



# SLOVENSKI STANDARD

## oSIST prEN 50156-1:2022

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### Električna oprema za peči in pomožna opremo - 1. del: Zahteve za zasnovu in vgradnjo

Electrical equipment for furnaces and ancillary equipment - Part 1: Requirements for application design and installation

Elektrische Ausrüstung von Feuerungsanlagen und zugehörige Einrichtungen - Teil 1: Bestimmungen für die Anwendungsplanung und Errichtung

Equipements électriques d'installation de chaudière - Partie 1: Exigences pour la conception, pour l'application et l'installation

Ta slovenski standard je istoveten z: prEN 50156-1

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#### ICS:

27.060.01	Gorilniki in grelniki vode na splošno	Burners and boilers in general
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oSIST prEN 50156-1:2022

en



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NORME EUROPÉENNE  
EUROPÄISCHE NORM

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**prEN 50156-1**

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Will supersede EN 50156-1:2015

English Version

## Electrical equipment for furnaces and ancillary equipment - Part 1: Requirements for application design and installation

Equipements électriques d'installation de chaudière - Partie  
1: Exigences pour la conception, pour l'application et  
l'installation

Elektrische Ausrüstung von Feuerungsanlagen und  
zugehörige Einrichtungen - Teil 1: Bestimmungen für die  
Anwendungsplanung und Errichtung

This draft European Standard is submitted to CENELEC members for enquiry.  
Deadline for CENELEC: 2023-01-06.

It has been drawn up by CLC/BTTF 132-2.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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<https://standards.cenelec.eu/catalogue/part-1/50156-1-2022>  
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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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

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## iTeh STANDARD PREVIEW (standards.iteh.ai)

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**prEN 50156-1:2022 (E)****European foreword**

This document (prEN 50156-1:2022) has been prepared by CLC/BTTF 132-2 "Revision of EN 50156 'Electrical equipment for furnaces and ancillary equipment'".

This document is currently submitted to the Enquiry.

The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50156-1:2015 and all of its amendments and corrigenda (if any).

prEN 50156-1:2022 includes the following significant technical changes with respect to EN 50156-1:2015:

- harmonization of the definitions to the new version of EN 61508;
- check and updating of the normative references;
- creation of the Annex ZZ for the harmonization to the new Low Voltage Directive;
- significant changes in Clause 4.1 and 10;
- EN 50156-3 will not be created.

This document has been prepared under a Standardization Request given to CENELEC 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 Annex ZZ, which is an integral part of this document.

This document covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits 2014/35/EU [2014 OJ L96].

This document is the first part of a series of European standards which specify the requirements for equipment of safety functions for furnaces, especially safety related system to protect personnel, the furnace with its ancillary equipment against hazards related to heat generation, the heated system and to operate reliably during normal conditions, and abnormal conditions which can be foreseen.

This document has been prepared by the German National Committee with the participation of experts of other National Committees. It is currently divided into 2 parts under the generic title "Electrical equipment for furnaces and ancillary equipment":

- Part 1: Requirements for application design and installation;
- Part 2: Requirements for design, development and type approval of safety devices and subsystems;



This document is based on EN 61508:2010 “Functional safety of electrical/electronic/ programmable electronic safety-related systems”, Parts 1 to 7, as a basic safety standard.

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## Introduction

This Part of EN 50156 specifies the requirements and recommendations for the application design and installation of electrical and control equipment for furnaces and ancillary equipment and for the systems heated by the thermal energy released in the furnace to ensure:

- safety of personnel, property and the environment;
- consistency of proper function.

The operating conditions of the furnace, the hazards of combustion and the safety of heated systems are considered.

A safety-related system consisting of safety devices for:

- monitoring of flames and other safety conditions of the firing;
- interrupting the flow of fuel to the furnace;
- ventilating the body of the furnace and the flue gas ducts;
- monitoring of the safety condition of the heated systems (e.g. water level limiter in steam boilers);

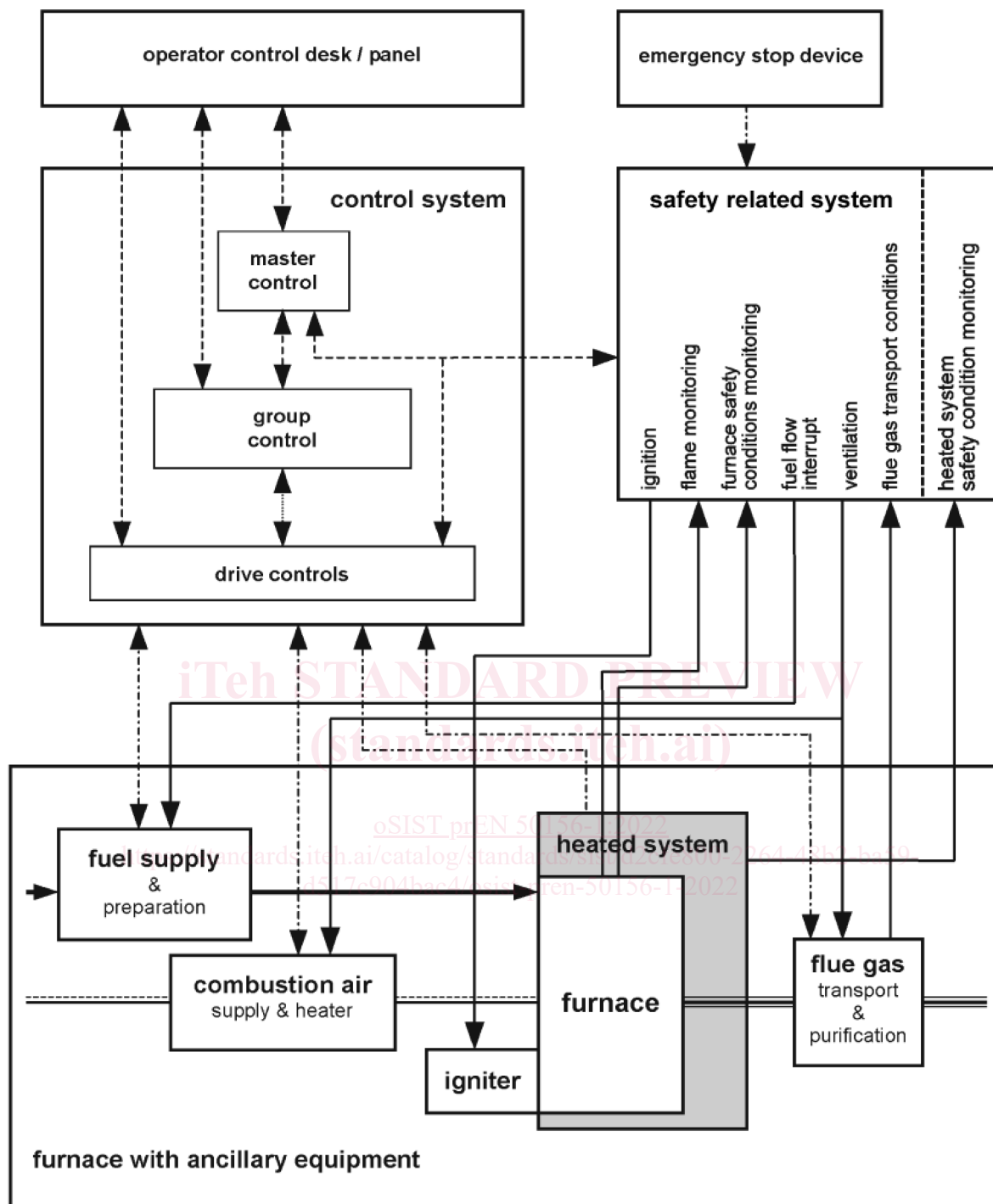
may be necessary to ensure proper ignition and combustion of fuel and to avoid the development, existence and/or ignition of an explosive mixture of fuel and air, and also to avoid damage to the heated systems (see 3.23).

The rating of necessary safety integrity levels is based on EN 61508-1:2010.

Figure 1 is provided as an aid to understanding the relationship between the various elements of furnaces and their ancillary equipment, the heated systems, the control system and the safety-related systems.

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**Key**

- fuel
- control signal
- combustion air
- safety related signal
- flue gas
- system interconnection

**Figure 1 — Example of the functionality of a furnace with its ancillary equipment, heated systems and relationship to control system and safety related system**

**prEN 50156-1:2022 (E)****1 Scope**

This document applies to the application design and installation of electrical equipment, control circuits and safety-related systems for furnaces which are operated with solid, liquid or gaseous fuels and their ancillary equipment. It specifies requirements to meet the operating conditions of furnaces, to reduce the hazards of combustion and to protect the heated systems from damage e.g. by overheating.

Such furnaces and the electrical equipment can be part by way of example of the following plant:

- a) water heating systems;
- b) steam boiler installations (steam and hot-water boilers) and heat recovery steam boilers;

NOTE 1 The requirements of this document apply according to the electrical equipment of electrically heated steam boilers.

NOTE 2 Seagoing vessels and offshore facilities are governed by International Maritime Law and as such are not within the scope of this document. These requirements can be used for such facilities.

- c) warm air heaters;
- d) hot-gas heaters;
- e) heat exchanger systems;
- f) combustion chambers of stationary turbines;
- g) as long as no other standard is applicable for combined heat and power stations, we recommend the use of the requirements of this document;

This document can also be used as reference for electrical equipment requirements for thermo-processing equipment.

The requirements in this document are not applicable to electrical equipment for:

- a) non-electrically heated appliances and burner control systems for household and similar purposes;
- b) furnaces using technologies for the direct conversion of heat into electrical energy;
- c) combustion chambers of non-stationary prime movers and turbines;
- d) central oil supply systems for individual heating appliances;
- e) furnaces using solid fuels for heating purposes for household use with a nominal thermal output up to 1 MW;
- f) furnaces which are used to heat process fluids and gasses in chemical plant.

This document can be used as a basis for the requirements placed on electrical equipment for furnaces, which are excluded from its field of application.

This document specifies special requirements for the management of functional safety.

**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.

EN 267, *Forced draught burners for liquid fuels*

- EN 676:2020, *Forced draught burners for gaseous fuels*
- EN 1854:2010, *Pressure sensing devices for gas burners and gas burning appliances*
- EN 12952-7:2012, *Water-tube boilers and auxiliary installations - Part 7: Requirements for equipment for the boiler*
- EN 12952-8:2002, *Water-tube boilers and auxiliary installations - Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler*
- EN 12952-9:2002, *Water-tube boilers and auxiliary installations - Part 9: Requirements for firing systems for pulverized solid fuels for the boiler*
- EN 12952-16:2002, *Water-tube boilers and auxiliary installations - Part 16: Requirements for grate and fluidized-bed firing systems for solid fuels for the boiler*
- EN 12953-6:2011, *Shell Boilers - Part 6: Requirements for equipment for the boiler*
- EN 12953-7:2002, *Shell boilers - Part 7 : Requirements for firing systems for liquid and gaseous fuels for the boilers*
- EN 12953-12:2003, *Shell boilers - Part 12: Requirements for grate firing systems for solid fuels for the boiler*
- EN 14597:2012, *Temperature control devices and temperature limiters for heat generating systems*
- EN 50156-2:2015, *Electrical equipment for furnaces and ancillary equipment - Part 2: Requirements for design, development and type approval of safety devices and subsystems*
- EN 55011:2016, *Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement*
- EN 60034 (all parts), *Rotating electrical machines (IEC 60034, all parts)*
- EN 60309-1:1999, *Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements*
- EN 60332-1-1:2004, *Tests on electric and optical fibre cables under fire conditions - Part 1-1: Test for vertical flame propagation for a single insulated wire or cable – Apparatus (IEC 60332-1-1:2004)*
- EN 60332-2-1:2004, *Tests on electric and optical fibre cables under fire conditions - Part 2-1: Test for vertical flame propagation for a single small insulated wire or cable – Apparatus (IEC 60332-2-1:2004)*
- EN IEC 60445:2021, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors (IEC 60445:2021)*
- EN 60519 (all parts), *Safety in installations for electroheating and electromagnetic processing*
- EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*
- EN 60654-3:1997, *Operating conditions for industrial-process measurement and control equipment - Part 3: Mechanical influences (IEC 60654-3:1983)*
- EN 60664-1:2007, *Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests (IEC 60664-1:2007)*
- EN 60947-2:2017, *Low-voltage switchgear and controlgear - Part 2: Circuit-breakers (IEC 60947-2:2016)*
- EN IEC 60947-3:2021, *Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

**prEN 50156-1:2022 (E)**

EN IEC 60947-4-1:2019, *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters*

EN 60947-5-1:2017, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:2016)*

EN 61000-4 (all parts), *Electromagnetic compatibility (EMC) (IEC 61000-4, all parts)*

EN IEC 61000-6-4:2019, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

EN 61000-6-7:2015, *Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations (IEC 61000-6-7:2014)*

EN 61082-1:2015, *Preparation of documents used in electrotechnology - Part 1: Rules*

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 61508-6:2010, *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 IEC 61558-1:2019, *Safety of transformers, reactors, power supply units and combinations thereof - Part 1: General requirements and tests*

EN 61810-1:2015, *Electromechanical elementary relays - Part 1: General and safety requirements (IEC 61810-1:2015)*

EN IEC 81346-1:2022, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules (IEC 81346-1:2022)*

HD 60364-4 (all parts), *Low-voltage electrical installations – Part 4: Protection for safety (IEC 60364-4, all parts)*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60417 DB, *Graphical symbols for use on equipment (IEC 60417 all parts)*

IEC 60617 DB:2001, *Graphical symbols for diagrams*

ISO 3864 (all parts), *Safety colours and safety signs*

### **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://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

**3.1****actuating element**

component which produces changes in other electrical circuits or volume flows (e. g. fuel, air) as a result of the effect of changes in signal

Note 1 to entry: Examples are valves, switches and motors including their common auxiliaries, also for example solenoid valve with magnetic actuation and final control element for direct process control.

**3.2****assessment**

investigation to judge if the functional safety of the EUC is achieved by the realized safety related system

**3.3****audit**

systematic and independent examination on the basis of evidence if defined specifications for the management of functional safety are met for every life cycle phase

**3.4****auxiliary circuit**

electrical circuit for ancillary functions, e. g. control circuits (command initiation, interlocking operation), signalling and measuring circuits

**3.5****component**

constituent part of electrical devices or subsystems, usually specified by function, but used in various applications

Note 1 to entry: These are elements or components in the sense of EN 61508-4. Examples include resistors, capacitors, transistors, integrated circuits, printed-circuit boards.

Note 2 to entry: A component is the smallest element a circuit can be subdivided into. If a component has to be broken down it loses its physical characteristics and/or does not conform to specifications.

Note 3 to entry: An element may comprise hardware and/or software.

**3.6****control circuit**

electrical circuit used for the operational control and the protection of the furnace and of the power circuits

**3.7****control device**

device connected into the control circuit and used for controlling the operation of the furnace

EXAMPLES a manually operated switch, a limit transducer, or a valve

**3.8****current limiting**

limiting of electric current to a predetermined maximum value for the defined operation by means of a suitable arrangement of components in the circuit

**3.9****diagnostic coverage**

proportion of all hardware faults which are detected by the online diagnostics embedded in the safety-related system

Note 1 to entry: To determine the diagnostic coverage a fault model should be used which is sufficient for the concerned technology.