BS ISO 23551-5:2014

BSI Standards Publication

Safety and control devices for gas burners and gas-burning appliances

Part 5: Manual gas valves

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National foreword

This British Standard is the UK implementation of ISO 23551-5:2014.

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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ISBN 978 0 580 78369 2

ICS 27.060.20

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2014.

Amendments issued since publication

Date	Text affected

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INTERNATIONAL STANDARD

ISO 23551-5

First edition
2014-05-01

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

Part 5: Manual gas valves

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

Partie 5: Robinets de gaz manuels

Reference number
ISO 23551-5:2014(E)

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Published in Switzerland

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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.

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The committee responsible for this document is ISO/TC 161, *Control and protective devices for gas and oil burners and gas and oil burning appliances*.

ISO 23551 consists of the following parts, under the general title *Safety and control devices for gas burners and gas-burning appliances — Particular requirements*:

— *Part 1: Automatic and semi-automatic valves*

— *Part 2: Pressure regulators*

— *Part 3: Gas/air ratio controls, pneumatic type*

— *Part 4: Valve-proving systems for automatic shut-off valves*

— *Part 5: Manual gas valves*

— *Part 6: Thermoelectric flame supervision controls*

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Introduction

This part of ISO 23551 is designed to be used in combination with ISO 23550. This part of ISO 23551 together with ISO 23550 establishes the full requirements as they apply to the product covered by this International Standard. This part adapts ISO 23550, where needed, by stating "with the following modification", "with the following addition", "is replaced by the following" or "is not applicable", in the corresponding Clause. In order to identify specific requirements that are particular to this part, that are not already covered by ISO 23550, this document may contain Clauses or Sub-clauses that are additional to the structure of ISO 23550. These Clauses are numbered starting from 101 or, in the case of an Annex, are designated AA, BB, CC etc.

In an attempt to develop a full International Standard, it has been necessary to take into consideration the differing requirements resulting from practical experience and installation practices in various regions of the world and to recognize the variation in basic infrastructure associated with gas and/or oil controls and appliances, some of which are addressed in Annexes E, F and G. This International Standard 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 5: Manual gas valves

1 Scope

This part of ISO 23551 specifies safety, constructional and performance requirements for manual gas valves intended for use with gas burners and gas-burning appliances, hereafter referred to as 'valves', unless otherwise specified.

This International Standard applies to following types of manual gas valves:

— manual gas shut-off valve;

— gas burner valve;

— appliance connector valve;

— "delta C" valve.

This part of ISO 23551 applies to valves for gas burners and gas-burning appliances of nominal connection size up to and including DN 100 that can be used and tested independently of these appliances using fuel gases, as natural gas, manufactured gas or liquefied petroleum gas (LPG) at inlet pressures up to and including 500 kPa. It is not applicable to corrosive and waste gases.

This International Standard covers type testing only.

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.

ISO 23550:2011, *Safety and control devices for gas burners and gas-burning appliances — General requirements*

3 Terms and definitions

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

3.101
manual gas shut-off valve
manually operated valve for the control of the gas flow from an "off" to an "on" position and vice versa

Note 1 to entry: Parts commonly used in manual gas shut-off valves are shown as examples in Figures AA.1 to AA.5.

3.102
"delta C" valve
manual gas valve suitable for use on food service equipment (commercial cooking equipment)

Note 1 to entry: These valves are identified by a "delta C" marking.

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3.103
gas burner valve
manual gas valve that requires user initiation of each usage cycle

Note 1 to entry: This type of manual gas valve is intended to be used in Canada and the US between the gas supply piping and the gas burner.

Note 2 to entry: The valve is turned on when the burner operating cycle is initiated and turned off when the burner operating cycle is completed.

3.104
appliance connector valve
manual gas valve having a non-displaceable valve member, a minimum specified capacity and an internal taper pipe thread inlet and an outlet for flared tubing connection

Note 1 to entry: This type of manual gas valve is intended to be used in Canada and the US between the gas supply piping and the appliance connector attached to the appliance.

Note 2 to entry: For minimum capacity see Table 2 and for inlet and outlet connection see 6.102.

3.105
flow rate curve
curve which indicates the air flow in relation to the angle of opening

3.106
bearing seal
shortest distance between gas-carrying parts and the atmosphere measured along the length of the sealing surfaces

3.107
plug
tapered valve member of a manual gas valve containing one or more gas flow openings

3.108
non-displaceable valve member
valve member that cannot be moved from its seat by a force applied to the handle, or force applied by a plane surface to any exterior portion of the valve

3.109
safety lock
means in a manual valve that requires a separate action of the user before being able to open the valve

EXAMPLE Pushing on the valve handle to “unlatch” the valve before the valve handle can be rotated to turn on the gas.

Note 1 to entry: A safety lock is also known as “niting arrangement”.

4 Classes of control

4.1 Classes of controls

Shall be according to ISO 23550:2011, 4.1 with the following addition:

Manual gas valves are classified according to the number of operations:

— 1 000 operations (e.g. appliance connector valves);

— 5 000 operations (e.g. central heating);

— 10 000 operations (e.g. space heaters);

— 12 000 operations; and

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— 40 000 operations (e.g. domestic cooking).

NOTE Number of operations during the expected life of the appliance.

4.2 Groups of controls

Shall be according to ISO 23550:2011, 4.2.

5 Test conditions

Shall be according to ISO 23550:2011, Clause 5.

6 Construction

6.1 General

Shall be according to ISO 23550:2011, 6.1.

6.2 Construction requirements

6.2.1 Appearance

Shall be according to ISO 23550:2011, 6.2.1.

6.2.2 Holes

Shall be according to ISO 23550:2011, 6.2.2.

6.2.3 Breather holes

ISO 23550:2011, 6.2.3 is not applicable.

6.2.4 Screwed fastenings

Shall be according to ISO 23550:2011, 6.2.4.

6.2.5 Jointing

Shall be according to ISO 23550:2011, 6.2.5.

6.2.6 Moving parts

Shall be according to ISO 23550:2011, 6.2.6.

6.2.7 Sealing caps

Shall be according to ISO 23550:2011, 6.2.7.

6.2.8 Dismantling and reassembling for servicing and/or adjustment

Shall be according to ISO 23550:2011, 6.2.8.

6.2.9 Auxiliary channels

Shall be according to ISO 23550:2011, 6.2.9.

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6.2.101 Operating parts of manual gas valves

Manual gas valves operated by rotation shall be opened by turning the operating device anticlockwise and closed by turning it clockwise, except for valves, which provide more than one burner with gas. Alternate construction is acceptable provided the rotation direction is clearly marked or specified in the operations and in installation instructions. Manual gas valves with 90° rotation do not have to meet these requirements when the construction is such that the lever or tee handle is 90° to the line of flow in the off position and parallel to the line of flow in the on position.

A separable handle, removable without further disassembly of the valve, shall be attached by tamper-resistant means unless removal of the handle does not affect the leak tightness of the valve or the retention of the valve member.

Manual gas shut-off valves shall be operated without the use of tools.

It shall not be possible to exert direct axial pressure (other than spring pressure) on the closure member when the operating spindle is depressed to clear any safety lock.

6.2.102 Seating force

Manual gas valves shall be provided with a means, other than gravity, to maintain a continuous seating force to compensate for manufacturing tolerances, operational variations, or displacement of lubricant(s).

It shall not be possible in normal use to apply such forces to the closure member that it is lifted out of its seat or is brought into a position which causes the leakage rates to exceed the values given in 7.2.

6.2.103 Tapered plug cavity

For taper plug manual gas valves the closure member included angle shall be at least 9° 25′. The taper plug at the large diameter shall be recessed into the body, and the plug shall protrude beyond the taper of the body at the small end. There shall be adequate clearance provided for this protrusion.

NOTE Regional specific requirements are given in Annex F.

6.3 Materials

6.3.1 General material requirements

Shall be according to ISO 23550:2011, 6.3.1.

6.3.2 Housing

6.3.2.1 Housing design

Shall be according to ISO 23550:2011, 6.3.2.1 with the following modification.

Item b) is not applicable. O-rings, gaskets and other seals are exempt.

6.3.2.2 Test for leakage of housing after removal of non-metallic parts

Shall be according to ISO 23550:2011, 6.3.2.2.

6.3.2.101 Manual gas valves with shaft seal

For manual gas valves with shaft seals, the shaft seal is excluded from the requirement in 6.3.2.1, if the following requirements are met:

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The structure surrounding a shaft seal shall be such as to confine the seal properly and, with the seal removed and the valve in any position, to allow, when tested at room temperature with air, not more than 45,6 dm^3/h at a pressure of 1,74 kPa to leak past the shaft.

6.3.3 Springs

Shall be according to ISO 23550:2011, 6.3.3.

6.3.4 Resistance to corrosion and surface protection

Shall be according to ISO 23550:2011, 6.3.4.

6.3.5 Impregnation

Shall be according to ISO 23550:2011, 6.3.5.

6.3.6 Seals for glands for moving parts

Shall be according to ISO 23550:2011, 6.3.6.

6.3.101 Valve closure member

Gas-closing parts shall either have a metallic support to withstand the sealing force or shall be made of metal. This requirement also applies to parts transmitting the closing force.

For guide elements (see Figures AA.1 to AA.5) non-metallic materials are admissible.

6.4 Gas connections

Shall be according to ISO 23550:2011, 6.4.

6.101 Component parts

6.101.1 General

The off-position shall have a non-adjustable stop.

6.101.2 Turning angles

6.101.2.1 General

The reduced flow position, if any, shall be placed either after the fully open position or between the open and the closed position.

The turning angle of the manual gas needle valve between the closed and the fully open position shall be between 180° and 360° when used as a shut-off valve unless otherwise specified in the installation and operating instructions.

6.101.2.2 Opening at maximum flow

If the reduced flow rate position is placed after the fully open position the following requirements shall be met:

— in order to change from the closed position to the fully open position the turning angle shall be (90 ± 5)° unless otherwise specified in the installation and operating instructions;

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— the turning angle between the fully open position and the reduced flow rate position shall be greater than 70° unless otherwise specified in the manufacturer's installation and operating instructions; this requirement is not applicable to multi-outlet valves;

— the movement of the manual gas valve closure member shall be limited by a fixed stop at the reduced flow rate position.

6.101.2.3 Opening at minimum flow

If the reduced flow rate position is placed between the closed and fully open position the following requirements shall be met:

— in order to change from the closed position to the fully open position the turning angle shall be greater than 90° unless otherwise specified in the installation and operating instructions;

— in order to change from the reduced flow rate position to the fully open position the turning angle shall be greater than 70° unless otherwise specified in the installation and operating instructions; this requirement is not applicable for multi-outlet-valves;

— a reduced flow rate position shall be provided by means of a part which locates the valve closure member in this position when the movement is in the direction of closing;

— the movement of the manual gas valve closure member shall be limited in the fully open position by a stop.

6.101.2.4 Single outlet manual gas valves

If a single outlet manual gas valve does not have a reduced flow position, the turning angle to pass from the closed position to the fully open position shall be (90 ± 5)° unless otherwise specified in the installation and operating instructions.

6.101.3 Lubrication

A manual gas valve shall be designed so that lubrication, if used, does not cause blockage of any gas way.

6.101.4 Stops

The travel to and from the extreme positions of a manual gas valve shall be limited by stops.

When operating a manual gas needle valve it shall not be possible to remove the needle completely from the body by unscrewing. When closing the positive stop is obtained by contact of the needle on its seat.

6.101.5 Safety lock

Single outlet manual gas valves may be provided with a safety lock that prevents any accidental opening as it requires two separate actions to operate the valve. It shall permit ready operation with one hand.

Manual gas valves with two outlets for two separate burners shall be designed so that in order to change from one outlet to the other it is necessary to pass through a locked closed position. It shall only be possible for the user to change from one outlet to the other by a deliberate action. In particular it shall not be possible to change from one outlet to the other by keeping the handle constantly pressed in or by a pure turning movement.

6.101.6 Bearing seal

The bearing seal for manual gas valves except needle valves shall be at least 3 mm (see Figure AA.1, Item 9), unless otherwise specified by the manufacturer based on tolerance calculation.

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