



SLOVENSKI STANDARD
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Gas welding equipment - Safety requirements for thermoprocess equipment with open firing oxy-fuel gas welding equipment

Gasschweißgeräte - Sicherheitsanforderungen an industrielle Thermprozessanlagen mit freibrennenden Gasschweißgeräte der Autogentechnik

Matériel de soudage au gaz - Prescriptions de sécurité pour les équipements thermiques avec matériel de soudage oxygaz à flamme nue

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Gas welding equipment - Safety requirements for thermoprocess equipment with open firing oxy-fuel gas welding equipment

Matériel de soudage au gaz - Prescriptions de sécurité
pour les équipements thermiques avec matériel de
soudage oxygaz à flamme nue

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industrielle Thermprozessanlagen mit freibrennenden
Gasschweißgeräte der Autogentechnik

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 121.

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European foreword

This document (prEN 17942:2023) has been prepared by Technical Committee CEN/TC 121 “Welding and allied processes”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annexes ZA and ZB, which are integral parts of this document.

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Introduction

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

The machinery affected and the extent to which hazards, hazardous situations and events are recorded is referenced in the scope of application of this document.

If, in this type-C standard, provisions other than those in type-A or B standards are specified, the provisions of the type-C standard apply to machinery designed and built in accordance with the provisions of this type-C standard.

This document assumes that the equipment does not generate a potentially explosive atmosphere and is located in an area with normal ventilation.

Even in the case of compliance with European product standards, e.g. EN 267, EN 12952-8, EN 12953-7 or EN 676, it is possible that the minimum safety requirements for IThE are not met. This document is intended to be applied to Industrial Thermoprocessing Equipment with open firing oxy-fuel gas welding equipment.

Thermoprocessing equipment (IThE) generally comprises the following components:

- gas distribution system, beginning in the direction of flow with the manually isolation main shut-off valve at the inlet of the thermoprocessing equipment;
- burner, burner assembly and ignition system, open firing;
- safety control system (protective system).

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prEN 17942:2023 (E)**1 Scope**

This document, together with EN 746-1:1997+A1:2009, EN 746-2:2010 and ISO 13577-4:2014, specifies the safety requirements for industrial thermoprocessing equipment “Open firing oxy-fuel gas welding equipment”, as well as the relevant gas distribution and protective systems. (Industrial thermoprocessing equipment is referred below as “IThe”).

This document applies to IThe supplied with fuel gases.

This document covers the significant hazards, hazardous situations and events listed in Annex A for oxy-fuel IThe, associated gas supply systems and protective systems on the basis that they are used as intended and under the conditions specified by the manufacturer.

This document applies to:

- gas distribution system, beginning in the direction of flow with the manually isolation main shut-off valve at the inlet of the thermoprocessing equipment;
- burner, burner assembly and ignition devices, open firing;
- safety control system (protective system).

This document is applicable to all types of combustion of fuel gases with atmospheric air, compressed air or oxygen.

This document also includes necessary requirements for user information.

This document does not apply to manual burners, systems for flame spraying and micro soldering torches.

This document does not apply to systems for welding, cutting and associated processes using plasma and laser technology. This document does not cover the hazards arising as a result of the release of flammable substances from the products processed in the IThe.

This document is not applicable to electrical wiring and heavy-current wiring connected upstream of the IThe control cabinet/control panel/protective system.

Noise and optical radiation can cause significant hazards when using gas welding equipment. These are not covered in this document.

This document is not applicable to oxy-fuel IThe, associated gas supply systems and protective systems manufactured before the date of publication of this document in the Official Journal of the EU.

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.

CEN/TR 13259:2013, *Gas welding equipment — Industrial manual and machine blowpipes for flame heating, flame brazing and allied processes*

DIN 32509:2009-04, *Hand-operated shut-off valves for welding, cutting and allied processes — Type of construction, safety requirements, tests*

EN 88-1:2011+A1:2016, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 88-2:2007, *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 88-3:2022, *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 161:2011+A3:2013, *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, *Manually 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 10 MPa (100 bar)*

EN 437:2021, *Test gases — Test pressures — Appliance categories*

EN 560:2018, *Gas welding equipment — Hose connections for equipment for welding, cutting and allied processes*

EN 561:2002, *Gas welding equipment — Quick-action coupling with shut-off valves for welding, cutting and allied processes*

EN 746-1:1997+A1:2009, *Industrial thermoprocessing equipment — Part 1: Common safety requirements for industrial thermoprocessing equipment*

EN 746-2:2010, *Industrial thermoprocessing equipment — Part 2: Safety requirements for combustion and fuel handling systems*

EN 1256:2006, *Gas welding equipment — Specification for hose assemblies for equipment for welding, cutting and allied processes*

EN 1643:2014, *Safety and control devices for gas burners and gas burning appliances — Valve proving systems for automatic shut-off valves*

EN 1854:2010, *Pressure sensing devices for gas burners and gas burning appliances*

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EN 60079-29-1:2016, *Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases (IEC 60079-29-1:2016, modified)*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016, modified)*

EN 61439-3:2012,¹ *Low-voltage switchgear and controlgear assemblies — Part 3: Distribution boards intended to be operated by ordinary persons (DBO) (IEC 61439-3:2012)*

EN 61439-4:2013, *Low-voltage switchgear and controlgear assemblies — Part 4: Particular requirements for assemblies for construction sites (ACS) (IEC 61439-4:2012)*

EN 61439-5:2015, *Low-voltage switchgear and controlgear assemblies — Part 5: Assemblies for power distribution in public networks (IEC 61439-5:2014 + Cor.:2015)*

EN 61439-6:2012, *Low-voltage switchgear and controlgear assemblies — Part 6: Busbar trunking systems (busways) (IEC 61439-6:2012)*

EN 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 1: General requirements (IEC 61508-1:2010)*

EN 61508-2:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems (IEC 61508-2:2010)*

EN 61508-3:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 3: Software requirements (IEC 61508-3:2010)*

EN 61508-4:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 4: Definitions and abbreviations (IEC 61508-4:2010)*

EN 61508-5:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 5: Examples of methods for the determination of safety integrity levels (IEC 61508-5:2010)*

EN 61508-6:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3 (IEC 61508-6:2010)*

EN 61508-7:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 7: Overview of techniques and measures (IEC 61508-7:2010)*

EN 61511-1:2017,² *Functional safety — Safety instrumented systems for the process industry sector — Part 1: Framework, definitions, system, hardware and application programming Requirements (IEC 61511-1:2016)*

EN 61511-2:2017, *Functional safety — Safety instrumented systems for the process industry sector — Part 2: Guidelines for the application of IEC 61511-1 (IEC 61511-2:2016)*

EN 61511-3:2017, *Functional safety — Safety instrumented systems for the process industry sector — Part 3: Guidance for the determination of the required safety integrity levels (IEC 61511-3:2016)*

¹ Document impacted by AC:2019.

² Document impacted by A1:2017.

EN 62061:2005,³ *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005)*

EN IEC 61439-1:2021, *Low-voltage switchgear and controlgear assemblies — Part 1: General rules (IEC 61439-1:2020)*

EN IEC 61439-2:2021, *Low-voltage switchgear and controlgear assemblies — Part 2: Power switchgear and controlgear assemblies (IEC 61439-2:2020)*

EN IEC/IEEE 82079-1:2020, *Preparation of information for use (instructions for use) of products — Part 1: Principles and general requirements (IEC/IEEE 82079-1:2019)*

EN ISO 2503:2009,⁴ *Gas welding equipment — Pressure regulators and pressure regulators with flow-metering devices for gas cylinders used in welding, cutting and allied processes up to 300 bar (30 MPa) (ISO 2503:2009)*

EN ISO 3821:2019, *Gas welding equipment — Rubber hoses for welding, cutting and allied processes (ISO 3821:2019)*

EN ISO 4126-1:2013,⁵ *Safety devices for protection against excessive pressure — Part 1: Safety valves (ISO 4126-1:2013)*

EN ISO 5171:2019, *Gas welding equipment — Pressure gauges used in welding, cutting and allied processes (ISO 5171)*

EN ISO 5172:2006,⁶ *Gas welding equipment — Blowpipes for gas welding, heating and cutting — Specifications and tests (ISO 5172:2006)*

EN ISO 5175-1:2017, *Gas welding equipment — Safety devices — Part 1: Devices incorporating a flame (flashback) arrestor (ISO 5175-1:2017)*

EN ISO 5175-2:2017, *Gas welding equipment — Safety devices — Part 2: Devices not incorporating a flame (flashback) arrestor (ISO 5175-2:2017, Corrected version 2019-01)*

EN ISO 7291:2010,⁷ *Gas welding equipment — Pressure regulators for manifold systems used in welding, cutting and allied processes up to 30 MPa (300 bar) (ISO 7291:2010)*

EN ISO 9012:2011, *Gas welding equipment — Air-aspirated hand blowpipes — Specifications and tests (ISO 9012:2008)*

EN ISO 9090:2019, *Gas tightness of equipment for gas welding and allied processes (ISO 9090:2019)*

EN ISO 9539:2010,⁸ *Gas welding equipment — Materials for equipment used in gas welding, cutting and allied processes (ISO 9539:2010)*

EN ISO 9606-1:2017, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*

³ Document impacted by Cor.:2010, A1:2013 and A2:2015.

⁴ Document impacted by A1:2015.

⁵ Document impacted by A1:2016.

⁶ Document impacted by A1:2012 and A2:2015.

⁷ Document impacted by A1:2015.

⁸ Document impacted by A1:2013.

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EN ISO 11114-1:2020, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials (ISO 11114-1:2020)*

EN ISO 11114-2:2021, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials (ISO 11114-2:2021)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13585:2012, *Brazing — Qualification test of brazers and brazing operators (ISO 13585:2012)*

EN ISO 13849-1:2015, *Sicherheit von Maschinen — Sicherheitsbezogene Teile von Steuerungen — Teil 1: Allgemeine Gestaltungsleitsätze (ISO 13849-1:2015)*

EN ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation (ISO 13849-2:2012)*

EN ISO 14114:2018, *Gas welding equipment — Acetylene manifold systems for welding, cutting and allied processes — General requirements (ISO 14114:2017)*

EN ISO 14731:2019, *Welding coordination — Tasks and responsibilities (ISO 14731:2019)*

EN ISO 15296:2018, *Gas welding equipment — Vocabulary (ISO 15296:2017)*

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

ISO 13577-4:2014, *Industrial furnace and associated processing equipment — Safety — Part 4: Protective systems*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13574:2015, EN ISO 15296:2018, EN 746-1:1997+A1:2009, EN 746-2:2010, CEN/TR 13259:2013 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

open firing oxy-fuel gas welding equipment

equipment in accordance with EN ISO 5172:2006, EN ISO 9012:2011 or CEN/TR 13259:2013 for heating and processing materials or workpieces via open firing burning using a fuel gas/oxygen mixture or fuel gas/air mixture

Note 1 to entry: The addition of “open firing” is dropped in the following part of the document.

3.2

automated industrial thermoprocessing equipment

IThE

IThE where all thermal, mechanical and control-related processes can be controlled via PLC, NC or CNC

Note 1 to entry: The entire process is self-monitoring. The thermal power of the IThE can be controlled automatically or manually. Otherwise, the IThE includes the majority of gas distribution systems, gas welding equipment, ignition devices and safety-related control systems listed in the scope of application

3.3

gas warning device

device that uses sensors to detect and indicate the presence of a fuel gas/air mixture and initiates a safety shutdown at or before 25 % of the lower explosion limit (LEL)

3.4

air/fuel gas ratio; oxygen/fuel gas ratio

ratio of the masses/flow rates of combustion air/oxygen and fuel gas

3.5

safety shut-down

establishing of a safe state of the IThE in the shortest possible time without compromising the safety of the IThE or the environment