 — Valve type flow chart

3.1.2

semi-automatic shut-off valve

valve (3.1.1) that is opened manually and closes automatically upon removal of the *actuating energy* (3.2.2)

Note 1 to entry: See [Figure 1](#).

3.1.3

automatic shut-off valve

valve (3.1.1) which opens when energized and closes automatically when de-energized

Note 1 to entry: See [Figure 1](#).

3.1.4

C/I valve

commercial/industrial valve

normally closed *automatic* or *semi-automatic shut-off valve* (3.1.3; 3.1.2) having an operating pressure of 3,5 kPa or greater

Note 1 to entry: See [Figure 1](#).

3.1.5

general purpose valve

valve (3.1.1) intended to control the flow of gas that does not provide a shut-off function

Note 1 to entry: A combination of a general purpose valve and a shut-off valve is primarily considered as a shut-off valve.

Note 2 to entry: See [Figure 1](#).

3.1.6

thermoelectric valve

semi-automatic shut-off valve (3.1.2) that receives its electrical actuating energy by means of a thermoelectric source

Note 1 to entry: Not applicable for *C/I valves* (3.1.4).

Note 2 to entry: See [Figure 1](#).

3.1.7

diaphragm type valve

automatic shut-off valve (3.1.3) where a closing member is opened by application of gas pressure upon a flexible diaphragm

Note 1 to entry: See [Figure 1](#).

3.1.8

valve with step control

multi-stage valve

valve (3.1.1) which controls the flow rate in steps

Note 1 to entry: See [Figure 1](#).

3.1.9

valve with modulating control

modulating valve

valve (3.1.1) which controls the flow rate continuously between two limits in response to external signals

Note 1 to entry: See [Figure 1](#).

3.2 General terms

3.2.1

actuating mechanism

part of the *valve* (3.1.1) which moves the closure member to the open position

3.2.2

actuating energy

required energy for the *actuating mechanism* (3.2.1) to move the closure member to the open position

Note 1 to entry: The actuating energy may have an external source (electrical, hydraulic or pneumatic) and can be transformed inside the *valve* (3.1.1).

3.2.3

closing force

force available to close the *valve* (3.1.1), independent of any force provided by gas pressure

3.2.4

sealing force

force acting on the *valve* (3.1.1) seat when the closure member is in the closed position, independent of any force provided by gas pressure

3.2.5

frictional force

largest force required to move the *actuating mechanism* (3.2.1) and the closure member from the open position to the closed position with the closure spring removed, independent of any force provided by gas pressure

3.2.6

actuating pressure

hydraulic or pneumatic pressure supplied to the *actuating mechanism* (3.2.1) of the *valve* (3.1.1)

3.2.7

opening time

time interval between energizing the *valve* (3.1.1) and the attainment of the maximum or other defined flow rate

3.2.8

closing time

time interval between de-energizing the *valve* (3.1.1) and the closure member attaining the closed position

3.2.9

delay time

time interval between energizing the *valve* (3.1.1) and the start of flow

3.2.10

control valve

valve (3.1.1) which controls the hydraulic or pneumatic means supplied to the *actuating mechanism* (3.2.1)

3.2.11

rated voltage

voltage declared by the manufacturer at which the *valve* (3.1.1) may be operated

3.2.12

rated current

current declared by the manufacturer at which the *valve* (3.1.1) may be operated

3.2.13

bypass

passage, provided in the body of the device or in a gas line around the body, which permits a gas flow from the inlet to the outlet connections of the device entirely independent of the action of the *valve* (3.1.1)

3.2.14

interlock

control or device to prove the physical state of a required condition, and to furnish proof to the automatic gas ignition system or other safety control circuit

3.2.15

proof of closure switch

POC

electrical switch which monitors the closed position of the *valve* (3.1.1) closure member, and which is used as an *interlock* (3.2.14)

3.2.16

closed position switch

CPS

switch fitted to a *valve* (3.1.1) which indicates when the closure member is in the closed position, and which is used as an *interlock* (3.2.14)

Note 1 to entry: For certain applications, a CPS is also known as a closed position indicator (CPI) switch.

3.2.17

switching element

electrical switch actuated by the *valve actuator* (3.2.18) and used as an electrical output

3.2.18

valve actuator

electrically operated mechanism (for example an electric motor or stepping solenoid), an electro-thermal device (for example the heating element of an energy regulator) or a mechanical device, used to effect the operation of a *valve* (3.1.1)