

**Report No. K17932018E3**

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

Models:

**AP004N\_2\_06, AP004N\_2\_07, AP004N\_2\_08**

Company:

**Palazzetti Lelio S.p.A.**



Deutsche  
Akkreditierungsstelle  
D-PL-11120-04-00

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Publication of page 2 is permitted.

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**Supplement to initial type testing report**  
**K 1793 2016 T1**  
**Residential space heating appliances fired by wood pellets**  
**in accordance with DIN EN 14785: September 2006**  
**Correction 1 DIN EN 14785: 10/2007**

Applicant/contractor:	<b>Palazzetti Lelio S.p.A.</b> Via Roveredo 103, 33080 Porcia (PN) - Italy
Trademark:	<b>Palazzetti</b>
Models:	<b>AP004N_2_06    AP004N_2_07    AP004N_2_08</b>
Description of appliances:	Residential space heating appliances fired by wood pellets without water heat exchanger, with fan assisted flue discharge and with internal fuel hopper
Total heat input:	3,1 - 6,6 kW            3,1 – 7,8 kW            3,1 - 9,3 kW
Space heat output:	2,9 - 6,0 kW            2,9 – 7,0 kW            2,9 - 8,2 kW
Fuels:	Wood pellets

**Test result:**

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 report K20842017T1

Dated in Cologne, 2018-05-30  
432 / pom


Assessor:



Dipl.-Ing. A. Pomp

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

Report released after review:



Dipl.-Ing. R. Verbert

Residential space heating appliances fired by wood pellets, Initial Type Test in accordance with the regulation 305/2011 conformity certification system no. 3
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## 1. Task

### History test report K 1793 2016 T1

The Test Centre for Energy Appliances was instructed to execute the initial type testing on the appliances **AP004N\_1\_08** and **AP004N\_1\_06** for the operation with wood pellets according 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. **AP004N\_1\_07** data are linearly interpolated between AP004N\_1\_08 and AP004N\_1\_06.

The practical tests were carried out in the laboratory in Thiene on the 18<sup>th</sup>, on the 19<sup>th</sup> and on the 25<sup>th</sup> of February 2016.

The (FPC) Factory Production Control was not performed.

### New test report K 1793 2018 E3

The Test Centre for Energy Appliances was instructed to execute the minimum load retest on the appliances of K17932016T1 test report to improve combustion gas emissions.

All new improved stoves have new type names: AP004N\_1\_06 becomes AP004N\_2\_06, AP004N\_1\_07 becomes AP004N\_2\_07 and AP004N\_1\_08 becomes AP004N\_2\_08.

The only differences between old and new appliances are the improved software settings at minimum load.

The practical tests were carried out in the laboratory in Thiene on the 14<sup>th</sup> of March 2018.

## 2. Brief description of appliances

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.

### 3. Testing

#### Resume of test results

AP004N_2_06		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	1,363	0,628	-
Flue gas mass flow	g/s	4,1	3,47	-
Flue gas temperature	°C	167,9	85,8	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO <sub>2</sub> -concentration	Vol.-%	11,40	6,0	-
O <sub>2</sub> -concentration	Vol.-%	9,03	14,7	-
CO-concentration	ppm	32	94	-
CO-emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	26	151	500/750
CO-emission	mg/kWh	63	348	-
CO-emission	mg/MJ	17	97	-
NO <sub>x</sub> -concentration	ppm	94	51	-
NO <sub>x</sub> -emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	128	133	-
NO <sub>x</sub> -emission	mg/kWh	305	308	-
NO <sub>x</sub> -emission	mg/MJ	85	86	-
CnHm-concentration measured acc. CEN/TS 15883	ppm	1	3	-
CnHm-emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	1	6	-
CnHm-emission	mg/kWh	3	14	-
CnHm-emission	mg/MJ	1	4	-
Dust emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	10	15	-
Dust emission	mg/kWh	24	35	-
Dust emission	mg/MJ	7	10	-
Total heat input	kW	6,6	3,1	-
Total heat output	kW	6,0	2,9	-
Water heat output	kW	0,0	0,0	-
Space heat output	kW	6,0	2,9	-
Efficiency	%	90,0	92,3	75/70 (EN14785)

<b>AP004N_2_07 *</b>		<b>Nominal</b>	<b>Partial</b>	<b>Requirement</b>
Mass of the test fuel fired hourly	kg/h	1,615	0,628	-
Flue gas mass flow	g/s	4,6	3,47	-
Flue gas temperature	°C	193,7	85,8	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO <sub>2</sub> -concentration	Vol.-%	12,13	6,0	-
O <sub>2</sub> -concentration	Vol.-%	8,26	14,7	-
CO-concentration	ppm	33	94	-
CO-emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	26	151	500/750
CO-emission	mg/kWh	62	348	-
CO-emission	mg/MJ	17	97	-
NO <sub>x</sub> -concentration	ppm	102	51	-
NO <sub>x</sub> -emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	131	133	-
NO <sub>x</sub> -emission	mg/kWh	311	308	-
NO <sub>x</sub> -emission	mg/MJ	86	86	-
CnHm-concentration measured acc. CEN/TS 15883	ppm	1	3	-
CnHm-emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	1	6	-
CnHm-emission	mg/kWh	2	14	-
CnHm-emission	mg/MJ	1	4	-
Dust emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	9	15	-
Dust emission	mg/kWh	22	35	-
Dust emission	mg/MJ	6	10	-
Total heat input	kW	7,8	3,1	-
Total heat output	kW	7,0	2,9	-
Water heat output	kW	0,0	0,0	-
Space heat output	kW	7,0	2,9	-
Efficiency	%	89,0	92,3	75/70 (EN14785)

\*) Data are linearly interpolated between 6 and 8 kW models

<b>AP004N_2_08</b>		<b>Nominal</b>	<b>Partial</b>	<b>Requirement</b>
Mass of the test fuel fired hourly	kg/h	1,917	0,628	-
Flue gas mass flow	g/s	5,1	3,47	-
Flue gas temperature	°C	224,5	85,8	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO <sub>2</sub> -concentration	Vol.-%	13,01	6,0	-
O <sub>2</sub> -concentration	Vol.-%	7,34	14,7	-
CO-concentration	ppm	35	94	-
CO-emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	26	151	500/750
CO-emission	mg/kWh	61	348	-
CO-emission	mg/MJ	17	97	-
NO <sub>x</sub> -concentration	ppm	111	51	-
NO <sub>x</sub> -emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	134	133	-
NO <sub>x</sub> -emission	mg/kWh	318	308	-
NO <sub>x</sub> -emission	mg/MJ	88	86	-
CnHm-concentration measured acc. CEN/TS 15883	ppm	1	3	-
CnHm-emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	1	6	-
CnHm-emission	mg/kWh	3	14	-
CnHm-emission	mg/MJ	1	4	-
Dust emission (at 13%-O <sub>2</sub> )	mg/m <sup>3</sup>	8	15	-
Dust emission	mg/kWh	20	35	-
Dust emission	mg/MJ	6	10	-
Total heat input	kW	9,3	3,1	-
Total heat output	kW	8,2	2,9	-
Water heat output	kW	0,0	0,0	-
Space heat output	kW	8,2	2,9	-
Efficiency	%	87,7	92,3	75/70 (EN14785)

For detailed test results see appendix A02, A04, A06, A07

## **4 Statement of the test results**

The appliances: **AP004N\_2\_06, AP004N\_2\_07, AP004N\_2\_08**

of the company **Palazzetti Lelio S.p.A.**

with Trademark **Palazzetti**

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	Subject	Reference
A 01	Fuel data	
A 02	Test results	
A 03	Measuring devices	
A 04	Type labels	
A 05	DoC	15/05/2018
A 06	DoP	16/05/2018
A 07	Instruction and installation manual	00 477 5461 – 11/2017
A 08	Declaration of differences between old and new models	15/05/2018



## Appendix 1

### Fuel data for all tested appliances

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:		26/02/2018		Analysis No.				Fuel sampling date:			
Fuel:		wood pellets		1801775-001				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							
<b>Berechnungen zum Versuchszeitpunkt</b>											
wasser zum Versuchszeitpunkt				w = 5,500 Gew. %							
Heizwert, roh zum Versuchszeitpunkt				Hu = 17834 kJ/kg							

## Appendix 2

### Test results

Report- No.		K17932018E3
TÜV- order- No.		21243235
Manufacturer		Palazzetti Lelio S.p.A.
Construction type		Residential room heating appliances fired by wood pellets without water heat exchanger, with fan assisted flue discharge and with internal fuel hopper
max. working temperature	°C	Not applicable
max. working pressure	bar	Not applicable
Type of fuel charging		automatic load
Special properties / Remarks		-
Special properties		room air dependent
Type designation		
Model name		AP004N_2_06, AP004N_2_07, AP004N_2_08
Test place		Thiene
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	2,9
		1. test
Test date		13/03/2018
Time		09:50 - 15:50
Ambient:		
Barometric pressure	mbar	997
Temperature of combustion air	°C	21,7
Ambient rel. humidity	%	72,0
Ambient temperature (room)	°C	21,7
Type of Fuel		wood pellets
Properties of Fuel		Ø 6 mm, Lmax 30 mm, max humidity 5,5% Firestixx
Number of fuel loadings		1
Weight of the stove, start, measurement	kg	147,6
Weight of the stove, end, measurement	kg	143,8
Fuel consumption, calculated of the difference	kg	3,8
Test duration	sec	21600
Fuel consumption "B"	kg/h	0,628
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	85,8
Flue draught, measurement	Pa	10,0
O2 - concentration, calculated	Vol.-%	14,7
CO2 - concentration, measurement	Vol.-%	6,0
lambda value, I	-	3,328

CO - concentration, measurement	ppm	94
CO - concentration, measurement	Vol.-%	0,009
CO - concentration, measurement	mg/m³	118
CO - concentr. (at 13% - O2)	Vol.-%	0,012
CO - concentr. (at 13% - O2)	mg/m³	151
CO - concentration rel. to fuel input	mg/kWh	348
CO - concentration rel. to fuel input	mg/MJ	97
NOx - concentration, measurement	ppm	51
NOx - concentration, measurement	mg/m³	104
NOx - concentr. (at 13% - O2)	mg/m³	133
NOx - concentration rel. to fuel input	mg/kWh	308
NOx - concentration rel. to fuel input	mg/MJ	86
CnHm concentration, measurement	ppm	3
CnHm concentration, measurement	mg/m³	5
CnHm concentr. (at 13% - O2)	mg/m³	6
CnHm - concentration (total C) rel. to fuel input	mg/kWh	14
CnHm - concentration (total C) rel. to fuel input	mg/MJ	4
Dust, measurement*	mg	4
Dust, measurement*	mg/m³	11
Dust (at 13% - O2)*	mg/m³	15,0
Dust* rel. to fuel input	mg/kWh	35
Dust* rel. to fuel input	mg/MJ	10
PME concentration (at 13% - O2)*	mg/m³	18
<b>Electrical consumption</b>		
Rated electrical power (max)	W	350
Electrical consumption (at nominal heat output)	W	50
Electrical consumption (at minimum heat output)	W	40
PSTBY (during stand-by)	W	2
<b>Calculation</b>		
"Qa" loss free heating flue gas	kJ/kg	1318,7
"qa" loss flue gas	%	7,4
"Qb" loss fix heating in flue gas	kJ/kg	17,5
"qb" loss fix heating in flue gas	%	0,098
"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	3,47
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,32
cpm-H2O	kJ/(m³K)	1,50
"eta" Efficiency (direct), to consider only water heating output Pw	%	not applicable
"eta" Efficiency (indirect)	%	92,3
Heating input	kW	3,1
"P" heating output, total	kW	2,9
"Pw" water heating output	kW	0,0
Space heating output: PSTR = P - Pw	kW	2,9
Space heating output, relating to heat input	%	92,3
Water heating output, relating to heat input	%	0,0
<b>Adjustments</b>		
Flue gas motor	rpm	830
Ambient motor	Volt	230
Fuel motor	sec	1,1 ON 4,9 OFF
Cleaning time	sec	off
Fire door	open / closed	closed

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

## Appendix 3

**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
B078	Gas volume	Diaphragm	CMC	0,025 – 4 m <sup>3</sup> /h	± 5 %	Air flow
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 <sub>2</sub>	Infrared-absorption	Siemens Ultramat 6E	0 – 3 % 0 – 30 %	± 1% related to the range	Reference gas: 15,53 %
	CO	Infrared-absorption	Siemens Ultramat 6E	0 – 300 ppm 0 – 3000 ppm	± 1% related to the range	Reference gas: 495,3 ppm
B095	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1 % 0 – 5 %	± 1% related to the range	Reference gas: 4,925 %
B096 + B123	CO <sub>2</sub>	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 15,53 %
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 495,3 ppm
	NO <sub>x</sub>	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 <sup>3</sup> /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

Index	Measure	Principle	Company	Range	Instrument specification	Reference
B122	CO <sub>2</sub>	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 15,53 %
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 495,3 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.