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Industrial furnaces and associated processing equipment - Safety - Part 2: Combustion and fuel handling systems (ISO 13577-2:2023)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

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**EN ISO 13577-2**

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English Version

**Industrial furnaces and associated processing equipment -  
Safety - Part 2: Combustion and fuel handling systems (ISO  
13577-2:2023)**

Fours industriels et équipements associés - Sécurité -  
Partie 2: Équipement de combustion et de manutention  
des combustibles (ISO 13577-2:2023)

Industrielle Thermoprozessanlagen und dazugehörige  
Prozesskomponenten - Sicherheitsanforderungen - Teil  
2: Feuerungen und Brennstoffführungssysteme (ISO  
13577-2:2023)

This European Standard was approved by CEN on 10 June 2023.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN ISO 13577-2:2023 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## **European foreword**

This document (EN ISO 13577-2:2023) has been prepared by Technical Committee ISO/TC 244 "Industrial furnaces and associated processing equipment" in collaboration with Technical Committee CEN/TC 186 "Industrial thermoprocessing - Safety" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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

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Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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## **Endorsement notice**

The text of ISO 13577-2:2023 has been approved by CEN as EN ISO 13577-2:2023 without any modification.

INTERNATIONAL  
STANDARD

ISO  
13577-2

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**Industrial furnaces and associated  
processing equipment — Safety —  
Part 2:  
Combustion and fuel handling systems**

*Fours industriels et équipements associés — Sécurité —*

*Partie 2: Équipement de combustion et de manutention des  
combustibles*



Reference number  
ISO 13577-2:2023(E)

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# Contents

	Page
<b>Foreword</b> .....	<b>vi</b>
<b>Introduction</b> .....	<b>vii</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms and definitions</b> .....	<b>4</b>
<b>4 Safety requirements, measures and verification means</b> .....	<b>4</b>
4.1 General.....	4
4.1.1 Safety objectives and basic requirements.....	4
4.1.2 Over-temperature protection.....	5
4.1.3 Accumulation of hazardous fluids.....	6
4.1.4 Seismic protection.....	6
4.1.5 Regional requirements.....	6
4.2 Fuel pipework.....	6
4.2.1 General.....	6
4.2.2 Connections.....	6
4.2.3 Unconnected pipework.....	8
4.2.4 Galvanic cells.....	8
4.2.5 Flexible tubing and couplings.....	8
4.2.6 Marking.....	8
4.2.7 Soundness/tightness.....	8
4.2.8 Condensate drains on gas pipework.....	10
4.2.9 Fuel pipe heating.....	10
4.2.10 Purge points.....	10
4.2.11 Pressure relief devices.....	10
4.2.12 Blow-off and breather pipes or conduits.....	10
4.2.13 Equipment supplied with different fuels.....	11
4.2.14 Bypass.....	11
4.2.15 Isolation of required safety devices.....	11
4.3 Required safety devices for gaseous fuels.....	11
4.3.1 Manual isolating valve.....	11
4.3.2 Filter/strainer.....	11
4.3.3 Gas pressure regulator.....	12
4.3.4 Low gas pressure protection.....	12
4.3.5 High gas pressure protection.....	13
4.3.6 Automatic shut-off valves.....	13
4.3.7 Valve proving.....	14
4.3.8 Individual manual shut-off valves for burners.....	15
4.3.9 Flame arrestor.....	15
4.4 Gas pressure boosters.....	15
4.5 Required safety devices for liquid fuels.....	16
4.5.1 Manual isolating valve.....	16
4.5.2 Filter/strainer.....	16
4.5.3 Pressure relief valve.....	16
4.5.4 Liquid fuel pressure regulator.....	16
4.5.5 Pressure regulation of auxiliary fluids.....	16
4.5.6 Liquid fuel and auxiliary fluid pressure protection.....	16
4.5.7 Liquid fuel temperature protection.....	16
4.5.8 Automatic shut-off valves.....	17
4.5.9 Automatic shut-off valves for multiple burners.....	17
4.5.10 Individual manual shut-off valves for multiple burners.....	17
4.6 Combustion air and fuel/air ratio.....	18
4.6.1 Combustion air system.....	18
4.6.2 Air flow and pressure sensing devices.....	18

**ISO 13577-2:2023(E)**

4.6.3	Air/fuel ratio .....	19
4.7	Supply of pre-mixed fuel gas/air .....	19
4.7.1	Mixture pipework.....	19
4.7.2	Air and gas supply to the mixture circuit.....	19
4.8	Liquid fuel atomisation .....	20
4.9	Burners.....	20
4.9.1	Main burners.....	20
4.9.2	Radiant tube burner systems.....	20
4.9.3	Ignition device/pilot burner .....	20
4.9.4	Permanent pilots.....	21
4.9.5	Burner capacity control .....	21
4.9.6	Flue gas venting.....	21
4.9.7	Purge of residual fuel.....	21
4.10	Automatic burner control systems.....	21
4.10.1	General.....	21
4.10.2	Low-temperature equipment.....	22
4.10.3	High-temperature equipment.....	22
4.10.4	Automatic burner control systems for burners operating in the open air .....	23
4.10.5	Flame supervision for line-burners.....	23
4.11	Start-up of the heating system and burner ignition.....	23
4.11.1	Pre-purging of the combustion chamber.....	23
4.11.2	Start-up of the fuel supply.....	25
4.11.3	Start fuel flow rate.....	25
4.11.4	Ignition.....	25
4.11.5	Maximum safety times for gas-fired natural draught burners .....	25
4.11.6	Maximum safety times for forced and induced draught gas-fired burners .....	26
4.11.7	Maximum safety times for liquid fuel fired burners .....	27
4.11.8	Flame failure on start-up.....	28
4.11.9	Flame failure during operation.....	28
4.12	Multiple fuels.....	29
4.12.1	General.....	29
4.12.2	Fuel circuit.....	29
4.12.3	Combustion air supplies.....	29
4.12.4	Operation of the safety devices.....	29
4.12.5	Air/fuel ratio .....	29
4.13	Oxygen or oxygen-enriched combustion air (OOECA) .....	29
4.13.1	General.....	29
4.13.2	Suitability for oxygen service .....	30
4.13.3	Pipework.....	30
4.13.4	Flow velocities.....	30
4.13.5	Connection for oxygen pipework.....	31
4.13.6	Sealing materials for oxygen pipework.....	31
4.13.7	Fittings.....	31
4.13.8	Blow off and venting lines.....	31
4.13.9	Flexible tubing and couplings.....	31
4.13.10	Safety devices against backflow .....	31
4.13.11	Material requirements.....	31
<b>5</b>	<b>Verification of the safety requirements and/or measures .....</b>	<b>32</b>
<b>6</b>	<b>Information for use .....</b>	<b>36</b>
6.1	General.....	36
6.2	Marking.....	36
6.3	Instruction handbook.....	36
6.3.1	General.....	36
6.3.2	Description of equipment.....	36
6.3.3	Inspection procedures .....	37
6.3.4	Commissioning, start-up and operating procedures .....	37



6.3.5	Shutdown procedures .....	37
6.3.6	Maintenance procedures.....	38
6.3.7	Documentation.....	38
<b>Annex A</b>	<b>(informative) List of significant hazards.....</b>	<b>39</b>
<b>Annex B</b>	<b>(informative) Examples of fuels.....</b>	<b>41</b>
<b>Annex C</b>	<b>(normative) Maximum allowed pressure.....</b>	<b>42</b>
<b>Annex D</b>	<b>(informative) Examples for the determination of safety integrity level (SIL) or performance level (PL) using the risk graph method .....</b>	<b>47</b>
<b>Annex E</b>	<b>(normative) Regional product standards.....</b>	<b>58</b>
<b>Annex F</b>	<b>(informative) Example for manual leak check of automatic shut-off valves.....</b>	<b>63</b>
<b>Annex G</b>	<b>(informative) Example of piping and components.....</b>	<b>65</b>
<b>Annex H</b>	<b>(informative) Methods for burner start-up .....</b>	<b>76</b>
<b>Annex I</b>	<b>(informative) Requirements specific to Japan .....</b>	<b>91</b>
<b>Annex J</b>	<b>(informative) Requirements specific to the USA.....</b>	<b>95</b>
<b>Annex K</b>	<b>(informative) Requirements for Europe and associated countries .....</b>	<b>99</b>
<b>Bibliography</b>	<b>.....</b>	<b>102</b>

## ISO 13577-2:2023(E)

### 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](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 244, *Industrial furnaces and associated processing equipment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 186, *Industrial thermoprocessing - Safety*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 13577-2:2014), which has been technically revised.

The main changes are as follows:

- revised document structure with requirements consolidated for the different fuels;
- improvement and specification of the requirements for testing the fuel pipework after construction;
- addition of requirements for gas pressure boosting systems;
- integration of selected requirements from the regional annexes into the global standard text;
- requirements for solid fuels removed;
- additional informative annex listing relevant product standards for components in the different regions.

A list of all parts in the ISO 13577 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](http://www.iso.org/members.html).

## Introduction

This document is a type-C standard as defined in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organisations, market surveillance etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery/equipment concerned and the extent to which hazards, hazardous situations or hazardous events are covered, is indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of the other standards, for machines that have been designed and built according to the requirements of this type-C standard.

This document assumes that the equipment is installed in a ventilated area and does not create any potentially explosive atmosphere. The installation of a TPE in accordance with the requirements of this document will not by itself require a change to the classification of the TPE location according to IEC 60079-10-1:2020.

Conformance with product standards, e.g. ISO 22967:2010 or ISO 22968:2010 is not sufficient to ensure the minimum safety requirements for industrial furnaces and associated processing equipment (TPE). This document always has priority for TPE.

Industrial furnaces and associated processing equipment (TPE) generally consist of the following components:

- processing chamber (e.g. steel construction with lining and/or refractory);
- heating systems;
- protective system;
- control and instrumentation system / operator-control level.

ISO 13577-1:2016 provides the general safety requirements common to TPE. This document details in addition specific safety requirements for combustion and fuel handling systems that are part of TPE as listed in the Scope.

The requirements for protective systems are specified in ISO 13577-4:2022.

The requirements for reducing hazards from noise are given in ISO 13577-1:2016.

It is assumed that TPE are operated and maintained by trained personnel.

# Industrial furnaces and associated processing equipment — Safety —

## Part 2: Combustion and fuel handling systems

### 1 Scope

This document specifies the safety requirements for combustion and fuel handling systems that are part of industrial furnaces and associated processing equipment (TPE), including single and multiple burner systems in thermoprocessing equipment and machines.

NOTE The general safety requirements common to TPE are provided in ISO 13577-1:2016. ISO 13577-1:2016, Annex B also includes a list of processes for which industrial furnaces and heating systems covered by the ISO 13577 series are used.

This document deals with significant hazards, hazardous situations and events relevant to combustion and fuel handling systems as listed in [Annex A](#), when used as intended and under the conditions for use as described in the instruction handbook.

This document covers:

- fuel pipework downstream of and including the manual isolating valve;
- combustion air supply (including oxygen and oxygen enriched combustion air) and flue gas system;
- burner(s), burner system and ignition device;
- functional requirements for safety related control system.

This document applies to any oxidation of gaseous and liquid fuels with air or other gases containing free oxygen to release thermal energy in TPE. [Annex B](#) includes examples of gaseous and liquid fuels.

For thermal or catalytic post combustion and waste incineration, this document applies only to auxiliary burners designed to start-up and/or support the process.

The pressure hazard of the piping and components covered by this document is within the maximum pressure/size relationship of category I as specified in [Annex C](#).

This document also gives the necessary requirements regarding information for use.

This document does not cover hazards from heating generated by electricity.

This document does not deal with the hazards created by the release of flammable substances from the products processed in the TPE.

This document is not applicable to combustion and fuel handling systems:

- of gas welding and allied processes;
- up-stream of the TPE manual isolating valve.

This document is not applicable to industrial furnaces and associated processing equipment (TPE), including single and multiple burner systems in thermoprocessing equipment and machines manufactured before the date of its publication.

## ISO 13577-2:2023(E)

This document is not applicable to blast furnaces, converters (in steel plants), boilers, fired heaters (including reformer furnaces) in the petrochemical and chemical industries.

This document is not applicable to electrical cabling and power cabling upstream of the TPE control panel/protective system.

## 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 49:1994, *Malleable cast iron fittings threaded to 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 5817:2014, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections*

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 8434-1:2018, *Metallic tube connections for fluid power and general use — Part 1: 24° 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 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13574:2015, *Industrial furnaces and associated processing equipment — Vocabulary*

ISO 13577-1:2016, *Industrial furnaces and associated processing equipment — Safety — Part 1: General requirements*

ISO 13577-4:2022, *Industrial furnace and associated processing equipment — Safety — Part 4: Protective systems*

ISO 16852:2016, *Flame arresters — Performance requirements, test methods and limits for use*

ISO 19879:2010, *Metallic tube connections for fluid power and general use — Test methods for hydraulic fluid power connections*

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

ISO 23551-1:2012, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 1: Automatic and semi-automatic valves*

ISO 23551-2:2018, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 2: Pressure regulators*

ISO 23551-5:2014, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 5: Manual gas valves*

- ISO 23551-6:2014, *Safety and control devices for gas burners and gas-burning appliances — Particular requirements – Part 6: Thermoelectric flame supervision controls*
- ISO 23552-1:2007+AMD 1:2010, *Safety and control devices for gas and/or oil burners and gas and/or oil appliances — Particular requirements — Part 1: Fuel/air ratio controls, electronic type*
- ISO 23553-1:2014, *Safety and control devices for oil burners and oil-burning appliances — Particular requirements - Part 1: Automatic and semi-automatic valves*
- ISO 23555-2:2022, *Gas pressure safety and control devices for use in gas transmission, distribution and installations for inlet pressures up to and including 10 MPa*
- IEC 60204-1:2016, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*
- IEC 60730-2-5:2013+A1:2017, *CSV, Automatic electrical controls – Part 2-5: Particular requirements for automatic electrical burner control systems*
- IEC 60730-2-6:2015+A1:2019, *CSV, Automatic electrical controls – Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements*
- ASME B1.20.1-2013, *Pipe Threads, General Purpose, Inch*
- CAN/CSA-C22.2 No.199-M89:2004, , *Combustion Safety Controls and Solid-State Igniters for Gas- and Oil-Burning Equipment*
- CAN/CSA-C22.2 No.60730-2-4-14: 2019, *Automatic electrical controls for household and similar use - Part 2-5: Particular requirements for automatic electrical burner control systems*
- CSA/ANSI Z21.18-2019/CSA 6.3-2019, *Gas appliance pressure regulators*
- CSA/ANSI Z21.21-19/CSA 6.5-2019, *Automatic valves for gas appliances*
- EN 88-1:2016, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*
- EN 88-2:2015, *Safety and control devices for gas burners and gas burning appliances — Part 2: Pressure regulators for inlet pressure above 50 kPa up to and including 500 kPa and associated safety devices*
- EN 88-2:2020, *Pressure regulators and associated safety devices for gas appliances — Part 2: Pressure regulators for inlet pressures above 500 mbar up to and including 5 bar*
- EN 88-3:2017, *Safety and control devices for gas burners and gas burning appliances — Part 3: Pressure and/or flow rate regulators for inlet pressures up to and including 500 kPa, electronic types*
- EN 125:2010+A1:2015, *Flame supervision devices for gas burning appliances — Thermoelectric flame supervision devices*
- EN 161:2013, *Automatic shut-off valves for gas burners and gas appliances*
- EN 298:2012, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*
- EN 331:2015, *Manual operated ball valves and closed bottom taper plug valves for gas installations for buildings*
- EN 334:2019, *Gas pressure regulators for inlet pressure up to 100 bar*
- EN 1854:2010, *Pressure sensing devices for gas burners and gas burning appliances*
- EN 12067-2:2004, *Safety and control devices for burners and appliances burning gaseous or liquid fuels — Control functions in electronic systems — Part 2: Fuel/air ratio control/supervision of the electronic type*
- EN 14382:2019, *Gas safety shut-off devices for inlet pressure up to 10 MPa (100 bar)*



**ISO 13577-2:2023(E)**

EN 13774:2013, *Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements*

EN 16678:2016, *Safety and control devices for gas burners and gas burning appliances — Automatic shut-off valves for operating pressure of above 500 kPa up to and including 6,300 kPa*

EN 60730-2-5:2015+A1:2019, *Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems*

EN 60730-2-6:2016+A1:2020, *Standard for automatic electrical controls — Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements*

JIS C 9730-2-5:2010, *Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems*

UL 372:2012, *Automatic electrical controls for household and similar use — Part 2: Particular requirements for Burner Ignition Systems and Components, 6th Edition*

UL 429:2013, *Standard for Electrically Operated Valves, 7th Edition*

UL 60730-2-5:2014, *Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems*

UL 60730-2-6:2016, *Standard for automatic electrical controls – Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**