

KÜTTEKATLAD. OSA 5: KÄSITSI JA AUTOMAATSELT  
KÖETAVAD TAHKEKÜTUSEKATLAD  
NIMISOOJUSTOOTLIKKUSEGA KUNI 500 KW. MÕISTED,  
NÕUDED, KATSETAMINE JA MÄRGISTUS

Heating boilers - Part 5: Heating boilers for solid fuels,  
manually and automatically stoked, nominal heat  
output of up to 500 kW - Terminology, requirements,  
testing and marking

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 303-5:2021 sisaldab Euroopa standardi EN 303-5:2021 ingliskeelset teksti.	This Estonian standard EVS-EN 303-5:2021 consists of the English text of the European standard EN 303-5:2021.
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English Version

Heating boilers - Part 5: Heating boilers for solid fuels,  
manually and automatically stoked, nominal heat output of  
up to 500 kW - Terminology, requirements, testing and  
marking

Chaudières de chauffage - Partie 5 : Chaudières  
spéciales pour combustibles solides, à chargement  
manuel et automatique, puissance utile inférieure ou  
égale à 500 kW - Définitions, exigences, essais et  
marquage

Heizkessel - Teil 5: Heizkessel für feste Brennstoffe,  
manuell und automatisch beschickte Feuerungen,  
Nennwärmeleistung bis 500 kW - Begriffe,  
Anforderungen, Prüfungen und Kennzeichnung

This European Standard was approved by CEN on 15 February 2021.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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## European foreword

This document (EN 303-5:2021) has been prepared by Technical Committee CEN/TC 57 “Central heating boilers”, 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of an identical text or by endorsement, at the latest by October 2021, and conflicting national standards shall be withdrawn at the latest by October 2021.

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.

This document supersedes EN 303-5:2012.

This document 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, ZB and ZC, which is an integral part of this document.

In comparison with EN 303-5:2012, the following technical changes have been made:

- the scope was extended to condensing boilers with a heat output of  $\leq 500$  kW;
- the scope was extended to boilers with outside combustion air supply at a heat output of  $\leq 100$  kW;
- requirements for materials, weld joints and wall thicknesses have been revised and adapted to condensing and room sealed operations;
- general and electrical safety requirements have been revised and adapted to condensing and room sealed applications;
- tests were revised and new tests for condensing boilers, outside combustion air supply, secondary emission reduction systems and safety requirements were added;
- Annexes were re-structured;
- Consideration was given to the essential requirements of the Machinery Directive 2006/42/EC and REGULATION (EU) 2015/1189 (Eco-design) and COMMISSION REGULATION (EU) 2015/1187 (Energy labelling).

The following structure is intended for the European Standards for heating boilers:

- EN 303-1, *Heating boilers — Part 1: Heating boilers with forced draught burners — Terminology, general requirements, testing and marking*;
- EN 303-2, *Heating boilers — Part 2: Heating boilers with forced draught burners — Special requirements for boilers with atomizing oil burners*;
- EN 303-3, *Heating boilers — Part 3: Gas-fired central heating boilers — Assembly comprising a boiler body and a forced draught burner*;

- EN 303-4, *Heating boilers — Part 4: Heating boilers with forced draught burners — Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar — Terminology, special requirements, testing and marking;*
- EN 303-5, *Heating boilers — Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW — Terminology, requirements, testing and marking;*
- EN 303-6, *Heating boilers — Part 6: Heating boilers with forced draught burners — Specific requirements for the domestic hot water operation of combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW;*
- EN 303-7, *Heating boilers — Part 7: Gas-fired central heating boilers equipped with a forced draught burner of nominal heat output not exceeding 1 000 kW;*
- EN 304, *Heating boilers — Test code for heating boilers for atomizing oil burners.*

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



## Introduction

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

The machinery concerned, and the extent to which hazards, hazardous situations and hazardous events are covered, are indicated in the scope of this document.

This document does deal with boilers which are within the Scope Machinery Directive and boilers that are outside of the Scope Machinery Directive.

The manufacturer is responsible for identifying all additional hazards outside of the scope of this document.

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

# 1 Scope

## 1.1 General

This document applies to heating boilers including safety devices up to a nominal heat output of 500 kW which are designed for the burning of solid fuels only and are operated according to the instructions supplied with the boiler and misuse reasonably foreseeable by the manufacturer.

This document applies also for solid fuel boilers taking the combustion air from outside the building and room sealed appliances.

This document does deal with significant hazards, hazardous situations and events relevant to heating boilers used as intended and under the conditions specified in the technical documentation of the boiler (see Clause 4).

The boilers may operate under natural draught or forced draught. The fuel feed may work manually or automatically. The boilers may operate in non-condensing operation or condensing operation.

NOTE 1 This document does deal with boilers which are within the scope of the Machinery Directive 2006/42/EC or outside of the scope of the Machinery Directive 2006/42/EC (manual stoked natural draught boiler).

NOTE 2 There is a risk of freezing condensate in the condensate drainage at low temperatures.

This document contains requirements and test methods for safety, combustion performance, operating characteristics, marking and maintenance of heating boilers. It also covers all external equipment that influences the safety systems (e.g. back burning safety device, integral fuel hopper).

This document covers only boilers that include burners as a unit. The document applies to the combination of a boiler body with a solid fuel burner according to EN 15270:2007 as a unit only when the whole unit is tested in accordance with this document.

Heating boilers in accordance with this document are designed for central heating installations where the heat carrier is water and the maximum allowable temperature is 110 °C, and which can operate at a maximum allowable operating pressure of 6 bars. For heating boilers with a built-in or attached water heater (storage or continuous flow heater), this document only applies to those parts of the water heater which are necessarily subject to the operating conditions of the heating boiler (heating part).

This document does not apply to:

- heating boilers and other heating appliances which are also designed for the direct heating of the place of installation, also according to the European regulation 2015/1185/EU;
- cooking appliances;
- the design and construction of external fuel storage and transportation devices prior to the safety devices of the boiler;
- manual stoked straw bale boilers;
- CHP appliances (combined heat and power).

This document specifies the necessary terminology for solid fuel heating boilers, the control and safety related requirements, the design requirements, the technical heating requirements (considering the environmental requirements) and testing, as well as the marking requirements.

This document is not applicable to heating boilers which are tested before the date of its publication as an EN (European Standard).

For evaluation of the requirements of this document test results of former versions of the standard may be used if applicable.

NOTE 3 This document can be used as a reference for boilers > 500 kW for safety evaluation.

This document does deal with all significant machine hazards, hazardous situations and events relevant to solid fuel boilers, when they are used as intended and under conditions of misuse which are reasonably foreseeable, except noise hazards.

NOTE 4 The document contains requirements regarding noise but not in its full extent to cover the Essential Health and Safety Requirements (EHSR, Annex I of the Machinery Directive 2006/42/EC).

## 1.2 Fuels

These boilers may burn either fossil fuels, biogenic fuels or other fuels such as peat, as specified for their use in the technical documentation, in accordance with the requirements of this document.

Solid fuels included in this document are categorized as follows.

### Biogenic fuels

Biomass in a natural state, in the form of:

- **log wood** with moisture content  $\leq M25$ , according to EN ISO 17225-5:2014;
- **chipped wood  $\leq M35$**  with moisture content from M15 to M35, according to EN ISO 17225-4:2014;
- **chipped wood  $> M35$**  with moisture content exceeding M35, according to EN ISO 17225-4:2014;
- **wood pellets** according to EN ISO 17225-2:2014;
- **wood briquettes** according to EN ISO 17225-3:2014;
- **sawdust** with moisture content  $\leq M20$ ;
- **sawdust** with moisture content M20 to M50;
- **sawdust** with moisture content  $\leq M20$  is dangerous against back burning;
- **non-woody biomass**, such as straw, miscanthus, reeds, kernels and grains according to EN ISO 17225-6:2014.

### Fossil fuels

- **a** bituminous coal;
- **b** brown coal;
- **c** coke;
- **d** anthracite.

### Other solid fuels

- Other solid fuels such as peat or processed fuels according to EN ISO 17225-1:2014.

## 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 303-1:2017, *Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking*

EN 304:2017, *Heating boilers - Test code for heating boilers for atomizing oil burners*

EN 1561:2011, *Founding - Grey cast irons*

EN 1563:2018, *Founding - Spheroidal graphite cast irons*

EN 10204:2004, *Metallic products - Types of inspection documents*

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 10226-3:2005, *Pipes threads where pressure tight joint are made on the threads - Part 3: Verification by means of limit gauges*

EN 12619:2013, *Stationary source emissions - Determination of the mass concentration of total gaseous organic carbon - Continuous flame ionisation detector method*

EN 12828:2012+A1:2014, *Heating systems in buildings - Design for water-based heating systems*

EN 13284-1:2017, *Stationary source emissions - Determination of low range mass concentration of dust - Part 1: Manual gravimetric method*

EN 13384-1:2015+A1:2019, *Chimneys - Thermal and fluid dynamic calculation methods - Part 1: Chimneys serving one combustion appliance*

EN 13501-1:2018, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 14597:2012, *Temperature control devices and temperature limiters for heat generating systems*

EN 14789:2017, *Stationary source emissions - Determination of volume concentration of oxygen - Standard reference method: Paramagnetism*

EN 14792:2017, *Stationary source emissions - Determination of mass concentration of nitrogen oxides - Standard reference method: chemiluminescence*

EN 15058:2017, *Stationary source emissions - Determination of the mass concentration of carbon monoxide - Standard reference method: non-dispersive infrared spectrometry*

EN 15259:2007, *Air quality - Measurement of stationary source emissions - Requirements for measurement sections and sites and for the measurement objective, plan and report*

EN 15270:2007, *Pellet burners for small heating boilers - Definitions, requirements, testing, marking*

EN 15456:2008, *Heating boilers - Electrical power consumption for heat generators - System boundaries - Measurements*

EN 60335-1:2012, *Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2012)*<sup>1</sup>

EN 60335-2-102:2016, *Household and similar electrical appliances - Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections (IEC 60335-2-102:2004, modified)*

EN 60730-1:2016, *Automatic electrical controls - Part 1: General requirements (IEC 60730-1:2013/COR1:2014)*<sup>2</sup>

EN 60730-2-5:2015, *Automatic electrical controls - Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5:2013)*<sup>3</sup>

EN IEC 60730-2-9:2019, *Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing control (IEC 60730-2-9:2015)*<sup>4</sup>

EN IEC 61000-6-2:2019, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments (IEC 61000-6-2:2016)*

EN 61000-6-3:2007, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3:2006)*<sup>5</sup>

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)*

EN ISO 228-2:2003, *Pipe threads where pressure-tight joints are not made on the threads - Part 2: Verification by means of limit gauges (ISO 228-2:1987)*

EN ISO 4063:2010, *Welding and allied processes - Nomenclature of processes and reference numbers (ISO 4063:2009, Corrected version 2010-03-01)*

EN ISO 6506-1:2014, *Metallic materials - Brinell hardness test - Part 1: Test method (ISO 6506-1:2014)*

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)*

EN ISO 9606-2:2004, *Qualification test of welders - Fusion welding - Part 2: Aluminium and aluminium alloys (ISO 9606-2:2004)*

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

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<sup>1</sup> As impacted by EN 60335-1:2012/A11:2014, EN 60335-1:2012/A13:2017, EN 60335-1:2012/A14:2019, EN 60335-1:2012/A1:2019 and EN 60335-1:2012/A2:2019.

<sup>2</sup> As impacted by EN 60730-1:2016/A1:2019.

<sup>3</sup> As impacted by EN 60730-2-5:2015/A1:2019 and EN 60730-2-5:2015/A2:2021.

<sup>4</sup> As impacted by EN IEC 60730-2-9:2019/A1:2019 and EN IEC 60730-2-9:2019/A2:2020.

<sup>5</sup> As impacted by EN 61000-6-3:2007/A1:2011/AC:2012.

EN ISO 13732-1:2008, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13919-1:2019, *Electron and laser-beam welded joints - Requirements and recommendations on quality levels for imperfections - Part 1: Steel, nickel, titanium and their alloys (ISO 13919-1:2019)*

EN ISO 13919-2:2021, *Electron and laser-beam welded joints - Requirements and recommendations on quality levels for imperfections - Part 2: Aluminium, magnesium and their alloys and pure copper (ISO 13919-2:2021)*

EN ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

EN ISO 15609-4:2009, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 4: Laser beam welding (ISO 15609-4:2009)*

EN ISO 15614-11:2002, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 11: Electron and laser beam welding (ISO 15614-11:2002)*

EN ISO 17225-1:2014, *Solid biofuels - Fuel specifications and classes - Part 1: General requirements (ISO 17225-1:2014)*

EN ISO 17225-2:2014, *Solid biofuels - Fuel specifications and classes - Part 2: Graded wood pellets (ISO 17225-2:2014)*

EN ISO 17225-3:2014, *Solid biofuels - Fuel specifications and classes - Part 3: Graded wood briquettes (ISO 17225-3:2014)*

EN ISO 17225-4:2014, *Solid biofuels - Fuel specifications and classes - Part 4: Graded wood chips (ISO 17225-4:2014)*

EN ISO 17225-5:2014, *Solid biofuels - Fuel specifications and classes - Part 5: Graded firewood (ISO 17225-5:2014)*

EN ISO 17225-6:2014, *Solid biofuels - Fuel specifications and classes - Part 6: Graded non-woody pellets (ISO 17225-6:2014)*

EN ISO 17225-7:2014, *Solid biofuels - Fuel specifications and classes - Part 7: Graded non-woody briquettes (ISO 17225-7:2014)*

EN ISO 18135:2017, *Solid Biofuels - Sampling (ISO 18135:2017)*

EN ISO 20023:2018, *Solid biofuels - Safety of solid biofuel pellets - Safe handling and storage of wood pellets in residential and other small-scale applications (ISO 20023:2018)*

CEN/TS 15883:2009, *Residential solid fuel burning appliances - Emission test methods*

ISO 857-2:2005, *Welding and allied processes — Vocabulary — Part 2: Soldering and brazing processes and related terms*

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*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 303-1:2017, and the following 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 <https://www.iso.org/obp>

#### 3.1

##### **maximum allowable operating pressure**

highest pressure at which the boiler can be operated safely

Note 1 to entry: The maximum operating pressure is less than the test pressure and the type test pressure.

#### 3.2

##### **test pressure**

pressure to which all boilers and their parts are subjected during production at the manufacturers plant or during setting up by the installer

#### 3.3

##### **type test pressure**

pressure to which the heating boilers and their parts are first subjected before the start of mass production

#### 3.4

##### **maximum allowable temperature**

maximum allowable water temperature of the heating boiler limited by safety devices

#### 3.5

##### **operating temperature**

temperature range at which the boiler can be operated under normal operating conditions, according to the setting on the boiler water temperature controller and the manufacturer's specifications

#### 3.6

##### **heat output**

$P$

usable heat delivered to water output by a boiler per unit time in accordance with the requirements of this document

Note 1 to entry: The heat output data for solid fuel boilers are the average values over a related test period which are established in accordance with the requirements of this document.

#### 3.7

##### **nominal heat output**

$P_N$

continuous heat output at nominal load as average related to the test duration specified in the technical documentation for a specific fuel in accordance with the requirements of this document