

DRAFT INTERNATIONAL STANDARD

ISO/DIS 23553-1

ISO/TC 161

Secretariat: DIN

Voting begins on:
2020-07-22

Voting terminates on:
2020-10-14

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 combustible liquide et pour appareils à combustible liquide — Exigences particulières —

Partie 1: Robinets automatiques et semi-automatiques

ICS: 27.060.10

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Reference number
ISO/DIS 23553-1:2020(E)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 161, controls and protective devices for gas and/or oil.

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This third edition cancels and replaces the second edition (ISO 23553-1:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- References to a previous version of ISO 23550:2011 have been replaced by the content of ISO 23550:2018 wherever possible.
- All references to IEC 60730-1 have been updated to reflect the current edition IEC 60730-1:2013.
- References to standards are now dated.

A list of all parts in the ISO 2355* series can be found on the ISO website.

Introduction

This updated part of ISO 23553-1 is designed to be used as a stand-alone standard and no longer in combination with ISO 23550 “Safety and control devices for gas burners and gas-burning appliances — General requirements”.

Whereas the previous ISO 23553-1 referred to specific sections in ISO 23550, are those sections now included direct in ISO 23553-1.

Compared to the previous document ISO 23553-1:2014 no technical changes have been done and no further technical requirements have been added.

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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:

- normally closed;
- used in combustion plants to interrupt the oil flow with or without delay on closing;
- for use with oil types (e.g. middle distillate fuel oil, 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.

NOTE 2 Oil types from petroleum refining processes are classified ISO-F-D in ISO 8216-99 and form 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;

- for use on burners or in appliances using oil;
- directly or indirectly operated, electrically or by mechanical or hydraulic means;
- fitted with or without closed-position indicator switches.

This part of ISO 23553 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 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 65:1981, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*

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

ISO 262:1998, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 272:1982, *Fasteners — Hexagon products — Widths across flats*

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ISO 1179-1:2013, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 1: Threaded ports*

ISO 1179-2:2013, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 2: Heavy-duty (S series) and light-duty (L series) stud ends with elastomeric sealing (type E)*

ISO 1179-3:2007, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 3: Light-duty (L series) stud ends with sealing by O-ring with retaining ring (types G and H)*

ISO 1179-4:2007, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 4: Stud ends for general use only with metal-to-metal sealing (type B)*

ISO 3601-5:2015, *Fluid power systems — O-rings — Part 5: Specification of elastomeric materials for industrial applications*

ISO 6149-1:2006, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 1: Ports with truncated housing for O-ring seal*

ISO 6149-3:2006, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 3: Dimensions, design, test methods and requirements for light-duty (L series) stud ends*

ISO 6708:1995, *Pipework components — Definition and selection of DN (nominal size)*

ISO 7005-1:2011, *Pipe flanges — Part 1: Steel flanges for industrial and general service piping systems*

ISO 7005-2:1988, *Metallic flanges — Part 2: Cast iron flanges*

ISO 7005-3:1988, *Metallic flanges — Part 3: Copper alloy and composite flanges*

ISO/TR 7620:2005, *Rubber materials — Chemical resistance*

ISO 8216-99:2002, *Petroleum products — Fuels (class F) — Classification — Part 99: General*

ISO 8434-1:2007, *Metallic tube connections for fluid power and general use — Part 1: 24 degree cone connectors*

ISO 8434-2:2007, *Metallic tube connections for fluid power and general use — Part 2: 37 degree flared connectors*

ISO 8434-3:2005, *Metallic tube connections for fluid power and general use — Part 3: O-ring face seal connectors*

ISO 8434-6:2009, *Metallic tube connections for fluid power and general use — Part 6: 60 degree cone connectors with or without O-ring*

ISO 9974-1:1996, *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 1: Threaded ports*

ISO 9974-3:1996, *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 3: Stud ends with metal-to-metal sealing (type B)*

ISO 10763:1994, *Hydraulic fluid power - Plain-end, seamless and welded precision steel tubes - Dimensions and nominal working pressures*

ISO 23936-1:2009, *Petroleum, petrochemical and natural gas industries — Non-metallic materials in contact with media related to oil and gas production — Part 1: Thermoplastics*

ISO 23936-2:2011, *Petroleum, petrochemical and natural gas industries — Non-metallic materials in contact with media related to oil and gas production — Part 2: Elastomers*

- IEC 60534-1:2005, *Industrial-process control valves— Part 1: Control valve terminology and general considerations IEC 60534-2-3*
- IEC 60534-2-3:2015, *Industrial-process control valves - Part 2-3: Flow capacity - Test procedures*
- IEC 60730-1:2013, *Automatic electrical controls for household and similar use — Part 1: General Requirements*
- EN 1057:2006, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*
- EN 1092-1:2007, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*
- EN 1092-2:1997, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*
- EN 1092-3:2003, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories PN designated — Part 3: Copper alloy flanges*
- EN 1092-4:2002, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 4: Aluminum alloy flanges*
- EN 1254-1:1998, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*
- EN 1254-2:1998, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with copper tubes*
- EN 1254-3:1998, *Copper and copper alloys — Plumbing fittings — Part 3: Fittings with compression ends for use with plastics pipes*
- EN 1254-5:1998, *Copper and copper alloys — Plumbing fittings — Part 5: Fittings with short ends for capillary brazing to copper tubes*
- EN 10226-1:2004, *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 10226-2:2005, *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 10241:2000, *Steel threaded pipe fittings*
- EN 10242:1994, *Threaded pipe fitting in malleable cast iron*
- EN 10284:2000, *Malleable cast iron fittings with compression ends for polyethylene (PE) piping systems*
- EN 10305-1:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*
- EN 10305-2:2010, *Steel tubes for precision applications — Technical delivery conditions — Part 2: Welded cold drawn tubes*
- EN 10305-3:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 3: Welded cold sized tubes*
- EN 10305-4:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 4: Seamless cold drawn tubes for hydraulic and pneumatic power systems*
- EN 10305-6:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 6: Welded cold drawn tubes for hydraulic and pneumatic power systems*
- EN 12516:2014, *(all parts), Industrial valves — Shell design strength*

EN 12627:2017, *Industrial valves — Butt welding ends for steel valves*

EN 12760:2016, *Valves — Socket welding ends for steel valves*

prEN 10344:2006, *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 1.1:2003, *Unified inch screw threads (UN and UNR thread form)*

ANSI/ASME B1.20.1:1983, *Pipe threads, general purpose (inch)*

ANSI/ASME B 16.1:1998, *Cast iron pipe flanges and flanged fittings, class 25, 125, 250 and 800*

ANSI/ASME B 16.5:2017, *Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard*

ANSI/SAE J 512:1997, *Automotive tube fittings*

ANSI/SAE J 514:2012, *Hydraulic tube fittings*

ASTM D 396:2019, *Standard Specification for Fuel Oils*

NEMA 250:2014, *Enclosures for Electrical Equipment (1 000 V Maximum)*

UL 50:2015, *Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://standards.iteh.ai/catalog/standards/sist/724dd5ef-a8af-4a5b-a948-558116617553>

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

breather hole

orifice which allows atmospheric pressure to be maintained within a compartment of variable volume

3.2

closure member

movable part of the valve which shuts off the oil flow

3.3

control

device which directly or indirectly controls the oil flow and/or provides a safety function within a oil burner or oil-burning appliance

3.4

external leak-tightness

leak-tightness of a oil-carrying compartment with respect to the atmosphere

3.5

internal leak-tightness

leak-tightness of the closure member (in the closed position) sealing an oil-carrying compartment with respect to another compartment or to the outlet of the control

3.6

inlet pressure

pressure at the inlet of the control

3.7**outlet pressure**

pressure at the outlet of the control

3.8**pressure difference**

difference between the inlet and outlet pressures

3.9**maximum working pressure**

highest inlet pressure declared by the manufacturer at which the control may be operated

3.10**minimum working pressure**

lowest inlet pressure declared by the manufacturer at which the control may be operated

3.11**flow rate**

volume flowing through the control divided by time

3.12**maximum ambient temperature**

highest temperature of the surrounding air declared by the manufacturer at which the control may be operated

3.13**minimum ambient temperature**

lowest temperature of the surrounding air declared by the manufacturer at which the control may be operated

3.14**mounting position**

position declared by the manufacturer for mounting the control

Note 1 to entry: Mounting positions are, for example, as follows:

- upright: single position on a horizontal axis with respect to the inlet connection, as specified by the manufacturer;
- horizontal: any position on a horizontal axis with respect to the inlet connection;
- vertical: any position on a vertical axis with respect to the inlet connection;
- limited horizontal: any position from upright to 90° (1,57 rad) from upright on a horizontal axis with respect to the inlet connection;
- multi poise: any position on a horizontal, vertical or intermediate axis with respect to the inlet connection

3.15**diameter nominal****DN****nominal size**

alphanumeric designation of size for components of a pipework system, which is used for reference purposes, comprising the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections

Note 1 to entry: The number following the letters DN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

Note 2 to entry: In those standards which use the DN designation system, any relationship between DN and component dimensions should be given, e.g. DN/OD or DN/ID.

Note 3 to entry: Adapted from ISO 6708:1995, definition 2.1.

3.16 valves

3.16.1 valve

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

Note 1 to entry: The actuator may be actuated by electrical or mechanical means.

Note 2 to entry: The actuation may be done by fuel pressure, electrical, hydraulic or pneumatic energy.

3.16.2 normally closed valve

nc
valve which is in closed position when no actuating energy is applied

3.16.3 automatic valve

normally closed valve that closes on removal of the actuating energy

3.16.4 semi-automatic valve

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

3.16.5 safety shut-off valve

normally closed valve, automatic or semi-automatic, that prevents the oil flow when de-energized

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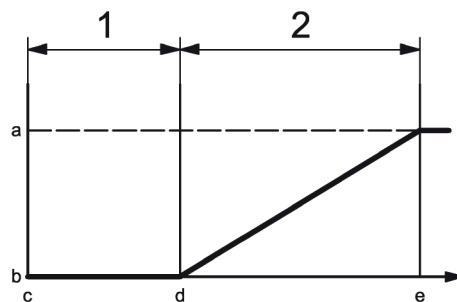
3.17 response times

3.17.1 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

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Note 1 to entry: For illustration refer to [Figure 1](#).



Key

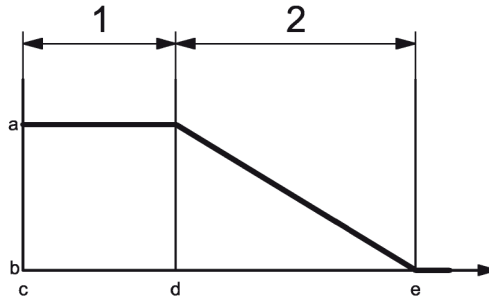
- | | | | |
|---|--------------|---|---------------------------------------|
| 1 | delay time | c | signal for opening |
| 2 | opening time | d | start of period of change in position |
| a | open | e | end of period of change in position |
| b | closed | | |

Figure 1 — Response time of closure member during opening

3.17.2 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 1 to entry: For illustration refer to [Figure 2](#).



Key

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

Figure 2 — Response time of closure member during closing
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3.18 opening force

force which effects the opening of the automatic valve

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3.19 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

3.20 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 1 to entry: Adapted from ISO 23551-1:2012, 3.109

3.21 opening (closing) characteristics

curve representing the movement of the closure member against time on opening (closing)

3.22 actuator

part effecting the movement of the closure member

Note 1 to entry: Also media could effect the movement.

3.23 auxiliary medium

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