

Report No. K5672011T1
Residential space heating appliances
Initial type testing
DIN EN 14785

Type: **HP008S_0_10**
HP008S_0_13

Company: **Palazzetti Lelio S.p.A**

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Publication of page 2 is permitted.

The test results presented in this report refer solely to the test object stated.

Initial type testing
Residential space heating appliances fired by wood pellets
- Pellet stove -
DIN EN 14785: September 2006

Applicant/contractor:	Palazzetti Lelio S.p.A Via Roveredo, 103 I-33080 Porcia (PN)
Type designation:	HP008S_0_10 HP008S_0_13
Type of appliance:	Residential space heating appliance fired by wood pellets with water heat exchanger with fan assisted flue discharge with internal fuel hopper
Total heat output:	HP008S_0_10 3,45 kW – 9,26 kW HP008S_0_13 3,45 kW – 13,51 kW
Water heat output:	HP008S_0_10 2,41 kW – 7,66 kW HP008S_0_13 2,41 kW – 10,99 kW
Space heat output:	HP008S_0_10 1,04 kW – 1,60 kW HP008S_0_13 1,04 kW – 2,51 kW
Max. water pressure:	2,0 bar
Max. water temperature	80 °C
Fuels:	Wood pellets

Remarks: Room sealed appliance. The constructions of both appliances are identical.

Test results:

The technical requirements cl. 4-9 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.

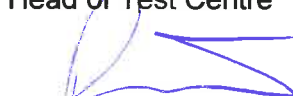
The presumption of conformity with the relevant European Directives could only be confirmed by full compliance with Annex ZA.

Dated in Cologne, 02.11.2011
432/pom

TÜV Rheinland Industrie Service GmbH
Test Centre according to Construction Product
Directive (CPD)
Notified Body: 0035

Expert

Head of Test Centre



Dipl.-Ing. A. Pomp

Dipl.-Ing. W. Rückwart

Residential space heating appliances fired by wood pellets, Initial Type Test in accordance with the directive 89/106/EEC, conformity certification system 3 Test Centre according to § 11 paragr.1 sentence 1 no. 2 Building Products Act for procedures according to § 8 paragr.2 sentence 1 no. 2 Building Products Act

1. Task

The Test Laboratory for Energy Appliances was instructed to execute the initial type testing on the appliances HP008S_0_10 and HP008S_0_13 for the operation with wood pellets according EN 14785:2006, cl. 4-9.

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

The practical tests were carried in the laboratory in Thiene on 2,3,4 and 7 March 2011.

The (FPC) Factory Production Control was performed in Porcia on 31 August 2009.

2. Description of the appliance

Construction

Residential space heating appliance fired by wood pellets with water heat exchanger for domestic central heating system. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition.

Combustion air

The combustion air is to be taken from outside. The appliance is room sealed.

2.1 General technical data of the pellet stove

Type:	HP008S_0_10
Nominal power	9,26 kW
Fuel	Pellets Ø 6 mm, L _{max} 30 mm, max. humidity 7%, Firestixx
Total dimension High x Width x Depths (mm)	1230 x 520,5 x 497
Diameter, exhaust gas stub	80 mm
Weight	180 kg
Distance of adjacent combustible materials	200 mm (backside) / 200 mm (side) / 800 mm (front)

Type:	HP008S_0_13
Nominal power	13,5 kW
Fuel	Pellets Ø 6 mm, L _{max} 30 mm, max. humidity 7%, Firestixx
Total dimension High x Width x Depths (mm)	1230 x 520,5 x 497
Diameter, exhaust gas stub	80 mm
Weight	180 kg
Distance of adjacent combustible materials	200 mm (backside) / 200 mm (side) / 800 mm (front)

For more information see appendix B1

3. Testing

The tests were carried out in March 2011 in the laboratory of TÜV Rheinland/CMC in Thiene.

3.1 General requirements

Requirement acc. EN 14785	Clause	Tested Acc.	Requirement Complies
Production documentation	4.1		Yes
General construction requirements	4.2		Yes
Flue spigot or socket	4.3		Yes
Combustion control device	4.4		Yes
Flue ways	4.5		Yes
Cleaning tools	4.6		Yes
Fire doors	4.7		Yes
Combustion air supply	4.8		Yes
-Primary air inlet control	4.8.1		
-Secondary air inlet control	4.8.2		
Internal flue gas diverter	4.9		Not applicable
Retort	4.10		Yes
Ash pan and ash removal	4.11		Yes
Integral boiler	4.12	A 4.9.5	Yes Yes Yes Not applicable Not applicable Yes Yes Yes Yes Yes Yes Not applicable
-General construction, material	4.12.1		
-Nominal minimum wall thickness (steel)	4.12.2		
-Welding seams and welding fillers	4.12.3		
-Minimum wall thicknesses (cast iron)	4.12.4		
-Cast iron parts subject to water pressure	4.12.5		
-Venting of water sections	4.12.6		
-Water tightness	4.12.7		
-Water side connections	4.12.8		
-Boiler internal waterways	4.12.9		
- Design of all water boilers	4.12.9.1		
- Boiler waterways used with indirect water systems	4.12.9.2		
- Boiler waterways used with direct water systems	4.12.9.3		
Control of flue gas	4.13		Not applicable
Cleaning of heating surfaces	4.14		Yes

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	Yes
Operating tools	5.2		Yes
Safety test for spillage of combustion gas and discharge of embers	5.3	A.4.7- A.4.9	Yes
Temperature in the fuel hopper	5.4	A.4.7- A.4.9	Yes
Safety against back burning through the fuel conveyor system	5.5	A.4.9.2	Yes
Safety against overheating the boiler system	5.6	-	Yes
Thermal discharge control	5.7	A.4.9.6	Not applicable
Strength and leak tightness of boiler shells	5.8	A.4.9.5 A.4.7	Yes
Electrical safety	5.9	EN 50165	Not tested

3.3 Performance

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

3.4 Appliance instructions and marking

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

3.5 Evaluation of conformity

Requirement acc. EN 14785	Clause	Requirement Complies
General	9.1	Yes
Type testing	9.2	Yes
-Initial type testing	9.2.1	
-Further type testing	9.2.2	
Factory production control (FPC)	9.3	Yes
- 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

Type designation		HP008S 0_10		
		Full load	Partial load	
Test fuel		Pellets		
Mass of the test fuel fired hourly	kg/h	2,02	0,75	-
Flue gas mass flow	g/s	5,9	3,8	-
Flue gas temperature	°C	86,5	54,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -Content	Vol.-%	11,7	6,56	-
O ₂ -Content	Vol.-%	8,83	14,18	-
CO-emission	ppm	23,3	110,4	-
CO-emission (at 13%-O ₂)	mg/m ³	19,2	162,0	500/750
NOx-content	ppm	65,8	41,9	-
NOx-content (at 13%-O ₂)	mg/m ³	88,6	100,8	-
Dust content (at 13%-O ₂)	mg/m ³	3,0	5,2	-
Total heat output	kW	9,26	3,45	-
Water heat output	kW	7,66	2,41	-
Space heat output	kW	1,6	1,04	-
Efficiency	%	95,31	95,61	75/70
Type designation		HP008S 0_13		
Mass of the test fuel fired hourly	kg/h	2,97	0,75	-
Flue gas mass flow	g/s	7,8	3,8	-
Flue gas temperature	°C	106,4	54,6	-
Flue draught	mbar	0,12	0,10	0,12/0,10 +/-0,02
CO ₂ -Content	Vol.-%	13,03	6,56	-
O ₂ -Content	Vol.-%	7,45	14,18	-
CO-emission	ppm	24,4	110,4	-
CO-emission (at 13%-O ₂)	mg/m ³	18,0	162,0	500/750
NOx-content	ppm	84,1	41,9	-
NOx-content (at 13%-O ₂)	mg/m ³	102,1	100,8	-
Dust content (at 13%-O ₂)	mg/m ³	4,1	5,2	-
Total heat output	kW	13,51	3,45	-
Water heat output	kW	10,99	2,41	-
Space heat output	kW	2,51	1,04	-
Efficiency	%	94,68	95,61	75/70
Maximum temperatures at trihedron:				
- Right side	°C	33,2		65K over t _{ambient}
- Back side	°C	35,6		65K over t _{ambient}
- Front side 80 cm	°C	30,6		65K over t _{ambient}
- Front side bottom	°C	22,4		65K over t _{ambient}
Distances:				
- Backside-Pelletstove	mm	200		
- Side-Pelletstove	mm	200		
Ambient temperature	°C	19,7		65K over t _{ambient}
Temp. in fuel hopper	°C	48,2		35K over t _{ambient}
Temp. operating tools 1	°C	35,2		35K over t _{ambient}
Soundness of the combustion circuit	m ³ /h	1,7		<2 m ³ /h
EN 613 (0,5 mbar)				

Detailed test results see appendix A 2.

4 Statement of the test results

The appliances **HP008S_0_10**
HP008S_0_13

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

comply for the operation with wood pellets with the requirements acc.

EN 14785: September 2006, cl.4-9.

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

The test results presented in this report refer solely to the test object stated.

5 Test documents

Appendix	Subject	
A 1	Fuel data	
A 2	Test results	
A 3	Measuring devices	
B 1	Type labels	
B1.1	Labels for DIBt	
B 2	Declarations of Conformity (2 pages)	07/09/2011
B 3	Essential requirements EN 14785 (6 pages)	01/09/2011
B 4	Manual	cod. 00477 1060
B 5	Electrical component list with certificates (25 pages)	01/09/2011
B 6	Datasheet glasses SCHOTT	
B 7	Datasheet seals	
B 8	Electric wiring diagram	
B 9	Parameter list (6 pages)	
B 10	Welder certification	
B 11	Material certifications	
C 1	Overview drawing	805711050
C 2	Drawing dimensions	805711050
C 3	Drawing welding symbols (2 pages)	805711050
C 4	Drawing thickness	805711050
C 5	Drawing retort	805711050
C 6	Drawing pellet storage	805711050
C 7	Drawing of pellets transport	805711050
C 8	Drawing of flue ways and water ways	805711050

Appendix A 1

Fuel data

 Brennstoffanalyse vom
 Brennstoff:

 11.11.2009
 wood pellets

Bestandteil im Brennstoff	Stoffanteil	Sauerstoffbedarf		Abgasbestandteile aus Brennstoff in Nm³/kg Brennstoff							
		in Nm³ je kg Bestandteil	in Nm³ je kg Brennstoff								
			Stoffanteil x	CO₂		SO₂		H₂O		N₂	
	Gew. %		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	47,000	1,860	0,874	1,850	0,8695	-	-	-	-	-	-
s	0,180	0,700	0,001	-	-	0,680	0,0012	-	-	-	-
h	5,680	5,550	0,315	-	-	-	-	11,100	0,6305	-	-
n	0,080	-	-	-	-	-	-	-	-	0,80	0,0006
o	39,630	-0,700	-0,277	-	-	-	-	-	-	-	-
wasser	7,200	-	-	-	-	-	-	1,240	0,0893	-	-
asche	0,250	-	-	-	-	-	-	-	-	-	-
summe	100,020	O min =	0,913	V CO₂ =	0,8695	V SO₂ =	0,0012	V W =	0,7198	V N₂ =	0,0006

Luftbedarf	L min =	4,3490 Nm³/kg Brennstoff
trockene stöchiometrische Abgasmenge	V A tr min =	4,3064 Nm³/kg Brennstoff
Max. Kohlenstoffdioxid-Anteil	CO₂ max =	20,1907 Vol.-%
Wasserdampfmenge	V w =	0,7198 Nm³/kg Brennstoff
	V A tr min/ L min =	0,9902
Heizwert, wf	Hu =	18826 kJ/kg
		5,229 kWh/kg

Berechnungen zum Versuchszeitpunkt

wasser	zum Versuchszeitpunkt	w =	7,200 Gew. %
Heizwert, roh	zum Versuchszeitpunkt	Hu	17295 kJ/kg



Appendix A 2

Test results

Report- No. TÜV- order- No. Manufacture Type Model		K5672011T1 21216396 Palazzetti HP008S_0_10 Room heater for wood pellets with internal fuel hopper and flue gas fan with water parts combustion air is taken from the room Sealed stove		
Specifics		Precisely Right.		
Nominal heat output		9,26 kW		
Test place Test date Type of test		Thiene 04.03.2011 Test at nominal load acc. EN 14785		
		1. test	2. test	Average
Test date		04.03.2011	04.03.2011	
Time		10.10-13.10	13.10-16.10	
Ambient:				
Barometric pressure	mbar	1013	1013	1013
Temperature of combustion air	°C	16,1	18,0	17,0
Ambient rel. humidity	%	39	39	39
Ambient temperature (room)	°C	16,1	18,0	17,0
Fuel:				
Type of fuel		wood pellets	wood pellets	-
Number of fuel loadings		1	1	1
Total weight of appliance at start	kg	230,57	224,53	227,55
Weight of additional loads	kg	224,53	218,44	221,49
Total weight of appliance at end	kg	0,00	0,00	0,00
Fuel consumption, calculated of the difference	kg	6,04	6,09	6,07
Test duration	sec	10800	10800	10800
Fuel consumption "B"	kg/h	2,013	2,030	2,022
Combustible constituents in material passing through the grate "b", analyse	Gew. %	0,0	0,0	0,0
Residue passing through the grate, measurement	kg	0,000	0,000	0,000
Residue passing through the grate "R"	Gew. %	0,00	0,00	0,0
Carbon content of the residue passing through the grate "C" depending of 1 kg fuel	Gew. %	0,10	0,10	0,10
Water part (average values)				
flow temperature	°C	81,6	83,0	82,3
return temperature	°C	60,2	61,1	60,6
delta-T	K	21,4	21,9	21,6
Cold water entrance temperature	°C	10,0	10,4	10,2
Cold water flow	kg/h	91,8	91,2	91,4
Additional energy of the pump	kW	0,000	0,000	0,000
Flue, average				
Flue gas temperature	°C	84,6	88,4	86,5
Flue gas draught	Pa	12,0	12,0	12,0
O ₂ - concentration, calculated	Vol.-%	8,83	8,83	8,83
CO ₂ - concentration (measurement)	Vol.-%	11,70	11,70	11,70
lambda value, λ	-	1,718	1,718	1,718
CO - concentration (measurement)	ppm	17,0	29,7	23,3
CO - concentration (measurement)	Vol.-%	0,002	0,003	0,002
CO - concentration (measurement)	mg/m ³	21,2	37,1	29,2
CO - concentr. (at reference - O ₂)	Vol.-%	0,001	0,002	0,001
CO - concentr. (at reference - O ₂)	mg/m ³	13,9	24,4	19,2
CO - concentration rel. to fuel input	mg/kWh	32,8	57,4	45,1
CO - concentration rel. to fuel input	mg/MJ	9,1	15,9	12,5
NOx - concentration (measurement)	ppm	72,3	59,2	65,8
NOx - concentration (measurement)	mg/m ³	148,3	121,4	134,9
NOx - concentr. (at reference - O ₂)	mg/m ³	97,5	79,8	88,6
NOx - concentration rel. to fuel input	mg/kWh	229,3	187,8	208,6
NOx - concentration rel. to fuel input	mg/MJ	63,7	52,2	57,9
CnHm - concentration (measurement)	mg/m ³	1,3	1,3	1,3
CnHm concentr. (at reference - O ₂)	mg/m ³	0,8	0,9	0,8
CnHm - concentration (total C) rel. to fuel input	mg/kWh	2,0	2,0	2,0
CnHm - concentration (total C) rel. to fuel input	mg/MJ	0,5	0,6	0,6
Dust (measurement*)	mg	3,3	0,0	3,3
Dust concentration (measurement*)	mg/m ³	4,7	0,0	4,7
Dust (at reference - O ₂ *)	mg/m ³	3,0	0,0	3,0
Dust* rel. to fuel input	mg/kWh	7,2	0,0	7,2
Dust* rel. to fuel input	mg/MJ	2,0	0,0	2,0
Calculation				
"Qa" loss free heating flue gas	kJ/kg	763,9	786,0	774,9
"qa" loss flue gas	%	4,42	4,54	4,48
"Qb" loss fix heating in flue gas	kJ/kg	1,6	2,8	2,2
"qb" loss fix heating in flue gas	%	0,01	0,02	0,01
"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	%	0,20	0,20	0,20
"m" flue gas mass flow	g/s	5,9	5,9	5,9
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m ³ K)	1,35	1,35	1,35
cpm-H ₂ O	kJ/(m ³ K)	1,50	1,50	1,50
"eta" Efficiency (direct), to consider only water heating output P _w	%	78,82	78,82	78,82
"eta" Efficiency (indirect)	%	95,37	95,24	95,31
Heating input	kW	9,67	9,75	9,71
"P" heating output, total	kW	9,22	9,29	9,26
"Pw" water heating output	kW	7,62	7,69	7,66
Space heating output: P _{STH} = P - P _w	kW	1,60	1,60	1,60
Space heating output, relating to heat input	%	16,55	16,42	16,49
Water heating output, relating to heat input	%	78,82	78,82	78,82
Settings				
Inlet air delta	-	441	441	-
Fuel motor	sec	5,0	5,0	-
Cleaning time	min	-	-	-
Fire door	open/closed	closed	closed	-

*) Average of 3 samples, based on separate calculation



Report- No. TÜV- order- No. Manufacture Type Model		K5672011T1 21216396 Palazzetti HP008S_0_13 Room heater for wood pellets with internal fuel hopper and flue gas fan with water parts combustion air is taken from the room Sealed stove		
Specifics		Precisely Right.		
Nominal heat output		13,5 kW		
Test place Test date Type of test		Thiene 02/03/2011-07/03/2011 Test at nominal load acc. EN 14785		
		1. test	2. test	Average
Test date		02.03.2011	07.03.2011	
Time		14.15-17.15	9.30-12.30	
Ambient:				
Barometric pressure	mbar	1010	1018	1014
Temperature of combustion air	°C	19,5	19,9	19,7
Ambient rel. humidity	%	32	35	34
Ambient temperature (room)	°C	19,5	19,9	19,7
Fuel:				
Type of fuel		wood pellets	wood pellets	-
Number of fuel loadings		1	1	1
Total weight of appliance at start	kg	234,13	230,34	232,23
Weight of additional loads	kg	225,27	221,38	223,33
Total weight of appliance at end	kg	0,00	0,00	0,00
Fuel consumption, calculated of the difference	kg	8,86	8,96	8,91
Test duration	sec	10800	10800	10800
Fuel consumption "B"	kg/h	2,953	2,987	2,970
Combustible constituents in material passing through the grate "b", analyse	Gew. %	0,0	0,0	0,0
Residue passing through the grate, measurement	kg	0,000	0,000	0,000
Residue passing through the grate "R"	Gew. %	0,00	0,00	0,0
Carbon content of the residue passing through the grate "C" depending of 1 kg fuel	Gew. %	0,10	0,10	0,10
Water part (average values)				
flow temperature	°C	80,4	81,6	81,0
return temperature	°C	64,0	57,3	60,7
delta-T	K	16,5	24,2	20,3
Cold water entrance temperature	°C	9,6	10,0	9,8
Cold water flow	kg/h	133,2	132,6	132,9
Additional energy of the pump	kW	0,000	0,000	0,000
Flue, average				
Flue gas temperature	°C	104,1	108,7	106,4
Flue gas draught	Pa	12,0	12,0	12,0
O ₂ - concentration, calculated	Vol.-%	7,69	7,20	7,45
CO ₂ - concentration (measurement)	Vol.-%	12,80	13,26	13,03
lambda value, λ	-	1,572	1,517	1,545
CO - concentration (measurement)	ppm	24,8	23,9	24,4
CO - concentration (measurement)	Vol.-%	0,002	0,002	0,002
CO - concentration (measurement)	mg/m ³	31,0	29,8	30,4
CO - concentr. (at reference - O ₂)	Vol.-%	0,001	0,001	0,00
CO - concentr. (at reference - O ₂)	mg/m ³	18,7	17,3	18,0
CO - concentration rel. to fuel input	mg/kWh	43,9	40,7	42,3
CO - concentration rel. to fuel input	mg/MJ	12,2	11,3	11,8
NOx - concentration (measurement)	ppm	94,1	74,2	84,1
NOx - concentration (measurement)	mg/m ³	192,8	152,1	172,5
NOx - concentr. (at reference - O ₂)	mg/m ³	115,9	88,2	102,1
NOx - concentration rel. to fuel input	mg/kWh	272,7	207,5	240,1
NOx - concentration rel. to fuel input	mg/MJ	75,8	57,6	66,7
CnHm - concentration (measurement)	mg/m ³	2,0	1,5	1,7
CnHm concentr. (at reference - O ₂)	mg/m ³	1,2	0,9	1,0
CnHm - concentration (total C) rel. to fuel input	mg/kWh	2,8	2,0	2,4
CnHm - concentration (total C) rel. to fuel input	mg/MJ	0,8	0,6	0,7
Dust (measurement*)	mg	4,8	0,0	4,8
Dust concentration (measurement*)	mg/m ³	6,9	0,0	6,9
Dust (at reference - O ₂)*	mg/m ³	4,1	0,0	4,1
Dust* rel. to fuel input	mg/kWh	9,6	0,0	9,6
Dust* rel. to fuel input	mg/MJ	2,7	0,0	2,7
Calculation				
"Qa" loss free heating flue gas	kJ/kg	875,2	891,4	883,3
"qa" loss flue gas	%	5,06	5,15	5,11
"Qb" loss fix heating in flue gas	kJ/kg	2,1	2,0	2,1
"qb" loss fix heating in flue gas	%	0,01	0,01	0,01
"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	%	0,20	0,20	0,20
"m" flue gas mass flow	g/s	7,9	7,7	7,8
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m ³ K)	1,35	1,36	1,35
cpm-H ₂ O	kJ/(m ³ K)	1,51	1,51	1,51
"eta" Efficiency (direct), to consider only water heating output P _w	%	77,30	76,84	77,07
"eta" Efficiency (indirect)	%	94,73	94,63	94,68
Heating input	kW	14,18	14,35	14,27
"P" heating output, total	kW	13,44	13,58	13,51
"Pw" water heating output	kW	10,96	11,03	10,99
Space heating output: P _{STR} = P - P _w	kW	2,47	2,55	2,51
Space heating output, relating to heat input	%	17,43	17,79	17,61
Water heating output, relating to heat input	%	77,30	76,84	77,07
Settings				
Inlet air delta	-	686	686	-
Fuel motor	sec	7,1	7,1	-
Cleaning time	min	-	-	-
Fire door	open/closed	closed	closed	-

*) Average of 3 samples, based on separate calculation



Report- No. TÜV- order- No. Manufacture Type Model	K5672011T1 21216396 Palazzetti HP008S_0_13/HP008S_0_10 Room heater for wood pellets with internal fuel hopper and flue gas fan with water parts combustion air is taken from the room Sealed stove		
Specifics			
Nominal heat output	3,45 kW		
Test place	Thiene		
Test date	03.03.2011		
Type of test	Test at reduced load acc. EN 14785		
		1. test	Average
Test date		03.03.2011	
Time		10.20-16.20	
Ambient:			
Barometric pressure	mbar	1012	1012
Temperature of combustion air	°C	16,9	16,9
Ambient rel. humidity	%	35	35
Ambient temperature (room)	°C	16,9	16,9
Fuel:			
Type of fuel		wood pellets	-
Number of fuel loadings		1	1
Total weight of appliance at start	kg	224,25	224,25
Weight of additional loads	kg	219,74	219,74
Total weight of appliance at end	kg	0,00	0,00
Fuel consumption, calculated of the difference	kg	4,51	4,51
Test duration	sec	21600	21600
Fuel consumption "B"	kg/h	0,751	0,751
Combustible constituents in material passing through the grate "b", analyse	Gew. %	0,0	0,0
Residue passing through the grate, measurement	kg	0,000	0,000
Residue passing through the grate "R"	Gew. %	0,00	0,0
Carbon content of the residue passing through the grate "Cr" depending of 1 kg fuel	Gew. %	0,10	0,10
Water part (average values)			
flow temperature	°C	80,0	80,0
return temperature	°C	71,7	71,7
delta-T	K	8,3	8,3
Cold water entrance temperature	°C	11,8	11,8
Cold water flow	kg/h	30,4	30,4
Additional energy of the pump	kW	0,000	0,000
Flue, average			
Flue gas temperature	°C	54,6	54,6
Flue gas draught	Pa	10,0	10,0
O ₂ - concentration, calculated	Vol.-%	14,18	14,18
CO ₂ - concentration (measurement)	Vol.-%	6,56	6,56
lambda value, λ	-	3,059	3,059
CO - concentration (measurement)	ppm	110,4	110,4
CO - concentration (measurement)	Vol.-%	0,011	0,011
CO - concentration (measurement)	mg/m ³	138,0	138,0
CO - concentr. (at reference - O ₂)	Vol.-%	0,013	0,01
CO - concentr. (at reference - O ₂)	mg/m ³	162,0	162,0
CO - concentration rel. to fuel input	mg/kWh	381,1	381,1
CO - concentration rel. to fuel input	mg/MJ	105,9	105,9
NOx - concentration (measurement)	ppm	41,9	41,9
NOx - concentration (measurement)	mg/m ³	85,9	85,9
NOx - concentr. (at reference - O ₂)	mg/m ³	100,8	100,8
NOx - concentration rel. to fuel input	mg/kWh	237,1	237,1
NOx - concentration rel. to fuel input	mg/MJ	65,9	65,9
CnHm - concentration (measurement)	mg/m ³	3,3	3,3
CnHm concentr. (at reference - O ₂)	mg/m ³	3,9	3,9
CnHm - concentration (total C) rel. to fuel input	mg/kWh	9,1	9,1
CnHm - concentration (total C) rel. to fuel input	mg/MJ	2,5	2,5
Dust (measurement*)	mg	3,1	3,1
Dust concentration (measurement*)	mg/m ³	4,4	4,4
Dust (at reference - O ₂ *)	mg/m ³	5,2	5,2
Dust* rel. to fuel input	mg/kWh	12,2	12,2
Dust* rel. to fuel input	mg/MJ	3,4	3,4
Calculation			
"Qa" loss free heating flue gas	kJ/kg	706,3	706,3
"qa" loss flue gas	%	4,08	4,08
"Qb" loss fix heating in flue gas	kJ/kg	18,6	18,6
"qb" loss fix heating in flue gas	%	0,11	0,11
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,20	0,20
"m" flue gas mass flow	g/s	3,8	3,8
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m ³ ·K)	1,32	1,32
cpm-H ₂ O	kJ/(m ³ ·K)	1,50	1,50
"eta" Efficiency (direct), to consider only water heating output P _w	%	66,89	66,89
"eta" Efficiency (indirect)	%	95,61	95,61
Heating input	kW	3,61	3,61
"P" heating output, total	kW	3,45	3,45
"Pw" water heating output	kW	2,41	2,41
Space heating output: P _{SHR} = P - P _w	kW	1,04	1,04
Space heating output, relating to heat input	%	28,72	28,72
Water heating output, relating to heat input	%	66,89	66,89
Settings			
Inlet air delta	-	185	-
Fuel motor	sec	1,8	-
Cleaning time	min	-	-
Fire door	open/closed	-	-

*) Average of 3 samples, based on separate calculation

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

Appendix A 3

**The requirements of the measuring instruments are fulfilled.
 Before each qualified measuring analysers were calibrated with zero gas and calibration gas.**

Gas	Principle	Company	Range	Uncertainty	Calibration-gas
CO ₂	Infrared-absorption	Siemens Analyser Ultramat 6E	0 - 3 % 0 - 30 %	± 1% related to final value	8,07 %
CO	Infrared-absorption	Siemens Analyser Ultramat 6E	0 - 300 ppm 0 - 3000 ppm	± 1% related to final value	510 ppm
NO _x	Chemolumineszenz	ECO Physics CLD 700 ED	0 - 100 ppm 0 - 1000 ppm	± 1% related to final value	81,4 ppm
OGC	FID	H&B Fidas 3E	0 - 50 mgC 0 - 100 mgC 0 - 500 mgC 0 - 1000 mgC	± 1% related to final value	29,8 ppm propane
Dust content	Gravimetric	Sartorius CPA224S	0,1 mg - 220 g	± 0,1 mg	-
Temperature	PT 100	Delta Ohm HD9215-TP93I	-50 to 199°C	0,5°C	-

The values were continuously recorded with data logger, Agilent 34970 A. The interval is 10s.
 All related certificates are stored.