



Instytut Badawczy Przemysłu Maszynowego, Brno, Republika Czeska
Enpiztee/4np Tøst Institute, Public 6nterpfse, Czech Reptzži/c

OSVÉDČENÍ O ZKOUŠCE CERTYFIKAT Z TESTU

Numer
Numer O-B-00061-24

Producent — *Manufactumr* BLAZE HARMONY s.r.o.
Trnávka 37
751 31 Lipník nad Bečvou VII Czechy
— *Czech Republic*

Produkt — *Product* Kotel vodny - *Hot-water boiler*

Oznaczenie typu — *Type designation* BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25,
BLAZE NATURAL PLUS 40

Wymagania dotyczące ekoprojektu — *Ecodesign requirements* Rozporządzenie Komisji (UE) nr 2015/1189, załącznik II, art. 1
Rozporządzenie Komisji (UE) nr 2015/1187
Rozporządzenie Komisji (UE) nr 2015/1187
ČSN EN 303-5+A1:2023

Metoda badań — *Tøst method* Ręczny — *Manual*

Sposób ogrzewania — *Heating method* Dřevo — *Drewno*

Preferowane paliwo — *Preferred fuel*

Wyniki - Results

Typ — <i>type</i>		BLAZE NATURAL PLUS 17	BLAZE NATURAL PLUS 25	BLAZE NATURAL PLUS 40
Moc znamionowa — <i>Nominal output</i>				
CO (10% Oz)	MQ/Mn*	318	210	50
OCC (10% Oz)	Mg/Mn ³	16	2	3
Pył — <i>Duel</i> (10% O2)	mg/m ³	37	27	28
NOx (10% O2)	mg/m [^]	167	166	158
Wydajność — <i>Efficiency</i>	%	90,1	89,5	90,0
Efektywność użytkowa — <i>Useful efficiency</i>	%	82,8	80,5	80,9
Spadek wydajności — <i>Minimal output</i>				
CO (10% 2)	mg/Mn3	221	362	462
OGC (10% Oz)	mg/ITIn ³	14	9	10
Pył - <i>Dust</i> (10% O2)	mg/ITIn*	16	8	13
NOx (10% O2)	MQ/ITIn3	131	112	131
Wydajność - <i>EIT/ciertcy</i>	%	91,2	90,5	91,0
Efektywność użytkowa — <i>Useful efficiency</i>	c		81,4	81,8





Typ — typ		BLAZE NATURAL PLUS 17	BLAZE NATURAL PLUS 25	BLAZE NATURAL PLUS 40
Emisje sezonowe – <i>Seasonal emissions</i>				
CO (10% O ₂)	mg/Mn*	236	339	400
OGC (10% O ₂)	mg/ITIn*	14	8	9
Pył - Oust (10% a O ₂)	mg/mn*	19	11	15
NOx (10% O ₂)	mg/ITIn*	136	120	135
η _{son}	%	83,7	81,2	81,7
F1	%	3,0	3	3,0
F2	%	0,7	0,5	0,3
Sezonowa efektywność energetyczna – <i>Seasonal space heating energy efficiency</i>				
η _{sp}	%	80	78	78
Wskaźnik efektywności energetycznej – <i>Energy Efficiency Index</i>				
EEI		117	114	115
Klasa efektywności energetycznej – <i>Energy Efficiency Class</i>				
		A+	A+	A+

Podstawa wydania
zaświadczenia
Podstawa wydania certyfikatu

Raport nr - *Report No.*
30-16981/2/T oraz protokoły uzupełniające - *and follow-up reports*,
wydane przez laboratorium badawcze nr 1045.1, akredytowane przez
CIA o.p.s., numer certyfikatu akredytacji 523/2023
wydane przez laboratorium badawcze nr 1045.1, akredytowane przez
CIA, numer certyfikatu akredytacji 523/2023

Instytut Badawczy Przemysłu Maszynowego potwierdza niniejszym certyfikatem, że przeprowadził badania i obliczenia przedmiotowego produktu, uzyskując powyższe wyniki.
Instytut Badań Inżynieryjnych niniejszym certyfikatem potwierdza, że przeprowadził dla danego produktu badania i obliczenia, uzyskując powyższe wyniki.

Brno, 2024-02-01


Miroslav Holomek
kierownik sekcji urządzeń spalających
Kierownik sekcji urządzeń spalających



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Strojírenský zkušební ústav, s.p., Brno, Česká republika
Engineering Test Institute, Public Enterprise, Czech Republic

OSVĚDČENÍ O ZKOUŠCE CERTIFICATE OF TEST

Číslo
Number **O-B-00061-24**

Výrobce – Manufacturer

BLAZE HARMONY s.r.o.
Tmávka 37
751 31 Lipník nad Bečvou VII
Česká republika – Czech Republic

Výrobek – Product

Kotel teplovodní – Hot-water boiler

Typové označení – Type designation

**BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25,
BLAZE NATURAL PLUS 40**

Požadavky na ekodesign – Ecodesign requirements

Nařízení Komise (EU) č. 2015/1189, příloha II, čl. 1
Commission Regulation (EU) No. 2015/1189, Annex II, Art. 1
Nařízení Komise (EU) č. 2015/1187
Commission Regulation (EU) No. 2015/1187

Metoda zkoušek – Test method

ČSN EN 303-5+A1:2023

Způsob topení – Heating method

Ruční – Manual

Preferované palivo – Preferred fuel

Dřevo – Wood

Výsledky – Results

Typ – type

**BLAZE NATURAL
PLUS 17**

**BLAZE NATURAL
PLUS 25**

**BLAZE NATURAL
PLUS 40**

Jmenovitý výkon – Nominal output

CO (10% O ₂)	mg/m ³	318	210	50
OGC (10% O ₂)	mg/m ³	16	2	3
Prach – Dust (10% O ₂)	mg/m ³	37	27	28
NO _x (10% O ₂)	mg/m ³	167	166	158
Účinnost – Efficiency	%	90.1	89.5	90.0
Užitečná účinnost – Useful efficiency	%	82.8	80.5	80.9

Snižovaný výkon – Minimal output

CO (10% O ₂)	mg/m ³	221	362	462
OGC (10% O ₂)	mg/m ³	14	9	10
Prach – Dust (10% O ₂)	mg/m ³	16	8	13
NO _x (10% O ₂)	mg/m ³	131	112	131
Účinnost – Efficiency	%	91.2	90.5	91.0
Užitečná účinnost – Useful efficiency	%	83.8	81.4	81.8





Typ – type		BLAZE NATURAL PLUS 17	BLAZE NATURAL PLUS 25	BLAZE NATURAL PLUS 40
Sezonní emise – Seasonal emissions				
CO (10% O ₂)	mg/m ³	236	339	400
OGC (10% O ₂)	mg/m ³	14	8	9
Prach – Dust (10% O ₂)	mg/m ³	19	11	15
NOx (10% O ₂)	mg/m ³	136	120	135
η_{son}	%	83.7	81.2	81.7
F1	%	3.0	3.0	3.0
F2	%	0.7	0.5	0.3
Sezonní energetická účinnost – Seasonal space heating energy efficiency				
η_s	%	80	78	78
Index energetické účinnosti – Energy Efficiency Index				
EEI		117	114	115
Třída energetické účinnosti – Energy Efficiency Class				
		A+	A+	A+

Podklad pro vydání osvědčení
Basis for Certificate issue

Protokol č. - Report No.
30-16981/2/T a protokoly navazující - and follow-up reports,
vydané Zkušební laboratoří č. 1045.1, akreditovanou ČIA o.p.s.,
číslo osvědčení o akreditaci 523/2023
issued by Testing Laboratory No. 1045.1, accredited by CAI,
Accreditation Certificate No. 523/2023

Strojirenský zkušební ústav, s.p. tímto osvědčením o zkoušce potvrzuje, že u předmětného výrobku provedl zkoušky a výpočty s výše uvedenými výsledky.
The Engineering Test Institute certifies by this Certificate of Test to have conducted for the given product the test and calculation with above stated results.

Brno, 2024-02-01



Milan Holomek
manažer sekce spalovacích zařízení
Section Manager of Combustion Equipment

O-B-00061-24, strana – page 2 (2)

Strojirenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic

www.szutest.cz



Testing Laboratory 1045.1
accredited by the Czech Accreditation Institute pursuant to ČSN EN ISO/IEC 17025:2018
Strojírenský zkušební ústav, s.p., Zkušební laboratoř
(Engineering Test Institute, Public Enterprise, Testing Laboratory)
Hudcova 424/56b, Medlánky, 621 00 Brno
Workplace Brno, Hudcova 424/56b, Medlánky, 621 00 Brno

Page 1 of 31



TEST REPORT

30-16981/2/T

Product: Wood gasification hot-water boilers with manual fuel supply

Type designation: BLAZE NATURAL PLUS xx

Customer: BLAZE HARMONY s.r.o.
Trnávka 37
751 31 Lipník nad Bečvou VII
Czech Republic
Company ID No.: 27816273

Manufacturer: BLAZE HARMONY s.r.o.
Trnávka 37
751 31 Lipník nad Bečvou VII
Czech Republic

Responsible employee: Ing. Vladimír Foit

Report issue date: 2024-01-11

Distribution list: 1 copy to the Customer
1 copy to the Engineering Test Institute

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SP-2021-000011_1_10

I. Description of product tested

The boiler BLAZE NATURAL PLUS is based on the principle of a two-stage combustion, whereby the fuel gasification process is followed by combustion of the gases formed. The boiler body is a weldment of 3-8 mm steel sheets. The fuel chamber walls are provided with a protective steel jacket, consisting of several segments joined together with lock joints.

In the lower part, the lateral walls of the combustion chamber are lined with refractory sheet. The combustion chamber bottom is funnel-shaped and it is lined with ceramic blocks. A nozzle opens through a combiner into the combustion chamber, which is also lined with ceramic blocks. The heat exchange surfaces of the boiler are formed by the side walls of the combustion chamber and by the rear tube exchanger. The boiler is insulated with a 30 mm mineral fibre layer. The boiler external casing is made of steel sheet. The lower door of the boiler contains a peephole with ceramic glass. The boiler is equipped with an electronic flue gas temperature regulator with a control panel in the front wall and a mechanical water temperature regulator with a control wheel in the front wall.

In the front part of the boiler under the front cover, there is an air distribution panel. In its lower part, there are 3 supply openings of the combustion air, equipped with flaps. The openings are equipped with a movable shield for regulating the ratio of secondary air. In the combustion chamber there is a permanent heat layer detection arm with an axis turning in the front wall of the combustion chamber. The detection arm is tightly connected to the balancing arm placed in the area of the air distribution panel. The water inlet pipe opens into the distributor, from which water enters the boiler water area through small openings. The exhaust fan can be turned so that the flue gas outlet opens in any direction. The boiler is equipped with a cooling loop, with an entrance and exit embouchure (both 1/2" internal) and a sink for a safety cooling fitting sensor.

The upper stoking door is equipped with a safety lock to ensure any opening position. The electronic fan speed regulator with a control panel is located in the front wall of the boiler. The mechanical water temperature regulator is located in the front wall of the boiler. The boiler is normally supplied with a flue gas sensor and an electronic regulator with an STB emergency thermostat.

All detailed descriptions of individual boiler component part assemblies are included in the enclosed technical documentation to Tasks 30-15417 and 30-16981.

II. Sample tested

Table 1

Boiler output version	Nominal output [kW]	Minimum output [kW]	Fuel	Place of tests
BLAZE NATURAL PLUS 17	17.0	5.0	Wood (ČSN EN ISO 17225-5:2022)	BLAZE HARMONY s.r.o. Trnávka 37 751 31 Lipník nad Bečvou VII, SZÚ Brno
BLAZE NATURAL PLUS 25	26.0	7.6		
BLAZE NATURAL PLUS 40	40.0	12.0		

Sample(s) evaluated:

- Number of samples: 3
- Submission date: 2021-03-22, 2021-07-13, 2023-12-04
- Registration number: –
- Serial number: prototyp1, prototyp2, prototyp3

The visual inspection, tests and evaluations of samples BLAZE NATURAL PLUS 25 and BLAZE NATURAL PLUS 40 were performed at BLAZE HARMONY s.r.o., Trnávka 37, 751 31 Lipník nad Bečvou VII and at SZÚ Test Station between 03 - 07/2021 by Bc. Petr Matoušek and Ing. Pavel Fojtů.

The visual inspection, tests and evaluations were performed by Ing. Filip Molčan and Ing. Vladimír Foit at BLAZE HARMONY s.r.o., Trnávka 37, 751 31 Lipník nad Bečvou VII in December 2023.

The tests were performed using measuring and testing equipment with valid calibration.

III. Measuring and test equipment

Table 2

No.	Description	Inventory number	Calibration valid until	Accuracy
1.	Analyser of emissions Horiba, type ENDA-680P	022394	Calibration before each measurement	see CRM 190/16 see CRM 103000414644
2.	Platform scale	022331	03/2025	see 6051-KL-H0317-23
3.	Induction flow meter	MaR10_Pr1	08/2026	see 6015-KL-P0612-22
4.	A kit for temperature measurement	022435/T1	06/2025	see KL-T-0109-22
5.	Thermometer, hygrometer	116258	11/2024	see 9640/2021
6.	Station barometer	111985	05/2024	see 6013-KL-K0005-19
7.	Digital pressure gauge – draught gauge	MaR11-Tah	08/2025	see KL-P-0086-23
8.	Electronic stopwatch	990760	11/2025	see 2955E-20
9.	Gravimat SHC 501	022328	06/2024	see KL-P-0039-21
10.	Analytical scale Sartorius	021682	03/2025	see 6051-KL-H0313-23
11.	Electronic thermometer THERM 3280-8M	022320/7	08/2024	see KL-T-0080-21
12.	Electric meter	022389-A/4	05/2025	see 039/15/E
13.	Induction water meter	116238	04/2024	see Q0216/2018
14.	Electromechanical scale	022151	03/2025	6051-KL-H0328-23
15.	Electromechanical scale	022211	03/2025	see 6051-KL-H0321-23
16.	Tape measure	ME 477	10/2027	see 8800/2022

IV. Methods, results of tests and verifications

Table 3

No.	Name and specification	Technical standard, regulation used	Documentation	Test evaluation
1.	Test of strength and tightness of pressurized components (1.1*)	ČSN EN 303-5+A1:2023 Art. 5.4, 5.4.1, 5.4.2	Page 5	+
2.	Test of the waterside resistance of the boiler (1.1*)	ČSN EN 303-5+A1:2023 Art. 5.10	Page 6	+
3.	Test of leakage of the combustion chamber (1.1*)	ČSN EN 303-5+A1:2023 Art. 4.3.8, 5.16.6	Page 7	+
4.	Surface temperature test (1.1*)	ČSN EN 303-5+A1:2023 Art. 5.11, 5.16.4, 4.3.7	Pages 8 – 11	+
5.	Test of heat output, input and efficiency (1.1*) Test of combustion products temperature (1.1*)	ČSN EN 303-5+A1:2023 Art. 4.4.2, 4.4.3, 5.2, 5.3, 5.6 to 5.9	Pages 12 – 18	+
6.	Electrical consumption (1.73*)	ČSN EN 303-5+A1:2023 Art. 5.7.7 ČSN EN 15456:2008 Art. 5	Page 19	+
7.	Combustion efficiency test – emissions (1.1*)	ČSN EN 303-5+A1:2023 Art. 4.4.7, 5.6.3, 5.6.4, 5.8, 5.9.4	Pages 20 – 24	+
8.	Function test of control, regulation and safety elements (1.1*) Combustion efficiency test – emissions (1.1*)	ČSN EN 303-5+A1:2023 Art. 5.8, 5.9.4, 5.13, 5.14, 5.16.2, 5.16.3, 5.17	Pages 25 – 28	+
9.	Test of the device for dissipating excess heat (1.1*)	ČSN EN 303-5+A1:2023 Art. 4.1, 5.15	Pages 29 – 30	+

*) Evaluation / Statement of Conformity:
+ Requirement fulfilled
- Requirement not fulfilled
0 Not applicable
x Not evaluated

Note:

The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% as regards standard classification.

If a statement of compliance is provided, the decision rule pursuant to ILAC-G8:09/2019, Art. 4.2.1 - binary statement for the simple acceptance rule shall apply.

Test subject:	Test of strength and tightness of pressurized components
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 5.4, 5.4.1, 5.4.2
Sample tested:	BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Requirement	Requirement specification	Test evaluation	Note
Pressure test for boilers of sheet or sheet metal of non-ferrous metal	ČSN EN 303-5+A1:2023 Art. 5.4		
Tests to be carried out before production The type test pressure is $2 \times PS$ using hydraulic pressure where PS is the maximum permissible operating pressure. The test period shall be at least 10 min and if it is to apply to a range of boilers, the test shall be carried out on at least 3 boiler sizes (smallest, medium, and largest size). No leakage or noticeable permanent deformation shall occur during the test. A record shall be made of the test, including the following details: - exact description of the boiler tested by stating the drawing number; - test pressure in bar and duration of the test; - test result; - place and date of the test, including the names of the persons carrying out the test. The test report shall be signed by, as a minimum, the works tester responsible and one witness. - exact description of the boiler tested by stating the drawing number;	ČSN EN 303-5+A1:2023 Art. 5.4.1	+ 	
Test during production Each boiler shall be tested during the production and the test pressure shall be at least $1.43 \times PS$.	ČSN EN 303-5+A1:2023 Art. 5.4.2	+	Enclosed technical documentation

Note:

+	Compliant
-	Non-compliant
0	Not applicable

Measurement results: BLAZE NATURAL PLUS 40

Date of test

2021-07-15

Ambient conditions

25.8 °C

54.1 %

98.35 kPa

Temperature [°C]

Relative humidity [%]

Barometric pressure [bar]

Maximum operating pressure [MPa]	Required testing pressure [MPa]	Set testing pressure [MPa]	Testing medium	Test duration [min]
0.3	0.6	0.6	water	420

Test evaluation:

There were no leaks or visible permanent deformation during the test.

Test subject:	Test of the waterside resistance of the boiler
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 5.10
Sample tested:	BLAZE NATURAL PLUS 25, BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Requirement	Requirement specification	Test evaluation	Note
Determination of the waterside resistance The water side resistance (measured in mbar) shall be determined for the flow which is equivalent to the rated output of the boiler at a temperature difference of 10 K and 20 K between the flow and return. The results are given in mbar for each boiler size and shall correspond to the values specified by the manufacturer.	ČSN EN 303-5+A1:2023 Art. 5.10	+	

Note: + Compliant
 - Non-compliant
 0 Not applicable

Measurement results: BLAZE NATURAL PLUS 25

No.	Q	ΔP
[-]	[m ³ ·h ⁻¹]	[mbar]
Temperature difference 20 K	1.118	1.9
Temperature difference 10 K	2.236	5.8

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Measurement results: BLAZE NATURAL PLUS 40

No.	Q	ΔP
[-]	[m ³ ·h ⁻¹]	[mbar]
Temperature difference 20 K	1.714	6.4
Temperature difference 10 K	3.429	25.8

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test subject:	Test of leakage of the combustion chamber
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 4.3.8, 5.16.6
Sample tested:	BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25, BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Requirement	Requirement specification	Test evaluation	Note
Leakage of the boilers category I For boilers designed to operate with a positive pressure in the combustion chamber when tested in accordance with 5.16.6 and 5.18.1 at a test pressure of 1,2 times the gas side resistance at nominal heat output, the leakage rate based on mass flow shall not exceed 2 % of the flue gas mass flow at the nominal heat output. The gas side resistance shall be determined for manual stoked boilers with the fuel chamber filled to maximum capacity (as specified by the manufacturer). These requirements are fulfilled for positive pressure boilers category 3. <i>NOTE For boilers designed to operate with negative pressure, the leakage rate measured according to 5.6 characterizes the boiler.</i>	ČSN EN 303-5+A1:2023 Art. 4.3.8	+	
Test for gas side leakage This test is for boilers with a positive pressure in the combustion chamber (category 1) and boilers category 2 and 3. The actual leakage rate of the boiler is determined using air at ambient temperature and using a test rig in accordance with (for example) Figure 2. Exhaust connection and connection to the fuel line shall be sealed tightly for boilers category 1, and the doors set as in normal use. The test rig is connected to the air input of the test boiler. For boilers category 2 and 3 the joint to the air supply duct and flue gas evacuation system shall be part of the leakage test setup. The leakage rates measured are to be converted in accordance with the standard test condition (0 °C, 1 013 mbar). The requirements of 4.2.5.2 or 4.3.8. shall be met. The test shall be performed after safety and performance test (5.7 to 5.18). <i>NOTE The test for boilers category 1 operating with negative pressure can be performed under a pressure of 20 Pa (see Figure 2, measuring point 10).</i>	ČSN EN 303-5+A1:2023 Art. 5.16.6	0 +	Category 1, operating with negative pressure

Note:

+	Compliant
–	Non-compliant
0	Not applicable

Test subject:	Surface temperature test
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 5.11, 5.16.4, 4.3.7
Sample tested:	BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25, BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Requirement	Requirement specification	Test evaluation	Note
Surface temperature The mean surface temperature shall be measured at nominal heat output. In order to do this, a minimum of 5 points on each boiler surface shall be measured. Under the same conditions, the critical temperatures (e.g. boiler doors, operating levers) shall be measured.	ČSN EN 303-5+A1:2023 Art. 5.11	+	
The surface temperature on the outside of the boiler (including the bottom and doors but not including the flue gas outlet and maintenance openings of natural draft boilers) shall not exceed the room temperature by more than 60 K when tested in accordance with 5.12. The requirement for the bottom is not applicable for instances when the manufacturer declares that the boiler is to be installed on a non-combustible base. When tested in accordance with 5.12, the surface temperature of operating levers and all parts which shall be touched by hand during operation of the boiler shall not exceed the room temperature by more than the following values as per EN ISO 13732-1:2008: – 51 K for metals and similar materials; – 56 K for porcelain and similar materials; – 60 K for plastics and similar materials.	ČSN EN 303-5+A1:2023 Art. 4.3.7	+	
Resistance to thermal conductance Temperature measurement shall be performed on the surface of the stoking device at the place next to the fuel line but within a maximum distance which shall be less than 1 m against the feeding direction from the inner wall of the combustion chamber. For boilers with integrated hopper, the temperature measurement shall be performed on the surface of the stoking device at the place next to the integrated hopper but within a maximum distance which shall be less than 1 m against the feeding direction from the inner wall of the combustion chamber. In addition, the highest surface temperature of the hopper shall be measured.	ČSN EN 303-5+A1:2023 Art. 5.16.4	+	

Note:

+	Compliant
–	Non-compliant
0	Not applicable

Measurement results:

Average temperatures of boiler walls, doors and covers (°C):		
Boiler	BLAZE NATURAL PLUS 17	
Fuel type	Wood	
Output	Nominal	Reduced
Date of test	2023-12-12	2023-12-04
Ambient temperature [°C]	27.2	25.7
Relative humidity [%]	20.6	24.5
Barometric pressure [kPa]	98.4	98.13
Front wall	42.4	35.8
Rear wall	41.3	35.8
Right wall	34.1	33.5
Left wall	34.5	32.3
Upper wall	34.8	33.6
Lower wall	54.1	35.3
Temperatures of control elements (°C):		
Upper door handle (metal)	31.0	
Lower door handle (metal)	47.0	
Air control (metal)	35.0	
Control unit (plastic)	28.0	
Arresting bar (metal)	69.0	

Measurement uncertainty: 2 °C for temperatures in the range of (0 + 200)°C

"The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% as regards standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02."

Test results: The prescribed warming values have not been exceeded.

Measurement results:

Average temperatures of boiler walls, doors and covers (°C):		
Boiler	BLAZE NATURAL PLUS 25	
Fuel type	Wood	
Output	Nominal	Reduced
Date of test	2021-07-13	2021-07-12
Ambient temperature [°C]	25.2	24.9
Relative humidity [%]	29.3	25.1
Barometric pressure [kPa]	98.66	98.83
Front wall	40.5	35.8
Rear wall	42.6	38.0
Right wall	37.4	35.2
Left wall	37.3	36.3
Upper wall	40.4	36.8
Lower wall	50.8	45.5
Temperatures of control elements (°C):		
Upper door handle (metal)	31.0	
Lower door handle (metal)	47.0	
Secondary air control (metal)	35.0	
Control unit (plastic)	28.0	
Arresting bar (metal)	69.0	

Measurement uncertainty: 2 °C for temperatures in the range of (0 ÷ 200)°C

"The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% as regards standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02."

Test results: The prescribed warming values have not been exceeded.

Measurement results:

Average temperatures of boiler walls, doors and covers (°C):		
Boiler	BLAZE NATURAL PLUS 40	
Fuel type	Wood	
Output	Nominal	Reduced
Date of test	2021-07-13	2021-07-12
Ambient temperature [°C]	28.0	26.4
Relative humidity [%]	52.5	52.3
Barometric pressure [kPa]	98.04	98.41
Front wall	44.3	43.9
Rear wall	49.4	41.0
Right wall	38.6	36.3
Left wall	43.3	37.1
Upper wall	40.8	38.6
Lower wall	46.8	40.4
Temperatures of control elements (°C):		
Upper door handle (metal)	33.0	
Lower door handle (metal)	48.0	
Secondary air control (metal)	40.0	
Control unit (plastic)	35.0	
Arresting bar (metal)	65.0	

Measurement uncertainty: 2 °C for temperatures in the range of (0 ÷ 200)°C

"The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% as regards standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02."

Test results: The prescribed warming values have not been exceeded.

Test subject:	Test of heat output, input and efficiency Test of combustion products temperature
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 4.4, 4.4.1, 4.4.2, 4.4.2.1, 4.4.2.2, 4.4.2.3, 4.4.2.4, 4.4.2.5, 4.4.3, 5.2, 5.3, 5.6 to 5.9
Sample tested:	BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25, BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Average measured and calculated values (solid fuels):

Test No.:	I.	II.	III.
Boiler type:	BLAZE NATURAL PLUS 17		
Date of test:			
Output tested:	Nominal I. period	Nominal II. period	Minimum
Type of fuel:	Wood		
Combustion period (manual fuel supply)	Minimum 2 x 2.5 hours		2 hours
Nominal heat output (specified by the manufacturer) [kW]	17.0	17.0	17.0
Flue gas temperature [°C]	133.2	133.2	64.6
Fuel consumption [kg/hour]	4.066	4.042	1.2450
Inlet water temperature [°C]	67.2	68.0	65.1
Outlet water temperature [°C]	88.9	89.7	75.9
Cooling water temperature [°C]	-	-	-
Cooling water volume flow [m ³ /hour]	0.6429	0.6429	0.4000
Amount of condensate [kg/hour]	-	-	-
Condensate temperature [°C]	-	-	-
Draught behind boiler [Pa]	7.9	8.4	7.7
Ambient temperature [°C]	27.9	26.5	25.7
Relative air humidity [%]	22.0	19.3	24.5
Barometric pressure [kPa]	98.42	98.38	98.13

Analysis of combustion products:

Test (combustion period) no.:	I.	II.	III.
Oxygen O ₂ [%]	9.34	9.02	11.26
Carbon dioxide CO ₂ [%]	11.29	11.69	9.39
Carbon monoxide CO [ppm]	300	246	156
Higher hydrocarbons THC/OGC [ppm]	13	8	8
Nitrogen oxides NO _x [ppm]	88	87	56
Sulphur oxides SO ₂ [ppm]	< 1	< 1	< 1

Auxiliary combustion values (solid fuels):

Test (combustion period) no.:	I.	II.	III.
Stoichiometric oxygen volume [m ³ /kg]	0.838	0.838	0.838
Stoichiometric air volume [m ³ /kg]	3.991	3.991	3.989
Stoichiometric volume of dry combustion products [m ³ /kg]	3.973	3.973	3.971
Maximum content of CO ₂ [%]	20.62	20.62	20.62
Stoichiometric air multiple [-]	1.79	1.75	2.15
Volume of dry combustion products – actual [m ³ /kg]	7.237	6.994	8.703
Content of H ₂ O in combustion air [m ³ /kg]	0.061	0.048	0.071
Content of H ₂ O in combustion products [m ³ /kg]	0.770	0.757	0.780
Wet combustion products mass flow rate [kg/s]	0.012	0.011	0.004

Calculated values – thermal overview:

Test (combustion period) no.:	I.	II.	III.
Loss through sensible heat of combustion [%] products (chimney)	7.4	7.2	3.2
Loss through gas underburning [%]	0.2	0.2	0.1
Loss through mechanical underburning [%]	0.1	0.1	0.1
Loss through heat transfer into environment [%]	1.9	1.9	5.0
Loss through flue gas condensation [%]	–	–	–
Total loss [%]	9.6	9.4	8.4
Efficiency – indirect method [%]	90.4	90.6	91.6
Fuel mass flow - actual [kg/hour]	4.078	4.054	1.249
Heat input [kW]	17.7	17.6	5.4
Heat output [kW]	15.9	15.9	4.9
Uncertainty of determining heat output [kW]	0.7	0.7	0.2
Output / Nominal output [%]	93.6	93.6	29.1
Efficiency – direct method [%]	89.9	90.4	91.2
Useful efficiency [%]	82.8		83.8
Seasonal efficiency [%]	83.7		
Seasonal energy efficiency [%]	80		
Energy efficiency index [-]	117		
Energy efficiency class [-]	A+		

Efficiency of boiler BLAZE NATURAL PLUS 17 when burning **Wood** meets the requirements for **Class 5** as per ČSN EN 303-5+A1:2023, Fig.1.

BLAZE NATURAL PLUS 17 – Wood meets the seasonal energy efficiency conditions as per ČSN EN 303-5+A1:2023, Art. 4.4.2.4.

Test evaluation:

The measured heat output is within the $\pm 8\%$ tolerance; Boiler Class 5;
Flue gas temperature at nominal output is less than 160 K above the ambient temperature;
Combustion period is 2 x 2.5 hours when burning wood;
The minimum heat output is lower than 30% of nominal heat output.

Average measured and calculated values (solid fuels):

Test No.:	I.	II.	III.
Boiler type:	BLAZE NATURAL PLUS 25		
Date of test:			
Output tested:	Nominal I. period	Nominal II. period	Minimum
Type of fuel:	Wood		
Combustion period (manual fuel supply)	Minimum 2 x 4 hours		7 hours
Nominal heat output (specified by the manufacturer) [kW]	26.0	26.0	26.0
Flue gas temperature [°C]	142.5	145.1	89.3
Fuel consumption [kg/hour]	6.370	6.340	1.980
Inlet water temperature [°C]	52.6	52.7	63.7
Outlet water temperature [°C]	73.8	73.9	72.0
Cooling water temperature [°C]	29.1	28.2	47.5
Cooling water volume flow [m ³ /hour]	1.0000	1.0000	0.8140
Amount of condensate [kg/hour]	–	–	–
Condensate temperature [°C]	–	–	–
Draught behind boiler [Pa]	5.1	5.0	4.9
Ambient temperature [°C]	24.6	25.9	24.9
Relative air humidity [%]	29.2	29.5	25.1
Barometric pressure [kPa]	98.67	98.65	98.83

Analysis of combustion products:

Test (combustion period) no.:	I.	II.	III.
Oxygen O ₂ [%]	8.45	8.17	8.31
Carbon dioxide CO ₂ [%]	11.92	12.11	12.01
Carbon monoxide CO [ppm]	236	152	194
Higher hydrocarbons THC/OGC [ppm]	2	0	1
Nitrogen oxides NO _x [ppm]	92	94	93
Sulphur oxides SO ₂ [ppm]	< 1	< 1	< 1

Auxiliary combustion values (solid fuels):

Test (combustion period) no.:	I.	II.	III.
Stoichiometric oxygen volume [m ³ /kg]	0.912	0.912	0.912
Stoichiometric air volume [m ³ /kg]	4.344	4.344	4.344
Stoichiometric volume of dry combustion products [m ³ /kg]	4.239	4.239	4.239
Maximum content of CO ₂ [%]	19.00	19.00	19.00
Stoichiometric air multiple [-]	1.66	1.62	1.64
Volume of dry combustion products – actual [m ³ /kg]	6.746	6.641	6.694
Content of H ₂ O in combustion air [m ³ /kg]	0.066	0.071	0.069
Content of H ₂ O in combustion products [m ³ /kg]	0.939	0.944	0.942
Wet combustion products mass flow rate [kg/s]	0.01744	0.01713	0.01728

Calculated values – thermal overview:

Test (combustion period) no.:	I.	II.	III.
Loss through sensible heat of [%] combustion products (chimney)	8.1	8.1	4.6
Loss through gas underburning [%]	0.1	0.1	0.2
Loss through mechanical underburning [%]	0.1	0.1	0.1
Loss through heat transfer into [%] environment	1.9	1.9	4.2
Loss through flue gas condensation [%]	–	–	–
Total loss [%]	10.3	10.2	9.0
Efficiency – indirect method [%]	89.7	89.8	91.0
Fuel mass flow - actual [kg/hour]	6.379	6.349	1.983
Heat input [kW]	27.2	27.1	8.4
Heat output [kW]	24.3	24.2	7.6
Uncertainty of determining heat output [kW]	1.0	1.0	0.3
Output / Nominal output [%]	93.5	93.2	29.4
Efficiency – direct method [%]	89.5	89.5	90.5
Useful efficiency [%]	80.5		81.4
Seasonal efficiency [%]	81.2		
Seasonal energy efficiency [%]	78		
Energy efficiency index [-]	114		
Energy efficiency class [-]	A+		

Efficiency of boiler BLAZE NATURAL PLUS 25 when burning **Wood** meets the requirements for **Class 5** as per ČSN EN 303-5+A1:2023, Fig.1.

BLAZE NATURAL PLUS 25 – Wood meets the seasonal energy efficiency conditions as per ČSN EN 303-5+A1:2023, Art. 4.4.2.4.

Test evaluation:

The measured heat output is within the $\pm 8\%$ tolerance;

Boiler Class 5;

Flue gas temperature at nominal output is less than 160 K above the ambient temperature;

Combustion period is 2 x 4 hours when burning wood;

The minimum heat output is lower than 30% of nominal heat output.

Average measured and calculated values (solid fuels):

Test No.:	I.	II.	III.
Boiler type:	BLAZE NATURAL PLUS 40		
Date of test:			
Output tested:	Nominal I. period	Nominal II. period	Minimum
Type of fuel:	Wood		
Combustion period (manual fuel supply)	Minimum 2 x 3 hours		7 hours
Nominal heat output (specified by the manufacturer) [kW]	40.0	40.0	40.0
Flue gas temperature [°C]	160.5	154.6	100.3
Fuel consumption [kg/hour]	9.840	9.350	3.084
Inlet water temperature [°C]	60.7	70.8	54.4
Outlet water temperature [°C]	81.3	90.5	70.9
Cooling water temperature [°C]	24.7	47.8	24.5
Cooling water volume flow [m ³ /hour]	1.6000	1.6000	0.6356
Amount of condensate [kg/hour]	–	–	–
Condensate temperature [°C]	–	–	–
Draught behind boiler [Pa]	8.5	9.2	4.1
Ambient temperature [°C]	26.7	29.3	26.4
Relative air humidity [%]	57.4	47.6	52.3
Barometric pressure [kPa]	98.08	97.99	98.41

Analysis of combustion products:

Test (combustion period) no.:	I.	II.	III.
Oxygen O ₂ [%]	7.24	7.02	7.13
Carbon dioxide CO ₂ [%]	13.33	13.51	13.42
Carbon monoxide CO [ppm]	38	62	50
Higher hydrocarbons THC/OGC [ppm]	1	3	2
Nitrogen oxides NO _x [ppm]	101	94	97
Sulphur oxides SO ₂ [ppm]	< 1	< 1	< 1

Auxiliary combustion values (solid fuels):

Test (combustion period) no.:	I.	II.	III.
Stoichiometric oxygen volume [m ³ /kg]	0.912	0.912	0.912
Stoichiometric air volume [m ³ /kg]	4.344	4.344	4.344
Stoichiometric volume of dry combustion products [m ³ /kg]	4.239	4.239	4.239
Maximum content of CO ₂ [%]	19.00	19.00	19.00
Stoichiometric air multiple [-]	1.51	1.49	1.50
Volume of dry combustion products – actual [m ³ /kg]	6.040	5.959	6.000
Content of H ₂ O in combustion air [m ³ /kg]	0.138	0.131	0.134
Content of H ₂ O in combustion products [m ³ /kg]	1.011	1.004	1.007
Wet combustion products mass flow rate [kg/s]	0.02461	0.02310	0.02386

Calculated values – thermal overview:

Test (combustion period) no.:	I.	II.	III.
Loss through sensible heat of [%] combustion products (chimney)	8.5	7.9	4.6
Loss through gas underburning [%]	0.0	0.0	0.2
Loss through mechanical underburning [%]	0.1	0.1	0.1
Loss through heat transfer into [%] environment	1.4	1.5	3.8
Loss through flue gas condensation [%]	–	–	–
Total loss [%]	10.1	9.5	8.7
Efficiency – indirect method [%]	89.9	90.5	91.3
Fuel mass flow - actual [kg/hour]	9.854	9.363	3.088
Heat input [kW]	42.0	39.9	13.2
Heat output [kW]	37.7	36.0	12.0
Uncertainty of determining heat output [kW]	1.6	1.5	0.5
Output / Nominal output [%]	94.1	90.1	29.9
Efficiency – direct method [%]	89.7	90.3	91.0
Useful efficiency [%]	80.9		81.8
Seasonal efficiency [%]	81.7		
Seasonal energy efficiency [%]	78		
Energy efficiency index [-]	115		
Energy efficiency class [-]	A+		

Efficiency of boiler BLAZE NATURAL PLUS 40 when burning **Wood** meets the requirements for **Class 5** as per ČSN EN 303-5+A1:2023, Fig.1.

BLAZE NATURAL PLUS 40 – Wood meets the seasonal energy efficiency conditions as per ČSN EN 303-5+A1:2023, Art. 4.4.2.4.

Test evaluation:

The measured heat output is within the $\pm 8\%$ tolerance;

Boiler Class 5;

Flue gas temperature at nominal output is less than 160 K above the ambient temperature;

Combustion period is 2 x 3 hours when burning wood – A;

The minimum heat output is lower than 30% of nominal heat output.

Fuel analysis:

Type of fuel	Wood (BLAZE NATURAL 17)			
Analytical indicator	Symbol	Unit	Value	Uncertainty
Combustion heat	Q_s	[UM/kg]	17.02	0.22
Calorific value	Q_j	[UM/kg]	15.63	0.22
Total water, in original condition	W_t	[% of mass]	12.08	0.01
Ash	A	[% of mass]	0.25	0.01
Carbon	C	[% of mass]	44.31	0.24
Hydrogen	H	[% of mass]	5.04	0.20
Nitrogen	N	[% of mass]	0.06	0.14
Sulphur	S	[% of mass]	0.019	0.001
Chlorine	Cl	[% of mass]	0.014	0.004
Oxygen, calculation for 100%	O	[% of mass]	38.23	

Note: Sample in original condition

Measurement uncertainty: Shown in the Table Measurement results

"The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% as regards standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02."

Fuel analysis:

Type of fuel	Wood (BLAZE NATURAL 25, 40)			
Analytical indicator	Symbol	Unit	Value	Uncertainty
Combustion heat	Q_s	[UM/kg]	17.06	0.22
Calorific value	Q_j	[UM/kg]	15.34	0.22
Total water, in original condition	W_t	[% of mass]	12.04	0.01
Ash	A	[% of mass]	0.11	0.01
Carbon	C	[% of mass]	43.56	0.24
Hydrogen	H	[% of mass]	6.52	0.20
Nitrogen	N	[% of mass]	0.19	0.14
Sulphur	S	[% of mass]	0.018	0.001
Chlorine	Cl	[% of mass]	0.035	0.002
Oxygen, calculation for 100%	O	[% of mass]	37.52	

Note: Sample in original condition

Measurement uncertainty: Shown in the Table Measurement results

"The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% as regards standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02."

Test subject:	Electrical consumption
Exact name of the test procedure:	1.73* - Electrical energy consumption tests
Test method:	ČSN EN 303-5+A1:2023 Art. 5.7.7 ČSN EN 15456:2008 Art. 5
Sample tested:	BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25, BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Requirement	Requirement specification	Test evaluation	Note
Electrical consumption During the tests, the electrical consumption shall be determined according to EN 15456. The values for maximum consumption, for stand by, nominal heat output and minimum heat output shall be stated in the test report. For boilers with automatic feeding systems (fuel line), the electrical consumption of the boiler and the fuel line shall be determined and stated separately. The average electrical power consumption during stand by shall be measured for a minimum duration of 10 min and shall be stated in watts. In cases where control operations influence the intrinsic energy consumption, a longer duration might be necessary.	ČSN EN 303-5+A1:2023 Art. 5.7.7	+	

Note:

- + Compliant
- Non-compliant
- 0 Not applicable

Measurement results: BLAZE GREEN 10 – Wood

Boiler type:	BLAZE NATURAL PLUS 17	BLAZE NATURAL PLUS 25	BLAZE NATURAL PLUS 40
Electric input at nominal output	20 W	29 W	33 W
Electric input at minimum output	17 W	14 W	14 W
Electric input for STAND BY mode	3 W	3 W	3 W

Note.: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test subject:	Combustion efficiency test – emissions
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 5.6.3, 5.6.4, 5.8, 5.9.4
Sample tested:	BLAZE NATURAL PLUS 17, BLAZE NATURAL PLUS 25, BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Requirement	Requirement specification	Test evaluation	Note
Emission limits Combustion shall be of low-emission. This requirement shall be satisfied if the emission values shown in Table 7 are not exceeded when operating at nominal heat output or, in the case of boilers with heat output range, when operating at nominal heat output and minimum heat output, determined in accordance with the requirements mentioned in 5.8 and calculated in accordance with 5.9.4.	ČSN EN 303-5+A1:2023 Art. 4.4.7.1	+	

Table 7

Fuel supply			Fuel		Nominal heat output		Emission limits								
							CO			OGC			Dust		
							mg/m³ at 10 % O₂ ^a								
							kW		Class	Class	Class	Class	Class	Class	Class
				3	4	5	3	4	5	3 ^b	4	5			
Manual	Biogenic	≤ 50	5 000	1 200	700	150	50	30	150	75	60				
		> 50 ≤ 150	2 500			100			150						
		> 150 ≤ 500	1 200			100			150						
	Fossil	≤ 50	5 000			150			125						
		> 50 ≤ 150	2 500			100			125						
		> 150 ≤ 500	1 200			100			125						
Automatic	Biogenic	≤ 50	3 000	1 000	500	100	30	20	150	60	40				
		> 50 ≤ 150	2 500			80			150						
		> 150 ≤ 500	1 200			80			150						
	Fossil	≤ 50	3 000			100			125						
		> 50 ≤ 150	2 500			80			125						
		> 150 ≤ 500	1 200			80			125						

NOTE The dust values in this Table are based on the experience of the gravimetric filter method. The method used needs to be referred to in the test report. The particulate matter emission measured according to this European Standard does not include condensable organic compounds which may form additional particulate matter when the flue gas is mixed with ambient air. The values are therefore not directly comparable with values measured by dilution tunnel methods. Neither can they be directly translated into ambient air particulate concentrations.

Referred to dry exit flue gas, 0 °C, 1013 mbar.

^b Boilers of class 3 for type E-fuels according to 1.2 do not need to fulfil the requirements for the dust emissions. The actual value shall be stated in the technical documentation and shall not exceed 200 mg/m³ at 10 % O₂.

Requirement	Requirement specification	Test evaluation	Note
Seasonal space heating emission limits For the seasonal space heating emissions see EU 2015/1189. The solid fuel boilers shall comply with the following requirements in Table 8. The requirements shall be met for the preferred fuel and for any other suitable fuel for the solid fuel boiler. Boilers tested only for fuels type non-woody biomass do not have to meet the requirements in Table 8.	ČSN EN 303-5+A1:2023 Art. 4.4.7.2	+	

Table 8

Fuel supply method	Fuel type	Nominal heat output	Seasonal space heating emission limits			
			CO _s	OGC _s	PM _s	NO _{x,s}
		kW	Seasonal emissions in mg/m³ at 10 % O₂^a			
Manual supply	Biogenic	≤ 500 kW	700	30	60	200
	Fossil	≤ 500 kW	700	30	60	350
Automatic supply	Biogenic	≤ 500 kW	500	20	40	200
	Fossil	≤ 500 kW	500	20	40	350

NOTE The dust values in this Table are based on the experience of the gravimetric filter method. The method used needs to be referred to in the test report. The particulate matter emission measured according to this European Standard does not include condensable organic compounds which may form additional particulate matter when the flue gas is mixed with ambient air. The values are therefore not directly comparable with values measured by dilution tunnel methods. Neither can they be directly translated into ambient air particulate concentrations.

^a Referred to dry exit flue gas, 0 °C, 1013 mbar.

Note:

- + Compliant
- Non-compliant
- 0 Not applicable

Measurement results: BLAZE NATURAL PLUS 17 – Wood

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	9.18	11.49	273	10	87	40	318	16	167	37
Minimum	11.26	9.39	156	8	56	14	221	14	131	16
Measured values							236	14	136	19

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test evaluation:

BLAZE NATURAL PLUS 17 – Wood meets emission requirements for **Class 5** as per ČSN EN 303-5+A1:2023, Table 7.

BLAZE NATURAL PLUS 17 – Wood meets the requirements for seasonal emission limits as per ČSN EN 303-5+A1:2023, Table 8.

Measurement results: BLAZE NATURAL PLUS 17 – Wood

Boiler output	Average values									
	Measured values						Converted values O ₂ =13%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	9.18	11.49	273	10	87	40	231	11	121	27
Minimum	11.26	9.39	156	8	56	14	161	10	95	11

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Measurement results: BLAZE NATURAL PLUS 17 – Wood

Boiler output	Average values									
	Measured values					Converted values O ₂ =0%				
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/UM]	NO _x [mg/UM]	OGC/THC [mg/UM]	Dust [mg/UM]	
Nominal	9.18	273	87	10	40	154	82	8	18	
Minimum	11.26	156	56	8	14	107	63	7	8	

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Measurement results: BLAZE NATURAL PLUS 25 – Wood

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	8.31	12.01	194	1	93	31	210	2	166	27
Minimum	9.16	11.42	312	6	59	9	362	9	112	8
Seasonal emissions							339	8	120	11

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test evaluation:

BLAZE NATURAL PLUS 25 – Wood meets emission requirements for **Class 5** as per ČSN EN 303-5+A1:2023, Table 7.

BLAZE NATURAL PLUS 25 – Wood meets the requirements for seasonal emission limits as per ČSN EN 303-5+A1:2023, Table 8.

Measurement results: BLAZE NATURAL PLUS 25 – Wood

Boiler output	Average values									
	Measured values						Converted values O ₂ =13%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	8.31	12.01	194	1	93	31	153	1	120	20
Minimum	9.16	11.42	312	6	59	9	264	7	82	6

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Measurement results: BLAZE NATURAL PLUS 25 – Wood

Boiler output	Average values								
	Measured values					Converted values O ₂ =0%			
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/UM]	NO _x [mg/UM]	OGC/THC [mg/UM]	Dust [mg/UM]
Nominal	8.31	194	93	1	31	111	88	1	14
Minimum	9.16	312	59	6	9	191	59	5	4

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Measurement results: BLAZE NATURAL PLUS 40 – Wood

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	7.13	13.42	50	2	97	35	50	3	158	28
Minimum	7.31	13.45	460	7	80	16	462	10	131	13
Seasonal emissions							400	9	135	15

Note.: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test evaluation:

BLAZE NATURAL PLUS 40 – Wood meets emission requirements for **Class 5** as per ČSN EN 303-5+A1:2023, Table 7.

BLAZE NATURAL PLUS 40 – Wood meets the requirements for seasonal emission limits as per ČSN EN 303-5+A1:2023, Table 8.

Measurement results: BLAZE NATURAL PLUS 40 – Wood

Boiler output	Average values									
	Measured values						Converted values O ₂ =13%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	7.13	13.42	50	2	97	35	36	2	115	20
Minimum	7.31	13.45	460	7	80	16	336	7	96	9

Note.: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Measurement results: BLAZE NATURAL PLUS 40 – Wood

Boiler output	Average values									
	Measured values					Converted values O ₂ =0%				
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/UM]	NO _x [mg/UM]	OGC/THC [mg/UM]	Dust [mg/UM]	
Nominal	7.13	50	97	2	35	26	84	1	15	
Minimum	7.31	460	80	7	16	244	69	5	7	

Note.: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test subject:	Function test of control, regulation and safety elements Combustion efficiency test – emissions
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 5.13, 5.14, 5.16.1, 5.16.2, 5.16.3, 5.17 ČSN EN 303-5+A1:2023 Art. 5.8, 5.9.4
Sample tested:	BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Requirement	Requirement specification	Test evaluation	Note
Function check of the temperature controller and safety temperature limiter of the boiler The water-side flow rate shall comply with that specified for the nominal heat output test. The flow temperature of 75 °C shall not be exceeded at the start of the test. Adjust the firing so that it corresponds to the nominal heat output P_N of the boiler. A steady state condition shall be reached and the outlet pressure at the flue gas section shall be according to the nominal heat output setting. For manual stoked boilers, the boiler shall be refuelled after reaching steady state with a full batch before starting the test. The dissipated output shall be reduced to $(40 \pm 5) \%$ of the nominal heat output of the boiler; circulating pump running in continuous operation; temperature controller adjusted to maximum set value. When the temperature regulator is running normally, the measured flow temperature shall not exceed 100 °C; the safety temperature cut out or limiter or the device for dissipating excess heat shall not trigger. Repeat the test with the temperature controller out of function. This time, check if the safety temperature limiter/detector switches off the firing system at the highest value specified by the boiler manufacturers and if all hazardous operation states are avoided (see 4.2).	ČSN EN 303-5+A1:2023 Art. 5.13	+	

Requirement	Requirement specification	Test evaluation	Note
Function test of the rapidly disconnectable firing system – Sudden absence of heat dissipation The water-side flow rate shall comply with that specified for the nominal output test. The flow temperature of 75 °C shall not be exceeded at the start of the test. Adjust the firing so that it corresponds to the nominal heat output P_N of the boiler, a steady state condition is reached and the outlet pressure at the flue spigot is according to the rated heat output. The heat consumption is set to 0; water circulation in the boiler is permitted; temperature controller is adjusted to manufacturer recommended maximum set value. Check if the safety temperature limiter or the temperature controller switches off the firing system and all hazardous operation states are avoided. – Loss of the electrical power supply The water-side flow rate shall comply with that specified for the nominal heat output test. The flow temperature of 75 °C shall not be exceeded at the start of the test. Adjust the firing so that it corresponds to the nominal heat output P_N of the boiler, a steady state condition is reached and the outlet pressure at the flue gas section is according to the rated heat output. The electrical supply including the circulation is cut off, check that no hazardous operation conditions occur. For the evaluation of the temperatures and the CO-concentrations, only mean values at a maximum average time of one minute shall be considered.	ČSN EN 303-5+A1:2023 Art. 5.14	0	

Requirement	Requirement specification	Test evaluation	Note
Safety test of consequences of fuel overload and effect of a blockage of the fuel supply The safety of the boiler shall be checked at continuous operation of the boiler with the fuel feed rate of the stoking device set at possible maximum capacity, taking into account failures according to the risk analysis and the electrical safety. If other fuel feed rates lower than the maximum are categorised as critical by the risk analysis, these shall also be tested. The functionality of the safety device for the shut-down of the fuel line shall occur by prevention of the ignition after release of the fuel if no or insufficient combustion in the combustion chamber occurs. The test for blocked fuel line shall be achieved by deactivating the stoking device. The requirements specified in 4.3.5 shall be satisfied.	ČSN EN 303-5+A1:2023 Art. 5.16.2	0	
Loss of combustion air supply The safety of the heating boiler shall be checked at maximum heat input under the following conditions: – Failure of the combustion air fan; – Failure to close of the adjustable combustion air supply. In each case, only one failure shall be simulated. The CO concentrations in the boiler shall not exceed 5 % volume. The management of CO concentration shall be carried out in the flue gas measuring section.	ČSN EN 303-5+A1:2023 Art. 5.16.3	+	
Check of safety for condensing operation The boiler is operated at nominal load. The condensate drainage is blocked. The measurement of CO concentration shall be carried out in the flue gas measuring section. Increased condensate formation can be simulated by adding water to the condensate system. It shall be checked and recorded whether the boiler shuts down or reaches the steady-state condition.	ČSN EN 303-5+A1:2023 Art. 5.17	0	

Note:

+	Compliant
–	Non-compliant
0	Not applicable

Test results: BLAZE NATURAL PLUS 40

Temperature control regulator		
Temperature	[°C]	Note:
Set	90 °C	Temperature set on the operating thermostat regulator
Off	92 °C	The flaps were closed and the fan stopped
On	75 °C	The flaps were opened and the fan turned on

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Safety temperature limiter STB		
Temperature	[°C]	Note:
Set	95 °C	Temperature set on the temperature limiter
Off	96 °C	The fan turned off
On	The boiler was irreversibly switched off. In order to restore operation, a manual intervention is required, after the temperature drops down under the limiter switching temperature.	

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test evaluation: The safety elements were proved to be functioning properly.

Test subject:	Test of the device for dissipating excess heat
Exact name of the test procedure:	1.1* - Tests of tightness, pressure resistance, thermal parameters, combustion efficiency, safety functions
Test method:	ČSN EN 303-5+A1:2023 Art. 4.1.1, 5.15
Sample tested:	BLAZE NATURAL PLUS 40
Measuring equipment used:	see Chapter III

Test results:

Requirement	Requirement specification	Test evaluation	Note
Functioning test of the device for dissipating excess heat (partly or non-disconnectable firing system) Adjust the firing so that it corresponds to the nominal heat output Q_N of the boiler, a steady state condition is reached and the outlet pressure at the flue gas section is according to the nominal heat output. Put the temperature controller out of function. Maintain the function of the of the safety temperature limiter. The heat consumption is set to 0; water circulation in the boiler is permitted. Check if the safety temperature limiter switches off the firing system and the device for dissipating excess heat works properly and all hazardous operation states are avoided. The cold water shall be kept at a temperature of $(10 \pm 5) ^\circ\text{C}$ and a pressure of maximum 2 bar. (Deviations are permissible if they are specified in the installation instructions.) For the evaluation of the temperatures and the CO-concentrations, only mean values at a maximum average time of one minute shall be considered.	ČSN EN 303-5+A1:2023 Art. 5.15	+	
The heat carrier (water) does not become heated to a dangerous extend ($\leq 110 ^\circ\text{C}$).	ČSN EN 303-5+A1:2023 Art. 4.1.1	+	

Note:

+	Compliant
-	Non-compliant
0	Not applicable

Test results: BLAZE NATURAL PLUS 40

Measured and calculated values:	Unit	Value	Limit	Note
Highest heating water temperature in the boiler	°C	109.0	110	
Cooling water temperature at the safety valve inlet	°C	16.5		
Water temperature at the cooling loop outlet	°C	26.1		
Safety valve opening temperature	°C	108.0		
Water flow through cooling equipment	m ³ /h	2.187		

Note: Date of testing and ambient conditions – see Test No. 1.1* (Test of heat output, input and efficiency)

Test evaluation:

During the safety test of the device for removing excess heat, the temperature of the water at the outlet of the boiler did not exceed 110 °C.

Tested by: Ing. Filip Molčan

Date: 2024-01-11

Signed:

Reviewed and
approved by: Ing. Vladimír Foit

Date: 2024-01-11

Signed:

V. A list of referenced background materials

- Order of 2023-11-06 (Order Reg. No. B-80816, received on 2023-11-15)
- Contract B-80816/30
- ČSN EN 303-5+A1:2023 - 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
- ČSN EN 15456:2008 - Heating boilers - Electrical power consumption for heat generators - System boundaries – Measurements
- ČSN ISO 80000-1:2023 Quantities and units – Part 1: General

Report compiled by: Ing. Filip Molčan

Report approved by: Milan Holomek
Combustion Equipment Manager



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