

Report No. K 1161 2018 E6

Residential space heating appliances fired by wood pellets
Supplement to initial type testing
DIN EN 14785

Types:

AP008S_3_08

AP008S_3_09

AP008S_3_10

AP008S_3_11

AP008S_3_12

Company: **PALAZZETTI LELIO S.p.A.**



Deutsche
Akkreditierungsstelle
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. 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.

2nd Supplement to initial type testing report**K 1161 2013 T1-Rev.01****K 1161 2018 E5****Residential space heating appliances fired by wood pellets****in accordance with 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) - ItalyTrademark: **PALAZZETTI**

Types designation:	AP008S_3_08	AP008S_3_09	AP008S_3_10	AP008S_3_11	AP008S_3_12
Total heat input [kW]:	4,04 - 8,81	4,04 - 9,97	4,04 - 10,94	4,04 - 12,35	4,04 - 13,6
Space heat output [kW]:	3,68 - 8,03	3,68 - 9,0	3,68 - 9,81	3,68 - 11,0	3,68 - 12,04

Type of construction: Residential room sealed heating appliances fired by wood pellets without water heat exchanger, with fan assisted flue discharge and with internal fuel hopper.

Water heat output: Not applicable

Type of fuel: wood pellets, Ø 6 mm, L_{max} 30 mm, max humidity 5,5%, Firestixx.

Type of loading: automatic load

Date of test: 15th February 2018**Remarks:**

Room sealed appliances. All the stoves are structurally identical. Only the setting of the fuel supply differs between the Types.

The datas of **AP008S_3_09**, **AP008S_3_10** and **AP008S_3_11** are achieved by linear interpolation.**Test results:**


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

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


Additional details are documented on the ITT report K11612013T1-Rev.01.

Dated in Cologne, 2018-06-11
432 pomTÜV Rheinland Energy GmbH
Test Centre according to Construction Product
Regulation 305/2011(CPR)
Notified Body: 2456

Assessor:


Dipl.-Ing. A. Pomp

Report released after review:


Dipl.-Ing. K. VerbertResidential space heating appliances fired by wood pellets, Initial Type Test in accordance with the regulation 305/2011
conformity certification system no. 3

1. Task

History test report K11612013T1-Rev.01

The Test Centre for Energy Appliances was instructed to execute the initial type testing on the appliances **AP008S_0_08**, **AP008S_0_09**, **AP008S_0_10**, **AP008S_0_11** and **AP008S_0_12** for the operation with wood pellets according to DIN EN 14785:2006, cl. 4-8.

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

The practical tests were carried out in the laboratory in Thiene on the 28th, 29th, 30th and on the 31th of October 2013.

The (FPC) Factory Production Control was not performed.

History test report K11612018E5

The manufacturer decided to perform a new test at reduced heat output, in order to achieve better performances and to enable the appliances to meet the requirements of Regulation EU 2015/1185 (Ecodesign Directive 2009/125/CE).

New reduced heat output has been achieved by changing the settings on the software.

Furthermore, new types designation have been created for the appliances:

AP008S_2_08; **AP008S_2_09**; **AP008S_2_10**; **AP008S_2_11**; **AP008S_2_12**.

The practical test was carried out in the laboratory in Thiene on the 15th of February 2018.

New test report K11612018E6

The manufacturer decided to add new models with concentric flue gas output socket to AP008S family. New type designations have been created for the appliances: **AP008S_3_08**; **AP008S_3_09**; **AP008S_3_10**; **AP008S_3_11**; **AP008S_3_12**.

For this reason, a comparison measurement was carried out in Thiene on 29th May 2018.

It was selected the stove AP008S_3_12 to measure the nominal load again and compare it to AP008S_2_12. The comparison measurements showed that no significant differences or better results can be observed in AP008S_3_12 stove model.

A comparison of the essential results is listed in the table below.

Nominal load comparison	Input (kW)	Output (kW)	Efficiency (%)	CO ₂	CO* (mg/m ³)	NOx* (mg/m ³)	CnHm* (mg/m ³)	Dust* (mg/m ³)
AP008S_2_12	13,6	12,0	88,5	13,5	88	147	3	11
AP008S_3_12	13,6	12,6	92,8	14,1	39	149	1	14

*) Concentration at 13% O₂

2. Brief description of appliances

Residential room sealed heating appliances fired by wood pellets without water heat exchanger for domestic central heating system. The flue discharge for pellet operation is fan assisted. The stoves are equipped with an automatic ignition and an ambient motor, which can blow the air in the installation room or in the canalization pipe by moving a selector, which deviates the ambient air towards the top or the backside canalization.

In addition, the appliances can be equipped with and without Magnofix in the combustion chamber. Moreover the appliances can be fitted with two additional ventilation motors (for additional canalization).

All the stoves are structurally identical and have the same reduced heat output. Only the nominal load parameters are different.

The data of **AP008S_3_09**, **AP008S_3_10** and **AP008S_3_11** are achieved by linear interpolation.

3. Resume of the test results

AP008S_3_08		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	1,8	0,83	-
Flue gas mass flow	g/s	5,4	4,4	-
Flue gas temperature	°C	157,7	97,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -concentration	Vol.-%	11,5	6,6	-
O ₂ -concentration	Vol.-%	9,0	13,9	-
CO-concentration	ppm	21,3	145,4	-
CO-emission (at 13%-O ₂)	mg/m ³	17,8	206,1	500/750
CO-emission	mg/kWh	41,4	520,3	-
CO-emission	mg/MJ	11,5	144,5	-
NO _x -concentration	ppm	110,3	58,7	-
NO _x -emission (at 13%-O ₂)	mg/m ³	151,3	136,4	-
NO _x -emission	mg/kWh	351,8	344,4	-
NO _x -emission	mg/MJ	97,7	95,7	-
CnHm-concentration measured acc. CEN/TS 15883	mg/m ³	2,5	4,4	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1,7	4,9	-
CnHm-emission	mg/kWh	3,9	12,5	-
CnHm-emission	mg/MJ	1,1	3,5	-
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	7,2	2,9	-
Dust emission (at 13%-O ₂)	mg/m ³	7,1	10,6	-
Dust emission	mg/kWh	11,0	26,8	-
Dust emission	mg/MJ	3,1	7,4	-
Total heat output	kW	8,03	3,68	-
Water heat output	kW	-	-	-
Space heat output	kW	8,03	3,68	-
Efficiency	%	91,16	91,0	75/70 (EN14785)

AP008S_3_09		Nominal*	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,05	0,83	-
Flue gas mass flow	g/s	5,8	4,4	-
Flue gas temperature	°C	174,1	97,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -concentration	Vol.-%	12,0	6,6	-
O ₂ -concentration	Vol.-%	8,5	13,9	-
CO-concentration	ppm	46,4	145,4	-
CO-emission (at 13%-O ₂)	mg/m ³	34,9	206,1	500/750
CO-emission	mg/kWh	81,1	520,3	-
CO-emission	mg/MJ	22,5	144,5	-
NO _x -concentration	ppm	114,2	58,7	-
NO _x -emission (at 13%-O ₂)	mg/m ³	150,4	136,4	-
NO _x -emission	mg/kWh	349,6	344,4	-
NO _x -emission	mg/MJ	97,1	95,7	-
CnHm-concentration measured acc. CEN/TS 15883	mg/m ³	3,0	4,4	-
CnHm-emission (at 13%-O ₂)	mg/m ³	1,9	4,9	-
CnHm-emission	mg/kWh	4,4	12,5	-
CnHm-emission	mg/MJ	1,2	3,5	-
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	8,7	2,9	-
Dust emission (at 13%-O ₂)	mg/m ³	8,1	10,6	-
Dust emission	mg/kWh	12,0	26,8	-
Dust emission	mg/MJ	3,4	7,4	-
Total heat output	kW	9,0	3,68	-
Water heat output	kW	-	-	-
Space heat output	kW	9,0	3,68	-
Efficiency	%	90,52	91,0	75/70 (EN14785)

*) The data are achieved by linear interpolation between the nominal heat output of **AP008S_3_08** and the nominal heat output of **AP008S_3_12**.

AP008S_3_10		Nominal**	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,25	0,83	-
Flue gas mass flow	g/s	6,2	4,4	-
Flue gas temperature	°C	187,6	97,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -concentration	Vol.-%	12,4	6,6	-
O ₂ -concentration	Vol.-%	8,1	13,9	-
CO-concentration	ppm	67,1	145,4	-
CO-emission (at 13%-O ₂)	mg/m ³	49,1	206,1	500/750
CO-emission	mg/kWh	114,0	520,3	-
CO-emission	mg/MJ	31,7	144,5	-
NO _x -concentration	ppm	117,5	58,7	-
NO _x -emission (at 13%-O ₂)	mg/m ³	149,6	136,4	-
NO _x -emission	mg/kWh	347,8	344,4	-
NO _x -emission	mg/MJ	96,6	95,7	-
CnHm-concentration measured acc. CEN/TS 15883	mg/m ³	3,5	4,4	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2,1	4,9	-
CnHm-emission	mg/kWh	4,9	12,5	-
CnHm-emission	mg/MJ	1,4	3,5	-
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	9,9	2,9	-
Dust emission (at 13%-O ₂)	mg/m ³	9,0	10,6	-
Dust emission	mg/kWh	12,8	26,8	-
Dust emission	mg/MJ	3,6	7,4	-
Total heat output	kW	9,81	3,68	-
Water heat output	kW	-	-	-
Space heat output	kW	9,81	3,68	-
Efficiency	%	90,0	91,0	75/70 (EN14785)

) The data are achieved by linear interpolation between the nominal heat output of **AP008S_3_08 and the nominal heat output of **AP008S_3_12**.

AP008S_3_11		Nominal***	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,54	0,83	-
Flue gas mass flow	g/s	6,7	4,4	-
Flue gas temperature	°C	207,5	97,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -concentration	Vol.-%	13,0	6,6	-
O ₂ -concentration	Vol.-%	7,5	13,9	-
CO-concentration	ppm	97,5	145,4	-
CO-emission (at 13%-O ₂)	mg/m ³	69,8	206,1	500/750
CO-emission	mg/kWh	162,2	520,3	-
CO-emission	mg/MJ	45,1	144,5	-
NO _x -concentration	ppm	122,2	58,7	-
NO _x -emission (at 13%-O ₂)	mg/m ³	148,4	136,4	-
NO _x -emission	mg/kWh	345,1	344,4	-
NO _x -emission	mg/MJ	95,9	95,7	-
CnHm-concentration measured acc. CEN/TS 15883	mg/m ³	4,1	4,4	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2,4	4,9	-
CnHm-emission	mg/kWh	5,5	12,5	-
CnHm-emission	mg/MJ	1,5	3,5	-
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	11,6	2,9	-
Dust emission (at 13%-O ₂)	mg/m ³	10,2	10,6	-
Dust emission	mg/kWh	14,0	26,8	-
Dust emission	mg/MJ	3,9	7,4	-
Total heat output	kW	11,0	3,68	-
Water heat output	kW	-	-	-
Space heat output	kW	11,0	3,68	-
Efficiency	%	89,22	91,0	75/70 (EN14785)

***) The data are achieved by linear interpolation between the nominal heat output of **AP008S_3_08** and the nominal heat output of **AP008S_3_12**.

AP008S_3_12		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	2,79	0,83	-
Flue gas mass flow	g/s	7,1	4,4	-
Flue gas temperature	°C	225,0	97,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -concentration	Vol.-%	13,5	6,6	-
O ₂ -concentration	Vol.-%	6,9	13,9	-
CO-concentration	ppm	124,4	145,4	-
CO-emission (at 13%-O ₂)	mg/m ³	88,1	206,1	500/750
CO-emission	mg/kWh	204,8	520,3	-
CO-emission	mg/MJ	56,9	144,5	-
NO _x -concentration	ppm	126,4	58,7	-
NO _x -emission (at 13%-O ₂)	mg/m ³	147,4	136,4	-
NO _x -emission	mg/kWh	342,8	344,4	-
NO _x -emission	mg/MJ	95,2	95,7	-
CnHm-concentration measured acc. CEN/TS 15883	mg/m ³	4,7	4,4	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2,6	4,9	-
CnHm-emission	mg/kWh	6,1	12,5	-
CnHm-emission	mg/MJ	1,7	3,5	-
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	13,2	2,9	-
Dust emission (at 13%-O ₂)	mg/m ³	11,3	10,6	-
Dust emission	mg/kWh	15,1	26,8	-
Dust emission	mg/MJ	4,2	7,4	-
Total heat output	kW	12,04	3,68	-
Water heat output	kW	-	-	-
Space heat output	kW	12,04	3,68	-
Efficiency	%	88,54	91,0	75/70 (EN14785)

4 Statement of the test results

The appliances:

AP008S_3_08; AP008S_3_09, AP008S_3_10; AP008S_3_11; AP008S_3_12

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 are 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 A 01 Fuel Data

Appendix A 02 Measurement Instruments

Appendix	Subject	Reference
A 04	Type labels	
A 05	EU Declaration of Conformity	
A 06	Declaration of Performances	08/06/2018
A 07	Extension declaration	08/06/2018
A 08	Software settings	08/06/2018
A 09	Manual with technical data	004774911

Appendix A 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:		26/02/2018		Analysis No.				1801775-001			
Fuel:		wood pellets		Fuel sampling date:				19/02/18			
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 Sauerstoff- Bedarf	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	47,400	1,860	0,882	1,850	0,8769	-	-	-	-	-	-
s	0,001	0,700	0,000	-	-	0,680	0,0000	-	-	-	-
h	5,980	5,550	0,332	-	-	-	-	11,100	0,6638	-	-
n	0,090	-	-	-	-	-	-	-	-	0,80	0,0007
o	40,900	-0,700	-0,286	-	-	-	-	-	-	-	-
wasser	5,500	-	-	-	-	-	-	1,240	0,0682	-	-
asche	0,129	-	-	-	-	-	-	-	-	-	-
summe	100,000	O min=	0,927	V CO₂ =	0,8769	V SO₂ =	0,0000	V W =	0,7320	V N₂ =	0,0007

Luftbedarf	L min =	4,4154 Nm³/kg Brennstoff
trockene stöchiometrische Abgasmenge	V A tr min =	4,3651 Nm³/kg Brennstoff
Max. Kohlenstoffdioxid-Anteil	CO₂ max =	20,0890 Vol.-%
Wasserdampfmenge	V w =	0,7320 Nm³/kg Brennstoff
	V A tr min/ L min =	0,9886
Heizwert, wf	Hu =	19014 kJ/kg
		5,282 kWh/kg

Berechnungen zum Versuchszeitpunkt		
wasser zum Versuchszeitpunkt	w =	5,500 Gew. %
Heizwert, roh zum Versuchszeitpunkt	Hu	17834 kJ/kg

Appendix A 02

**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	Balance
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: 19,99 %
	CO	Infrared-absorption	Siemens Ultramat 6E	0 – 300 ppm 0 – 3000 ppm	± 1% related to the range	Reference gas: 2002 ppm
B095	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1 % 0 – 5 %	± 1% related to the range	Reference gas: 4,925 %
B096 + B123	CO ₂	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 19,99 %
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 2002 ppm
	NO _x	Infrared-absorption	Siemens Ultramat 23 + Bühler Bünox MV	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 191,4 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: 29,82 ppm propane
B098	Temperature	K-type thermocouple	Testo 925	0 – 200 °C	± 2 °C	Reference thermometer
B116	Air flow	Mass flow measurement	Bronkhorst F-11AC-50K-AAD-33-V	0 – 50 l/min	± (0,5 % Rd + 0,1 % FS)	External calibration
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: 29,82 ppm propane
B122	CO ₂	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 19,99 %

Index	Measure	Principle	Company	Range	Instrument specification	Reference
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 2002 ppm
	NO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 191,4 ppm
B129	Water flow	Magnetic	ASA AF6-2600/1/B/1/AC	0 – 1500 kg/h	Accuracy: ± 0,5% r.v.	Balance
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

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