



SLOVENSKI STANDARD

oSIST prEN 303-2:2023

01-marec-2023

Kotli za ogrevanje - 2. del: Kotli za ogrevanje z ventilatorskimi gorilniki - Posebne zahteve za kotle z razprševalnimi oljnimi gorilniki

Heating boilers - Part 2: Heating boilers with forced draught burners - Special requirements for boilers with atomizing oil burners

Heizkessel - Heizkessel mit Gebläsebrennern - Teil 2: Spezielle Anforderungen an Heizkessel mit Ölzerstäubungsbrennern

Chaudières de chauffage - Chaudières avec brûleurs à air soufflé - Partie 2 : Prescriptions spéciales pour chaudières avec brûleurs fioul à pulvérisation

Ta slovenski standard je istoveten z: **prEN 303-2**

ICS:

27.060.10	Gorilniki na tekoče in trdo gorivo	Liquid and solid fuel burners
91.140.10	Sistemi centralnega ogrevanja	Central heating systems
97.100.40	Grelniki na tekoče gorivo	Liquid fuel heaters

oSIST prEN 303-2:2023

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 303-2

March 2023

ICS 91.140.10

Will supersede EN 303-2:2017

English Version

Heating boilers - Part 2: Heating boilers with forced draught burners - Special requirements for boilers with atomizing oil burners

Chaudières de chauffage - Chaudières avec brûleurs à air soufflé - Partie 2 : Prescriptions spéciales pour chaudières avec brûleurs fioul à pulvérisation

Heizkessel - Heizkessel mit Gebläsebrennern - Teil 2: Spezielle Anforderungen an Heizkessel mit Ölzerstäubungsbrennern

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 57.

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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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<https://standards.iteh.ai/catalog/standards/sist/39d1f75b-a954-451c-973f-5857be9dd071/osist-pren-303-2-2023>

European foreword

This document (prEN 303-2:2023) has been prepared by Technical Committee CEN/TC 57 “Central heating boilers”, the secretariat of which is held by DIN.

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 is an integral part of this document.

This document supersedes EN 303-2:2017.

The main technical changes compared to EN 303-2:2017 are the following:

- a) new Annex AA for information in regard to the labelling was added;
- b) new clause marking and instructions was added;
- c) technical and editorial changes related to ecotest were introduced in order to bring in more clarity and less deviations of test results;
- d) updated references;
- e) updated normative references.

The following structure is intended for the 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 304, *Heating boilers — Test code for heating boilers for atomizing oil burners*
- 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*

1 Scope

This document is applicable to boilers used for central heating in accordance with EN 303-1:2017 up to a nominal heat output of 1 000 kW and EN 303-4:1999 up to a nominal heat output of 70 kW with forced draught burners in accordance with EN 267:2020 that are designed for operating with liquid fuels.

The performance requirements of this document apply to type testing to heating boilers (standard, low temperature and condensing boilers) which are tested on a test rig in accordance with the test code given in EN 304:2017.

This document applies also to room sealed boilers as defined in EN 15035 regarding efficiency and emissions.

This document can also be used as the basis for evaluation of boiler-/burner units.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 267:2020, *Forced draught burners for liquid fuels*

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 15036-1:2006, *Heating boilers — Test regulations for airborne noise emissions from heat generators — Part 1: Airborne noise emissions from heat generators*

EN 15316-4-1:2017, *Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-1: Space heating and DHW generation systems, combustion systems (boilers, biomass), Module M3-8-1, M8-8-1*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 303-1:2017 and the following apply.

3.1 General terms and definitions

3.1.1

range rated boiler

appliance where the heat output is fixed in a given range

3.1.2

modulating boiler

appliance where the heat output is varying in a given range automatically

3.1.3

standby heat loss

P_{stby}

heat loss of a boiler space heater, boiler combination heater in operating mode without heat demand, expressed in kW

prEN 303-2:2023 (E)**3.1.4****combination boiler (combi boiler)**

boiler designed both for central heating and for the production of domestic hot water

Note 1 to entry: Depending on its type of domestic hot water production, the combination boiler is classified in accordance with the manufacturer's declaration as instantaneous type or storage type.

3.2 Terms and definitions relevant to eco-design and labelling regulations terms**3.2.1****sound power level****L_{WA}**

A-weighted sound power level, indoors, expressed in dB(A)

3.2.2**package**

unit of boilers or combination boilers, temperature control and/or solar devices means a package offered to the end-user containing one or more boilers or combination boilers combined with one or more temperature controls and/or one or more solar devices

Note 1 to entry: Definition based on Labelling Regulation 811/2013 Article 2 - (19) and (20).

Note 2 to entry: Informative Annex AA (and its Tables AA.1 and AA.2) provides a copy of table 1 of Annex II of COMMISSION REGULATION (EU) No 813/2013 that uses many of the definitions given in this document.

4 Performance requirements**4.1 General**

All the following performance tests are carried out using an oil forced draught burner in accordance with EN 267:2020.

Multi-stage or modulating burners shall operate within the output range of the boiler.

If the boiler was already tested with a forced draught burner for gaseous fuels in accordance with EN 303-1:2017 and EN 303-3:2006, the tests described in 4.2 and 4.6 need not be performed.

For assembly criteria see Annex A.

4.2 Boiler efficiency**4.2.1 Air ratio for efficiency measurement**

The air ratio λ for the efficiency measurement shall comply with the following:

- less than 100 kW: with the requirements of Figure 1 in the tolerance $\pm 10\%$ of λ ;
- from 100 kW up to 1 000 kW: $1,18 \leq \lambda \leq 1,22$.

4.2.2 Boilers of heat output ≤ 70 kW

The seasonal space heating energy efficiency (η_s) shall not fall below 86 % based on GCV.

4.2.3 Boilers of heat output > 70 kW and ≤ 400 kW

The useful efficiency at nominal heat output (η_4) shall not fall below 86 % based on GCV, and the useful efficiency at 30 % of the nominal heat output (η_1) shall not fall below 94 % based on GCV.

4.2.4 Boilers of heat output > 400 kW and ≤ 1 000 kW

Table 1 — Efficiency requirements for boilers above 400 kW

	Full load efficiency (%) ^a		Part load efficiency (%) ^{a b}	
	η_4		η_1	
Type of boiler	NCV	GCV	NCV	GCV
Standard	89,2	84,2	87,8	82,8
Low temperature	91,4	86,2	91,4	86,2
Condensing	93,6	88,3	96,6	91,1

^a The efficiency based on GCV is equal to the efficiency based on NCV divided by 1,06.
^b Part load efficiency is measured at 30 % of the nominal heat output

4.3 Draught requirements and gas side resistance

The gas side resistance and draught shall be determined during the efficiency performance test at nominal load.

For boilers which operate with negative pressure in the combustion chamber, the values of draught requirements shown in Figure 2 shall be met or the corresponding technical documentation and/or manual shall be made available.

For boilers which are operated with positive pressure in the combustion chamber, the values for the flue gas resistance shown in Figure 3 shall be met or the corresponding technical documentation and/or manual shall be made available.

4.4 Emission values

The emission values in this clause are taken from EN 267:2020.

During the tests in accordance with 4.2 (at nominal heat output) the smoke number shall not exceed 1.

The concentration of unburnt hydrocarbons in the flue gases shall not exceed 10 ppm, except during the first 20 s after release of the fuel. The measurement shall be carried out by a flame ionization detector (FID).

The emissions of CO while operating the boiler at minimum continuous output and nominal output, shall not exceed 60 mg/kWh on NCV or 56 mg/kWh on GCV.

The emissions of nitrogen oxides, expressed in nitrogen dioxide, shall not exceed:

- for boilers with $P_N \leq 400$ kW: 120 mg/kWh fuel input in terms of GCV;
- for boilers with $P_N > 400$ kW: 250 mg/kWh fuel input in terms of NCV.

4.5 Standby heat loss

If the default value of EN 15316-4-1:2017 is not used the standby heat loss for boilers shall be measured in accordance with EN 304:2017.

NOTE For boilers up to 70 kW, the value is used in the calculation of the seasonal space heating energy efficiency.

prEN 303-2:2023 (E)**4.6 Auxiliary electricity consumption**

If the default values of EN 15316-4-1:2017 are not used the auxiliary electricity consumption for boilers shall be measured in accordance with EN 304:2017.

The auxiliary electricity consumption at nominal heat output ($e_{l_{max}}$), the auxiliary electricity consumption at 30 % part load ($e_{l_{min}}$) and auxiliary electricity consumption in standby mode (P_{SB}) shall be measured according EN 304:2017.

4.7 Sound power level

The sound power level L_{WA} shall be measured at nominal heat output according to EN 15036-1:2006.

4.8 Samples for testing

The type test determines whether the individual boilers sizes of a type or range meet the requirements laid down in this document. During the type test the boiler shall be representative of production in its design and equipment.

For boilers in a product range which has the same constructional design it is sufficient to test only the smallest and largest boiler provided the ratio in heat output of the smallest to the largest boiler is less than or equal to 1:2. If, however, within the same product range, this ratio is larger than 1:2 then so many intermediate sizes shall be tested so that the ratio of 1:2 is not exceeded.

The characteristics according to this document for non-tested boilers are determined by linear interpolation based on the nominal heat output.

5 Material performance**5.1 General**

- Material according to EN 303-1:2017, 4.1.1.3.3 have sufficient resistance regarding corrosion resistance, heat resistance and mechanical stability for non-condensing boilers.
- Materials classified as corrosion resistant in Table 2 of EN 303-1:2017 are sufficient resistant as state of the art for low temperature or condensing boilers. Materials not listed as corrosion resistant in Table 2 of EN 303-1:2017 or materials with coating may be tested regarding corrosion resistance according to Annex B (Table B.1, Figure B.1 and B.2) and 5.2 and 5.3.

5.2 Test specimen and test duration

At least two serial-production test specimens with the intended minimum equipment are to be selected from the boiler series to be tested and subjected to fatigue tests according to the following provisions. Before beginning the test, the test specimens shall be subjected to a water pressure test according to EN 303-1:2017, 5.2.2 resp. 5.3.2.

The duration of the test is 3 months; during this period, the evaluation of the boiler inlet and return temperature shall be registered by recording instruments. Throughout the duration of the test, the control setting may not be modified, nor the heating surfaces or combustion chamber cleaned.

After expiry of the test period, the test boiler shall be inspected visually and no significant corrosion and other damages shall be detectable.

5.3 Adjustment values for the test

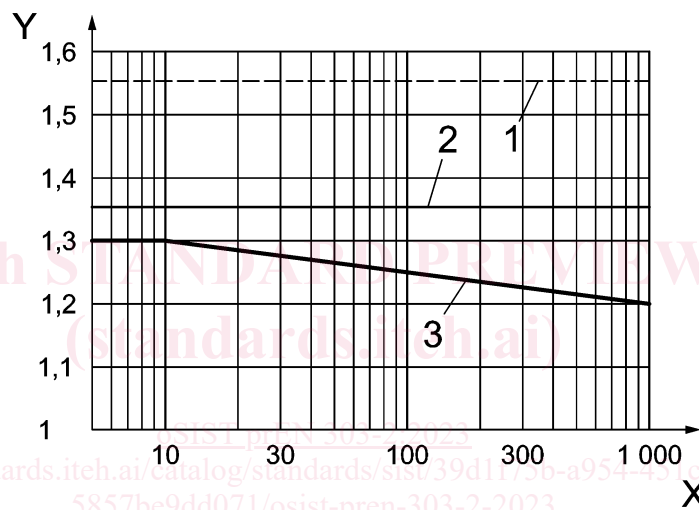
The lower temperature is to be set such that the lowest permissible boiler inlet temperature indicated by the manufacturer shall not be exceeded. For boilers according to EN 303-1:2017, 4.1.2.2.1, the lower temperature shall be set to max. 25 °C.

The firing rate shall be set to the lowest value of the output range permissible according to the manufacturer's indications. The air ratio according to Figure 1 shall be observed.

The power output shall be between 18 % and 22 % of the set thermal output, with sufficiently accurate demonstration of burner running and shutdown times.

The lower value of the boiler return temperature shall not exceed 20 °C.

Firing — except for that according to EN 303-1:2017, 4.1.2.2.2 b) — is shut down for one hour every five hours during the duration of the test, during which available thermal output until achievement of a boiler inlet temperature of 20 °C is uninterrupted.



Key

- Y air ratio
- X heat output P_n in kW
- 1 λ_{\max} for $Q_{F\min}$ at turndownrate > 3:1
- 2 λ_{\max} for $Q_{F\min}$ at turndownrate \leq 3:1
- 3 λ_{\max} for $Q_{F\max}$

Figure 1 — Air ratio