

Report No. K 3123 2021 T1

Residential space heating appliances
Type testing

DIN EN 14785

Types:

AP400S_0_09, AP400B_0_09, AP400S_1_09, AP400B_1_09,
AP400S_0_10, AP400B_0_10, AP400S_1_10, AP400B_1_10,
AP400S_0_11, AP400B_0_11, AP400S_1_11, AP400B_1_11,
AP400S_0_12, AP400B_0_12, AP400S_1_12, AP400B_1_12,
AP400S_0_13, AP400B_0_13, AP400S_1_13, AP400B_1_13

Trademark:
PALAZZETTI

Company:
PALAZZETTI LELIO S.p.A.



Deutsche
Akkreditierungsstelle
D-PL-11120-04-00

This accreditation is valid only for the listed standards as stated in the accreditation annex of D-PL-11120-04-00

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Publication of page 2 is permitted.

The test results presented in this report refer solely to the test object stated as described on page 2. The report does not represent a general statement about the serial production of the test object and gives not an authorization for use of a TÜV Rheinland test/certification mark.

Type testing
Residential space heating appliances fired by wood pellets
DIN EN 14785: September 2006
Correction 1 DIN EN 14785: October 2007

Applicant/contractor: **PALAZZETTI LELIO S.p.A.**
Via Roveredo, 103
33080 Porcia (PN) - Italy

Trademark: **PALAZZETTI**

Description of the appliances: Residential space heating appliances fired by wood pellets without water heat exchanger, with fan assisted flue discharge and with internal fuel hopper.

Types designation: **AP400...**, See overview models designation table on page 3.

Heat input [kW]: See overview models designation table on page 3.

Heat output [kW]: See overview models designation table on page 3.

Water heat output: Not applicable.

Test fuel: Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to EN 17225-2.

Type of fuel charging: Automatic load.

Remarks:

Sealed appliances for Germany (FC62x) and for France requirements (acc. to EN613, cl. 6.2.2.2). Refractory materials for the internal walls of the combustion chamber (Magnofix). The appliances used for testing are prototypes, intended to be representative of the future production, according to clause 9.2 of the Standard.

Test results:

The technical requirements cl. 4-8 of the above-mentioned standard are fulfilled. The local applicable installation conditions have to be observed.

The electrical safety cl. 5.9. of the standard was not a part of this initial type testing.

The presumption of conformity with the relevant European Directives respectively Regulations could only be confirmed by full compliance with Annex ZA.

Dated in Cologne, 2022-03-11

TÜV Rheinland Energy GmbH
Test Centre according to Construction
Product Regulation 305/2011(CPR)
Notified Body: 2456

Assessor:



Dipl.-Ing. I. Metin

Report released after review:

Dipl.-Ing. A. Pomp

Overview models designation table

Model designation	Nominal heat input (kW)	Nominal heat output (kW)	Horizontal flue gas outlet	Upright flue gas outlet	Burner manually removable for cleaning	Automatic cleaning system for the burner
AP400S_0_09	3,1 – 10,2	2,8 – 9,3	X			X
AP400B_0_09	3,1 – 10,2	2,8 – 9,3		X		X
AP400S_1_09	3,5 – 9,9	3,2 – 9,0	X		X	
AP400B_1_09	3,5 – 9,9	3,2 – 9,0		X	X	
AP400S_0_10	3,1 – 10,9	2,8 – 10,0	X			X
AP400B_0_10	3,1 – 10,9	2,8 – 10,0		X		X
AP400S_1_10	3,5 – 11,0	3,2 – 10,0	X		X	
AP400B_1_10	3,5 – 11,0	3,2 – 10,0		X	X	
AP400S_0_11	3,1 – 12,1	2,8 – 11,0	X			X
AP400B_0_11	3,1 – 12,1	2,8 – 11,0		X		X
AP400S_1_11	3,5 – 12,1	3,2 – 11,0	X		X	
AP400B_1_11	3,5 – 12,1	3,2 – 11,0		X	X	
AP400S_0_12	3,1 – 13,2	2,8 – 12,0	X			X
AP400B_0_12	3,1 – 13,2	2,8 – 12,0		X		X
AP400S_1_12	3,5 – 13,3	3,2 – 12,0	X		X	
AP400B_1_12	3,5 – 13,3	3,2 – 12,0		X	X	
AP400S_0_13	3,1 – 14,4	2,8 – 13,0	X			X
AP400B_0_13	3,1 – 14,4	2,8 – 13,0		X		X
AP400S_1_13	3,5 – 14,6	3,2 – 13,2	X		X	
AP400B_1_13	3,5 – 14,6	3,2 – 13,2		X	X	

1 Task

The Test Centre for Energy Appliances was instructed to execute the initial type testing on the appliances **AP400S_0_09**, **AP400S_0_13**, **AP400S_1_09** and **AP400S_1_13** for the operation with wood pellets according to DIN EN 14785:2006, clauses 4-8.

Further comparison and safety tests have been carried out on the stove **AP400S_0_13**, not fitted with the air inlet pressure sensor, and on the room heaters with type **AP400B_0_13** and **AP400B_1_13** arranged for the concentric flue gas system.

The electrical safety, cl. 5.9. of the standard, was not a part of this initial type testing.

The practical tests were performed by CMC Centro Misura Compatibilità S.r.l., via della Fisica 20 Thiene (VI), on the 19th - 20th - 21th - 22th - 23th of July, on the 28th of September and on the 22th - 23th - 24th - 26th of November 2021.

2 Description of the appliances

2.1 Construction

Residential space heating appliances fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stoves are equipped with an automatic ignition.

All the appliances are sealed for Germany (typ FC62x) and for France requirements (acc. to EN613, cl. 6.2.2.2).

The appliances are equipped with an air inlet pressure sensor as control for exhaust flue gas fan speed. There is the optional possibility to equip the appliances without the air inlet pressure sensor: in this case, the exhaust flue gas fan speed is determined by the selected power.

AP400S_0_09, **AP400S_0_10**, **AP400S_0_11**, **AP400S_0_12** and **AP400S_0_13** appliances are all identical in construction: only software setups at nominal load are different.

Main features of "AP400S_0_xx" appliances:

- All appliances are equipped with an automatic cleaning system for the burner;
- The flue gas outlet is positioned on the backside of the stoves;
- The stoves are equipped with a frontal "ambient" hot air convection blower;
- The stoves may be equipped with one or two optional canalization hot air convection blowers on the backside of the appliance.

AP400B_0_09, **AP400B_0_10**, **AP400B_0_11**, **AP400B_0_12** and **AP400B_0_13** appliances are all identical to the relative "AP400S_0_xx" appliances, except than:

- "AP400B_0_xx" models are all arranged for the concentric flue gas system (upright connection).
- "AP400B_0_xx" models may be equipped with only one hot air convection blower on the backside of the appliance.

AP400S_1_09, **AP400S_1_10**, **AP400S_1_11**, **AP400S_1_12** and **AP400S_1_13** appliances are all identical in construction to the relative "AP400S_0_xx" models, except than for the different burner design (in this case, the cleaning is manual and not automatic).

AP400B_1_09, AP400B_1_10, AP400B_1_11, AP400B_1_12 and AP400B_1_13 appliances are all identical in construction to the relative “AP400B_0_xx” models, except than for the different burner design (in this case, the cleaning is manual and not automatic).

The user can adjust independently the speed of the 3 (when provided) ambient/canalisation hot air convection blowers in different steps, from power off to maximum speed.

See the paragraph “3.9 - Comparison tests” for additional tests on appliances with alternative components or construction.

2.2 General technical data of the pellet stoves

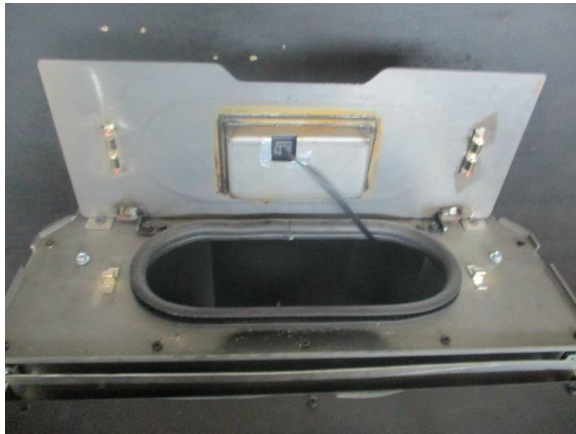
Types:	AP400S_0_09 AP400B_0_09	AP400S_0_10 AP400B_0_10	AP400S_0_11 AP400B_0_11	AP400S_0_12 AP400B_0_12	AP400S_0_13 AP400B_0_13
Nominal heat output:	9,3 kW	10,0 kW	11,0 kW	12,0 kW	13,0 kW
Test fuel:	Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to EN 17225-2.				
Total dimension: Height x Width x Depth	AP400B_x_xx: 1221 x 583 x 665 mm AP400S_x_xx: 1221 x 583 x 578 mm				
Flue spigot:	80 mm				
Declared weight:	AP400B_x_xx: 165 kg AP400S_x_xx: 155 kg				
Distances of adjacent combustible materials:	50 mm (Backside) distance from test wall 300 mm (Side) distance from test wall 800 mm (Front) distance from test wall				

Types:	AP400S_1_09 AP400B_1_09	AP400S_1_10 AP400B_1_10	AP400S_1_11 AP400B_1_11	AP400S_1_12 AP400B_1_12	AP400S_1_13 AP400B_1_13
Nominal heat output:	9,0 kW	10,0 kW	11,0 kW	12,0 kW	13,2 kW
Test fuel:	Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to EN 17225-2.				
Total dimension: Height x Width x Depth	AP400B_x_xx: 1221 x 583 x 665 mm AP400S_x_xx: 1221 x 583 x 578 mm				
Flue spigot:	80 mm				
Declared weight:	AP400B_x_xx: 165 kg AP400S_x_xx: 155 kg				
Distances of adjacent combustible materials:	50 mm (Backside) distance from test wall 300 mm (Side) distance from test wall 800 mm (Front) distance from test wall				

For more information see appendix A02, A04, A06.

2.3 Photos of the tested appliances

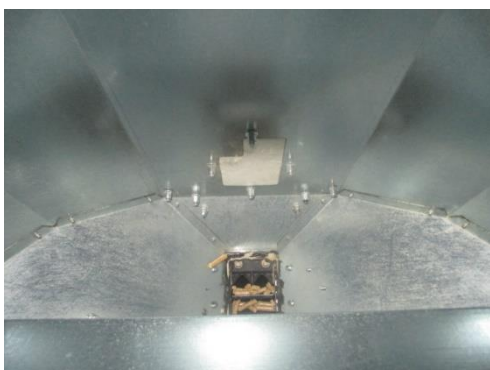
AP400S_0_09, AP400B_0_09, AP400S_1_09, AP400B_1_09, AP400S_0_10, AP400B_0_10,
AP400S_1_10, AP400B_1_10, AP400S_0_11, AP400B_0_11, AP400S_1_11, AP400B_1_11,
AP400S_0_12, AP400B_0_12, AP400S_1_12, AP400B_1_12, AP400S_0_13, AP400B_0_13,
AP400S_1_13, AP400B_1_13 (photos in common for all models)



**AP400S_0_09, AP400S_1_09, AP400S_0_10, AP400S_1_10, AP400S_0_11, AP400S_1_11,
AP400S_0_12, AP400S_1_12, AP400S_0_13, AP400S_1_13, (horizontal flue gas outlet)**



**AP400B_0_09, AP400B_1_09, AP400B_0_10, AP400B_1_10, AP400B_0_11, AP400B_1_11,
AP400B_0_12, AP400B_1_12, AP400B_0_13, AP400B_1_13, (upright flue gas outlet)**



AP400S_0_09, AP400B_0_09, AP400S_0_10, AP400B_0_10, AP400S_0_11, AP400B_0_11, AP400S_0_12, AP400B_0_12, AP400S_0_13, AP400B_0_13 (automatic cleaning system for the burner)



AP400S_1_09, AP400B_1_09, AP400S_1_10, AP400B_1_10, AP400S_1_11, AP400B_1_11, AP400S_1_12, AP400B_1_12, AP400S_1_13, AP400B_1_13 (burner manually removable for cleaning)



3 Testing

3.1 General requirements

- P (pass)
- NA (not applicable)
- NT (not tested)
- F (fail)

Requirement acc. EN 14785	Clause	Tested Acc.	Requirement Complies
Production documentation	4.1	-	P
General construction requirements	4.2	A.4.7	P
Flue spigot or socket	4.3	-	P
Combustion control device	4.4	-	P
Flue ways	4.5	-	P
Cleaning tools	4.6	-	P
Fire doors	4.7	-	P
Combustion air supply	4.8	-	P NA
- Primary air inlet control	4.8.1	-	
- Secondary air inlet control	4.8.2	-	
Internal flue gas diverter	4.9	-	NA
Retort	4.10	-	P
Ash pan and ash removal	4.11	-	P
Integral boiler	4.12	A 4.9.2	NA
- General construction material	4.12.1		NA
- Nominal minimum wall thickness (steel)	4.12.2		NA
- Welding seams and welding fillers	4.12.3		NA
- Minimum wall thicknesses (cast iron)	4.12.4		NA
- Cast iron parts subject to water pressure	4.12.5		NA
- Venting of water sections	4.12.6		NA
- Water tightness	4.12.7		NA
- Water side connections	4.12.8		NA
- Boiler internal waterways	4.12.9		NA
- Design of all water boilers	4.12.9.1		NA
- Boiler waterways used with indirect water systems	4.12.9.2		NA
- Boiler waterways used with direct water systems	4.12.9.3		NA
Control of flue gas	4.13	-	NA
Cleaning of heating surfaces	4.14	-	P

3.2 Safety

Requirement acc. EN 14785	Clause	Tested Acc.	Requirement Complies
Temperatures of adjacent combustible materials	5.1	A.4.7 A.4.9	P
Operating tools	5.2	A.4.7	P*
Safety test for spillage of combustion gas and discharge of embers	5.3	A.4.7 A.4.9	P
Temperature in the fuel hopper	5.4	A.4.9.1	P
Safety against back burning through the fuel conveyor system	5.5	A.4.9.1	P
Safety against overheating the boiler system	5.6	-	NA
Thermal discharge control	5.7	A.4.9.3	NA
Strength and leak tightness of boiler shells	5.8	A.4.7 A.4.9.2	NA
Electrical safety	5.9	EN 50165	NT

*) tool available (detachable handle for firedoor).

3.3 Performance

Requirement acc. EN 14785	Clause	Tested Acc.	Requirement Complies
Flue draught	6.1	-	P
Flue gas temperature	6.2	A.4.7 A.4.8	P
Carbon monoxide emissions for pellet stoves	6.3	A.4.7 A.4.8	P
Efficient energy utilisation	6.4		
- General	6.4.1	A.4.7	P
- Efficiency at nominal heat output and at reduced heat output	6.4.2	A.4.8	P
Nominal heat output	6.5	A.4.7	P
Reduced heat output	6.6	A.4.8	P
Water heating output	6.7	A.4.7	NA
Space heating output	6.8	A.4.7	P
Capacity of fuel storage	6.9	A.4.7 A.4.8	P
User operations	6.10	A.4.7	P

3.4 Appliance instructions and marking

Requirement acc. EN 14785	Clause	Tested Acc.	Requirement Complies
General	7.1	-	P
Installation instructions	7.2	-	P
User operating instructions	7.3	-	P
Marking	8.0	-	P

3.5 Evaluation of conformity

Requirement acc. EN 14785	Clause	Tested Acc.	Requirement Complies
General	9.1		P
Type testing	9.2		
- Initial type testing	9.2.1		P
- Further type testing	9.2.2		-
Factory production control (FPC)	9.3		
- General	9.3.1		
- Raw materials and components	9.3.2		
- Control of inspection, meas. And test equipment	9.3.3		
- Process control	9.3.4		
- Product inspection, testing and evaluation	9.3.5		
- Material of construction	9.3.5.1		
- Insulation material	9.3.5.2		
- Seals and sealant materials	9.3.5.3		
- Manufacturing checks	9.3.5.4		
- Construction and dimensions	9.3.5.4.1		
- Other checks	9.3.5.4.2		
- Non conforming products	9.3.6		
- Corrective and preventive action	9.3.7		
- Handling, storage, packaging, preservation and delivery	9.3.8		

3.6 Resume of test results

AP400S_0_09, AP400B_0_09		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,110	0,638	-
Flue gas mass flow	g/s	4,91	3,38	-
Flue gas temperature	°C	183,6	105,9	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	14,7	6,1	-
O ₂ -concentration	Vol.-%	6,3	14,8	-
CO-concentration	ppm	14	145	-
CO-emission (at 13%-O ₂)	mg/m ³	9	236	≤ 500/750
CO-emission	mg/kWh	21	531	-
CO-emission	mg/MJ	6	147	-
NO _x -concentration	ppm	89	35	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	92	-
NO _x -emission	mg/kWh	223	207	-
NO _x -emission	mg/MJ	62	58	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	1	3	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	5	-
CnHm-emission	mg/kWh	3	12	-
CnHm-emission	mg/MJ	1	3	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1 *	mg	4	4	-
Dust emission (at 13%-O ₂)	mg/m ³	9	16	-
Dust emission	mg/kWh	20	36	-
Dust emission	mg/MJ	6	10	-
Total heat input	kW	10,2	3,1	-
Total heat output	kW	9,3	2,8	-
Water heat output	kW	-	-	-
Space heat output	kW	9,3	2,8	-
Efficiency	%	91,8	90,9	≥ 75/70 (EN14785)

*) Average of 3 samples, based on separate calculation.

AP400S_1_09, AP400B_1_09		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,053	0,735	-
Flue gas mass flow	g/s	5,46	3,77	-
Flue gas temperature	°C	167,7	109,1	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	12,7	6,3	-
O ₂ -concentration	Vol.-%	8,2	14,7	-
CO-concentration	ppm	29	189	-
CO-emission (at 13%-O ₂)	mg/m ³	22	298	500/750
CO-emission	mg/kWh	49	671	-
CO-emission	mg/MJ	14	186	-
NO _x -concentration	ppm	77	22	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	57	-
NO _x -emission	mg/kWh	223	128	-
NO _x -emission	mg/MJ	62	36	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	1	2	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	4	-
CnHm-emission	mg/kWh	2	8	-
CnHm-emission	mg/MJ	1	2	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1 *	mg	2	2	-
Dust emission (at 13%-O ₂)	mg/m ³	5	7	-
Dust emission	mg/kWh	11	16	-
Dust emission	mg/MJ	3	4	-
Total heat input	kW	9,9	3,5	-
Total heat output	kW	9,0	3,2	-
Water heat output	kW	-	-	-
Space heat output	kW	9,0	3,2	-
Efficiency	%	91,2	89,9	75/70 (EN14785)

*) Average of 3 samples, based on separate calculation.

AP400S_0_10, AP400B_0_10		Nominal *	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,271	0,638	-
Flue gas mass flow	g/s	5,17	3,38	-
Flue gas temperature	°C	190,5	105,9	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	15,0	6,1	-
O ₂ -concentration	Vol.-%	6,0	14,8	-
CO-concentration	ppm	22	145	-
CO-emission (at 13%-O ₂)	mg/m ³	14	236	≤ 500/750
CO-emission	mg/kWh	32	531	-
CO-emission	mg/MJ	9	147	-
NO _x -concentration	ppm	91	35	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	92	-
NO _x -emission	mg/kWh	223	207	-
NO _x -emission	mg/MJ	62	58	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	3	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	5	-
CnHm-emission	mg/kWh	3	12	-
CnHm-emission	mg/MJ	1	3	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1	mg	5	4	-
Dust emission (at 13%-O ₂)	mg/m ³	10	16	-
Dust emission	mg/kWh	22	36	-
Dust emission	mg/MJ	6	10	-
Total heat input	kW	10,9	3,1	-
Total heat output	kW	10,0	2,8	-
Water heat output	kW	-	-	-
Space heat output	kW	10,0	2,8	-
Efficiency	%	91,6	90,9	≥ 75/70 (EN14785)

*) Nominal combustion data linearly interpolated between the nominal heat output of AP400S_0_09 / AP400B_0_09 and the nominal heat output of AP400S_0_13 / AP400B_0_13 appliances.

AP400S_1_10, AP400B_1_10		Nominal *	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,287	0,735	-
Flue gas mass flow	g/s	5,68	3,77	-
Flue gas temperature	°C	181,1	109,1	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	13,6	6,3	-
O ₂ -concentration	Vol.-%	7,3	14,7	-
CO-concentration	ppm	35	189	-
CO-emission (at 13%-O ₂)	mg/m ³	25	298	500/750
CO-emission	mg/kWh	56	671	-
CO-emission	mg/MJ	15	186	-
NO _x -concentration	ppm	83	22	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	57	-
NO _x -emission	mg/kWh	223	128	-
NO _x -emission	mg/MJ	62	36	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	1	2	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	4	-
CnHm-emission	mg/kWh	3	8	-
CnHm-emission	mg/MJ	1	2	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1	mg	4	2	-
Dust emission (at 13%-O ₂)	mg/m ³	7	7	-
Dust emission	mg/kWh	16	16	-
Dust emission	mg/MJ	4	4	-
Total heat input	kW	11,0	3,5	-
Total heat output	kW	10,0	3,2	-
Water heat output	kW	-	-	-
Space heat output	kW	10,0	3,2	-
Efficiency	%	90,9	89,9	75/70 (EN14785)

*) Nominal combustion data linearly interpolated between the nominal heat output of AP400S_1_09 / AP400B_1_09 and the nominal heat output of AP400S_1_13 / AP400B_1_13 appliances.

AP400S_0_11, AP400B_0_11		Nominal *	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,508	0,638	-
Flue gas mass flow	g/s	5,55	3,38	-
Flue gas temperature	°C	200,6	105,9	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	15,4	6,1	-
O ₂ -concentration	Vol.-%	5,5	14,8	-
CO-concentration	ppm	34	145	-
CO-emission (at 13%-O ₂)	mg/m ³	21	236	≤ 500/750
CO-emission	mg/kWh	48	531	-
CO-emission	mg/MJ	13	147	-
NO _x -concentration	ppm	93	35	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	92	-
NO _x -emission	mg/kWh	223	207	-
NO _x -emission	mg/MJ	62	58	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	3	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	5	-
CnHm-emission	mg/kWh	3	12	-
CnHm-emission	mg/MJ	1	3	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1	mg	6	4	-
Dust emission (at 13%-O ₂)	mg/m ³	11	16	-
Dust emission	mg/kWh	24	36	-
Dust emission	mg/MJ	7	10	-
Total heat input	kW	12,1	3,1	-
Total heat output	kW	11,0	2,8	-
Water heat output	kW	-	-	-
Space heat output	kW	11,0	2,8	-
Efficiency	%	91,2	90,9	≥ 75/70 (EN14785)

*) Nominal combustion data linearly interpolated between the nominal heat output of AP400S_0_09 / AP400B_0_09 and the nominal heat output of AP400S_0_13 / AP400B_0_13 appliances.

AP400S_1_11, AP400B_1_11		Nominal *	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,523	0,735	-
Flue gas mass flow	g/s	5,90	3,77	-
Flue gas temperature	°C	194,6	109,1	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	14,5	6,3	-
O ₂ -concentration	Vol.-%	6,5	14,7	-
CO-concentration	ppm	42	189	-
CO-emission (at 13%-O ₂)	mg/m ³	28	298	500/750
CO-emission	mg/kWh	62	671	-
CO-emission	mg/MJ	17	186	-
NO _x -concentration	ppm	88	22	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	57	-
NO _x -emission	mg/kWh	223	128	-
NO _x -emission	mg/MJ	62	36	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	2	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	4	-
CnHm-emission	mg/kWh	3	8	-
CnHm-emission	mg/MJ	1	2	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1	mg	5	2	-
Dust emission (at 13%-O ₂)	mg/m ³	10	7	-
Dust emission	mg/kWh	22	16	-
Dust emission	mg/MJ	6	4	-
Total heat input	kW	12,1	3,5	-
Total heat output	kW	11,0	3,2	-
Water heat output	kW	-	-	-
Space heat output	kW	11,0	3,2	-
Efficiency	%	90,7	89,9	75/70 (EN14785)

*) Nominal combustion data linearly interpolated between the nominal heat output of AP400S_1_09 / AP400B_1_09 and the nominal heat output of AP400S_1_13 / AP400B_1_13 appliances.

AP400S_0_12, AP400B_0_12		Nominal *	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,746	0,638	-
Flue gas mass flow	g/s	5,94	3,38	-
Flue gas temperature	°C	210,7	105,9	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	15,8	6,1	-
O ₂ -concentration	Vol.-%	5,1	14,8	-
CO-concentration	ppm	47	145	-
CO-emission (at 13%-O ₂)	mg/m ³	29	236	≤ 500/750
CO-emission	mg/kWh	64	531	-
CO-emission	mg/MJ	18	147	-
NO _x -concentration	ppm	96	35	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	92	-
NO _x -emission	mg/kWh	223	207	-
NO _x -emission	mg/MJ	62	58	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	3	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2	5	-
CnHm-emission	mg/kWh	4	12	-
CnHm-emission	mg/MJ	1	3	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1	mg	6	4	-
Dust emission (at 13%-O ₂)	mg/m ³	12	16	-
Dust emission	mg/kWh	26	36	-
Dust emission	mg/MJ	7	10	-
Total heat input	kW	13,2	3,1	-
Total heat output	kW	12,0	2,8	-
Water heat output	kW	-	-	-
Space heat output	kW	12,0	2,8	-
Efficiency	%	90,9	90,9	≥ 75/70 (EN14785)

*) Nominal combustion data linearly interpolated between the nominal heat output of AP400S_0_09 / AP400B_0_09 and the nominal heat output of AP400S_0_13 / AP400B_0_13 appliances.

AP400S_1_12, AP400B_1_12		Nominal *	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,759	0,735	-
Flue gas mass flow	g/s	6,12	3,77	-
Flue gas temperature	°C	208,1	109,1	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	15,4	6,3	-
O ₂ -concentration	Vol.-%	5,6	14,7	-
CO-concentration	ppm	48	189	-
CO-emission (at 13%-O ₂)	mg/m ³	30	298	500/750
CO-emission	mg/kWh	68	671	-
CO-emission	mg/MJ	19	186	-
NO _x -concentration	ppm	93	22	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	57	-
NO _x -emission	mg/kWh	223	128	-
NO _x -emission	mg/MJ	62	36	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	2	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1	4	-
CnHm-emission	mg/kWh	3	8	-
CnHm-emission	mg/MJ	1	2	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1	mg	7	2	-
Dust emission (at 13%-O ₂)	mg/m ³	12	7	-
Dust emission	mg/kWh	27	16	-
Dust emission	mg/MJ	8	4	-
Total heat input	kW	13,3	3,5	-
Total heat output	kW	12,0	3,2	-
Water heat output	kW	-	-	-
Space heat output	kW	12,0	3,2	-
Efficiency	%	90,4	89,9	75/70 (EN14785)

*) Nominal combustion data linearly interpolated between the nominal heat output of AP400S_1_09 / AP400B_1_09 and the nominal heat output of AP400S_1_13 / AP400B_1_13 appliances

AP400S_0_13, AP400B_0_13		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,988	0,638	-
Flue gas mass flow	g/s	6,33	3,38	-
Flue gas temperature	°C	221,0	105,9	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	16,3	6,1	-
O ₂ -concentration	Vol.-%	4,7	14,8	-
CO-concentration	ppm	59	145	-
CO-emission (at 13%-O ₂)	mg/m ³	36	236	≤ 500/750
CO-emission	mg/kWh	81	531	-
CO-emission	mg/MJ	22	147	-
NO _x -concentration	ppm	99	35	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	92	-
NO _x -emission	mg/kWh	222	207	-
NO _x -emission	mg/MJ	62	58	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	3	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2	5	-
CnHm-emission	mg/kWh	4	12	-
CnHm-emission	mg/MJ	1	3	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1 *	mg	7	4	-
Dust emission (at 13%-O ₂)	mg/m ³	13	16	-
Dust emission	mg/kWh	28	36	-
Dust emission	mg/MJ	8	10	-
Total heat input	kW	14,4	3,1	-
Total heat output	kW	13,0	2,8	-
Water heat output	kW	-	-	-
Space heat output	kW	13,0	2,8	-
Efficiency	%	90,5	90,9	≥ 75/70 (EN14785)

*) Average of 3 samples, based on separate calculation.

AP400S_1_13, AP400B_1_13		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	3,040	0,735	-
Flue gas mass flow	g/s	6,38	3,77	-
Flue gas temperature	°C	224,1	109,1	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO ₂ -concentration	Vol.-%	16,4	6,3	-
O ₂ -concentration	Vol.-%	4,5	14,7	-
CO-concentration	ppm	56	189	-
CO-emission (at 13%-O ₂)	mg/m ³	34	298	500/750
CO-emission	mg/kWh	75	671	-
CO-emission	mg/MJ	21	186	-
NO _x -concentration	ppm	100	22	-
NO _x -emission (at 13%-O ₂)	mg/m ³	99	57	-
NO _x -emission	mg/kWh	223	128	-
NO _x -emission	mg/MJ	62	36	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	2	2	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2	4	-
CnHm-emission	mg/kWh	4	8	-
CnHm-emission	mg/MJ	1	2	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1 *	mg	9	2	-
Dust emission (at 13%-O ₂)	mg/m ³	15	7	-
Dust emission	mg/kWh	34	16	-
Dust emission	mg/MJ	9	4	-
Total heat input	kW	14,6	3,5	-
Total heat output	kW	13,2	3,2	-
Water heat output	kW	-	-	-
Space heat output	kW	13,2	3,2	-
Efficiency	%	90,1	89,9	75/70 (EN14785)

*) Average of 3 samples, based on separate calculation.

3.7 Temperatures

AP400S_0_09, AP400S_1_09, AP400S_0_10, AP400S_1_10, AP400S_0_11, AP400S_1_11, AP400S_0_12, AP400S_10_12, AP400S_0_13, AP400S_1_13			Requirement
Maximum temperatures at trihedron:			
- Side	°C	58,7	$\leq 65 \text{ K over } t_{\text{ambient}}$
- Back side	°C	31,2	$\leq 65 \text{ K over } t_{\text{ambient}}$
- Front side	°C	78,1	$\leq 65 \text{ K over } t_{\text{ambient}}$
- Floor	°C	42,4	$\leq 65 \text{ K over } t_{\text{ambient}}$
Distances:			
- Backside-Pelletstove	mm	50	
- Side-Pelletstove	mm	300	
- Front-Pelletstove	mm	800	
Ambient temperature	°C	21,9	
Max. temperature in fuel hopper	°C	84,6	$\leq 65 \text{ K over } t_{\text{ambient}}$
Max. temperature of operating tools (handle of fuel hopper)	°C	49,0	$\leq 35 \text{ K over } t_{\text{ambient}}$
Max. temperature of operating tool 2 (control panel)	°C	52,2	$\leq 60 \text{ K over } t_{\text{ambient}}$

AP400B_0_09, AP400B_1_09, AP400B_0_10, AP400B_1_10, AP400B_0_11, AP400B_1_11, AP400B_0_12, AP400B_10_12, AP400B_0_13, AP400B_1_13			Requirement
Maximum temperatures at trihedron:			
- Side	°C	55,1	$\leq 65 \text{ K over } t_{\text{ambient}}$
- Back side	°C	42,7	$\leq 65 \text{ K over } t_{\text{ambient}}$
- Front side	°C	68,3	$\leq 65 \text{ K over } t_{\text{ambient}}$
- Floor	°C	44,3	$\leq 65 \text{ K over } t_{\text{ambient}}$
Distances:			
- Backside-Pelletstove	mm	50	
- Side-Pelletstove	mm	300	
- Front-Pelletstove	mm	800	
Ambient temperature	°C	28,9	
Max. temperature in fuel hopper	°C	85,0	$\leq 65 \text{ K over } t_{\text{ambient}}$
Max. temperature of operating tool 1 (handle of fuel hopper)	°C	59,6	$\leq 35 \text{ K over } t_{\text{ambient}}$
Max. temperature of operating tool 2 (control panel)	°C	52,2	$\leq 60 \text{ K over } t_{\text{ambient}}$

For detailed test results see appendix A02, A04, A06.

3.8 Leakage test

AP400S_0_09, AP400B_0_09, AP400S_1_09, AP400B_1_09, AP400S_0_10, AP400B_0_10,
 AP400S_1_10, AP400B_1_10, AP400S_0_11, AP400B_0_11, AP400S_1_11, AP400B_1_11,
 AP400S_0_12, AP400B_0_12, AP400S_1_12, AP400B_1_12, AP400S_0_13, AP400B_0_13,
 AP400S_1_13, AP400B_1_13

		Before mechanical and thermal tests	After mechanical tests	After mechanical and thermal tests	Limit
Leakage test of combustion room at 5 Pa	m ³ /h	< 0,3	< 0,3	< 0,3	-
Leakage test of combustion room at 10 Pa	m ³ /h	0,4	0,4	0,4	2,0
Leakage test of combustion room at 15 Pa	m ³ /h	0,5	0,5	0,5	-
Leakage test of combustion room at 50 Pa (acc. to EN613, cl. 6.2.2.2)	m ³ /h	1,5	1,5	1,5	2,5

All the appliances are sealed for Germany (typ FC62x) and for France requirements (acc. to EN613, cl. 6.2.2.2).

3.9 Comparison tests

The Test Centre for Energy Appliances was instructed to execute the following comparison tests:

- A nominal load comparison test between the appliances equipped with the air inlet pressure sensor (variable exhaust flue gas fan speed) and without the air inlet pressure sensor (the exhaust flue gas fan speed is determined by the chosen power).

It was selected the appliance AP400S_0_13 without the air inlet pressure sensor for the comparison test. The comparison measurements shown no significant differences between the same appliance equipped with the air inlet pressure sensor, as listed in the following table:

Model	Input (kW)	Output (kW)	Efficiency (%)	CO** (mg/m ³)	NOx** (mg/m ³)	CnHm** (mg/m ³)
AP400S_0_13 (With the air inlet pressure sensor)	14,4	13,0	90,5	36	99	2
AP400S_0_13* (Without the air inlet pressure sensor)	14,4	13,0	90,5	38	93	1

*) The reported measurements are achieved from a single valid test period of 3 hours

**) Concentration at 13% O₂

As result of the comparison, all data measured or calculated for the appliances equipped without the air inlet pressure sensor are assigned also to the same appliances equipped with the air inlet pressure sensor.

- A nominal load comparison test between “AP400S_0_xx” and “AP400B_0_xx” appliances.

It was selected AP400B_0_13 model, arranged for the concentric flue gas system (vertical connection).

The comparison measurements shown no significant differences between AP400S_0_13 and AP400B_0_13 models, as listed in the following table:

Model	Input (kW)	Output (kW)	Efficiency (%)	CO** (mg/m ³)	NOx** (mg/m ³)	CnHm** (mg/m ³)
AP400S_0_13 (with the air inlet pressure sensor)	14,4	13,0	90,5	36	99	2
AP400B_0_13* (with the air inlet pressure sensor)	14,1	13,0	92,2	65	100	1

*) The reported measurements are achieved from a single valid test period of 3 hours

**) Concentration at 13% O₂

As result of the comparison, all data measured or calculated for “AP400S_0_xx” appliances are assigned also to “AP400B_0_xx” appliances.

- A nominal load comparison test between “AP400S_1_xx” and “AP400B_1_xx” appliances. It was selected AP400B_1_13 model, arranged for the concentric flue gas system (vertical connection).

The comparison measurements shown no significant differences between AP400S_1_13 and AP400B_1_13 models, as listed in the following table:

Model	Input (kW)	Output (kW)	Efficiency (%)	CO** (mg/m ³)	NOx** (mg/m ³)	CnHm** (mg/m ³)
AP400S_1_13 (with the air inlet pressure sensor)	14,6	13,2	90,1	34	99	2
AP400B_1_13* (with the air inlet pressure sensor)	14,4	13,4	93,2	57	100	1

*) The reported measurements are achieved from a single valid test period of 3 hours

**) Concentration at 13% O₂

As result of the comparison, all data measured or calculated for “AP400S_1_xx” appliances are assigned also to “AP400B_1_xx” appliances.

4 Statement of the test results

The appliances:

**AP400S_0_09, AP400B_0_09, AP400S_1_09, AP400B_1_09,
AP400S_0_10, AP400B_0_10, AP400S_1_10, AP400B_1_10,
AP400S_0_11, AP400B_0_11, AP400S_1_11, AP400B_1_11,
AP400S_0_12, AP400B_0_12, AP400S_1_12, AP400B_1_12,
AP400S_0_13, AP400B_0_13, AP400S_1_13, AP400B_1_13**

of the company:

PALAZZETTI LELIO S.p.A.

comply for the operation with wood pellets with the requirements acc.
DIN EN 14785: September 2006, cl.4-8.

The technical requirements cl. 4-8 of the above-mentioned standard are fulfilled. The local applicable installation conditions have to be observed.

The electrical safety cl. 5.9. of the standard was not a part of this initial type testing.

The presumption of conformity with the relevant European Directives respectively Regulations could only be confirmed by full compliance with Annex ZA.

The test results presented in this report refer solely to the test object stated as described on page 2. The report does not represent a general statement about the serial production of the test object and gives not an authorization for use of a TÜV Rheinland test/certification mark.

5 Test documents

Appendix 01 Fuel Data

Appendix 02 Test results

Appendix 03 Measurement Instruments

TÜV Rheinland Energy GmbH declines any responsibility derived from missing or wrong informations in the documents provided by the applicant.

Appendix	Subject	Reference
A04	Type labels	-
A05	Essential requirements EN 14785	11/02/2022
A06.1	Instruction and installation manual	004778980 - 16/02/2022
A06.2	User manual	004778041 - 21/09/2021
A07.1	List of electrical components AP400X_0_XX	31/01/2022
A07.2	List of electrical components AP400X_1_XX	31/01/2022
A08.1	Ambient fan IPC	FLH190 CFXMAX0018
A08.2	Ambient fan EBM (alternative component)	R4S190-AC04-05
A08.3	Canalisation motors IPC	CFH21203H401, CFH21203H501
A09	Exhaust gas fan IPC	AVX2A1502PC102
A10	Gear motor IPC	GMF210D901
A11	Ignition resistance FKK	PSX-2-240-B
A12	Temperature cut-out IMIT	LS1 541630
A13.1	Pressure switch HUBA	605
A13.2	Pressure switch Cleveland (alternative component)	NS2
A14.1	Safety electrical circuit Fumis ALPHA	MB 65-230 V2
A14.2	Safety electrical circuit Fumis ALPHA (alternative component)	MB 60-230 V2
A14.3	Safety electrical circuit Fumis ALPHA (alternative component)	MB 70-230 V2
A14.4	Safety electrical circuit Fumis ALPHA (alternative component)	MB 75-230 V2
A15.1	Setup parameters AP400x_0_09	-
A15.2	Setup parameters AP400x_1_09	-
A15.3	Setup parameters AP400x_0_13	-
A15.4	Setup parameters AP400x_1_13	-
A16	Technical data glass SCHOTT	ROBAX
A17	Technical data seals	Tespe
A18.1	Overview drawings AP400B_0_xx	805806870
A18.2	Overview drawings AP400S_0_xx	805806730
A18.3	Overview drawings AP400B_1_xx	805806730dv- 220111
A18.4	Overview drawings AP004S_1_xx	805806730dv- 220111
A18.5	Upright flue gas outlet for AP400B_x_xx models	142220563
A19	Combustion room drawings	

A20.1	Pellet transport drawings	160620103
A20.2	Pellet storage drawings AP400S_x_xx	142220565
A20.3	Pellet storage drawings AP400B_x_xx	140020836
		140020832,
A21.1	Retort drawings AP400S_0_xx and AP400B_0_xx	765520011,
		765520012,
		765520013
A21.2	Retort drawings AP400S_1_xx and AP400B_1_xx	165510031,
		165510032

Appendix 01

Fuel data

Test at nominal load											
Verbrennungsrechnung aus der Elementaranalyse											
nach DIN EN 304 Teil 2, Ausgabe 01/2004											
nach DIN 4702 Teil 2, Ausgabe 3/1990											
Analysis from:		02/10/2020		Analysis No.				Fuel sampling date:			
Fuel:		wood pellets		2012717-001				24/09/20			
Bestandteil im Brennstoff	Stoffanteil	Sauerstoffbedarf		Abgasbestandteile aus Brennstoff in Nm³/kg Brennstoff							
		in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	CO₂		SO₂		H₂O		N₂	
	Gew. %		Stoffanteil x	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff
c	46,600	1,860	0,867	1,850	0,8621	-	-	-	-	-	-
s	0,002	0,700	0,000	-	-	0,680	0,0000	-	-	-	-
h	5,190	5,550	0,288	-	-	-	-	11,100	0,5761	-	-
n	0,010	-	-	-	-	-	-	-	-	0,80	0,0001
o	41,100	-0,700	-0,288	-	-	-	-	-	-	-	-
wasser	6,700	-	-	-	-	-	-	1,240	0,0831	-	-
asche	0,500	-	-	-	-	-	-	-	-	-	-
summe	100,102	O min=	0,867	V CO₂ =	0,8621	V SO₂ =	0,0000	V W =	0,6592	V N₂ =	0,0001
Luftbedarf				L min = 4,1291 Nm³/kg Brennstoff							
trockene stöchiometrische Abgasmenge				V A tr min = 4,1241 Nm³/kg Brennstoff							
Max. Kohlenstoffdioxid-Anteil				CO₂ max = 20,9038 Vol.-%							
Wasserdampfmenge				V w = 0,6592 Nm³/kg Brennstoff							
				V A tr min/ L min = 0,9988							
Heizwert, wf				Hu = 18750 kJ/kg							
				5,208 kWh/kg							
Berechnungen zum Versuchszeitpunkt											
wasser zum Versuchszeitpunkt				w = 6,700 Gew. %							
Heizwert, roh zum Versuchszeitpunkt				Hu = 17330 kJ/kg							
Test at reduced load											
Verbrennungsrechnung aus der Elementaranalyse											
nach DIN EN 304 Teil 2, Ausgabe 01/2004											
nach DIN 4702 Teil 2, Ausgabe 3/1990											
Analysis from:		02/10/2020		Analysis No.				Fuel sampling date:			
Fuel:		wood pellets		2012717-001				24/09/20			
Bestandteil im Brennstoff	Stoffanteil	Sauerstoffbedarf		Abgasbestandteile aus Brennstoff in Nm³/kg Brennstoff							
		in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	CO₂		SO₂		H₂O		N₂	
	Gew. %		Stoffanteil x	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff	in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff
c	46,600	1,860	0,867	1,850	0,8621	-	-	-	-	-	-
s	0,002	0,700	0,000	-	-	0,680	0,0000	-	-	-	-
h	5,190	5,550	0,288	-	-	-	-	11,100	0,5761	-	-
n	0,010	-	-	-	-	-	-	-	-	0,80	0,0001
o	41,100	-0,700	-0,288	-	-	-	-	-	-	-	-
wasser	6,700	-	-	-	-	-	-	1,240	0,0831	-	-
asche	0,500	-	-	-	-	-	-	-	-	-	-
summe	100,102	O min=	0,867	V CO₂ =	0,8621	V SO₂ =	0,0000	V W =	0,6592	V N₂ =	0,0001
Luftbedarf				L min = 4,1291 Nm³/kg Brennstoff							
trockene stöchiometrische Abgasmenge				V A tr min = 4,1241 Nm³/kg Brennstoff							
Max. Kohlenstoffdioxid-Anteil				CO₂ max = 20,9038 Vol.-%							
Wasserdampfmenge				V w = 0,6592 Nm³/kg Brennstoff							
				V A tr min/ L min = 0,9988							
Heizwert, wf				Hu = 18750 kJ/kg							
				5,208 kWh/kg							
Berechnungen zum Versuchszeitpunkt											
wasser zum Versuchszeitpunkt				w = 6,700 Gew. %							
Heizwert, roh zum Versuchszeitpunkt				Hu = 17330 kJ/kg							

Appendix 02

Test results

Report- No.		K31232021T1		
TÜV- order- No.		21253794		
Manufacturer		PALAZZETTI LELIO S.p.A.		
Construction type		Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.		
max. working temperature	°C	Not applicable		
max. working pressure	bar	Not applicable		
Type of fuel charging		automatic load		
Special properties / Remarks		All the appliances are sealed for Germany (typ FC62x) and for		
Special properties		room sealed		
Type designation				
Model name		AP400S_0_09, AP400B_0_09		
Test place		CMC Centro Misure Compatibilità S.r.l., via della Fisica,		
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007		
Type of test		Test at nominal load		
Heat input from manufacturer	kW	10,2		
Heat output from manufacturer	kW	9,3		
		1. test	2. test	Average
Test date		22/07/2021	22/07/2021	
Time		10:05 - 13:05	13:10 - 16:10	
Ambient:				
Barometric pressure	mbar	1007	1007	1007
Temperature of combustion air	°C	30,9	32,1	31,5
Ambient rel. humidity	%	60,0	60,0	60,0
Ambient temperature (room)	°C	30,9	32,1	31,5
Type of Fuel		wood pellets		
Properties of Fuel		Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to		
Number of fuel loadings		1	1	
Weight of the stove, start, measurement	kg	223,6	226,0	
Weight of the stove, end, measurement	kg	217,3	219,7	
Fuel consumption, calculated of the difference	kg	6,3	6,3	
Test duration	sec	10800	10800	
Fuel consumption "B"	kg/h	2,113	2,107	2,110
Calculation of losses in the ash (yes = 1, no = 0)	Gew. %	25,0	25,0	25,0
Residue passing through the grate, measurement	kg	0,00	0,00	0,00
Residue passing through the grate "R"	Gew. %	0,000	0,000	0,000
Carbon content of the residue passing through the grate "Cr" depending of 1kg fuel	Gew. %	0,104	0,104	0,104
Water side, measurement				
Flow, measurement	°C	0,0	0,0	0,0
Return, measurement	°C	0,0	0,0	0,0
Delta T	K	0,0	0,0	0,0
Cold water flow, measurement	kg/h	0,0	0,0	0,0
Additional energy of the pump	kW	0,00	0,00	0,00
Flue, average				
Flue gas temperature, measurement	°C	184,2	183,1	183,6
Flue draught, measurement	Pa	10,0	10,0	10,0
O2 - concentration, calculated	Vol.-%	6,1	6,4	6,3
CO2 - concentration, measurement	Vol.-%	14,8	14,6	14,7
lambda value, l	-	1,413	1,434	1,424

CO - concentration, measurement	ppm	19	9	14
CO - concentration, measurement	Vol.-%	0,002	0,001	0,001
CO - concentration, measurement	mg/m³	23	11	17
CO - concentr. (at 13% - O2)	Vol.-%	0,001	0,000	0,001
CO - concentr. (at 13% - O2)	mg/m³	13	6	9
CO - concentration rel. to fuel input	mg/kWh	28	14	21
CO - concentration rel. to fuel input	mg/MJ	8	4	6
NOx - concentration, measurement	ppm	90	89	89
NOx - concentration, measurement	mg/m³	184	182	183
NOx - concentr. (at 13% - O2)	mg/m³	99	99	99
NOx - concentration rel. to fuel input	mg/kWh	223	223	223
NOx - concentration rel. to fuel input	mg/MJ	62	62	62
CnHm concentration, measurement	ppm	1	2	1
CnHm concentration, measurement	mg/m³	2	2	2
CnHm concentr. (at 13% - O2)	mg/m³	1	1	1
CnHm - concentration (total C) rel. to fuel input	mg/kWh	3	3	3
CnHm - concentration (total C) rel. to fuel input	mg/MJ	1	1	1
Dust, measurement*	mg	4		4
Dust, measurement*	mg/m³	17		17
Dust (at 13% - O2)*	mg/m³	9		9
Dust* rel. to fuel input	mg/kWh	20		20
Dust* rel. to fuel input	mg/MJ	6		6
PME concentration (at 13% - O2)*	mg/m³	9		9
Electrical consumption				
Rated electrical power (max)	W		360	
Electrical consumption (at nominal heat output)	W		30	
Electrical consumption (at minimum heat output)	W		12	
PSTBY (during stand-by)	W		1,6	
Calculation				
"Qa" loss free heating flue gas	kJ/kg	1389,8	1386,4	1388,1
"qa" loss flue gas	%	8,0	8,0	8,0
"Qb" loss fix heating in flue gas	kJ/kg	1,4	0,7	1,0
"qb" loss fix heating in flue gas	%	0,008	0,004	0,006
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0	0,0	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,200	0,200	0,200
"m" flue gas mass flow	g/s	4,88	4,94	4,91
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,37	1,37	1,37
cpm-H2O	kJ/(m³K)	1,52	1,52	1,52
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable	not applicable	not applicable
"eta" Efficiency (indirect)	%	91,8	91,8	91,8
Heating input	kW	10,2	10,1	10,2
"P" heating output, total	kW	9,3	9,3	9,3
"Pw" water heating output	kW	0,0	0,0	0,0
Space heating output: PSTR = P - Pw	kW	9,3	9,3	9,3
Space heating output, relating to heat input	%	91,8	91,8	91,8
Water heating output, relating to heat input	%	0,0	0,0	0,0
Adjustments				
Flue gas delta pressure		800	800	
Ambient motor	volt	140	140	
Auger star motor	sec	4,2 ON - 1,8 OFF	4,2 ON - 1,8 OFF	
Cleaning time		OFF	OFF	
Fire door	open / closed	closed	closed	
Canalisation motors	volt	OFF	OFF	

Report- No.		K31232021T1		
TÜV- order- No.		21253794		
Manufacturer		PALAZZETTI LELIO S.p.A.		
Construction type		Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.		
max. working temperature	°C	Not applicable		
max. working pressure	bar	Not applicable		
Type of fuel charging		automatic load		
Special properties / Remarks		All the appliances are sealed for Germany (typ FC62x) and for		
Special properties		room sealed		
Type designation				
Model name		AP400S_0_13, AP400B_0_13		
Test place		CMC Centro Misure Compatibilità S.r.l., via della Fisica,		
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007		
Type of test		Test at nominal load		
Heat input from manufacturer	kW	14,4		
Heat output from manufacturer	kW	13,0		
		1. test	2. test	Average
Test date		19/07/2021	20/07/2021	
Time		12:30 - 15:30	09:10 - 12:10	
Ambient:				
Barometric pressure	mbar	1000	1000	1000
Temperature of combustion air	°C	30,9	30,0	30,5
Ambient rel. humidity	%	65,0	65,0	65,0
Ambient temperature (room)	°C	30,9	30,0	30,5
Type of Fuel		wood pellets		
Properties of Fuel		Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to		
Number of fuel loadings		1	1	
Weight of the stove, start, measurement	kg	203,4	224,4	
Weight of the stove, end, measurement	kg	194,5	215,4	
Fuel consumption, calculated of the difference	kg	8,9	9,0	
Test duration	sec	10800	10800	
Fuel consumption "B"	kg/h	2,970	3,007	2,988
Calculation of losses in the ash (yes = 1, no = 0)	Gew. %	25,0	25,0	25,0
Residue passing through the grate, measurement	kg	0,00	0,00	0,00
Residue passing through the grate "R"	Gew. %	0,000	0,000	0,000
Carbon content of the residue passing through the grate "Cr" depending of 1 kg fuel	Gew. %	0,104	0,104	0,104
Water side, measurement				
Flow, measurement	°C	0,0	0,0	0,0
Return, measurement	°C	0,0	0,0	0,0
Delta T	K	0,0	0,0	0,0
Cold water flow, measurement	kg/h	0,0	0,0	0,0
Additional energy of the pump	kW	0,00	0,00	0,00
Flue, average				
Flue gas temperature, measurement	°C	221,8	220,2	221,0
Flue draught, measurement	Pa	10,0	10,0	10,0
O2 - concentration, calculated	Vol.-%	5,0	4,4	4,7
CO2 - concentration, measurement	Vol.-%	16,0	16,6	16,3
lambda value, l	-	1,309	1,261	1,285

CO - concentration, measurement	ppm	30	89	59
CO - concentration, measurement	Vol.-%	0,003	0,009	0,006
CO - concentration, measurement	mg/m³	37	111	74
CO - concentr. (at 13% - O2)	Vol.-%	0,001	0,004	0,003
CO - concentr. (at 13% - O2)	mg/m³	18	53	36
CO - concentration rel. to fuel input	mg/kWh	41	120	81
CO - concentration rel. to fuel input	mg/MJ	11	33	22
NOx - concentration, measurement	ppm	98	99	99
NOx - concentration, measurement	mg/m³	200	204	202
NOx - concentr. (at 13% - O2)	mg/m³	100	98	99
NOx - concentration rel. to fuel input	mg/kWh	225	220	222
NOx - concentration rel. to fuel input	mg/MJ	62	61	62
CnHm concentration, measurement	ppm	2	2	2
CnHm concentration, measurement	mg/m³	3	4	3
CnHm concentr. (at 13% - O2)	mg/m³	1	2	2
CnHm - concentration (total C) rel. to fuel input	mg/kWh	3	4	4
CnHm - concentration (total C) rel. to fuel input	mg/MJ	1	1	1
Dust, measurement*	mg	7		7
Dust, measurement*	mg/m³	26		26
Dust (at 13% - O2)*	mg/m³	13		13
Dust* rel. to fuel input	mg/kWh	28		28
Dust* rel. to fuel input	mg/MJ	8		8
PME concentration (at 13% - O2)*	mg/m³	13		13
Electrical consumption				
Rated electrical power (max)	W		360	
Electrical consumption (at nominal heat output)	W		55	
Electrical consumption (at minimum heat output)	W		12	
PSTBY (during stand-by)	W		1,6	
Calculation				
"Qa" loss free heating flue gas	kJ/kg	1631,6	1574,9	1603,3
"qa" loss flue gas	%	9,4	9,1	9,3
"Qb" loss fix heating in flue gas	kJ/kg	2,0	5,9	4,0
"qb" loss fix heating in flue gas	%	0,012	0,034	0,023
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0	0,0	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,200	0,200	0,200
"m" flue gas mass flow	g/s	6,40	6,26	6,33
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,39	1,39	1,39
cpm-H2O	kJ/(m³K)	1,53	1,53	1,53
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable	not applicable	not applicable
"eta" Efficiency (indirect)	%	90,4	90,7	90,5
Heating input	kW	14,3	14,5	14,4
"P" heating output, total	kW	12,9	13,1	13,0
"Pw" water heating output	kW	0,0	0,0	0,0
Space heating output: PSTR = P - Pw	kW	12,9	13,1	13,0
Space heating output, relating to heat input	%	90,4	90,7	90,5
Water heating output, relating to heat input	%	0,0	0,0	0,0
Adjustments				
Flue gas delta pressure		1350	1350	
Ambient motor	volt	230	230	
Auger star motor	sec	5,9 ON - 0,1 OFF	5,9 ON - 0,1 OFF	
Cleaning time		OFF	OFF	
Fire door	open / closed	closed	closed	
Canalisation motors	volt	OFF	OFF	

Report- No.		K31232021T1
TÜV- order- No.		21253794
Manufacturer		PALAZZETTI LELIO S.p.A.
Construction type		Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.
max. working temperature	°C	Not applicable
max. working pressure	bar	Not applicable
Type of fuel charging		automatic load
Special properties / Remarks		All the appliances are sealed for Germany (typ FC62x) and for room sealed
Special properties		room sealed
Type designation		
Model name		AP400S_0_09, AP400B_0_09, AP400S_0_13, AP400B_0_13
Test place		CMC Centro Misure Compatibilità S.r.l., via della Fisica
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007
Type of test		Test at reduced load
Heat input from manufacturer	kW	3,1
Heat output from manufacturer	kW	2,8
		1. test
Test date		21/07/2021
Time		10:00 - 16:00
Ambient:		
Barometric pressure	mbar	1006
Temperature of combustion air	°C	29,2
Ambient rel. humidity	%	60,0
Ambient temperature (room)	°C	29,2
Type of Fuel		wood pellets
Properties of Fuel		Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to EN 14961-2
Number of fuel loadings		1
Weight of the stove, start, measurement	kg	225,3
Weight of the stove, end, measurement	kg	221,5
Fuel consumption, calculated of the difference	kg	3,8
Test duration	sec	21600
Fuel consumption "B"	kg/h	0,638
Calculation of losses in the ash (yes = 1, no = 0)	Gew. %	25,0
Residue passing through the grate, measurement	kg	0,00
Residue passing through the grate "R"	Gew. %	0,000
Carbon content of the residue passing through the grate "Cr" depending of 1kg fuel	Gew. %	0,104
Water side, measurement		
Flow, measurement	°C	0,0
Return, measurement	°C	0,0
Delta T	K	0,0
Cold water flow, measurement	kg/h	0,0
Additional energy of the pump	kW	0,00
Flue, average		
Flue gas temperature, measurement	°C	105,9
Flue draught, measurement	Pa	10,0
O2 - concentration, calculated	Vol.-%	14,8
CO2 - concentration, measurement	Vol.-%	6,1
lambda value, l	-	3,406

CO - concentration, measurement	ppm	145
CO - concentration, measurement	Vol.-%	0,015
CO - concentration, measurement	mg/m³	182
CO - concentr. (at 13% - O2)	Vol.-%	0,019
CO - concentr. (at 13% - O2)	mg/m³	236
CO - concentration rel. to fuel input	mg/kWh	531
CO - concentration rel. to fuel input	mg/MJ	147
NOx - concentration, measurement	ppm	35
NOx - concentration, measurement	mg/m³	71
NOx - concentr. (at 13% - O2)	mg/m³	92
NOx - concentration rel. to fuel input	mg/kWh	207
NOx - concentration rel. to fuel input	mg/MJ	58
CnHm concentration, measurement	ppm	3
CnHm concentration, measurement	mg/m³	4
CnHm concentr. (at 13% - O2)	mg/m³	5
CnHm - concentration (total C) rel. to fuel input	mg/kWh	12
CnHm - concentration (total C) rel. to fuel input	mg/MJ	3
Dust, measurement*	mg	4
Dust, measurement*	mg/m³	12
Dust (at 13% - O2)*	mg/m³	16
Dust* rel. to fuel input	mg/kWh	36
Dust* rel. to fuel input	mg/MJ	10
PME concentration (at 13% - O2)*	mg/m³	18
Electrical consumption		
Rated electrical power (max)	W	360
Electrical consumption (at nominal heat output)	W	30
Electrical consumption (at minimum heat output)	W	12
PSTBY (during stand-by)	W	1,6
Calculation		
"Qa" loss free heating flue gas	kJ/kg	1513,6
"qa" loss flue gas	%	8,7
"Qb" loss fix heating in flue gas	kJ/kg	25,9
"qb" loss fix heating in flue gas	%	0,150
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,200
"m" flue gas mass flow	g/s	3,38
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,33
cpm-H2O	kJ/(m³K)	1,51
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable
"eta" Efficiency (indirect)	%	90,9
Heating input	kW	3,1
"P" heating output, total	kW	2,8
"Pw" water heating output	kW	0,0
Space heating output: PSTR = P - Pw	kW	2,8
Space heating output, relating to heat input	%	90,9
Water heating output, relating to heat input	%	0,0
Adjustments		
Flue gas delta pressure		400
Ambient motor	volt	OFF
Auger star motor	sec	1,2 ON - 4,8 OFF
Cleaning time		OFF
Fire door	open / close	closed
Canalisation motors	volt	OFF

Report- No.		K31232021T1		
TÜV- order- No.		21253794		
Manufacturer		PALAZZETTI LELIO S.p.A.		
Construction type		Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.		
max. working temperature	°C	Not applicable		
max. working pressure	bar	Not applicable		
Type of fuel charging		automatic load		
Special properties / Remarks		Appliance with hot air canalisation		
Special properties		room air dependent		
Type designation				
Model name		AP400S_1_09, AP400B_1_09		
Test place		CMC Centro Misure Compatibilità S.r.l., via della Fisica,		
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007		
Type of test		Test at nominal load		
Heat input from manufacturer	kW	9,9		
Heat output from manufacturer	kW	9,0		
		1. test	2. test	Average
Test date		24/11/2021	24/11/2021	
Time		10:00 - 13:00	14:05 - 17:05	
Ambient:				
Barometric pressure	mbar	1011	1011	1011
Temperature of combustion air	°C	23,5	22,9	23,2
Ambient rel. humidity	%	45,0	45,0	45,0
Ambient temperature (room)	°C	23,5	22,9	23,2
Type of Fuel		wood pellets		
Properties of Fuel		Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to		
Number of fuel loadings		1	1	
Weight of the stove, start, measurement	kg	230,7	230,2	
Weight of the stove, end, measurement	kg	224,6	224,0	
Fuel consumption, calculated of the difference	kg	6,1	6,2	
Test duration	sec	10800	10800	
Fuel consumption "B"	kg/h	2,037	2,070	2,053
Calculation of losses in the ash (yes = 1, no = 0)	Gew. %	25,0	25,0	25,0
Residue passing through the grate, measurement	kg	0,00	0,00	0,00
Residue passing through the grate "R"	Gew. %	0,000	0,000	0,000
Carbon content of the residue passing through the grate "Cr" depending of 1 kg fuel	Gew. %	0,104	0,104	0,104
Water side, measurement				
Flow, measurement	°C	0,0	0,0	0,0
Return, measurement	°C	0,0	0,0	0,0
Delta T	K	0,0	0,0	0,0
Cold water flow, measurement	kg/h	0,0	0,0	0,0
Additional energy of the pump	kW	0,00	0,00	0,00
Flue, average				
Flue gas temperature, measurement	°C	168,1	167,4	167,7
Flue draught, measurement	Pa	10,0	10,0	10,0
O2 - concentration, calculated	Vol.-%	8,6	7,8	8,2
CO2 - concentration, measurement	Vol.-%	12,3	13,1	12,7
lambda value, l	-	1,699	1,593	1,646

CO - concentration, measurement	ppm	2	56	29
CO - concentration, measurement	Vol.-%	0,000	0,006	0,003
CO - concentration, measurement	mg/m³	2	70	36
CO - concentr. (at 13% - O2)	Vol.-%	0,000	0,003	0,002
CO - concentr. (at 13% - O2)	mg/m³	1	43	22
CO - concentration rel. to fuel input	mg/kWh	3	96	49
CO - concentration rel. to fuel input	mg/MJ	1	27	14
NOx - concentration, measurement	ppm	75	80	77
NOx - concentration, measurement	mg/m³	153	164	158
NOx - concentr. (at 13% - O2)	mg/m³	99	100	99
NOx - concentration rel. to fuel input	mg/kWh	223	224	223
NOx - concentration rel. to fuel input	mg/MJ	62	62	62
CnHm concentration, measurement	ppm	1	1	1
CnHm concentration, measurement	mg/m³	2	2	2
CnHm concentr. (at 13% - O2)	mg/m³	1	1	1
CnHm - concentration (total C) rel. to fuel input	mg/kWh	2	2	2
CnHm - concentration (total C) rel. to fuel input	mg/MJ	1	1	1
Dust, measurement*	mg	2		2
Dust, measurement*	mg/m³	7		7
Dust (at 13% - O2)*	mg/m³	5		5
Dust* rel. to fuel input	mg/kWh	11		11
Dust* rel. to fuel input	mg/MJ	3		3
PME concentration (at 13% - O2)*	mg/m³	5		5
Electrical consumption				
Rated electrical power (max)	W		300	
Electrical consumption (at nominal heat output)	W		45	
Electrical consumption (at minimum heat output)	W		12	
PSTBY (during stand-by)	W		1,4	
Calculation				
"Qa" loss free heating flue gas	kJ/kg	1532,7	1448,7	1490,7
"qa" loss flue gas	%	8,8	8,4	8,6
"Qb" loss fix heating in flue gas	kJ/kg	0,2	4,7	2,4
"qb" loss fix heating in flue gas	%	0,001	0,027	0,014
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0	0,0	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,200	0,200	0,200
"m" flue gas mass flow	g/s	5,58	5,34	5,46
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,36	1,36	1,36
cpm-H2O	kJ/(m³K)	1,52	1,52	1,52
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable	not applicable	not applicable
"eta" Efficiency (indirect)	%	91,0	91,4	91,2
Heating input	kW	9,8	10,0	9,9
"P" heating output, total	kW	8,9	9,1	9,0
"Pw" water heating output	kW	0,0	0,0	0,0
Space heating output: PSTR = P - Pw	kW	8,9	9,1	9,0
Space heating output, relating to heat input	%	91,0	91,4	91,2
Water heating output, relating to heat input	%	0,0	0,0	0,0
Adjustments				
Flue gas motor	delta pressure	700	700	
Ambient motor	volt	230	230	
Auger motor	sec	4,0 ON - 2,0 OFF	4,0 ON - 2,0 OFF	
Cleaning time		OFF	OFF	
Fire door	open / closed	closed	closed	
Canalisation motors		OFF	OFF	

Report- No.		K31232021T1		
TÜV- order- No.		21253794		
Manufacturer		PALAZZETTI LELIO S.p.A.		
Construction type		Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.		
max. working temperature	°C	Not applicable		
max. working pressure	bar	Not applicable		
Type of fuel charging		automatic load		
Special properties / Remarks		Appliance with hot air canalisation		
Special properties		room air dependent		
Type designation				
Model name		AP400S_1_13, AP400B_1_13		
Test place		CMC Centro Misure Compatibilità S.r.l., via della Fisica,		
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007		
Type of test		Test at nominal load		
Heat input from manufacturer	kW	14,6		
Heat output from manufacturer	kW	13,2		
		1. test	2. test	Average
Test date		22/11/2021	22/11/2021	
Time		10:50 - 13:50	13:55 - 16:55	
Ambient:				
Barometric pressure	mbar	1001	1001	1001
Temperature of combustion air	°C	22,5	24,3	23,4
Ambient rel. humidity	%	55,0	55,0	55,0
Ambient temperature (room)	°C	22,5	24,3	23,4
Type of Fuel		wood pellets		
Properties of Fuel		Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to		
Number of fuel loadings		1	1	
Weight of the stove, start, measurement	kg	232,0	232,6	
Weight of the stove, end, measurement	kg	222,9	223,4	
Fuel consumption, calculated of the difference	kg	9,1	9,1	
Test duration	sec	10800	10800	
Fuel consumption "B"	kg/h	3,033	3,047	3,040
Calculation of losses in the ash (yes = 1, no = 0)	Gew. %	25,0	25,0	25,0
Residue passing through the grate, measurement	kg	0,00	0,00	0,00
Residue passing through the grate "R"	Gew. %	0,000	0,000	0,000
Carbon content of the residue passing through the grate "Cr" depending of 1 kg fuel	Gew. %	0,104	0,104	0,104
Water side, measurement				
Flow, measurement	°C	0,0	0,0	0,0
Return, measurement	°C	0,0	0,0	0,0
Delta T	K	0,0	0,0	0,0
Cold water flow, measurement	kg/h	0,0	0,0	0,0
Additional energy of the pump	kW	0,00	0,00	0,00
Flue, average				
Flue gas temperature, measurement	°C	224,5	223,7	224,1
Flue draught, measurement	Pa	10,0	10,0	10,0
O2 - concentration, calculated	Vol.-%	4,9	4,0	4,5
CO2 - concentration, measurement	Vol.-%	16,0	16,9	16,4
lambda value, l	-	1,307	1,237	1,272

CO - concentration, measurement	ppm	32	80	56
CO - concentration, measurement	Vol.-%	0,003	0,008	0,006
CO - concentration, measurement	mg/m³	40	100	70
CO - concentr. (at 13% - O2)	Vol.-%	0,002	0,004	0,003
CO - concentr. (at 13% - O2)	mg/m³	20	47	34
CO - concentration rel. to fuel input	mg/kWh	45	106	75
CO - concentration rel. to fuel input	mg/MJ	13	29	21
NOx - concentration, measurement	ppm	97	103	100
NOx - concentration, measurement	mg/m³	199	211	205
NOx - concentr. (at 13% - O2)	mg/m³	99	99	99
NOx - concentration rel. to fuel input	mg/kWh	222	223	223
NOx - concentration rel. to fuel input	mg/MJ	62	62	62
CnHm concentration, measurement	ppm	3	1	2
CnHm concentration, measurement	mg/m³	5	2	3
CnHm concentr. (at 13% - O2)	mg/m³	2	1	2
CnHm - concentration (total C) rel. to fuel input	mg/kWh	5	2	4
CnHm - concentration (total C) rel. to fuel input	mg/MJ	1	1	1
Dust, measurement*	mg	9		9
Dust, measurement*	mg/m³	32		32
Dust (at 13% - O2)*	mg/m³	14,9		14,9
Dust* rel. to fuel input	mg/kWh	34		34
Dust* rel. to fuel input	mg/MJ	9		9
PME concentration (at 13% - O2)*	mg/m³	15		15
Electrical consumption				
Rated electrical power (max)	W		300	
Electrical consumption (at nominal heat output)	W		50	
Electrical consumption (at minimum heat output)	W		12	
PSTBY (during stand-by)	W		1,4	
Calculation				
"Qa" loss free heating flue gas	kJ/kg	1725,4	1626,7	1676,0
"qa" loss flue gas	%	10,0	9,4	9,7
"Qb" loss fix heating in flue gas	kJ/kg	2,2	5,2	3,7
"qb" loss fix heating in flue gas	%	0,013	0,030	0,021
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0	0,0	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,200	0,200	0,200
"m" flue gas mass flow	g/s	6,53	6,24	6,38
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,39	1,39	1,39
cpm-H2O	kJ/(m³K)	1,53	1,53	1,53
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable	not applicable	not applicable
"eta" Efficiency (indirect)	%	89,8	90,4	90,1
Heating input	kW	14,6	14,7	14,6
"P" heating output, total	kW	13,1	13,3	13,2
"Pw" water heating output	kW	0,0	0,0	0,0
Space heating output: PSTR = P - Pw	kW	13,1	13,3	13,2
Space heating output, relating to heat input	%	89,8	90,4	90,1
Water heating output, relating to heat input	%	0,0	0,0	0,0
Adjustments				
Flue gas motor	delta pressure	1100	1100	
Ambient motor	volt	230	230	
Auger motor	sec	5,9 ON - 0,1 OFF	5,9 ON - 0,1 OFF	
Cleaning time		OFF	OFF	
Fire door	open / closed	closed	closed	
Canalisation motors		OFF	OFF	

Report- No.		K31232021T1
TÜV- order- No.		21253794
Manufacturer		PALAZZETTI LELIO S.p.A.
Construction type		Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.
max. working temperature	°C	Not applicable
max. working pressure	bar	Not applicable
Type of fuel charging		automatic load
Special properties / Remarks		Appliance with hot air canalisation
Special properties		room air dependent
Type designation		
Model name		AP400S_1_09, AP400B_1_09, AP400S_1_13, AP400B_1_13
Test place		CMC Centro Misure Compatibilità S.r.l., via della Fisica
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007
Type of test		Test at reduced load
Heat input from manufacturer	kW	3,5
Heat output from manufacturer	kW	3,2
		1. test
Test date		23/11/2021
Time		09:40 - 15:40
Ambient:		
Barometric pressure	mbar	1011
Temperature of combustion air	°C	21,1
Ambient rel. humidity	%	50,0
Ambient temperature (room)	°C	21,1
Type of Fuel		wood pellets
Properties of Fuel	Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,7%, Salzburg, class A1 according to E	
Number of fuel loadings		1
Weight of the stove, start, measurement	kg	230,8
Weight of the stove, end, measurement	kg	226,4
Fuel consumption, calculated of the difference	kg	4,4
Test duration	sec	21600
Fuel consumption "B"	kg/h	0,735
Calculation of losses in the ash (yes = 1, no = 0)	Gew. %	25,0
Residue passing through the grate, measurement	kg	0,00
Residue passing through the grate "R"	Gew. %	0,000
Carbon content of the residue passing through the grate "Cr" depending of 1kg fuel	Gew. %	0,104
Water side, measurement		
Flow, measurement	°C	0,0
Return, measurement	°C	0,0
Delta T	K	0,0
Cold water flow, measurement	kg/h	0,0
Additional energy of the pump	kW	0,00
Flue, average		
Flue gas temperature, measurement	°C	109,1
Flue draught, measurement	Pa	10,0
O2 - concentration, calculated	Vol.-%	14,7
CO2 - concentration, measurement	Vol.-%	6,3
lambda value, I	-	3,305

CO - concentration, measurement	ppm	189
CO - concentration, measurement	Vol.-%	0,019
CO - concentration, measurement	mg/m³	237
CO - concentr. (at 13% - O2)	Vol.-%	0,024
CO - concentr. (at 13% - O2)	mg/m³	298
CO - concentration rel. to fuel input	mg/kWh	671
CO - concentration rel. to fuel input	mg/MJ	186
NOx - concentration, measurement	ppm	22
NOx - concentration, measurement	mg/m³	45
NOx - concentr. (at 13% - O2)	mg/m³	57
NOx - concentration rel. to fuel input	mg/kWh	128
NOx - concentration rel. to fuel input	mg/MJ	36
CnHm concentration, measurement	ppm	2
CnHm concentration, measurement	mg/m³	3
CnHm concentr. (at 13% - O2)	mg/m³	4
CnHm - concentration (total C) rel. to fuel input	mg/kWh	8
CnHm - concentration (total C) rel. to fuel input	mg/MJ	2
Dust, measurement*	mg	2
Dust, measurement*	mg/m³	6
Dust (at 13% - O2)*	mg/m³	7
Dust* rel. to fuel input	mg/kWh	16
Dust* rel. to fuel input	mg/MJ	4
PME concentration (at 13% - O2)*	mg/m³	8
Electrical consumption		
Rated electrical power (max)	W	300
Electrical consumption (at nominal heat output)	W	45
Electrical consumption (at minimum heat output)	W	12
PSTBY (during stand-by)	W	1,4
Calculation		
"Qa" loss free heating flue gas	kJ/kg	1688,5
"qa" loss flue gas	%	9,7
"Qb" loss fix heating in flue gas	kJ/kg	32,8
"qb" loss fix heating in flue gas	%	0,189
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,200
"m" flue gas mass flow	g/s	3,77
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,33
cpm-H2O	kJ/(m³K)	1,51
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable
"eta" Efficiency (indirect)	%	89,9
Heating input	kW	3,5
"P" heating output, total	kW	3,2
"Pw" water heating output	kW	0,0
Space heating output: PSTR = P - Pw	kW	3,2
Space heating output, relating to heat input	%	89,9
Water heating output, relating to heat input	%	0,0
Adjustments		
Flue gas motor	delta pressure	360
Ambient motor	volt	OFF
Auger motor	sec	1,4 ON - 4,6 OFF
Cleaning time		OFF
Fire door	open / close	closed
Canalisation motors		OFF

The tests were carried out under the conditions of DIN EN 14785:2006

Appendix 03

The requirements of the measuring instruments are fulfilled.

Before each qualified measuring analysers were calibrated with zero gas and calibration gas.

Index	Measure	Principle	Company	Range	Instrument specification	Reference
B030	Water pressure	Manometer	Cewal DN 150	0 – 25 bar	± 0,6%	Reference manometer
B062	Temperature	PT 100 K-type thermocouples	Agilent 34970 A	0 – 300 °C	Up to 0,5 °C	Reference thermometer
B066	Gas pressure	Manometer	Testo 510	0 – 100 hPa	± 3% related to final value	Reference manometer
B068	Temperature	IR emission	Fluke Ti20	-10 – 350 °C	---	---
B070	Fuel consumption	Gravimetric	Dini Angeo DFWK	0 – 600 kg	± 10 g	Reference load
B079	Water flow	Magnetic	ABB Copa-XE DE43FI	0 – 2000 kg/h	± 1% related to the range	Reference flow meter
B084	Temperature	PT 100 K-type thermocouples	Agilent 34970 A	0 – 300 °C	Up to 0,5 °C	Reference thermometer
B090	Dust content	Gravimetric	Sartorius CPA 224 S	0,1 mg – 220 g	± 0,1 mg	Reference load
B092	Fuel consumption	Gravimetric	Dini Angeo DFWK	0 – 1200 kg	± 10 g	Reference load
B094	CO ₂	Infrared-absorption	Siemens Ultramat 6E	0 – 3 % 0 – 30 %	± 1% related to the range	Reference gas: 17,96 %
	CO	Infrared-absorption	Siemens Ultramat 6E	0 – 300 ppm 0 – 3000 ppm	± 1% related to the range	Reference gas: 2001 ppm
B095	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1 % 0 – 5 %	± 1% related to the range	Reference gas: 5,004 %
B096 + B123	CO ₂	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 17,96 %
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 2001 ppm
	NO _x	Infrared-absorption	Siemens Ultramat 23 + Bühler Bünox MV	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 199,3 ppm
B097	OGC	FID	Siemens Fidamat 6	0 – 3,33 ppm C3 0 – 33,3 ppm C3 0 – 333 ppm C3 0 – 3333 ppm C3	± 1% related to the range	Reference gas: 997 ppm propane
B098	Temperature	K-type thermocouple	Testo 925	0 – 200 °C	± 2 °C	Reference thermometer
B109	Air flow	Flow measurement	CMC / ASA 132826 P13-2800	400 - 4000 l/h	± (2 % FS)	Reference flow meter
B118	Gas volume	Diaphragm	CMC	0,016 – 2,5 m ³ /h	± 5 %	Air flow
B121	OGC	FID	Siemens Fidamat 6	0 – 3,33 ppm C3 0 – 33,3 ppm C3 0 – 333 ppm C3 0 – 3333 ppm C3	± 1% related to the range	Reference gas: 997 ppm propane
B122	CO ₂	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 17,96 %
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 2001 ppm
	NO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 199,3 ppm
B140	Gas pressure	Inclined liquid column manometer	Kimo HP series	0 – 15 Pa	± 10% related to final value	Reference manometer
B141	Gas pressure	Inclined liquid column manometer	Kimo HP series	0 – 15 Pa	± 10% related to final value	Reference manometer
B149	Mass	Gravimetric	Kern FKB 15K0.5A	0 – 15 kg	± 0,5 g (reproducibility)	Reference load
B154	Gas volume	Diaphragm	Elster BK-G4M	---	Class 1,5	Air flow
B169	Electrical power	---	Yokogawa WT310E	0 – 2000 W	± 0,5 %	External calibration
B179	Stopwatch	---	RS 8111814	0 – 99 h	0,01 s	---
B180	Absolute pressure meter	Absolute pressure meter	Testo 511	0 – 999,0 hPa	±3,0 hPa	External calibration
B183	Water flow	Magnetic	ISOIL Industria MS501-T10-1A1A1A + ML210-B0A1B3A0	0 – 2000 kg/h	Accuracy: ± 0,2% r.v.	Reference flow meter

The values are continuously recorded. The scan interval is 10s. All related certificates are stored.