



SLOVENSKI STANDARD

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Vodocevni kotli in pomožne napeljave - 8. del: Zahteve za gorilnike kotlov na tekoča in plinasta goriva

Water-tube boilers and auxiliary installations - Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler

Wasserrohrkessel und Anlagenkomponenten - Teil 8: Anforderungen an Feuerungsanlagen für flüssige und gasförmige Brennstoffe für den Kessel

Chaudières à tubes d'eau et installations auxiliaires - Partie 8 : Exigences pour les équipements de chauffe pour combustibles gazeux et liquides de la chaudière

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Water-tube boilers and auxiliary installations - Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler

Chaudières à tubes d'eau et installations auxiliaires -
Partie 8 : Exigences pour les équipements de chauffe
pour combustibles gazeux et liquides de la chaudière

Wasserrohrkessel und Anlagenkomponenten - Teil 8:
Anforderungen an Feuerungsanlagen für flüssige und
gasförmige Brennstoffe für den Kessel

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 269.

If this draft becomes a European Standard, CEN 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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword	4
1 Scope.....	6
1.1 Firing systems	6
1.2 Fuels.....	6
2 Normative references.....	6
3 Terms and definitions.....	7
4 Fuel supply	11
4.1 General.....	11
4.2 Fuel transfer and preparation.....	11
4.3 Fuel lines.....	12
4.4 Safety shut-off devices (Safety trip valves).....	13
5 General.....	15
5.1 Air supply.....	15
5.2 Air/fuel ratio	16
5.3 Flue gas discharge.....	16
6 Firing system	16
6.1 Burners.....	16
6.2 Flue gas recirculation.....	17
6.3 Control and monitoring.....	18
6.4 Electrical equipment.....	19
6.5 Safety precautions	19
6.6 Common stack for several firing systems	20
7 Operating manual	20
8 Particular requirements for firing systems burning gaseous fuels with high relative density	20
8.1 Main firing systems	20
8.1.1 Supply of gases.....	20
8.1.2 Safety shut-off device.....	20
8.2 Ignition burner systems	21
Annex A (normative) Chemical recovery boiler (black liquor boiler).....	22
A.1 General.....	22
A.2 Additional requirements for the firing system for black liquor in the chemical recovery boiler	22
A.3 Special requirements for oil- or gas firing for chemical recovery boilers	23
A.3.1 General.....	23
A.3.2 Special requirements for start-up burners	23
A.3.3 Special requirements for the firing of odorous gases.....	24
Annex B (normative) Gas turbines in combination with heat recovery steam generators	25

B.1	General	25
B.2	Additional requirements for gas turbines in combination with heat recovery steam generators	25
B.2.1	Safety shut-off devices	25
B.2.2	Electrical equipment	25
B.2.3	Bypass operation of the heat recovery boiler	25
B.2.4	Switching from gas turbine operation to fresh air operation at secondary firing	25
Annex C (informative)	Operational requirements for permanent supervised firing systems for liquid and gaseous fuels	27
C.1	General	27
C.2	Operation	27
C.3	Fuel preparation	27
C.4	Safety shutoff devices	27
C.5	Air/fuel ratio	27
C.6	Modification of firing, burner or air/fuel ratio setting	27
C.7	Control and monitoring	28
C.8	Emergency operation	28
C.9	Operating and maintenance instructions	28
C.10	Firing systems burning gaseous fuels with high relative density	28
Annex D (informative)	Significant technical changes between this document and the previous edition	30
Annex ZA (informative)	Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered	31
Bibliography	32

prEN 12952-8:2020 (E)**European foreword**

This document (prEN 12952-8:2020) has been prepared by Technical Committee CEN/TC 269 “Shell and water-tube boilers”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12952-8:2002.

EN 12952 series “Water-tube boilers and auxiliary installations” consists of the following Parts:

- *Part 1: General;*
- *Part 2: Materials for pressure parts of boilers and accessories;*
- *Part 3: Design and calculation for pressure parts;*
- *Part 4: In-service boiler life expectancy calculations;*
- *Part 5: Workmanship and construction of pressure parts of the boiler;*
- *Part 6: Inspection during construction, documentation and marking of pressure parts of the boiler;*
- *Part 7: Requirements for equipment for the boiler;*
- *Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler;*
- *Part 9: Requirements for firing systems for pulverized solid fuels for the boiler;*
- *Part 10: Requirements for safeguards against excessive pressure;*
- *Part 11: Requirements for limiting devices of the boiler and accessories;*
- *Part 12: Requirements for boiler feedwater and boiler water quality;*
- *Part 13: Requirements for flue gas cleaning systems;*
- *Part 14: Requirements for flue gas DENOX systems using liquefied pressurized ammonia and ammonia water solution;*
- *Part 15: Acceptance tests;*
- *Part 16: Requirements for grate and fluidized-bed firing systems for solid fuels for the boiler;*
- *CR 12952 Part 17: Guideline for the involvement of an inspection body independent of the manufacturer.*

Although these parts may be obtained separately, it should be recognized that the parts are inter-dependent. As such, the design and manufacture of water-tube boilers requires the application of more than one part in order for the requirements of the document to be satisfactorily fulfilled.

NOTE Part 4 and Part 15 are not applicable during the design, construction and installation stages.

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

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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prEN 12952-8:2020 (E)**1 Scope****1.1 Firing systems**

This document specifies requirements, for liquid and gaseous fuel firing systems of steam boilers and hot water generators as defined in EN 12952-1:2015.

These requirements also apply to firing systems of chemical recovery boilers (black liquor boilers) with the additions and amendments specified in Annex A of this document.

These requirements also apply to gas turbines in combination with fired/unfired heat recovery steam generators with the additions and amendments specified in Annex B of this document.

NOTE 1 This standard is not applicable to coil type boilers (flash boilers/small boilers) that use burners in accordance with EN 12953-7 apply for single burner installations.

NOTE 2 This standard is not applicable to the storage of liquid fuels and to transfer stations of long-distance gas pipelines.

1.2 Fuels

This document specifies requirements, which cover the use of liquid and gaseous fuels as defined in this standard. Fuels deviating from standardized commercially available types may require additional or alternative safety measures. For black liquor these safety measures are given in Annex A.

2 Normative references

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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 161:2011+A3:2013, *Automatic shut-off valves for gas burners and gas appliances*

EN 751 (series), *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water*

EN 16678:2015, *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 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 23553-1:2014)*

prEN 12952-5:2020,¹ *Water-tube boilers and auxiliary installations — Part 5: Workmanship and construction of pressure parts of the boiler*

EN 13480-2:2017, *Metallic industrial piping - Part 2: Materials*

EN 50156-1:2015, *Electrical equipment for furnaces and ancillary equipment - Part 1: Requirements for application design and installation*

EN ISO 3677:2016, *Filler metal for soldering and brazing - Designation (ISO 3677:2016)*

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)*

¹ Under preparation

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

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

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:

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

3.1

black liquor

spent liquor from the pulp cook

3.2

black liquor gun

device for the introduction of the black liquor as a spray of droplets into the furnace

Note 1 to entry: The black liquor gun is not a burner.

3.3

high volume low concentration odorous gas

mixtures of air and a low concentration of odorous gases collected from the pulp mill processes, where the concentration of the combustible odorous gas is always kept below the lower explosion limit

3.4

burners

devices (including main or igniter burners) for the introduction of fuel and air into a combustion chamber of a steam generator at required velocities, turbulence and local fuel concentration to establish and maintain proper ignition and stable combustion of the fuel

Note 1 to entry: Burners are differentiated by their mode of operation.

3.4.1

chemical recovery boiler start up burner

oil- or gasfired burner mainly intended for the initiation of the black liquor combustion process

Note 1 to entry: The chemical recovery boiler start up burners are located in and integrated with a combustion air register, like the primary or the secondary air register of the furnace. Thus they have no individual air supply and no individual combustion air control.

3.4.2

multi-fuel burners

burners in which more than one fuel is burned either simultaneously or alternately

3.4.3

pilot burner

burner which maintains a proper permanent ignition source for one or a group of other non-monitored burners

prEN 12952-8:2020 (E)**3.5****burner group**

burners operated in unison and controlled jointly. One of the burners can be a master burner

3.6**burner management system**

system that performs a predetermined sequence of actions and always operates in conjunction with a flame monitor that reacts to signals from control and safety devices, gives control commands, controls the start-up sequence, supervises the burner operation, and manages controlled shutdown and lockout

3.7**firing system**

total equipment required for the combustion of fuels including the installations for the storage, preparation, and supply of fuels, the combustion air supply, the burner(s), the flue gas discharge, and all related control and monitoring devices

Note 1 to entry: A flue gas recirculation system can be an integral part of the firing system.

3.8**firing system heat input**

heat input into the combustion chamber according to the mass flow of the fuel supplied multiplied by the net calorific value

3.9**flame monitor**

device which detects the presence or absence or break-away of the flame and transmits a signal to the control device, and generally consists of a sensing device (with amplifier if necessary) and switching equipment

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3.10**flue gas recirculation**

return of flue gas from downstream of the flame zone or from the flue gas exit by hydrodynamic pressure difference or a separate fan into the air register of the burner or directly into the combustion chamber

3.11**implosion**

unintentional instantaneous negative pressure build-up caused, for example, by an explosion in a confined space, by rapid closing of dampers, or by rapid reduction in temperature (flame out)

3.12**limiters**

transducer, which, on reaching a fixed value (e.g. pressure, temperature, flow, water level) is used to interrupt and lock-out the energy supply, and requires manual unlocking before restart

3.13**lock-out**

isolation of energy supply which requires a manual intervention to reinstate

3.14**master fuel trip**

extinction of all burners and igniters in the combustion chamber

3.15**maximum heat input of the firing system**

heat input including the reserve required for load control at which the boiler can be safely operated

3.16**maximum firing rate of the burners**

firing rate at which the burner may be operated

3.17**monitor**

limit transducer, which senses the reaching of a fixed limit value and initiates an alarm and/or a cut out

Note 1 to entry: The output signal is only cancelled if the cause of the alarm has been removed and the value has returned to within its fixed limits.

3.18**multi-fuel firing system**

firing system where, in a common combustion chamber, more than one fuel can be burnt simultaneously or alternately by separate or multi-fuel burners

3.19**purge of burner guns**

carried out after shutdown of a burner to ensure the removal of residual fuel by the introduction of steam or pressurized air into the fuel lines downstream of the shut-off devices

3.20**purging of the flue gas passes**

forced flow of air through the combustion chamber, flue gas passes, and associated ducts which effectively removes any gaseous combustibles and replace them with air

3.21**quick-acting shut-off device**

safety trip valve which closes within 1 s according to EN 161:2011+A3:2013 or EN 264

3.22**relative density**

ratio of the density of the gas to the density of dry air under equal conditions of pressure and temperature

3.23**liquid fuels**

fuels include light fuel oils, and heavy fuel oils which need preheating for proper atomisation. For improvement of atomisation, emulsions of heavy fuel oil with water may be used with appropriate precautions

3.24**gaseous fuels**

standardized quality differentiated mainly by their relative density

3.24.1**light gases**

with relative density below 1,3 e.g. natural gas, coke-oven gas, blast-furnace gas

Note 1 to entry: Natural gas in accordance with ISO 6976.

prEN 12952-8:2020 (E)**3.24.2****heavy gases**

with relative densities exceeding 1,3 e.g. liquefied petroleum gases, the main components of which are propane and butane

3.25**restart**

operation where fuel supply shut-off is initiated within 1 s at the latest after extinction of the flame during operation, and a directly following attempt of re-ignition is automatically made in compliance with the start-up sequence

Note 1 to entry: This operation ends with the operating condition being reached or, if the flame is not ignited after expiration of the ignition safety time, with the lock-out.

3.26**return-flow atomizer**

oil burners, where a portion of the quantity of oil supplied to the burner via the flow line does not flow from a burner gun vortex chamber into the combustion chamber, but flows backwards into the storage tank or to the suction side of the pump via a separate return line

Note 1 to entry: Output is adjusted by a control device in the return line.

3.27**safety shut-off device****safety trip valve**

valve which automatically and totally cuts off the fuel supply

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3.28**safety time**

time taken from the occurrence of an unsafe operating condition (for example, flame interrupt during normal operation) to the point at which the actuating element is initiated

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Note 1 to entry: The reaction time of the actuating element is to be considered separately.

[SOURCE: EN 50156-1:2015, 3.43]

3.28.1**ignition time**

when starting-up the burner, the period of time between the first fuel entering the combustion chamber and the first indication of the flame by the flame monitor

3.28.2**ignition safety time**

when starting-up the burner, the period of time between the first fuel entering the combustion chamber and the de-energizing of the quick-acting shut-off device if the flame monitor does not indicate a flame

3.28.3**main burner safety time**

when there is an ignition safety time applicable to an igniter burner only the period of time between the first fuel of the main burner entering the combustion chamber and the de energizing of the quick acting shut-off device of the main burner if the flame monitor does not indicate a flame