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

Part 1: Automatic and semi-automatic valves

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

Partie 1: Robinets automatiques

[Revision of first edition (ISO 23553-1:2007) and ISO 23553-1:2007/Cor.1:2009]

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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Contents

Page

1	Scope	1
2	Normative references	1
3	Terms and definitions	3
4	Classification	6
5	Test conditions	6
6	Construction	6
7	Performance	12
8	EMC/Electrical requirements	18
9	Marking, installation and operating instructions	22
	Annex A (informative) Leak-tightness test — Volumetric Method	25
	Annex B (informative) Leak-tightness test — Pressure-loss method	26
	Annex C (normative) Conversion of pressure loss into leakage rate	27
	Annex D (normative) Test for immunity to power-frequency magnetic fields	28
	Annex E (normative) Specific regional requirements in European countries	29
	Annex F (normative) Specific regional requirements in Canada and USA	31
	Annex G (normative) Specific regional requirements in Japan	34
	Bibliography	35

Figures

Figure 1 — Response time of closure member during opening	4
Figure 2 — Response time of closure member during closing	5

Tables

Table 1 — Internal leak-tightness	12
Table 2 — Maximum winding temperature (for test of blocked output conditions and valves where the test methods shall different to IEC 60730-1, 4.1 and 4.2 based on declared of the manufacturer)	19
Table G.1 — Internal leak-tightness	34

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 23553-1 was prepared by Technical Committee ISO/TC 161, *Control and protective devices for gas and/or oil burners and appliances*.

ISO 23553 consists of the following parts, under the general title *Safety and control devices for oil burners and oil-burning appliances — Particular requirements*:

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

This part of ISO 23553 is designed to be used in combination with ISO 23550. This part 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 subclauses 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 fully 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 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.

IMPORTANT — When reference is made in ISO 23553 to ISO 23550, the word “gas” shall be replaced by “oil” as appropriate. The current base standard, ISO 23550:2011; is focusing on gas controls only. It is however the intention to revise the base standard in such a fashion that both, gas and oil product standards can be used in conjunction with the base standard. Attention is drawn especially to the following Subclauses 6.4, 7.4 and 7.5.

It should be noted that the following significant technical changes compared to the previous edition have been incorporated in this International Standard:

- a) change of the title from shut-off valves to automatic and semi-automatic valves;
- b) extension of the scope to automatic and semi-automatic valves;

- c) introduction of further classifications for valves;
- d) inclusion of references to the general electrical requirements of IEC 60730-1:2010;
- e) integration of non electrical requirements from IEC 60730-2-19;
- f) integration of electrical requirements from IEC 60730-2-19 which are unalterable for valves;
- g) inclusion of the Subclause 7.7.103 “Test of endurance of electrically operated valves”;
- h) change of endurance cycles for valves up to DN 15;
- i) extended limits of internal leakage for valves \leq DN 50;
- j) test of closing function updated.

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Safety and control devices for oil burners and oil burning appliances — Particular requirements — Part 1: Automatic and semi-automatic valves

1 Scope

This part of ISO 23553 specifies safety, constructional and performance requirements and testing of automatic and semi-automatic valves for oil.

It applies to automatic and semi-automatic valves which:

- are designed as fast-closing devices;
- are used in combustion plants to interrupt the flow of oil with or without delay on closing and with or without delay on opening;
- are for use with oil types (e. g. diesel, crude oil, heavy fuel oil or kerosene) without gasoline;

NOTE 1 For other oil types (e. g. oil emulsions), additional test methods can be agreed between the manufacturer and the test authority.

- from part of a device having other function(s), such as oil pumps. In this case the test methods apply to those parts or components of the device forming the automatic and semi-automatic valves, i. e. those parts which are necessary for the closing function;
- are for use on burners or in appliances using oil;

NOTE 2 There is a need for applications above 5 000 kPa in the market.

- are directly or indirectly operated electrically or by mechanical or hydraulic means;
- are fitted with or without closed-position indicator switches.

This ISO standard covers type testing only.

2 Normative references

The following referenced documents are indispensable for the application 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 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 274, *Copper tubes of circular section — Dimensions*

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

IEC 60534-1, *Industrial-process control valves — Part 1: Control valve terminology and general considerations*

IEC 60534-2-3, *Industrial-process control valves — Part 2-3: Flow capacity; test procedures*

IEC 60730-1:2010, *Automatic electrical controls for household and similar use — Part 1: General requirements*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1092-1, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1092-2, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

EN 1092-3, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories PN designated — Part 3: Copper alloy flanges*

EN 1092-4, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 4: Aluminium alloy flanges*

EN 1254-1, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*

EN 1254-2, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with copper tubes*

EN 1254-3, *Copper and copper alloys — Plumbing fittings — Part 3: Fittings with compression ends for use with plastics pipes*

EN 1254-5, *Copper and copper alloys — Plumbing fittings — Part 5: Fittings with short ends for capillary brazing to copper tubes*

EN 10226-1, *Pipe threads where pressure tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads; Dimensions, tolerances and designation*

EN 10226-2, *Pipe threads where pressure tight joints are made on the threads — Part 2: Taper external threads and taper internal threads - Dimensions, tolerances and designation*

EN 10241, *Steel threaded pipe fittings*

EN 10242, *Threaded pipe fitting in malleable cast iron*

EN 10284, *Malleable cast iron fittings with compression ends for polyethylene (PE) piping systems*

EN 10305-1, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*

EN 10305-2, *Steel tubes for precision applications — Technical delivery conditions — Part 2: Welded cold drawn tubes*

EN 10305-3, *Steel tubes for precision applications — Technical delivery conditions — Part 3: Welded cold sized tubes*

EN 10305-4, *Steel tubes for precision applications — Technical delivery conditions — Part 4: Seamless cold drawn tubes for hydraulic and pneumatic power systems*

EN 10305-6, *Steel tubes for precision applications — Technical delivery conditions — Part 6: Welded cold drawn tubes for hydraulic and pneumatic power systems*

EN 12516 (all parts), *Industrial valves — Shell design strength*

EN 12627, *Industrial valves — Butt welding ends for steel valves*

EN 12760, *Valves — Socket welding ends for steel valves*

prEN 10344, *Malleable cast iron fittings with compression ends for steel pipes*

prEN 12514-4:2009, *Parts for supply systems for consuming units with liquid fuels — Part 4: Safety requirements and tests — Pipings and parts within pipelines*

ANSI/ASME B 1.1:1998, *Unified inch screw threads (UN and UNR thread form)*

ANSI/ASME B1.20.1, *Pipe threads, general purpose (inch)*

ANSI/ASME B 16.1, *Cast iron pipe flanges and flanged fittings, class 25, 125, 250 and 800*

ANSI/SAE J 512, *Automotive tube fittings*

ANSI/SAE J 514, *Hydraulic tube fittings*

ASTM D 396:2010, *Standard Specification for Fuel Oils*

NEMA 250, *Enclosures for Electrical Equipment (1 000 V Maximum)*

UL 50 UL, *Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23550:2011 and the following apply.

3.101 valves

3.101.1 valve

device consisting essentially of a valve body, closure member, and actuator that controls the flow of oil

NOTE 1 The actuator may be actuated by electrical or mechanical means.

NOTE 2 The actuation may be done by fuel pressure, electrical, hydraulic or pneumatic energy.

3.101.2 normally closed valve

valve which closes when no actuating energy is applied

3.101.3 automatic valve

normally closed valve that closes on removal of the actuating energy

3.101.4 semi-automatic valve

normally closed valve that is actuated manually and returns to the closed position upon removal of the actuating energy

3.101.5

safety shut-off valve

normally closed valve, automatic or semi-automatic, that prevents delivery of oil when de-energized

3.101.6

valve with step control

multi stage valve

valve which controls the flow rate in steps

3.101.7

valve with modulating control

modulating valve

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

3.102

fast-closing device

safety shut-off valve with a predetermined time for the closing process

3.103

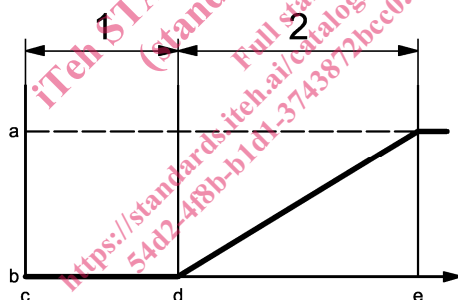
response times

3.103.1

opening time

time from the beginning until the end of the change in position of the closure member from the closed to the open position

NOTE For illustration refer to Figure 1.



Key

- 1 delay time
- 2 opening time

- a open
- b closed
- c signal for opening
- d start of period of change in position
- e end of period of change in position

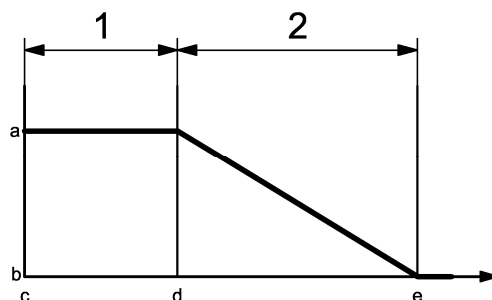
Figure 1 — Response time of closure member during opening

3.103.2

closing time

time from the beginning until the end of the change in position of the closure member from the open to the closed position

NOTE For illustration refer to Figure 2.



Key

- | | | | |
|---|--------------|---|---------------------------------------|
| 1 | delay time | a | open |
| 2 | closing time | b | closed |
| | | c | signal for closing |
| | | d | start of period of change in position |
| | | e | end of period of change in position |

Figure 2 — Response time of closure member during closing

3.103.3

delay time on opening

interval between the signal to open and the point at which the closure member no longer maintains the required tightness

3.103.4

delay time on closure

interval between the signal to close and the start of change in position of the closure member

3.104

opening force

force which effects the opening of the automatic valve

3.105

closing force

force which effects the closing of the closure member in the case of failure or interruption of the externally applied actuating energy, such as spring force, independent of any force provided by oil pressure

3.106

frictional force

largest force required to move the actuating mechanism and the closure member from the open position to the closed position with the closing force removed, independent of any force provided by oil pressure

NOTE Adapted from ISO 23551-1:2006, 3.109.

3.107

opening [closing] characteristics

curve representing the movement of the closure member against time on opening [closing]

3.108

actuator

part effecting the movement of the closure member

3.109

auxiliary medium

medium used for actuating the moving parts of the system (pneumatic or hydraulic)

3.110

auxiliary medium pressure

pressure exerted by the auxiliary medium during actuation of the moving parts

3.111

Commercial / industrial valve

C/I Valve

a normally closed automatic or semi-automatic shut-off valve

4 Classification

4.1 Classes of control

4.2 Shall be according to ISO 23550:2011, 4.1.Groups of Control

Shall be according to ISO 23550:2011, 4.2 with the following modification:

Group 1 is not applicable.

5 Test conditions

Shall be according to ISO 23550:2011, Clause 5 with the following modification:

Controls which can be converted for use with another oil by exchanging components are additionally tested with the conversion components.

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

ISO 23550:2011, 6.2.2 shall be replaced by the following:

Holes for screws, pins, etc., which are used for the assembly of parts or used to install the valve shall not penetrate oil passageways.

Holes necessary in manufacture which connect oil passageways to the atmosphere but which do not affect the function of the valve shall be permanently sealed by metallic means. Suitable jointing compounds may additionally be used.

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.

NOTE Specific regional requirements are given in Annex F.