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

Part 12: Multifunctional controls with integral overpressure protection safety function (OPSF) for use with butane gas cartridges used in portable gas appliances

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Foreword

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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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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.

Introduction

This document is designed to be used in combination with ISO 23550. Together, they establish the full requirements applicable to the product such as the multifunctional controls mounted on portable gas appliances (cookers, space heaters, etc.) 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 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 the 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.

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

Part 12: Multifunctional controls with integral overpressure protection safety function (OPSF) for use with butane gas cartridges used in portable gas appliances

1 Scope

This document specifies safety, construction, performance and testing requirements for multifunctional controls with integral overpressure protection safety function (OPSF) intended for use with portable gas appliances.

This document is applicable to:

— multifunctional controls which consist of a pressure-limiting device and at least one or more controls, including but not limited to a manual gas valve, a pressure regulator and a thermoelectric flame supervision device; and

— multifunctional controls with declared maximum operating pressures in normal use, up to and including 500 kPa for use with a butane gas cartridge specified by ISO/TS 21985.

This document does not apply to multifunctional controls with OPSF having thread connections for mounting butane gas cartridges.

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 301, *Zinc alloy ingots intended for castings*

ISO 9227:2022, *Corrosion tests in artificial atmospheres — Salt spray tests*

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

ISO 23551-5:—[1)], *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 5: Manual gas valves*

ISO 23551-6:2021, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 6: Thermoelectric flame supervision controls*

3 Terms and definitions

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

1) Under preparation. Stage at the time of publication: ISO/FDIS 23551-5:2023.

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
portable gas appliance
portable appliance using vaporized butane from a replaceable, non-refillable, horizontally-mounted, butane gas cartridge specified by ISO/TS 21985 as the primary fuel source

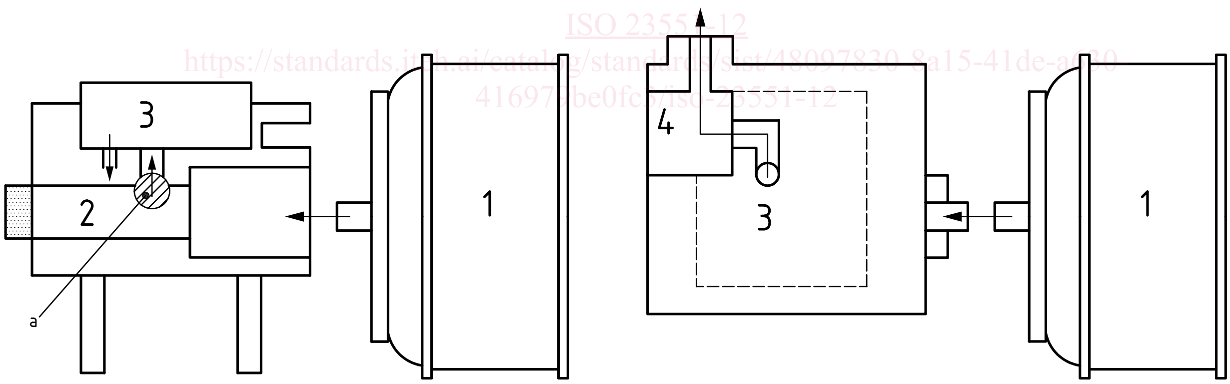
3.2
pressure regulator
device that maintains the outlet pressure constant within given limits, independently of the variations in inlet pressure and/or flow rate

[SOURCE: ISO 23551-2:2018, 3.1.1]

3.3
pressure limiting device
device having overpressure safety function (OPSF) as a function

3.4
overpressure safety function
OPSF
safety function for portable gas appliances which shuts off gas supply to the burner when the supply pressure from the butane gas cartridge reaches the declared pressure range of the OPSF either by shutting off the gas passage or by releasing the cartridge

Note 1 to entry: Examples are shown in Figure 1 and Figure 2.

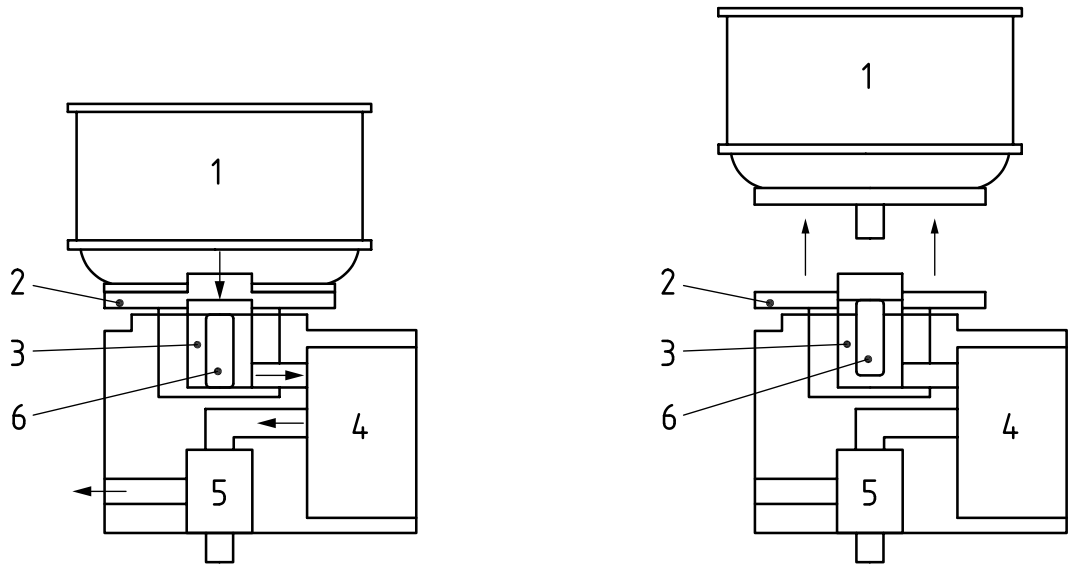


a) Side view b) Top view

Key

1 butane gas cartridge
2 pressure limiting device
3 pressure regulator
4 manual gas valve
[a] Gas passage which is shut off by the shut-off valve mounted on the pressure limiting device when the pressure of the cartridge increases.

Figure 1 — Multifunctional control with gas passage shut-off function



a) Before OPSF operation **b) After OPSF operation**

Key

1 butane gas cartridge
2 magnet
3 pressure limiting device
4 pressure regulator
5 manual gas valve
6 component for cartridge disengagement

NOTE When the pressure of cartridge increases to the operation pressure of OPSF, OPSF operates and disengages the butane gas cartridge from multifunctional control by a force stronger than the force joining the magnet and the cartridge shuts off the gas supply.

Figure 2 — Multifunctional control with cartridge-release function (top view)

3.5
gas passage shut-off function
function which shuts off the gas flow of the gas passage in controls

Note 1 to entry: An example is shown in Figure 1.

3.6
cartridge-release function
function which detaches the cartridge from the control by mechanical means

Note 1 to entry: An example is shown in Figure 2.

3.7
applicable butane gas cartridge
cartridge specified by manufacturer and ISO/TS 21985 intended for use with multifunctional controls using gas with no less than 95 % of butane

Note 1 to entry: The cartridge is classified as UN 2037 as specified in the scope of ISO/TS 21985.

4 Classification

4.1 Classes of controls

Shall be according to ISO 23550:2018, 4.1.

4.2 Group of controls

ISO 23550:2018, 4.2 is not applicable.

4.3 Types of direct current (DC) supplied controls

ISO 23550:2018, 4.3 is not applicable.

4.4 Classes of control functions

ISO 23550:2018, 4.4 is not applicable.

5 Test conditions and tolerances

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

6 Construction

6.1 General

ISO 23550:2018, 6.1 is applicable with the following additions:

This document covers requirements for the safety related interactions between the different functions of the controls (see 6.1.2).

Where there are no requirements for these interactions between two or more functions, a risk assessment shall be performed.

6.1.1 Controls based on combination of functions

6.1.1.1 General

Controls consist of OPSF and a combination of the functions provided by the controls as given by the following list:

— Pressure regulators according to ISO 23551-2;

— Manual gas valves according to ISO 23551-5;

— Thermoelectric flame supervision devices according to ISO 23551-6.

6.1.2 Interaction between controls

6.1.2.1 Closing mechanism for closure member

Each valve shall consist of a separate, independent closing mechanism controlling only one closure member. Verification of internal leak-tightness shall be possible on each of the valves. If two or more closure members are controlled by one closing mechanism, the valve is considered as one valve.

6.1.2.2 Interactions between functions

The interactions between the functions of the controls shall not interfere with the safety of the individual functions.

6.2 Construction requirements

6.2.1 Appearance

Shall be according to ISO 23550:2018, 6.2.1.

6.2.2 Holes

Shall be according to ISO 23550:2018, 6.2.2.

6.2.3 Breather holes

Shall be according to ISO 23550:2018, 6.2.3.

6.2.4 Vent limiters

ISO 23550:2018, 6.2.4 is not applicable.

6.2.5 Screwed fastenings

Shall be according to ISO 23550:2018, 6.2.5.

6.2.6 Moving parts

Shall be according to ISO 23550:2018, 6.2.6.

6.2.7 Sealing caps

Shall be according to ISO 23550:2018, 6.2.7.

6.2.8 Disassembling and assembling for servicing and/or adjustment

ISO 23550:2018, 6.2.8 is not applicable.

NOTE Controls have no means to adjust.

6.2.9 Auxiliary channels and orifices

Shall be according to ISO 23550:2018, 6.2.9.

6.2.10 Pre-setting device

Shall be according to ISO 23550:2018, 6.2.10.

6.2.11 Adjustments

ISO 23551-2:2018, 6.2.11 is not applicable.

NOTE Controls have no means to adjust.

6.2.12 Resistance to pressure

Subclause specific to this document.

Parts of the pressure regulator that are subjected to inlet pressure under normal operating conditions, or that could be subjected to inlet pressure in the event of a failure, shall resist a pressure equal to the withstand pressure.

The withstand pressure shall be stated in the installation and operating instructions. If no withstand pressure is stated, the withstand pressure is equal to the maximum inlet pressure.

6.2.13 Signal tube connections

ISO 23551-2:2018, 6.2.14 is not applicable.

6.2.14 Operating parts of manual gas valves

Shall be according to ISO 23551-5:—[2)], 6.2.11.

6.2.15 Seating force

Shall be according to ISO 23551-5:—, 6.2.12.

6.2.16 Tapered plug cavity

Shall be according to ISO 23551-5:—, 6.2.13 with the following additions:

For the manual gas valves where the small end of the plug does not protrude from the body, and non-metallic material is used between the body and the taper plug, the requirement for the angle of closure member is not applied. This type of manual gas valve shall be designed so that the taper plug shall be securely contacted with the body using a spring, for example. Grease used between the taper plug and non-metallic material shall conform to 6.3.11.

6.2.17 Pressure-limiting device

Subclause specific to this document.

The pressure-limiting device shall be designed not to release the gas when the OPSF is actuated. Also, it shall be designed not to reset automatically after lock out, even if the pressure is reduced.

The lever for connecting the butane gas cartridge shall not serve as part of the OPSF.

The actuating parts which are affected to the OPSF and are exposed to the elements shall not depend on lubricant.

The pressure-sensing part of the pressure-limiting device shall be designed to be able to accurately detect the pressure of the cartridge.

The pressure-limiting device shall be designed so that the factory setting pressure of the OPSF shall not be changed.

6.3 Materials

6.3.1 General material requirements

Shall be according to ISO 23550:2018, 6.3.1.

6.3.2 Housing

6.3.2.1 General

Shall be according to ISO 23550:2018, 6.3.2.1.

2) Under preparation. Stage at the time of publication: ISO/FDIS 23551-5:2023.

