

Report No. K 2062 2017 T1
Residential space heating appliances
Initial type testing
DIN EN 14785 and DIN EN12815 (in part)
as far as applicable

Model: **Alfa Term 20 Pellet**

Company: **ALFAPLAM A.D.**



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. 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.

Initial type testing

**Residential space heating appliances fired by wood pellets
- Pellet stove -**

DIN EN 14785: September 2006 (as far as applicable)

DIN EN 14785 Correction 1: October 2007

Residential cookers fired by solid fuels (in part)

DIN EN 12815: 09/2005 (as far as applicable)

Correction 1 DIN EN12815: 06/2008

Applicant/contractor:	ALFAPLAM A.D. Radnicka, 1 17500 – Vranje (Serbia)
Model designation:	Alfa Term 20 Pellet
Type of appliance:	Residential room heating appliance fired by wood pellets with water heat exchanger, with fan assisted flue discharge and with internal fuel hopper.
Nominal heat output:	5,8 kW – 20,0 kW
Water heat output:	4,3 kW – 15,2 kW
Space heat output:	1,5 kW – 4,8 kW
Max. water pressure:	2,0 bar
Max. water temperature	80 °C
Fuels:	Wood pellets Ø 6 mm, Maximum lenght: 30 mm, max humidity 6,3%, Pfeifer

Remarks: -

Test results: The technical requirements cl. 4-8 of the standard DIN EN14785 are fulfilled.
The technical requirements cl. 4.10/4.17/4.18/4.22 of the standard DIN EN12815 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 present test report is not to be seen as a confirmation acc. to CPR.

Cologne, 24.07.2017
432/vp

Assessor:


M. Sc. L. von Pidoll

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

Report released after review:


Dipl.-Ing. A. Pomp

1. Task

The Test Centre for Energy Appliances was instructed to execute the initial type testing on the appliance **Alfa Term 20 Pellet**.

Due to the fact that the normative EN 12815 does not cover pellet fuels and isn't applicable to products with fan assisted flue discharge, the appliance is out of the scope of the normative.

For the above mentioned reasons, the appliance was tested for the operation with wood pellets according EN14785:2006, cl. 4-8 and according EN12815, in part.

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 the 30th and 31th of May and on the 1st June 2017.

The (FPC) Factory Production Control was not performed.

2. Description of the appliance

Construction

Residential room 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 and with oven for cooking function.

Combustion air

The combustion air is to be taken from the installation room.

General technical data of the pellet stove

Model name:	Alfa Term 20 Pellet
Nominal power:	20,0 kW
Test fuel:	wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,3%, Pfeifer
Total dimension [mm]: High x Width x Depths	850 x 1100 x 600
Flue spigot:	80 mm
Weight:	210 kg
Distance of adjacent combustible materials	200 mm (Backside) distance from test wall 200 mm (Side) distance from test wall 800 mm (Front) distance from test wall

For more information see appendix A04-A06-A07-A25-A26.

3. Testing

The tests were carried out in May and June 2017 in the laboratory of TÜV Rheinland/CMC Centro Misura Compatibilità in Thiene.

3.1 General requirements

- P (pass)
- N (not applicable)
- 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	-	N
Fire doors	4.7	-	P
Combustion air supply	4.8	-	
- Primary air inlet control	4.8.1	-	P
- Secondary air inlet control	4.8.2	-	N
Internal flue gas diverter	4.9	-	P
Retort	4.10	-	P
Ash pan and ash removal	4.11	-	P
Integral boiler	4.12		
- General construction material	4.12.1		P
- Nominal minimum wall thickness (steel)	4.12.2		P
- Welding seams and welding fillers	4.12.3		P
- Minimum wall thicknesses (cast iron)	4.12.4		N
- Cast iron parts subject to water pressure	4.12.5		N
- Venting of water sections	4.12.6	A 4.9.2	P
- Water tightness	4.12.7		P
- Water side connections	4.12.8		P
- Boiler internal waterways	4.12.9		P
- Design of all water boilers	4.12.9.1		P
- Boiler waterways used with indirect water systems	4.12.9.2		P
- Boiler waterways used with direct water systems	4.12.9.3		N
Control of flue gas	4.13	-	N
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, tools available*
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	-	P
Thermal discharge control	5.7	A.4.9.3	N
Strength and leak tightness of boiler shells	5.8	A.4.7 A.4.9.2	P
Electrical safety	5.9	EN 50165	Not tested

*) glove and detachable handle.

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	P
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 Additional requirements according EN 12815

Requirement acc. EN 12815	Clause	Tested Acc.	Requirement Complies
Oven door	4.10	A.4.14	P
Hotplate and top plate	4.17	-	P
Main/additional ovens	4.18	A.4.13	P
Oven temperature indicators	4.22	-	P
Oven heating	6.7	A.4.11	P
Boiling test	6.9	A.4.10	P

3.7 Resume of test results (acc. EN 14785)

Alfa Term 20 Pellet		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	4,76	1,32	-
Flue gas mass flow	g/s	17,6	8,7	-
Flue gas temperature	°C	181,7	80,6	-
Flue draught	mbar	0,14	0,10	0,12/0,10 +/-0,02
CO ₂ -concentration	Vol.-%	9,0	4,9	-
O ₂ -concentration	Vol.-%	11,3	15,8	-
CO-concentration	ppm	240	130	-
CO-emission (at 13%-O ₂)	mg/m ³	248	249	500/750
CO-emission	mg/kWh	595	596	-
CO-emission	mg/MJ	165	166	500 (Art. 15a)
NO _x -concentration	ppm	78	27	-
NO _x -emission (at 13%-O ₂)	mg/m ³	133	83	-
NO _x -emission	mg/kWh	318	200	-
NO _x -emission	mg/MJ	88	56	100 (Art. 15a)
CnHm-concentration measured acc. CEN/TS 15883	ppm	1	1	-
CnHm-emission (at 13%-O ₂)	mg/m ³	2	2	-
CnHm-emission	mg/kWh	5	6	-
CnHm-emission	mg/MJ	1	2	30 (Art. 15a)
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	10	8	-
Dust emission (at 13%-O ₂)	mg/m ³	29	42	-
Dust emission	mg/kWh	70	99	-
Dust emission	mg/MJ	19	28	25 (Art.15a)
Total heat output	kW	20,0	5,8	-
Water heat output	kW	15,2	4,3	-
Space heat output	kW	4,8	1,5	-
Efficiency	%	87,1	91,9	75/70 (EN14785) - 80 (Art. 15a)

3.8 Temperatures

Alfa Term 20 Pellet			
Maximum temperatures at trihedron:			
- Right side	°C	88,9	65 K over t_{ambient}
- Back side	°C	71,3	65 K over t_{ambient}
- Front side 800 cm	°C	42,3	65 K over t_{ambient}
- Floor	°C	35,2	65 K over t_{ambient}
Distances:			
- Backside-Pelletstove	mm	200	
- Side-Pelletstove	mm	200	
- Front-Pelletstove	mm	800	
Ambient temperature	°C	28,6	
Max. temperature in fuel hopper	°C	58,4	65 K over t_{ambient}
Max. temperature of handle of fuel hopper	°C	41,7	35 K over t_{ambient}

For detailed test results see appendix 02

3.9 Resume of test results (acc. EN 12815)

Alfa Term 20 Pellet		Results	Requirement
Drop down doors opening	mm	15	≤ 15
Hotplate height	mm	860	$> 800 < 930$
Oven shelves inclination	°	10	≤ 10
Oven heating	-	Optimum / Darkest	-
Boiling test	min	14' 30"	≤ 15
Temperature inside oven	°C	237°C	230 +/- 30

4 Statement of the test results

The appliance

Alfa Term 20 Pellet

of the company

ALFAPLAM A.D.

complies for the operation with wood pellets with the requirements acc.
EN 14785: September 2006, cl.4-8 and with EN 12815, in part.

The technical requirements cl. 4.10/4.17/4.18/4.22 of the standard DIN EN12815 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 present test report is not to be seen as a confirmation acc. To CPR.

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 authorization for use a TÜV Rheinland test-/ certification mark.

5 Test documents

Appendix 01 Fuel Data

Appendix 02 Test results

Appendix 03 Measurement Instruments

Appendix	Subject	Reference
A 04	Type labels	
A 05	EU Declaration of Conformity	14/06/2017
A 06	Essential requirements declaration	14/06/2017
A 07	Declaration of Performances	n. AT20P 06/17
A 08	List of electrical components	
A 09	Water temperature limiter technical drawing, declaration of conformity and certificate	710 V - 88°C DoC 11/05/2016 Certif. 129102
A 10	Fuel temperature limiter technical drawing, declaration of conformity and certificate	710 V - 80 °C DoC 11/05/2016 Certif. 129102
A 11	Pressure switch datasheet, declaration of conformity and certificate	605 DoC 14/12/2010 Certif. 12-0638-GEA
A 12	Flue gas motor drawing and declaration of conformity	ST53M 176.27.R.46 DoC 29/12/2009
A 13	Air inlet fan datasheet	CF 70
A 14	Auger motor technical drawing and declaration of conformity	FB1249 3,0 rpm
A 15	Ignition resistance technical drawing and declaration of conformity	02/02/2004 HT46073
A 16	Control board declaration of conformity	DoC 23/11/2012
A 17	Air flow sensor datasheet and declaration of conformity	DoC 01/01/2017
A 18	Pump circulator datasheet	DoC 01/01/2017
A 19	Firedoor glass - quality certificate	RS 25/6-3
A 20	Seals datasheet	07/07/2011
A 21	Electrical wiring diagram with declaration for PCB internal connections	01/01/2008
A 22	Software settings	
A 23	Material certificates	0027320766/000005 0027315524/000006 0027164121/000003 0027164121/000004 6584/1/2017 53780/1/2016
A 24	Welder certificate	96/2017

A 25	User and installation manual	
A 26	Overview drawing with dimensions	KŠP.110E-00.00.00
A 27	Drawings of heat exchanger with thicknesses, welding symbols, waterways and flueways	KŠP.110E-01.00.00 KŠP.110E-01.03.01 KŠP.110E-01.03.00 KŠP.110E-01.02.00
A 28	Drawing of burner	KŠP.110E-00.00.35
A 29	Drawings of fuel hopper and loading system	KŠP.110E-03.00.00 KŠP.90-06.00 KŠP.90-06.03 KŠP.90-22.01 KŠP.90-22.02 KŠP.90-47.02 KŠP.90-47.01/A KPC-00.00.37/A
A 30	Drawing of flueways	KŠP.110E-00.00.61
A 31	Drawing of flue gas bypass marking	KŠP.110E-09.00.01

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:				Analysis No.				Fuel sampling date:			
Fuel:				1616649-001				01/12/16			
13/12/2016				wood pellets							
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	46,800	1,860	0,870	1,850	0,8658	-	-	-	-	-	-
s	0,009	0,700	0,000	-	-	0,680	0,0001	-	-	-	-
h	6,320	5,550	0,351	-	-	-	-	11,100	0,7015	-	-
n	0,080	-	-	-	-	-	-	-	-	0,80	0,0006
o	40,300	-0,700	-0,282	-	-	-	-	-	-	-	-
wasser	6,300	-	-	-	-	-	-	1,240	0,0781	-	-
asche	0,191	-	-	-	-	-	-	-	-	-	-
summe	100,000	O min=	0,939	V CO₂ =	0,8658	V SO₂ =	0,0001	V W =	0,7796	V N₂ =	0,0006
Luftbedarf				L min = 4,4724 Nm³/kg Brennstoff							
trockene stöchiometrische Abgasmenge				V A tr min = 4,3991 Nm³/kg Brennstoff							
Max. Kohlenstoffdioxid-Anteil				CO₂ max = 19,6815 Vol.-%							
Wasserdampfmenge				V w = 0,7796 Nm³/kg Brennstoff							
				V A tr min/ L min = 0,9836							
Heizwert, wf				Hu = 18682 kJ/kg							
				5,189 kWh/kg							
Berechnungen zum Versuchszeitpunkt											
wasser zum Versuchszeitpunkt				w = 6,300 Gew. %							
Heizwert, roh zum Versuchszeitpunkt				Hu 17351 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:				Analysis No.				Fuel sampling date:			
Fuel:				1616649-001				01/12/16			
13/12/2016				wood pellets							
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	46,800	1,860	0,870	1,850	0,8658	-	-	-	-	-	-
s	0,009	0,700	0,000	-	-	0,680	0,0001	-	-	-	-
h	6,320	5,550	0,351	-	-	-	-	11,100	0,7015	-	-
n	0,080	-	-	-	-	-	-	-	-	0,80	0,0006
o	40,300	-0,700	-0,282	-	-	-	-	-	-	-	-
wasser	6,300	-	-	-	-	-	-	1,240	0,0781	-	-
asche	0,191	-	-	-	-	-	-	-	-	-	-
summe	100,000	O min=	0,939	V CO₂ =	0,8658	V SO₂ =	0,0001	V W =	0,7796	V N₂ =	0,0006
Luftbedarf				L min = 4,4724 Nm³/kg Brennstoff							
trockene stöchiometrische Abgasmenge				V A tr min = 4,3991 Nm³/kg Brennstoff							
Max. Kohlenstoffdioxid-Anteil				CO₂ max = 19,6815 Vol.-%							
Wasserdampfmenge				V w = 0,7796 Nm³/kg Brennstoff							
				V A tr min/ L min = 0,9836							
Heizwert, wf				Hu = 18682 kJ/kg							
				5,189 kWh/kg							
Berechnungen zum Versuchszeitpunkt											
wasser zum Versuchszeitpunkt				w = 6,300 Gew. %							
Heizwert, roh zum Versuchszeitpunkt				Hu 17351 kJ/kg							

Appendix 02

Test results

Report- No.		K20622017T1		
TÜV- order- No.		21239904		
Manufacture		ALFAPLAM A.D.		
Construction type		Residential room heating appliance fired by wood pellets with water heat exchanger, with fan assisted flue discharge and with internal fuel hopper		
max. working temperature	°C	80		
max. working pressure	bar	2		
Type of fuel charging		automatic load		
Special properties / Remarks		-		
Special properties		room air dependent		
Type designation		-		
Model name		Alfa Term 20 Pellet		
Test place		Thiene		
Standard		DIN EN 14785:10.2006, Correction 1: 10.2007		
Type of test		Test at nominal load		
Heat input from manufacturer	kW	22,90		
Heat output from manufacturer	kW	20,00		
		1. test	2. test	Average
Test date		30/05/2017	30/05/2017	
Time		09:45-12:45	14:30-17:30	
Ambient:				
Barometric pressure	mbar	1016	1016	1016
Temperature of combustion air	°C	27,7	28,6	28,2
Ambient rel. humidity	%	50,0	50,0	50,0
Ambient temperature (room)	°C	27,7	28,6	28,2
Type of Fuel		wood pellets		
Properties of Fuel		Ø 6 mm, Lmax 30 mm, max humidity 6,3% Pfeifer		
Number of fuel loadings		1	1	
Weight of the stove, start, measurement	kg	328,8	322,0	
Weight of the stove, end, measurement	kg	314,5	307,7	
Fuel consumption, calculated of the difference	kg	14,3	14,3	
Test duration	sec	10800	10800	
Fuel consumption "B"	kg/h	4,750	4,760	4,755
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	76,8	79,9	78,4
Return, measurement	°C	51,5	54,4	53,0
Delta T	K	25,3	25,5	25,4
Cold water flow, measurement	kg/h	516,8	512,1	514,4
Additional energy of the pump	kW	0,00	0,00	0,00
Flue, average				
Flue gas temperature, measurement	°C	181,6	181,9	181,7
Flue draught, measurement	Pa	14,0	14,0	14,0
O2 - concentration, calculated	Vol.-%	11,4	11,3	11,3
CO2 - concentration, measurement	Vol.-%	9,0	9,1	9,0
lambda value, I	-	2,165	2,146	2,156

CO - concentration, measurement	ppm	232	248	240
CO - concentration, measurement	Vol.-%	0,023	0,025	0,024
CO - concentration, measurement	mg/m³	290	310	300
CO - concentr. (at 13% - O2)	Vol.-%	0,019	0,020	0,020
CO - concentr. (at 13% - O2)	mg/m³	241	255	248
CO - concentration rel. to fuel input	mg/kWh	577	612	595
CO - concentration rel. to fuel input	mg/MJ	160	170	165
NOx - concentration, measurement	ppm	77	79	78
NOx - concentration, measurement	mg/m³	159	161	160
NOx - concentr. (at 13% - O2)	mg/m³	132	133	133
NOx - concentration rel. to fuel input	mg/kWh	317	319	318
NOx - concentration rel. to fuel input	mg/MJ	88	89	88
CnHm concentration, measurement	ppm	1	2	1
CnHm concentration, measurement	mg/m³	2	2	2
CnHm concentr. (at 13% - O2)	mg/m³	2	2	2
CnHm - concentration (total C) rel. to fuel input	mg/kWh	4	5	5
CnHm - concentration (total C) rel. to fuel input	mg/MJ	1	1	1
Dust, measurement*	mg	10		10
Dust, measurement*	mg/m³	35		35
Dust (at 13% - O2)*	mg/m³	29		29
Dust* rel. to fuel input	mg/kWh	70		70
Dust* rel. to fuel input	mg/MJ	19		19
PME concentration (at 13% - O2)*	mg/m³	30		30
Electrical consumption				
Rated electrical power (max)	W		370	
Electrical consumption (at nominal heat output) - average	W		65 (pump not included)	
Electrical consumption (at minimum heat output) - average	W		40 (pump not included)	
PSTBY (during stand-by)	W		3,2	
Calculation				
"Qa" loss free heating flue gas	kJ/kg	2184,0	2157,3	2170,7
"qa" loss flue gas	%	12,6	12,4	12,5
"Qb" loss fix heating in flue gas	kJ/kg	28,3	29,9	29,1
"qb" loss fix heating in flue gas	%	0,163	0,172	0,168
"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	17,63	17,51	17,6
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,35	1,35	1,35
cpm-H2O	kJ/(m³K)	1,52	1,52	1,52
"eta" Efficiency (direct), to consider only water heating output Pw	%	66,3	66,1	66,2
"eta" Efficiency (indirect)	%	87,1	87,2	87,1
Heating input	kW	22,9	22,9	22,9
"P" heating output, total	kW	19,9	20,0	20,0
"Pw" water heating output	kW	15,2	15,2	15,2
Space heating output: PSTR = P - Pw	kW	4,7	4,8	4,8
Space heating output, relating to heat input	%	20,7	21,1	20,9
Water heating output, relating to heat input	%	66,3	66,1	66,2
Adjustments				
Flue gas motor	rpm	2450	2450	
Combustion air inlet fan	Volts	170	170	
Fuel motor	rpm	2000	2000	
Cleaning time	sec	15 sec / 45 min	15 sec / 45 min	
Firedoor	open / closed	closed	closed	

Report- No.		K20622017T1
TÜV- order- No.		21239904
Manufacture		ALFAPLAM A.D.
Construction type		Residential room heating appliance fired by wood pellets with water heat exchanger, with fan assisted flue discharge and with internal fuel hopper
max. working temperature	°C	80
max. working pressure	bar	2
Type of fuel charging		automatic load
Special properties / Remarks		-
Special properties		room air dependent
Type designation		-
Model name		Alfa Term 20 Pellet
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	6,30
Heat output from manufacturer	kW	5,80
		1. test
Test date		31/05/2017
Time		10:10-16:10
Ambient:		
Barometric pressure	mbar	1020
Temperature of combustion air	°C	26,3
Ambient rel. humidity	%	58,0
Ambient temperature (room)	°C	26,3
Type of Fuel		wood pellets
Properties of Fuel		Ø 6 mm, Lmax 30 mm, max humidity 6,3% Pfeifer
Number of fuel loadings		1
Weight of the stove, start, measurement	kg	321,4
Weight of the stove, end, measurement	kg	313,5
Fuel consumption, calculated of the difference	kg	7,9
Test duration	sec	21600
Fuel consumption "B"	kg/h	1,317
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	76,8
Return, measurement	°C	53,3
Delta T	K	23,5
Cold water flow , measurement	kg/h	155,7
Additional energy of the pump	kW	0,00
Flue, average		
Flue gas temperature, measurement	°C	80,6
Flue draught, measurement	Pa	10,0
O2 - concentration, calculated	Vol.-%	15,8
CO2 - concentration, measurement	Vol.-%	4,9
lambda value, l	-	3,969

CO - concentration, measurement	ppm	130
CO - concentration, measurement	Vol.-%	0,013
CO - concentration, measurement	mg/m³	163
CO - concentr. (at 13% - O2)	Vol.-%	0,020
CO - concentr. (at 13% - O2)	mg/m³	249
CO - concentration rel. to fuel input	mg/kWh	596
CO - concentration rel. to fuel input	mg/MJ	166
NOx - concentration, measurement	ppm	27
NOx - concentration, measurement	mg/m³	54
NOx - concentr. (at 13% - O2)	mg/m³	83
NOx - concentration rel. to fuel input	mg/kWh	200
NOx - concentration rel. to fuel input	mg/MJ	56
CnHm concentration, measurement	ppm	1
CnHm concentration, measurement	mg/m³	2
CnHm concentr. (at 13% - O2)	mg/m³	2
CnHm - concentration (total C) rel. to fuel input	mg/kWh	6
CnHm - concentration (total C) rel. to fuel input	mg/MJ	2
Dust, measurement*	mg	8
Dust, measurement*	mg/m³	27
Dust (at 13% - O2)*	mg/m³	42
Dust* rel. to fuel input	mg/kWh	99
Dust* rel. to fuel input	mg/MJ	28
PME concentration (at 13% - O2)*	mg/m³	42
Electrical consumption		
Rated electrical power (max)	W	370
Electrical consumption (at nominal heat output) - average	W	65 (pump not included)
Electrical consumption (at minimum heat output) - average	W	40 (pump not included)
PSTBY (during stand-by)	W	3,2
Calculation		
"Qa" loss free heating flue gas	kJ/kg	1337,6
"qa" loss flue gas	%	7,7
"Qb" loss fix heating in flue gas	kJ/kg	29,2
"qb" loss fix heating in flue gas	%	0,168
"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	8,7
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	%	67,1
"eta" Efficiency (indirect)	%	91,9
Heating input		
"P" heating output, total	kW	5,8
"Pw" water heating output	kW	4,3
Space heating output: PSTR = P - Pw	kW	1,5
Space heating output, relating to heat input	%	24,8
Water heating output, relating to heat input	%	67,1
Adjustments		
Flue gas motor	rpm	950
Combustion air inlet fan	Volts	100
Fuel motor	rpm	500
Cleaning time	sec	15 sec / 45 min
Firedoor	open / closed	closed

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	Uncertainty	Reference
B030	Water pressure	Manometer	Cewal DN 150	0 – 25 bar	± 0,6%	External calibration
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
B067	Mass	Gravimetric	Kern DE 120K10N	0 – 120 kg	± 10 g	Reference load
B068	Temperature	IR emission	Fluke Ti20	-10 – 350 °C	---	---
B070	Fuel consumption	Gravimetric	Dini Angeo DFWK	0 – 600 kg	± 10 g	Reference load
B077	NOx	Chemiluminescence	ECO Physics CLD 700 EL	0 – 10 ppm 0 – 10 ppm 0 – 100 ppm 0 – 1000 ppm 0 – 10000 ppm	± 1% related to final value	Reference gas: 198,3 ppm
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
B087	Electrical power	---	Yokogawa WT3000	0 – 600 W	± 0,5 %	External calibration
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 final value	Reference gas: 15,53 %
B094	CO	Infrared-absorption	Siemens Ultramat 6E	0 – 300 ppm 0 – 3000 ppm	± 1% related to final value	Reference gas: 495,3 ppm
B095	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1 % 0 – 5 %	± 1% related to the range	Reference gas: 4,929 %
B096	CO ₂	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 15,53 %
B096	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 495,3 ppm
B096 + B123	NOx	Infrared-absorption	Siemens Ultramat 23 + Bühler Bünox MV	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 198,3 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: 29,96 ppm propane
B098	Temperature	K-type thermocouple	Testo 925	0 – 200 °C	± 2 °C	Reference thermometer
B113	Gas pressure	Manometer	Testo 512	0 – 200 Pa	± 0,5% related to the range	External calibration
B116	Air flow	Mass flow masurement	Bronkhorst F-11AC- 50K-AAD-33-V	0 – 50 l/min	± (0,5 % Rd + 0,1 % FS)	External calibration
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: 29,96 ppm propane

Index	Measure	Principle	Company	Range	Uncertainty	Reference
B122	CO ₂	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas: 15,53 %
B122	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 495,3 ppm
B122	NO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas: 198,3 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 – 50 Pa	± 10% related to final value	Reference manometer
B141	Gas pressure	Inclined liquid column manometer	Kimo HP series	0 – 50 Pa	± 10% related to final value	Reference manometer
S005	Electrical power	---	Xitron 2503AH	0 – 1500 W	± 0,5 %	Reference wattmeter

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