BS ISO 23551-11:2024

BSI Standards Publication

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

Part 11: Automatic and semi-automatic shut-off valves for operating pressure of above 500 kPa up to and including 6 300 kPa

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National foreword

This British Standard is the UK implementation of ISO 23551-11:2024.

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

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

Part 11: Automatic and semi-automatic shut-off valves for operating pressure of above 500 kPa up to and including 6 300 kPa

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

Partie 11: Robinets automatiques et semi-automatiques de sectionnement pour une pression de fonctionnement supérieure à 500 kPa et jusqu'à 6 300 kPa inclus

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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*.

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, 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.”

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, B, C and D. 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 11: Automatic and semi-automatic shut-off valves for operating pressure of above 500 kPa up to and including 6 300 kPa

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 excluding use in fuel gas infrastructures (transportation and distribution systems).

This document applies to controls for use at maximum operating pressures above 500 kPa up to and including 6 300 kPa with sizes up to DN 250 for use on burners or in appliances using fuel gases, such as natural gas, manufactured gas or liquefied petroleum gas (LPG).

This document applies to:

— valves being mounted in gas installations;

— valves directly or indirectly actuated, electrically or by mechanical means;

— valves actuated by hydraulic or pneumatic means, including the pilot valves for these fluids if actuated electrically and including release valves, but not to any external electrical devices for switching the actuating energy;

— 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;

— valves to be used in appliances, but not in gas transfer systems outside appliances.

This document covers type testing only.

This document does not apply to valves covered under the scope of ISO 23551-1 or the ISO 23555 series.

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 7005-1, *Pipe flanges — Part 1: Steel flanges for industrial and general service piping systems*

ISO 7005-2, *Metallic flanges — Part 2: Cast iron flanges*

ISO 7005-3, *Pipe flanges — Part 3: Copper alloy and composite flanges*

ISO 9692-1, *Welding and allied processes — Types of joint preparation — Part 1: Manual metal arc welding, gas-shielded metal arc welding, gas welding, TIG welding and beam welding of steels*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

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ISO 23550:2018, *Safety and control devices for gas and/or oil burners and appliances — General requirements*

ISO 23551-1:2024, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 1: Automatic and semi-automatic shut-off valves*

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

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

IEC 60529, *Degrees of Protection Provided by Enclosures (IP Code)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23550, ISO 23551-1 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

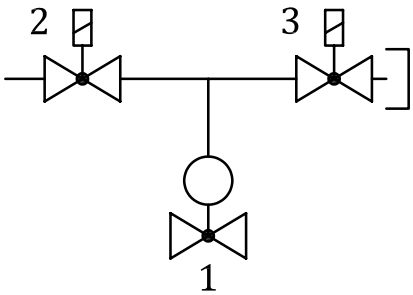
— IEC Electropedia: available at https://www.electropedia.org/

3.1
pilot valve
valve which controls the fluid (e.g. compressed air) supplied to the actuating mechanism

Note 1 to entry: A typical pilot and *release valve* (3.2) application is shown in Figure 1.

3.2
release valve
valve in the line from the *pilot valve* (3.1) to the actuating mechanism which closes the vent automatically when the actuating fluid is released by the pilot valve and opens it automatically when the pilot valve is closed

Note 1 to entry: A typical pilot and release valve application is shown in Figure 1.



Key

1 control under test

2 pilot valve (normally closed)

3 release valve (normally open)

Figure 1 — Typical pilot and release valve application

3.3
design pressure
DP
pressure on which design calculations are based

Note 1 to entry: In particular, DP is the maximum pressure for which the body, its inner metallic partition walls and some other pressure-containing parts are designed.

Note 2 to entry: According to local regulations, DP can be defined as maximum allowable pressure.

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[SOURCE: ISO 23555-1:2022, 3.1.4.3 modified — Note 2 to entry has been added.]

4 Classification

4.1 Classes of controls

Shall be according to ISO 23550:2018, 4.1, with the following addition:

4.1.1 Classification based on sealing force

Subclause specific to this document.

Automatic shut-off valves where the sealing force is not decreased by the gas inlet pressure are classified according to sealing force requirements and shall be designated according to Class A (see Tables 1, 4, 6, 7 and 8).

These valves may also have:

— modulating control function, or

— step control function/multi-stage.

4.1.2 Classifications based on pressure surge

Subclause specific to this document.

Automatic and semi-automatic valves with pressure surge requirements shall be designated according to class C/I (see ISO 23551-1:2024 3.1.4 and Tables 1, 4, 6, 7 and 8).

4.1.3 Classification with neither sealing force nor pressure surge

Subclause specific to this document.

Automatic and semi-automatic shut-off valves without sealing force and without pressure surge requirements shall be designated according to Class E (see Tables 1, 4, 6, 7 and 8).

4.1.4 Classification of flow control valves for general purpose

Subclause specific to this document.

General purpose valves with modulating control that do not provide a shut-off function shall be designated according to Class D (see Tables 1, 4, 6, 7 and 8).

These valves include:

— valves with modulating control function,

— valves with step control function/multi-stage.

4.2 Groups of controls

Shall be according to ISO 23550:2018, 4.2.

4.3 Types of DC supplied controls

Shall be according to ISO 23550:2018, 4.3.

4.4 Classes of control function

Shall be according to ISO 23550:2018, 4.4.

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5 Test conditions and tolerances

5.1 Test conditions

Shall be according to ISO 23550:2018, 5.1.

5.2 Tolerances

Shall be according to ISO 23550:2018, 5.2 with the following addition:

The full range of the measuring apparatus is chosen to be suitable for maximum anticipated value.

The measurement uncertainties concern individual measurements. For measurements requiring a combination of individual measurements (e.g. efficiency measurements), lower uncertainties for the individual measurements can be necessary to limit the total uncertainty.

Testing labs performing equipment calibration and testing measurement uncertainty are in conformity with ISO/IEC 17025.

Therefore, where specified, the tolerances in this document apply. Otherwise, ISO/IEC 17025 applies.

6 Construction

6.1 General

Shall be according to ISO 23550:2018, 6.1, with the following addition:

If an automatic shut-off valve requires a release and/or a pilot valve to fulfil the requirements of this document, these are considered to be part of the automatic shut-off valve and shall be specified in the installation and operating instructions.

The combination of automatic shut-off valve and release and/or pilot valve shall conform to all requirements of this document.

The interaction of all valves participating in the closing mechanism shall be evaluated. An appropriate risk assessment shall be carried out.

For each pressurized compartment, the local maximum pressure shall be considered for the strength design and for the selection of the material. It shall be ensured by mechanical means that parts for different pressures are separated. A diaphragm shall not be used for this purpose.

Table 1 describes applicable constructions requirements and tests for the classified valves. Combination of valve types are not excluded (e.g. automatic Class A and C/I valve). If the respective construction requirement is used, the design shall be according to the assigned clause in Table 1, if applicable.

The marking "x" identifies the minimum requirements to be verified by the given subclauses in this document.

Requirements without existing construction or performance properties cannot be verified and those associated clauses are therefore not applicable.

EXAMPLE Strainers are an optional element in the design of the valve. Therefore, 6.4.10 is not always applicable even though the assignment is given in Table 1.

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Table 1 — Assignment of valve construction requirements and tests

Clause	Title	Shut-off valve (Classes)					General purpose valve (Class)
		automatic	automatic	semi-automatic	automatic	semi-automatic	
		A	C/I	C/I	E	E	D
6.2	Construction requirements						
6.2.1	Appearance	x	x	x	x	x	x
6.2.2	Holes	x	x	x	x	x	x
6.2.3	Breather holes	x	x	x	x	x	x
6.2.4	Vent limiter	x	x	x	x	x	x
6.2.5	Screwed fastenings	x	x	x	x	x	x
6.2.6	Moving parts	x	x	x	x	x	x
6.2.7	Sealing caps	x	x	x	x	x	x
6.2.8	Disassembling and assembling for servicing and/or adjustment for controls	x	x	x	x	x	x
6.2.9	Auxiliary channels and orifices	x	x	x	x	x	x
6.2.10	Pre-setting device	x	x	x	x	x	x
6.2.11	Closed position indication	x	x	x	x	x	—
6.2.12	Specific construction	x	x	x	—	—	—
6.2.13	Flow rates of valves with modulating control	x	x	x	x	x	x
6.2.14	Bypass	x	x	x	x	x	—
6.2.15	Semi-automatic shut-off valve	—	—	x	—	x	—
6.2.16	Other controls assembled to a valve	x	x	x	x	x	x
6.2.17	Balanced valves	x	x	x	x	x	x
6.3	Materials	x	x	x	x	x	X
6.4	Connections						
6.4.1	General	x	x	x	x	x	x
6.4.2	Connection sizes	x	x	x	x	x	x
6.4.3	Connection types	x	x	x	x	x	x
6.4.4	Threads	x	x	x	x	x	x
6.4.5	Union joints	x	x	x	x	x	x
6.4.6	Flanges	x	x	x	x	x	x
6.4.7	Compression fittings	x	x	x	x	x	x
6.4.8	Flare connections	x	x	x	x	x	x
6.4.9	Nipples for pressure tests	x	x	x	x	x	x
6.4.10	Strainers	x	x	x	x	x	x
6.4.11	Gas connections by GQC	x	x	x	x	x	x

Key

x required only if the construction is present in the design of the valve

— no requirement even if the function is present

GQC gas quick connector

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