STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s. p.
(ENGINEERING TEST INSTITUTE, Public Enterprise)
Hudcova 56b, 621 00 Brno, Czech Republic

TEST REPORT
No. 39-8910/2

Product:	Hot-water boiler burning wood with manual fuel supply
Type designation:	ORLIGNO 200
Versions:	ORLIGNO 200 25 kW

Customer:	EKO-VIMAR ORLAŃSKI Sp. Z o.o. ul. Nyska 17b 48-385 Otmuchów Poland
Manufacturer:	EKO-VIMAR ORLAŃSKI Sp. Z o.o. ul. Nyska 17b 48-385 Otmuchów Poland
Responsible employee:	Ing. Stanislav Buchta
Report issue date:	2011-02-02
Distribution list:	1 copy to the Engineering Test Institute 1 copy to the Customer

This Report was drafted on the basis of Order B-38376 of 2010-09-01, Contract B-38376/39 of 2010-09-15 and Contract Supplement No. 1. The above mentioned Report reproduces the test results of Report No. 39-8811/2 of 2010-06-24.

I. Product description

The steel hot-water boiler with manual fuel supply, type ORLIGNO 200, is designed for the burning of wood on the principle of upward burning with pyrolisis combustion.
The boiler is designed for the heating of family houses, residential buildings, flats, offices, small municipal buildings, business premises and outlets, etc.
The boiler body is made of welded steel, with a combined wall thickness of 6 and 4 mm. The charging chamber is situated in the upper part of the boiler body, and the combustion chamber with ceramic lining is situated in the bottom part. The charging chamber is separated from the combustion chamber with a wall in which a ceramic nozzle is mounted with integrated openings for the secondary combustion air supply. Combustion products are discharged from the combustion chamber through a tubular heat exchanger to the boiler exhaust branch. The primary and secondary combustion air is supplied to the boiler via a forced draft blower situated in the front wall. The quantity of air can be regulated in combination of an electronic setup (40 ÷ 100)% and mechanical throttles. The boiler shell consists of painted steel plates lined with mineral wool.
Water connection branches in the rear part of the boiler have the dimension of G2 for heating water inlet and outlet, and G3/4 for the drainage and filling. The exhaust branch with a horizontal axis is situated on the rear side of the boiler.
There is a control panel in the upper part of the boiler with an electronic indication of the water temperature in the boiler and with regulating and security elements.

Basic technical specifications:

Size	Rated capacity wood [kW]	Water volume [l]	Max. operating temperature [°C]	Max. operating pressure [bar]	Weight [kg]
ORLIGNO 200 25 kW	25	75	95	3,0	525

Verification was conducted at the testing station of the Engineering Test Institute in Brno in December 2010 by Milan Holomek (technician).

II. Results of tests and evaluation

No.	Title and specification	Technical standard / regulation applied		Background data	Evaluation	
					Tests	Result
1.	Surface temperatures	ČSN EN 303-5:2000, Art. 4.2.7		Page 4 ÷ 5	+	
2.	Heat capacity, calorific efficiency, temperature of combustion products, draught after the boiler	ČSN EN 303-5:2000, Art. 4.2, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.5, 5.8.2		Page 6÷9	+	
		ČSN EN 303-5:2000 Annex A, deviation A.1.1		Page 10	+	
3.	Combustion efficiency, emissions	ČSN EN 303-5:2000, Art. 4.2.6		Page 11÷12	+	
		ČSN EN 303-5:2000 Annex A (deviations A.1.2, A.2, A.5)	A.1.2.	Page 13	+	
			A. 2	Page 14	+	
			A. 5	Page 15	+	

Note:
No.
(**) no test

Evaluation:
+ Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Accredited test number: **1003** Test title: **Surface temperature measurement**

Testing method: ČSN EN 303-5:2000, Art. 5.12

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐	*Other:*

Test result:

Requirement	Requirement specification	Test evaluation	Note
Surface temperature During the tests according to 5.12, the average temperature of the boiler door surface and the cleaning eye covers on the operators' side must not exceed the ambient temperature by more than 100 K. During the tests according to 5.12, the surface temperature of the outer side of the boiler bottom must not exceed the ambient temperature by more than 65 K. This test is not performed if the manufacturer requires that the boiler is installed on a non-combustible material base. Alternative testing method: The surface temperature below the boiler (according to EN 304) at any place must not exceed 80°C. During the tests according to 5.12, the surface temperature of the operating handles and all parts with which the operating staff will come in contact must not exceed the ambient temperature by more than: - 35 K as regards metals and similar materials; - 45 K as regards porcelain and similar materials; - 60 K as regards plastic material and similar materials	ČSN EN 303-5 Art. 4.2.7	+	

Measurement results: **1. boiler: ORLIGNO 200 25 kW**

Average temperatures of boiler walls, doors and covers (°C):	
Fuel type	**wood**
Date of test	2007-09-14
Rel. humidity (%) Bar. press. (kPa) Amb. temp (°C)	49 99.112 27.3
Front wall	67.6
Rear wall	39.3
Right wall	34.8
Left wall	36.8
Upper wall	43.3
Lower wall	60.8
Charging door	61.3
Ash-pan door	106.0
Temperatures of control elements (°C):	
Loading door handle - plastic	41
Ash pan door handle - plastic	56
Charging throttle drawbar handle - plastic	34
Exchanger cleaning lever - plastic	31

Measurement uncertainty: 2°C for temperatures within the range of (0 ÷ 250) °C
The above-specified 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 the document EA 4/02."

Test evaluation: The prescribed temperature rise values have not been exceeded.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

Accredited test number: **1004.1** **1004.2**

Test title: **Heating output, heating input and calorific efficiency test, Combustion product temperature test**

Testing method: ČSN EN 303-5:2000 Art. 5.7 to 5.10

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐	*Other:*

Test result:

Requirement	Requirement specification	Test evaluation	Note
Requirements regarding boiler capacity The fulfilment of the requirements specified below regarding the boiler capacity must be checked with the use of test fuels. The rated heat capacity and the heat output range may fluctuate depending on the fuel. The requirements regarding the boiler efficiency and emissions are divided into three categories. So that the requirements for the given category can be deemed fulfilled, all efficiency and emission limit values for the category concerned must be fulfilled.	ČSN EN 303-5 Art. 4.2	+	
Boiler efficiency During tests according to 5.7, 5.8 and 5.10, the boiler efficiency for the rated heat output must not be lower than the values specified in the formulas shown in figure 1. 1.	ČSN EN 303-5 Art. 4.2.1	+	
Combustion product temperature In boilers operated under the rated heating output and at temperatures lower than 160 K above the ambient temperature, the manufacturer must provide recommendations regarding the mounting of the flue duct for adequate draught and to prevent condensation and soot depositing in the entire chimney.	ČSN EN 303-5 Art. 4.2.2	+	
Draught The values of draught determined, as specified on Fig. 2, are the maximum values. They also serve as the recommended values for the chimney. In the case that the maximum draught values are exceeded, there must be a special reference to technical instruction manuals.	ČSN EN 303-5 Art. 4.2.3	+	
Period of burning In boilers with manual fuel charging and under the rated heating output, the period of burning must be declared by the manufacturer and must be at least: - 2 hours as regards biological fuels - 4 hours as regards fossil fuels In boilers with automatic fuel charging, the period of burning must be at least 6 hours.	ČSN EN 303-5 Art. 4.2.4	+	

Minimum heating output The minimum heating output must not be higher than 30% of the rated heating output. In boilers with manual fuel charging, the minimum heating output may be higher. In such a case, the manufacturer must state in the technical documentation how the generated heat will be dissipated.	ČSN EN 303-5 Art. 4.2.5	+	
Determination of rated heating output The heating output declared by the manufacturer must be verified by testing, with tolerance of ± 8%. The rated heating output declared by the manufacturer must be achieved at least during one burning period. Otherwise, the rated heating output must be modified.	ČSN EN 303-5 Art. 5.8.2	+	

Measurement results: **1. boiler: ORLIGNO 200 25 kW, fuel: wood**

Average values measured and calculated (solid fuels):

Burning period: Type of boiler: Date of testing: Test conditions:	I. ORLIGNO 200 25 kW 2007-09-14 rated capacity	II. ORLIGNO 200 25 kW 2007-09-14 rated capacity
Type of fuel:	wood/beech/45cm	wood/beech/45cm
Rated heat capacity (specified by manufacturer) [kW]	25.0	25.0
Ambient temperature [°C]	151.7	137.5
Fuel consumption [kg/hour]	6.72	5.93
Ambient temperature [°C]	62.7	58.2
Ambient temperature [°C]	80.8	75.0
Ambient temperature [°C]	16.0	17.4
Cooling water flow [m^3/hour]	0.3410	0.3420
Draught after boiler [Pa]	14.0	13.0
Ambient temperature [°C]	27.9	26.7
Relative air humidity [%]	49.0	49.0
Barometric pressure [kPa]	99.112	99.112

Analysis of combustion products:

Burning period: Type of boiler: Date of testing: Test conditions:	I. ORLIGNO 200 25 kW 2007-09-14 rated capacity	II. ORLIGNO 200 25 kW 2007-09-14 rated capacity
Type of fuel:	wood/beech/45cm	wood/beech/45cm
Oxygen O_2 [%]	3.73	3.55
Carbon dioxide CO_2 [%]	14.18	14.05
Carbon monoxide CO [ppm]	949	1373
Higher hydrocarbons OGC [ppm]	101	168
Nitrogen oxides NO_x [ppm]	164	136

Auxiliary combustion values (solid fuels):

Burning period: Type of boiler: Date of testing: Test conditions:	I. ORLIGNO 200 25 kW 2007-09-14 rated capacity	II. ORLIGNO 200 25 kW 2007-09-14 rated capacity
Type of fuel:	wood/beech/45cm	wood/beech/45cm
Stoichiometric oxygen volume [m^3/kg]	0.866	0.866
Stoichiometric air volume [m^3/kg]	4.122	4.122
Stoichiometric volume of dry combustion products [m^3/kg]	4.051	4.051
Maximum CO_2 volume [%]	19.56	19.56
Stoichiometric air multiple [-]	1.21	1.20
Volume of dry combustion products [m^3/kg]	5.552	5.585
Volume of H_2O in the combustion air [m^3/kg]	0.094	0.087
Volume of H_2O in the combustion products [m^3/kg]	0.911	0.903

Calculated values - thermal balance

Burning period: Type of boiler: Date of testing: Test conditions:	I. ORLIGNO 200 25 kW 2007-09-14 rated capacity	II. ORLIGNO 200 25 kW 2007-09-14 rated capacity
Type of fuel:	wood/beech/45cm	wood/beech/45cm
Loss of sensible heat of combustion products (chimney) [%]	7.2	6.4
Loss of gas underburning [%]	0.6	0.8
Loss of mechanical underburning [%]	0.4	0.4
Loss of heat transfer into the environ. [%]	1.57	1.7
Total loss [%]	9.6	9.3
Calorific efficiency - indirect method [%]	90.4	90.7
Heat input [kW]	28.8	25.5
Heating output [kW]	**26.0**	**23.2**
Uncertainty of determining heating output [kW]	1.1	1.0
Calorific efficiency – direct method [%]	**90.3**	**91.0**
Capacity / rated capacity [%]	104.1	92.7

Under the rated output, he boiler efficiency regarding wood burning meets the requirements applicable to category 3 according to ČSN EN 303-5:2000, figure 1.

Fuel analysis

Fuel type	wood			
Analytical indicator	Symbol	Unit	Value	Uncertainty
Heat of combustion	Q_s	[IU/kg]	17.06	0.14
Calorific value	Q_j	[IU/kg]	15.45	0.14
All water in original condition	W^r_t	[% by weight]	13.62 ± 0.01	
Ash	A	[% by weight]	0.51 ± 0.02	
Carbon	C	[% by weight]	43.01	0.25
Hydrogen	H	[% by weight]	5.83	0.10
Nitrogen	N	[% by weight]	0.23	0.10
Sulphur	S	[% by weight]	0.00	
Chlorine	Cl	[% by weight]	0.00	
Oxygen - recalculation for 100%	O	[% by weight]	36.80	
CO_2 max	CO_{2max}	[% by volume]	19.55	
Conversion factor f_{emis} for the conversion of [mg.m^3] emissions to [mg.IU]	f_{emis}	[-]	0.26334	
Min. required volume of O_2	$V_{O2\,min}$	[m^3/kg]	0.86862	
Min. required dry air volume	$V_{vz\,min}$	[m^3/kg]	4.13629	
Min. quantity of dry chimney gas	$V_{ks\,min}$	[m^3/kg]	4.06944	

Note: Sample in the original condition

Measurement uncertainty: specified in the table of measurement results

The above-specified 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 the document EA 4/02."

Test evaluation:

The heating output measured is within the tolerance of ± 8%;
Boiler class 3;
The temperature of combustion products is lower than 160°C above the ambient temperature, see the respective data in the technical documentation;
The measured draught values do not exceed the maximum values according to figure 2;
The period of burning is more than 2 hours during wood burning;
The minimum heating output equals the rated heating output, see the relevant data in the technical documentation.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

Accredited test number: **1004.1**

Test title: **Heating output, heating input and calorific efficiency test Deviation of type A.1.1**

Testing method: ČSN EN 303-5:2000 Art. 5.7, 5.8 and 5.10

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Date of test and ambient conditions – see the "Heating output and calorific efficiency" test

Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐	*Other:*

Test result:

Requirement	Requirement specification	Test evaluation	Note
Deviation of type A			
A.1 Deviation for Austria			
Boiler efficiency for rated heating output and minimum heating output: *a) Manual fuel supply* ≤ 10 kW 73 % > 10 kW ≤ 200 kW $(65.3 + 7.7 \log Q_N)$ % > 200 kW 83 % *b) Automatic fuel supply* ≤ 10 kW 76 % > 10 kW ≤ 200 kW $(68.3 + 7.7 \log Q_N)$ % > 200 kW 86 %	ČSN EN 303-5 Annex A Art. A 1.1	+	

Measurement results: **1. boiler: ORLIGNO 200 25 kW, rated output, fuel: wood**

Boiler output	Calorific efficiency required	Calorific efficiency measured
Rated – 1st burning period	76.1	90.3
Rated – 2nd burning period	76.1	91.0

Test evaluation: The measured efficiency is higher than the required minimum.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

Accredited test number: **1005.1** Test title: **Combustion efficiency test – emissions**

Testing method: ČSN EN 303-5:2000 Art. 5.7, 5.9 and 5.10

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Date of test and ambient conditions - see the "Heating output and calorific efficiency" test							
Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐	*other:*

Test result:

Requirement	Requirement specification	Test evaluation	Note
Limit values of emissions The emission values must be low during burning. This requirement is considered fulfilled if the emission values specified in table 7 are not exceeded, provided that the boiler is operated under rated heating output, or as regards boilers with a range of heating outputs operated under the rated heating output and the minimum heating output in accordance with 5.7, 5.9 and 5.10. The requirement regarding the limit values of dust emissions under the minimum heating output is fulfilled if the requirements concerned are fulfilled under the rated heating output.	ČSN EN 303-5 Art. 4.2.6	+	category 3

Measurement results: **1. boiler: ORLIGNO 200 25 kW, rated output, fuel: wood**

Average values of gas emissions of O_2, CO_2, CO, OGC, NO_x and dust:

	O_2 [%]	CO_2 [%]	CO [ppm]	OGC [ppm]	NO_x [ppm]	Dust [mg/m^3]	CO [mg/m^3] O_2 = 10%	OGC [mg/m^3] O_2 = 10%	NO_x [mg/m^3] O_2 = 10 %	Dust [mg/m^3] O_2 = 10 %
Average values	**3.63**	**14.12**	**1161**	**134**	**150**	**52**	**921**	**46**	**196**	**33**

Measured and calculated values concerning the dust measurements:

Concentration of solid pollutants at the boiler output				
Measurement number	1	2	3	4
beginning – end of measurement (hour, min.)	13^{58}-14^{28}	14^{58}-15^{28}	15^{58}-16^{28}	16^{58}-17^{28}
ambient temperature (°C)	28,1	27,9	27,4	26,1
number of measuring points ()	1	1	1	1
duration of consumption at the measuring point	30	30	30	30
flu gas temperature (°C)	175,1	137,2	113,3	147,3
negative (positive) pressure in the measurement	-14	-14	-13	-13
atmospheric air pressure (Pa)	99 112			
measurement cross-section (m^2)	0,00785			
fictitious humidity under standard conditions (kg/m^3)	0,1251			

dew point temperature (°C)	46,0			
relative flu gas humidity (%)	14,0			
humid flu gas density under stand. conditions (kg/m^3)	1,2767			
operating content of O_2 (%)	3,6			
flue gas volume flow rate (m^3/h)	65,8			
flu gas vol. flow rate under stand. conditions (m^3/h)	40,9			
dry flu gas volume flow rate under standard conditions (m^3/h)	35,2			
medium exhaust rate (m/s)	2,3	2,3	2,3	2,3
weight of solid pollutants (mg)	12,4	13,6	11,7	11,4
flu gas sample volume (m^3)	0,431	0,432	0,432	0,434
flu gas sample volume under stand. conditions (m^3)	0,257	0,281	0,299	0,276
dry flu gas sample volume under standard conditions (m^3)	0,221	0,242	0,257	0,237
medium weight concentration of solid pollutants (mg/m^3)	28,8	31,5	27,1	26,3
medium weight concentration of solid pollutants under standard conditions (mg/m^3)	48,2	48,4	39,1	41,3
medium weight concentration of solid pollutants in dry flu gas under standard conditions (mg/m^3)	56,1	56,2	45,5	48,1
mass flow rate of solid pollutants (g/h)	1,90	2,07	1,78	1,73
average medium weight concentration of solid pollutants (mg/m^3)	28,4			
average medium weight concentration of solid pollutants under standard conditions (mg/m^3)	44,3			
average medium weight concentration of solid pollutants in dry flu gas under standard conditions	51,5			
avg. medium weight concentration of solid pollutants in dry flu gas under standard conditions at 10% O_2	32,6			
average mass flow rate of solid pollutants (g/h)	1,90			
standard deviation for determination of medium weight concentration of solid pollutants (mg/m^3)	2,30			
standard deviation for determination of average mass flow rate of solid pollutants (g/h)	0,15			

Note: standard conditions – temperature: 0 °C, pressure: 101.325 kPa

Test evaluation: Emissions – category 3.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

Accredited test number: **1005.1**

Test title: **Combustion efficiency test – emissions**
Deviation of type A.1.2

Testing method: ČSN EN 303-5:2000 Art. 5.7, 5.9 and 5.10

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Date of test and ambient conditions - see the "Heating output and calorific efficiency" test						
Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐ *other:*

Test result:

Requirement						**Requirement specification**	**Test evaluation**	**Note**
A.1 Deviation for Austria								
Limit values of emissions						ČSN EN 303-5 Annex A Art. A 1.2	+	
	mg/IU[1]	**CO**	**NO_x**	**OGC**	**Dust**			
Manual fuel supply	**Biological fuels**	**1100**	**150 [2]**	**80**	**60**			
	Fossil fuels	**1100**	**100**	**80**	**60**			
Automatic fuel supply	**Biological fuels**	**500 [3]**	**150 [2]**	**40**	**60**			
	Fossil fuels	**500**	**100**	**40**	**40**			
[1] With respect to the calorific value of the fuel used **[2] Limit values of NO_x apply for boilers burning wood only** **[3] At 30% of the rated heating output, the limit value may be exceeded by 50%**								

Measurement results: **1. boiler: ORLIGNO 200 25 kW, rated output, fuel: wood**

Boiler output	**Average emission values**								
	Measured values					**Converted values**			
	O_2 [%]	**CO [ppm]**	**NO_x [ppm]**	**OGC [ppm]**	**Dust [mg/m^3]**	**CO [mg/MJ]**	**NO_x [mg/MJ]**	**OGC [mg/MJ]**	**Dust [mg/MJ]**
Rated	3.63	1161	150	134	52	460	98	23	16

Test evaluation: The measured emission values do not exceed the limit values.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

Accredited test number: **1005.1**

Test title: **Combustion efficiency test – emissions**
Deviation of type A.2

Testing method: ČSN EN 303-5:2000 Art. 5.7, 5.9 and 5.10

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Date of test and ambient conditions - see the "Heating output and calorific efficiency" test							
Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐	*other:*

Test result:

Requirement				Requirement specification	Test evaluation	Note
A.2 Deviation for Germany						
For Germany, only category 3 in accordance with table 7 is acceptable. Central heating boilers burning solid fuels with the rated heat capacity exceeding 15 kW must be constructed and operated so that the emissions meet the following requirements, depending on the fuel used:				ČSN EN 303-5 Annex A Art. A.2	+	
Fuel	**Emission values [g/m³]**	**CO**	**Dust**			
black and brown coal (lignite)	**reference content of O_2 = 8%**	**-**	**0.15**			
wood in natural condition	**reference content of O_2 = 13%**	**4 [1] 2 [2] 1 [3] 0,5 [4]**	**0.15**			
[1] 15 kW < O_N ≤ 50 kW [2] 50 kW < O_N ≤ 150 kW [3] 150 kW < O_N ≤ 500 kW [4] O_N > 500 kW						

Measurement results: **1. boiler: ORLIGNO 200 25 kW, rated output, fuel: wood**

Boiler output	Average emission values								
	Measured values				Converted values				
	O_2 [%]	CO [ppm]	OGC [ppm]	Dust [mg/m³]	CO O_2 = 10 % [mg/m³]	OGC O_2 = 10 % [mg/m³]	Dust O_2 = 10 % [mg/m³]	CO O_2 = 13% [g/m³]	Dust O_2 = 13% [g/m³]
Rated	3.63	1161	134	52	921	46	33	0.668	0.024

Test evaluation: The measured emission values do not exceed the limit values.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

Accredited test number: **1005.1**

Test title: **Combustion efficiency test – emissions**
Deviation of type A.5

Testing method: ČSN EN 303-5:2000 Art. 5.7, 5.9 and 5.10

Sample tested: ORLIGNO 200 25 kW

Measuring devices: see Report 39-8811/2

Date of test and ambient conditions - see the "Heating output and calorific efficiency" test						
Place of testing:	at SZÚ	x	at the manufacturer's	☐	at the customer's	☐ *other:*

Test result:

Requirement					Requirement specification	Test evaluation	Note
A.5 Deviation for Switzerland							
For boilers burning wood in natural condition, only category 3 of Table 7 is acceptable. The use of coal, coal briquettes and coke with the specific content of sulphur > 1% is not permitted.					ČSN EN 303-5 Annex A Art. A.5	+	
Fuel	**Q_N [kW]**	**Emissions [mg/m³]**	**CO**	**Dust**			
Fossil	**$Q_N \leq 70$** **$70 < Q_N \leq 1000$**	**reference content of O_2 = 7%**	**4000** **1000**	**-** **150**			
Wood in natural condition	**$Q_N \leq 70$** **$70 < Q_N \leq 200$** **$200 < Q_N \leq 500$** **$500 < Q_N \leq 1000$**	**reference content of O_2 = 13%**	**4000** **2000** **1000** **500**	**-** **150** **150** **150**			

Measurement results: **1. boiler: ORLIGNO 200 25 kW, rated output, fuel: wood**

Boiler output	Average emission values								
	Measured values				Converted values				
	O_2 [%]	CO [ppm]	OGC [ppm]	Dust [mg/m³]	CO O_2 = 10 % [mg/m³]	OGC O_2 = 10 % [mg/m³]	Dust O_2 = 10 % [mg/m³]	CO O_2 = 13 % [mg/m³]	Dust O_2 = 13% [mg/m³]
Rated	3.63	1161	134	52	921	46	33	668	-

Test evaluation: The measured emission values do not exceed the limit values.

Tested by: Milan Holomek Date: 2010-12-10 Signature:

Reviewed by: Stanislav Buchta Date: 2010-12-10 Signature:

The test methods in this Report were applied without deviations, additions, or exceptions.

III. List of referenced documents

- Order B-38376 of 2010-09-01
- Contract B-38376/39 of 2010-09-15
- Contract Supplement No. 1 of 2011-02-02
- ČSN EN 303-5:2000 – Central heating boilers – Part 5: Central heating boilers burning solid fuels, with manual or automatic supply and max. rated heating capacity of 300 kW. Terminology, requirements, testing, and marking
- Instruction & Service Manual ORLIGNO 200
- Customer's declaration of 2010-12-27
- Source materials for Task No. 39-8811/2

The persons stated below are accountable for the accuracy of the above-specified data:

Ing. Stanislav Buchta
Head of Boiler and Industrial Heat Equipment Team

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ

Ing. Jiří Dvořák
Head of Heat and Ecological Equipment Test Station