

URZĄD DOZORU TECHNICZNEGO  Centralne Laboratorium Dozoru Technicznego	SPRAWOZDANIE Z BADAŃ	Nr rej. zlecenia 2412/2015-LOK
		Strona 5
		Stron 12

Tablica 4. Wyniki badań cieplnych kotła MC 15 / Results of thermal tests of the boiler type MC 15.

Wymagania normy / Requirements of the standard PN-EN 303-5:2012	Wyszczególnienie / Itemisation	Wyniki badań / Results of tests	Ocena wyników badań / Assessment of test results
1	2	3	4
MOC NOMINALNA / Nominal heat output			
Wymagania dla mocy nominalnej według pkt 4.4.2 i 4.4.7 - badania wykonano według pkt. 5.7; 5.8; 5.9; 5.10. Requirements for nominal heat output according to p. 4.4.2 and 4.4.7 - Tests were performed as per Points 5.7, 5.8, 5.9, 5.10.			
Wyznaczenie sprawności / Determination of efficiency	Ilość spalonego paliwa / godz Quantity of fuel combusted / hour	3,15 ± 0,12 kg/h	---
	Moc paleniska Furnace power	15,86 ± 0,34 kW	---
	Średnia temperatura wody na zasilaniu Average temperature of water at supply	74,45 ± 0,12 °C	---
	Średnia temperatura wody na powrocie Average temperature of water at return	59,27 ± 0,12 °C	---
	Przepływ wody przez kocioł Flow of water through the boiler	0,767 ± 0,018 m³/h	---
	Moc kotła Thermal power	13,54 ± 0,65 kW	+
	Sprawność Efficiency	85,36 ± 2,9 %	Klasa 4
Pomiar emisji spalin / Flue gas emission measurements	Temperatura spalin Flue gas temperature	108,9 ± 0,6 °C	---
	Temperatura otoczenia Ambient temperature	26,2 ± 1,2 °C	---
	CO ₂	12,7 ± 0,7 %	---
	O ₂	7,32 ± 0,42 %	---
	CO / 10 % O ₂	788 ± 46 mg/m³	Klasa 4
	Pył / Dust / 10 % O ₂	54,8 ± 3,2 mg/m³	Klasa 4
	OGC / 10 % O ₂	25 ± 2 mg/m³	Klasa 4
	NO _x / 10 % O ₂	244 ± 14 mg/m³	---
MOC MINIMALNA / Minimum heat output			
Wymagania dla mocy minimalnej według pkt. 4.4.7 - badania według pkt. 5.7; 5.8; 5.9; 5.10. Requirements for minimum heat output according to p. 4.4.7 - Tests were performed as per Points 5.7, 5.8, 5.9, 5.10.			
Wyznaczenie minimalnej mocy cieplnej Determination of minimum heat output	Średnia temperatura wody na zasilaniu Average temperature of water at supply	73,58 ± 0,12 °C	---
	Średnia temperatura wody na powrocie Average temperature of water at return	68,87 ± 0,12 °C	---
	Przepływ wody przez kocioł Flow of water through the boiler	0,761 ± 0,018 m³/h	---
	Moc kotła Thermal power	4,17 ± 0,18 kW	+
Pomiar emisji spalin / Flue gas emission measurements	Temperatura spalin Flue gas temperature	72,8 ± 0,6 °C	---
	Temperatura otoczenia Ambient temperature	24,4 ± 1,2 °C	---
	CO ₂	5,4 ± 0,3 %	---
	O ₂	15,40 ± 0,89 %	---
	CO / 10 % O ₂	969 ± 56 mg/m³	Klasa 4
	OGC / 10 % O ₂	28 ± 2 mg/m³	Klasa 4
	NO _x / 10 % O ₂	307 ± 18 mg/m³	---

Data for pellet boiler “MC 15”

	Unit	Date	
		Nominal heating output	Reduced heating output
Class of boiler according to EN 303-5:2012 - 4			
Fuel	-	Wood pellets - class A1	
Fuel consumption	kg/h	3.15±0.12	
The heat input	kW	15.86±0.34	
The heat output	kW	13.54±0.65	4.17±0.18
The mean CO at 10%O ₂	mg/m ³	788±46	969±56
The mean CO at 13%O ₂	mg/m ³		-
The mean OGC at 10%O ₂	mg/m ³	25±2	28±2
The mean value of dust at 10%O ₂	mg/m ³	54.8±3.2	-
The mean value of dust at 13%O ₂	mg/m ³		-
Efficiency	%	85.36±2.9	
Flue gases temperature	°C	108.9±0.6	72.8±0.6
Mass of the flue gases	g/s		

KONTROL 94 Ltd.

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Accredited testing laboratory by EA BAS according to EN ISO/IEC 17025
Certificate № 122 ЛН Dated September 30th, 2016 Valid until September 30th, 2020



KONTROL 94 Ltd.

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TEST REPORT

For initial type test of heating boilers for solid fuels in compliance with EN 303-5:2012

No of test report: **SFB-02-2017**

Object for testing: A heating boilers for solid fuels EN 303-5:2012

Model: "MC 20"
Serial No 38166710616

Kind of the heating appliance: an automatic pellet boiler

Purpose: for heating of residential premises

Burning material: wood pellets

Producer: "KEPO" d.o.o., "Tulimira Divca" 11, Kosjerić, Serbia

Applicant's name: "KEPO" d.o.o., "Tulimira Divca" 11, Kosjerić, Serbia

Request: No 07 / 14.03.2017

Range of request: Initial type test within the methods for assessment of CE conformity and assessment of the appliance regarding the meeting of requirements in compliance with EN 303-5:2012, Annex B, Annex C, Annex ZA.

Duration of test: 28.04.2017 ÷ 05.05.2017

Place for testing: Testing laboratory "Kontrol 94" Ltd., Gorna Oryahovitsa

Head of Laboratory:

/ Dipl. Eng. Goran Gadjonov /

Date: 05.05.2017
Gorna Oryahovitsa

**Test Report No SFB-02-2017****Test conditions for the measurement of performance**

The test at nominal heat, according to EN 303-5:2012, EN 304:1992+A1:1998+A2:2003 and CEN/TS 15883:2009

	Respond to EN	Test conditions
Fuel type	Table 7 ¹⁾	Wood pellets
Fire box		closed
Burning process		continuous burning
Thermostat		set on 90°C
Position heat		position 5
Position of control devices:		
- Primary air		opened
- Secondary air		NA

Results obtained from the measurement of performance

Results obtained from the measurement	Unit	Respond to EN	Results	Requirements	Uncertainty ± U
The mean flue draught	Pa	by manufacturer	10.0		-
The mean ambient room temperature	°C	5.7.1 ¹⁾	26.0		-
Atmospheric pressure	mbar		989.6		-
Fuel load	kg		27.360		-
The mean flue gas temperature	°C		119		-
The mean CO ₂ emission	%	5.9.1/5.9.2 ¹⁾	8.98		-
The mean CO emission at 10%O ₂	%	5.9.1/5.9.2 ¹⁾	0.0069		-
The mean CO emission at 10%O ₂	mg/m ³		86	≤500 (Class 5)	-
The mean CO emission at 13%O ₂	%		0.0050		-
The mean CO emission at 13%O ₂	mg/m ³		63		-
The mean OGC emission at 10%O ₂	mg/m ³	5.9.1/5.9.2 ¹⁾ Table 6 ¹⁾	19.07	≤20 (Class 5)	-
The mean NOx emission at 10%O ₂	mg/m ³	5.9.1/5.9.2 ¹⁾	168.12		-
Duration at nominal heat output	h	5.7.4.2 ¹⁾	6.00		-
Duration of test period	h		6.00		-
Fuel load	kg/h		4.560		-
The heat input	kW	5.10.2 ¹⁾ ; A.8.1 ²⁾	20.77		-
Loss through sensible heat of the products of combustion - q _a	%	A.9.1 ²⁾	8.95		-
Loss through incomplete combustion-q _u	%	A.9.2 ²⁾	0.05		-
Loss through radiation, convection and conduction - q _s	%	A.9.3 ²⁾	2.176		-
Loss through unburned fuel in ash - q _b	%		0.05		-
Efficiency - indirect method - η	%	5.10.3.2 ¹⁾ ; A.9 ²⁾	88.77	>88.26 (Class 5)	-
Efficiency - direct method - η	%	5.10.3.1 ¹⁾	88.45		-
The heating output (from the test) indirect / direct method	kW	5.10.1 ¹⁾ ; A.7 ²⁾	18.44 / 18.38		-
The heat output (manufacturer declared)	kW		20.00		-
Difference from the mean value for the nominal heat output test results	%	5.8.2 ¹⁾	±8		-
Flue gas mass flow	g/s		15.14		-
The mean value of dust in the flue gas at 10%O ₂	mg/Nm ³	5.9.1/5.9.2 ¹⁾ Table 6 ¹⁾	16.10	≤40 (Class 5)	-
The mean value of dust in the flue gas at 13%O ₂	mg/Nm ³	5.9.1/5.9.2 ¹⁾ Table 6 ¹⁾	11.7		-
Water section					
Water temperature out	°C	5.8.2 ¹⁾	76.6		-
Water temperature in	°C		53.6		-
Rate of input water	m ³ /h		0.687		-

1) According to EN 303-5:2012

2) According to EN 304:1992+A1:1998+A2:2003

Data for pellet boiler "MC 20"

	Unit	Date	
		<i>Nominal heating output</i>	<i>Reduced heating output</i>
Class of boiler according to EN 303-5:2012 - 5			
Fuel	-	Wood pellets - class A1	
Fuel consumption	kg/h	4.560	1.375
The heat input	kW	20.77	6.26
The heat output	kW	18.44	5.79
The mean CO at 10%O ₂	mg/m ³	86	145
The mean CO at 13%O ₂	mg/m ³	63	-
The mean OGC at 10%O ₂	mg/m ³	19.07	26.80
The mean value of dust at 10%O ₂	mg/m ³	16.1	-
The mean value of dust at 13%O ₂	mg/m ³	11.7	-
Efficiency – indirect / direct method	%	88.77 / 88.45	92.51 / 91.52
Flue gases temperature	°C	119	63
Mass of the flue gases	g/s	15.14	5.40



Rešenje za budućnost

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TEST REPORT

**For initial type test of heating boilers for solid fuels in compliance with EN 303-5:2012
Results according to interpolation of results from
test reports SFB-01-2017 and SFB-02-2017**

Object for testing: A heating boilers for solid fuels EN 303-5:2012
Model: "MC25"

Kind of the heating appliance: an automatic pellet boiler

Purpose: for heating of residential premises

Burning material: wood pellet

Producer: "KEPO" d.o.o., "Tulimira Divca" 11, Kosjerić, Serbia

Applicant's name: "KEPO" d.o.o., "Tulimira Divca" 11, Kosjerić, Serbia

Range of request: Results according to interpolation of results from test reports SFB-01-2017 and SFB-02-2017

For "KEPO"

General Manager





Rešenje za budućnost

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TEST REPORT

Results according to interpolation of results from test reports SFB-01-2017 and SFB-02-2017

Results obtained from the measurement	Unit	Respond to EN	Results	Requirements
The mean flue draught	Pa	by manufacturer	10	
The mean ambient room temperature	°C	5.7.1 ¹	21.8	
Atmospheric pressure	mbar		986	
Fuel load	kg		35.5	
The mean flue gas temperature	°C		102	
The mean CO ₂ emission	%	5.9.1/5.9.2 ¹	8.69	
The mean CO emission at 10%O ₂	%	5.9.1/5.9.2 ¹	0.0114	
The mean CO emission at 10%O ₂	mg/m ³		142	≤ 500(Class 5)
The mean CO emission at 13%O ₂	%		0.0083	
The mean CO emission at 13%O ₂	mg/m ³		104	
The mean OGC emission at 10%O ₂	mg/m ³	5.9.1/5.9.2 ¹ Table 6 ¹	19.32	≤ 20 (Class 5)
The mean NO _x emission at 10%O ₂	mg/m ³	5.9.1/5.9.2 ¹	171.33	
Duration at nominal heat output	h	5.7.4.2 ¹	6	
Duration of test period	h		6	
Fuel load	kg/h		5.93	
The heat input	kW	5.10.2 ¹ ; A.8.1 ²	27	
Loss through sensible heat of the products of combustion- q _a	%	A.9.1 ²	8.44	
Loss through incomplete combustion- q _u	%	A.9.2 ²	0.08	
Loss through radiation, convection and conduction- q _s	%	A.9.3 ²	1.9	
Loss through unburned fuel in ash- q _b	%		0.25	
Efficiency- indirect method-η	%	5.10.3.2 ¹ ; A.9 ²	89.3	> 88 (Class 5)
Efficiency- direct method-η	%	5.10.3.1 ¹	89	
The heating output (form the test) indirect/direct method	kW	5.10.1 ¹ ; A7 ²	24.19/24.11	
The heat output (manufacturer declared)	kW		25	
Difference from the mean value for the nominal heat output test results	%	5.8.2 ¹	±8	
Flue gas mass flow	g/s		20.56	
The mean value of dust in the flue gas at 10%O ₂	mg/Nm ³	5.9.1/5.9.2 ¹ Table 6 ¹	16.76	≤ 40 (Class 5)
The mean value of dust in the flue gas at 13%O ₂	mg/Nm ³	5.9.1/5.9.2 ¹ Table 6 ¹	12.2	
Water section				
Water temperature out	°C	5.8.2 ¹	76.6	
Water temperature in	°C		53	
Rate of input water	m ³ /h		0.687	

1) According to EN 303-5:2012

2) According to EN 304:1992+A1:1998+A2:2003

Data for pellet boiler "MC 25"

	Unit	Date	
		<i>Nominal heating output</i>	<i>Reduced heating output</i>
Class of boiler according to EN 303-5:2012 -	5		
Fuel	-	Wood pellets - class A1	
Fuel consumption	kg/h	5.93	1.65
The heat input	kW	27	7.52
The heat output	kW	25	6.93
The mean CO at 10%O ₂	mg/m ³	142	214
The mean CO at 13%O ₂	mg/m ³	104	-
The mean OGC at 10%O ₂	mg/m ³	19.32	30.81
The mean value of dust at 10%O ₂	mg/m ³	16.76	-
The mean value of dust at 13%O ₂	mg/m ³	12.2	-
Efficiency	%	89.3/89	92.3/91
Flue gases temperature	°C	102	60
Mass of the flue gases	g/s	20.56	6.87

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TEST REPORT

For initial type test of heating boilers for solid fuels in compliance with EN 303-5:2012

No of test report: **SFB-01-2017**

Object for testing: A heating boilers for solid fuels EN 303-5:2012

Model: "MC 35"
Serial No 381090010317

Kind of the heating appliance: an automatic pellet boiler

Purpose: for heating of residential premises

Burning material: wood pellets

Producer: "KEPO" d.o.o., "Tulimira Divca" 11, Kosjerić, Serbia

Applicant's name: "KEPO" d.o.o., "Tulimira Divca" 11, Kosjerić, Serbia

Request: No 07 / 14.03.2017

Range of request: Initial type test within the methods for assessment of CE conformity and assessment of the appliance regarding the meeting of requirements in compliance with EN 303-5:2012, Annex B, Annex C, Annex ZA.

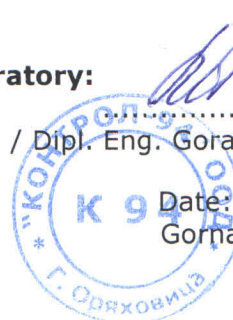
Duration of test: 04.04.2017 ÷ 11.04.2017

Place for testing: Testing laboratory "Kontrol 94" Ltd., Gorna Oryahovitsa

Head of Laboratory:

/ Dipl. Eng. Goran Gadjonov /

Date: 12.04.2017
Gorna Oryahovitsa



**Test Report No SFB-01-2017****Test conditions for the measurement of performance**

The test at nominal heat, according to EN 303-5:2012, EN 304:1992+A1:1998+A2:2003 and CEN/TS 15883:2009

	Respond to EN	Test conditions
Fuel type	Table 7 ¹⁾	Wood pellets
Fire box		closed
Burning process		continuous burning
Thermostat		set on 90°C
Position heat		position 5
Position of control devices:		
- Primary air		opened
- Secondary air		NA

Results obtained from the measurement of performance

Results obtained from the measurement	Unit	Respond to EN	Results	Requirements	Uncertainty ± U
The mean flue draught	Pa	by manufacturer	10.0		-
The mean ambient room temperature	°C	5.7.1 ¹⁾	22.0		-
Atmospheric pressure	mbar		986.6		-
Fuel load	kg		52.000		-
The mean flue gas temperature	°C		93		-
The mean CO ₂ emission	%	5.9.1/5.9.2 ¹⁾	8.12		-
The mean CO emission at 10%O ₂	%	5.9.1/5.9.2 ¹⁾	0.0204		-
The mean CO emission at 10%O ₂	mg/m ³		255	≤500 (Class 5)	-
The mean CO emission at 13%O ₂	%		0.0149		-
The mean CO emission at 13%O ₂	mg/m ³		186		-
The mean OGC emission at 10%O ₂	mg/m ³	5.9.1/5.9.2 ¹⁾ Table 6 ¹⁾	19.82	≤20 (Class 5)	-
The mean NOx emission at 10%O ₂	mg/m ³	5.9.1/5.9.2 ¹⁾	177.76		-
Duration at nominal heat output	h	5.7.4.2 ¹⁾	6.00		-
Duration of test period	h		6.00		-
Fuel load	kg/h		8.667		-
The heat input	kW	5.10.2 ¹⁾ ; A.8.1 ²⁾	39.48		-
Loss through sensible heat of the products of combustion - q _a	%	A.9.1 ²⁾	7.43		-
Loss through incomplete combustion-q _u	%	A.9.2 ²⁾	0.14		-
Loss through radiation, convection and conduction - q _s	%	A.9.3 ²⁾	1.35		-
Loss through unburned fuel in ash - q _b	%		0.67		-
Efficiency - indirect method - η	%	5.10.3.2 ¹⁾ ; A.9 ²⁾	90.41	>88.55 (Class 5)	-
Efficiency - direct method - η	%	5.10.3.1 ¹⁾	90.10		-
The heating output (from the test) indirect / direct method	kW	5.10.1 ¹⁾ ; A.7 ²⁾	35.70 / 35.58		-
The heat output (manufacturer declared)	kW		35.00		-
Difference from the mean value for the nominal heat output test results	%	5.8.2 ¹⁾	± 8		-
Flue gas mass flow	g/s		31.41		-
The mean value of dust in the flue gas at 10%O ₂	mg/Nm ³	5.9.1/5.9.2 ¹⁾ Table 6 ¹⁾	18.1	≤40 (Class 5)	-
The mean value of dust in the flue gas at 13%O ₂	mg/Nm ³	5.9.1/5.9.2 ¹⁾ Table 6 ¹⁾	13.2		-
Water section					
Water temperature out	°C	5.8.2 ¹⁾	76.3		-
Water temperature in	°C		53.0		-
Rate of input water	m ³ /h		1.313		-
1) According to EN 303-5:2012					
2) According to EN 304:1992+A1:1998+A2:2003					

Data for pellet boiler “MC 35”

	Unit	Date	
		<i>Nominal heating output</i>	<i>Reduced heating output</i>
Class of boiler according to EN 303-5:2012 - 5			
Fuel	-	Wood pellets - class A1	
Fuel consumption	kg/h	8.667	2.100
The heat input	kW	39.48	9.57
The heat output	kW	35.70	8.79
The mean CO at 10%O ₂	mg/m ³	255	327
The mean CO at 13%O ₂	mg/m ³	186	-
The mean OGC at 10%O ₂	mg/m ³	19.82	37.34
The mean value of dust at 10%O ₂	mg/m ³	18.1	-
The mean value of dust at 13%O ₂	mg/m ³	13.2	-
Efficiency – indirect / direct method	%	90.41 / 90.10	91.91 / 90.16
Flue gases temperature	°C	93	55
Mass of the flue gases	g/s	31.41	9.26