

Report No. K18762016T1

Initial Type Test
In accordance with DIN EN 13240
Room heaters fired by solid fuels

Types:

Gloria 2016 - Gloria 2 2016 - Gloria Forno 2016 - Gloria 2 Forno 2016 - Norah - Norah Forno - Blues 2016 - Dafne 2016 - Dafne Forno 2016 - Giulia 2016 – Miss 2016

Manufacturer:
Edilkamin S.p.A.



**This report may only be published and forwarded to third parties in its complete, unabridged form. The publication or dissemination of extracts, summaries, appraisals or any other adaptation and alterations, in particular for advertising purposes, is only permissible with the prior written permission of TÜV Rheinland.
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 test**Room heaters fired by solid fuels in accordance with DIN EN 13240: 10/ 2005
Corrigenda 1 DIN EN 13240: 06.2008**

Manufacturer: **Edilkamin S.p.A.**
Via Vincenzo Monti, 47
I-20123 Milano (MI)

Trademarks **INNOFIRE** **ITALIANA CAMINI**

Type designations: **Gloria 2016; Gloria 2 2016;** **Blues 2016; Dafne 2016;**
Gloria Forno 2016; **Dafne Forno 2016; Giulia 2016;**
Gloria 2 Forno 2016; Norah; **Miss 2016**
Norah Forno

Type of appliance: 1a according to table 1

Test subject: Room heaters for wood logs without ambient fan and without hot water heat exchanger for connection to the heating system. Steel construction. Cast iron for the bottomgrate and the external parts, including firedoor. Manual handle for primary air control and flue gas exhaust on top.

Construction: fully closed firebox

Features: **Gloria Forno 2016, Gloria 2 Forno 2016, Norah Forno and Dafne Forno 2016** are equipped with a pot warmer without cooking function.

Nominal heat output: **7,2 kW**

Type of fuel: Wood logs

Type of loading: Manual loading

Max water pressure: Not applicable

Max water temperature: Not applicable

Date of test: 23-24/05/2016 – 07/07/2016

Results of inspection:

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

Remarks: All stoves share the same basic construction. The only differences are on the trademark and on the external claddings.

The shared flue gas connection was not a part of this initial type test.

Dated in Cologne, 30.08.2016
432 / jd

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

Assessor:

Report released after review:



B. Sc. J. Duschanek



Dipl.-Ing. A. Pomp

Room heaters fired by solid fuels, Initial Type Test in accordance with the regulation 305/2011
conformity certification system no.3

1 Task definition / reason for testing

The room heater **Gloria 2016** was to be subjected to type testing in accordance with the valid and applicable harmonised standard DIN EN 13240, in order to enable the appliance to be marked with the CE-marking in accordance with the Construction Products Regulation n° 305/2011.

Additional safety temperatures measurement was performed on the stove **Gloria Forno 2016**. The pot warmer without cooking function was not object of this initial type testing.

The (FPC) Factory Production Control was not performed.

2 Description of the test specimen

The appliance is a room heater dependent on ambient air for installation and is designed for wood logs.

Main features of the appliances:

- Steel construction.
- Cast iron for the bottomgrate and the external parts, including firedoor.
- Manual handle for primary air control.
- Natural draught for wood log operation.
- Flue gas connection on the top.
- Pot warmer without cooking function for **Gloria Forno 2016**, **Gloria 2 Forno 2016**, **Norah Forno** and **Dafne Forno 2016**.

2.1 General technical data of the test specimen:

Trademark:	-	INNOFIRE					
Types of appliance:	-	<i>Gloria 2016</i>	<i>Gloria 2 2016</i>	<i>Norah</i>	<i>Gloria Forno 2016</i>	<i>Gloria 2 Forno 2016</i>	<i>Norah Forno</i>
Nominal output	kW	7,2 kW					
Fuels	-	Wood logs					
Dimensions Height x Width x Depth	mm	938 x 473 x 490			1234 x 473 x 490		
Practical testing	-	yes					
Minimum distance side	mm	500					
Minimum distance back	mm	400					
Minimum distance front	mm	1500					
Design		Intermittent burning appliance dependent on ambient air with closed firebox for wood logs operation					
Classification acc. to Table 1 EN 13240		1a					

Trademark:	-	ITALIANA CAMINI				
Types of appliance:	-	<i>Dafne 2016</i>	<i>Giulia 2016</i>	<i>Blues 2016</i>	<i>Miss 2016</i>	<i>Dafne Forno 2016</i>
Nominal output	kW	7,2 kW				
Fuels	-	Wood logs				
Dimensions Height x Width x Depth	mm	938 x 473 x 490	941 x 436 x 450	941 x 436 x 450	878 x 438 x 451	1234 x 473 x 490
Practical testing	-	yes				
Minimum distance side	mm	500				
Minimum distance back	mm	400				
Minimum distance front	mm	1500				
Design		Intermittent burning appliance dependent on ambient air with closed firebox for wood logs operation				
Classification acc. to Table 1 EN 13240		1a				

*) For more information see appendix A04.1-A04.2-A07-A10.1-A11-A12-A13-A14-A15-A16-A17-A18-A19-A20-A21-A22

3 Testing

- P (pass)
- N (not applicable)
- F (fail)

DIN EN 13240	Description	Test results
4	Materials, design and construction	
4.1	Production documentation the specification of the materials used in the construction of the appliance the nominal heat output in kW using fuels recommended by the manufacturer If the appliance is fitted with a boiler then the following additional details shall also be specified: - the welding process used in the manufacture of the boiler shell; - the permissible maximum operating water temperature in °C - the permissible maximum operating pressure in bar; - the type test pressure in bar; - the water heating output in kW.	P P N
4.2	Construction	
4.2.1	General construction The shape and dimensions of the components and equipment, and the method of design and manufacture and, if assembled on site, the method of assembly and installation shall ensure that the appliance operates reliably and safely under the respective mechanical, thermal and chemical stresses. During normal operation no combustion gases posing a hazard may escape into the room in which the appliance is installed nor may any embers fall out. No part of the appliance shall comprise any material known to be harmful. Non-combustible materials shall be used, except that it shall be permissible to use combustible materials for the following applications: - components or accessories fitted outside the appliance; - internal components of controls and safety equipment; - operating handles; - electrical equipment. When fired with solid mineral fuels, the appliance shall have a bottomgrate and an ashpan. Components which are regularly replaced or must be re-installed must be marked or constructed in such a manner that they can be fitted correctly.	P P P N P
4.2.2	Parts subject to water pressure - general requirements - Made of cast iron or steel - Operation at operating pressure as stated by the manufacturer must be possible - Materials and dimensions in accordance with the test standard - Kind of steels used according to Table 3	N
4.2.2.1	Parts subject to water pressure (steel) - Suitability for welding	N
4.2.2.1.1	Minimum wall thickness steel in accordance with Table 2	N

DIN EN 13240	Description	Test results
4	Materials, design and construction	
4.2.2.2	Parts subject to water pressure (cast iron)	N
4.2.2.2.1	The minimum mechanical requirements for components made of cast iron which are subject to water pressure shall be in accordance with Table 4	N
4.2.2.3	Minimum wall thickness for cast iron in accordance with Table 5	N
4.2.2.4	Water side connections (acc. Tables 6 and 7) - Minimum thread size - Minimum depth - Thread length	N
4.2.2.5	Boiler internal waterways	N
4.2.2.5.1	Requirements of the design of boiler waterways for all appliances - Free flow of water - No sharp or wedge-shaped waterways with a taper towards the bottom, - Openings for cleaning: ➤ Minimum size: 70x40 mm or minimum diameter 70 mm ➤ Equipped with gasket and cap	N
4.2.2.5.2	Minimum internal dimensions for boiler waterway parts used with indirect water systems: 20mm (15 mm)	N
4.2.2.5.3	Minimum internal dimensions for boiler waterway parts used with direct water systems: 25 mm	N
4.2.2.5.4	Venting of the water sections	N
4.2.2.5.5	Water tightness	N
4.2.3	Cleaning of heating surfaces All heating surfaces shall be accessible by means of cleaning apertures from the flue gas side for inspection and cleaning. Special tools are to be supplied by the manufacturer	P
4.2.4	Flue spigots or sockets The flue spigot or socket shall be designed in such a manner that the connection between the appliance and the pipe is gas-tight. The overlap shall be at least - 40 mm for horizontal installation - 25 mm for vertical installation	P
4.2.5	Size of flueways - Minimum dimension 30 mm - Minimum dimension 15 mm if appliances is designed only to burn fuels other than bituminous coals and peat briquettes , and where an access door(s) is provided for cleaning the flueway - It shall be possible to clean the flueways of the appliance completely	P
4.2.6	Ashpan and ash removal A means of removing ash from the appliance shall be provided Ashpan - Must collect ash effectively - Minimum volumetric capacity: residue from two full charges of fuel at Q_{NENN} - Must allow primary air to flow freely - Removal, carrying and emptying must be easy and safe even when the ashpan is hot	P

DIN EN 13240	Description	Test results
4	Materials, design and construction	
4.2.7	Firebox bottomgrate - Where the bottomgrate is removable it shall be designed in such a manner as to ensure correct assembly. - De-ashing must be possible without undue effort. - The preferred design should allow de-ashing to be carried out with the ashpit door closed.	P
4.2.8	Combustion air supply	P
4.2.8.1	Primary air inlet control - The appliance shall be fitted with either a thermostatically controlled primary air inlet control or a manual primary air inlet control. - For appliances with a boiler, a manual primary air inlet control shall only be allowed for boiler outputs up to 7,5 kW. - The adjusting control shall be clearly visible or shall be permanently marked so that its operation is readily understandable. - The design shall be such that during operation of the appliance, neither ash nor unburned fuel can prevent the movement or closure of the air inlet control. - The 'cold' setting of the air inlet control shall be clearly marked and the method of adjustment shall be described in the user instructions. - The thermostat shall have a variable temperature range and be of the immersion or dry pocket type. The pocket shall be positioned so that the thermostat senses the temperature of the flow water from the appliance.	P N P P P N
4.2.8.2	Secondary air inlet control The position of air entry is to be designed in such a manner that the passage of this air is not restricted when the firebox is filled to the manufacturer's recommended capacity.	N
4.2.9	Flue gas control - Flue damper must be easy to operate - The setting must be clear for the user - Dampers must incorporate an aperture which is at least 20 cm ² in size or occupies at least 3 % of the cross-sectional area if this leads to values of over 20 cm ² . - If a draught regulator is fitted the minimum cross sectional area requirement shall not be applicable but the device must be easily accessible for cleaning	N
4.2.10	Fire doors and charging doors - Opening must be large enough for enable appliance to be filled - Accidental opening is avoided and positive closure is facilitated	P
4.2.11	Flue bypass device - shall be easily operable - the extreme positions corresponding to full opening and closing shall be stable and easily identifiable (permanent marking)	N

DIN EN 13240	Description	Test results
4	Materials, design and construction	
4.2.12	<p>Front firebars and/or deepening plates</p> <ul style="list-style-type: none"> - If the appliance is fitted with removable front firebars/deepening plates, they shall be designed in such a manner that they can neither be fitted incorrectly nor dislodged accidentally - The front firebars/deepening plate should be designed to retain fuel or ash to prevent unnecessary ash or burning fuel dropping out of the firebox during normal operation, particularly during refuelling or de-ashing of the appliance 	N N
4.2.13	<p>Solid mineral fuel and peat briquettes burning appliances</p> <ul style="list-style-type: none"> - When the recommended fuels are solid mineral fuel and peat briquettes, the appliances shall have a bottomgrate and an ashpan. 	N

DIN EN 13240	Description	Test results
5	Safety requirements	
5.1	<p>Safety test at natural draught</p> <ul style="list-style-type: none"> - Test acc. 4.9.3 only for continuous burning appliances which can be connected to a chimney serving more than one appliance, and can be operated with solid mineral fuel and peat briquettes as suitable fuels, - either the flue draught >3 Pa or - if flue draught falls below 3 Pa then over a period of 10h the emitted quantity of carbon monoxide shall not be greater than 250 dm³. - Such an appliance shall be clearly labelled to indicate whether or not it can be installed into a shared flue (see 7.2). 	N
5.2	<p>Operation with open firedoors</p> <p>The operation of an appliance with an open firebox shall only be permitted when:</p> <ul style="list-style-type: none"> - - any escape of harmful combustion gases, and - - any loss of the firebed from the appliance, - does not occur under the test conditions described in section A.4.9.1. 	N
5.3	<p>Strength and leaktightness of boiler shells and water carrying components</p> <p>Testing was effected in accordance with A 4.9.5 / A 4.7</p>	N
5.4	<p>Temperature in integral fuel storage container</p> <p>Max. permissible: $t_{\text{Room}} + 65 \text{ K}$</p> <p>Actual - value: $_ \text{ } ^\circ\text{C}$</p> <p>Ambient = $_ \text{ } ^\circ\text{C}$</p>	N

DIN EN 13240	Description	Test results
5	Safety requirements	
5.5	<p>Operating tools Operating tools are to be provided in accordance with operation manual, where it would otherwise be necessary to touch a surface which has a temperature which exceed the following values: These temperature requirements shall be evaluated during the nominal heat output test in accordance with A 4.7</p> <ul style="list-style-type: none"> - Metal: 35 K + t_{Room} - Porcelain, enamel: 45 K + t_{Room} - Plastics, rubber, wood: 60 K + t_{Room} <p>Actual - value of max. surface temperature: <60 K + t_{Room} Actual - value: Handle of firedoor (plastic) = 107 °C Ambient = 25 °C ΔT = 82 K</p> <p>*) A suitable tool is a part of the appliance and is provided by the producer. (Glove available)</p>	P*
5.6	<p>Temperatures of adjacent combustible materials max. permissible temperature: t_{Room} + 65 K</p> <ul style="list-style-type: none"> - The corresponding information for ensuring the requirement must be included in the installation instructions - Practical verification is provided during testing. <p>Actual value of the max. surface temperature: 88,7 °C t_{Room} = 24,4 °C</p>	<p>P*</p> <p>* (The appliance must be installed on a non combustible base, see prescriptions on the manual)</p>
5.7	<p>Thermal discharge control Opens at t_{max} = 105 °C or at a lower temp. in accordance with manufacturer's specifications Manufacturer's specifications: _ °C Test results:</p>	N
5.8	<p>Electrical safety must correspond to EN 50165</p>	N

DIN EN 13240	Description	Test results
6	Performance requirements	
6.1	Flue gas temperature	P
6.2	Max. CO-emission rel. to 13% O ₂ <u>Testing at nominal heat output</u> Max. permissible: 1 Vol. % at 13 Vol. % O ₂ in Flue gas Measured value: Test fuel: wood logs 0,065 Vol. % at 13 Vol. % O ₂	P
6.3	Total efficiency at nominal heat output at mean of at least two separate tests Required: 50 % or as supplier has indicated Determined: 82,64 %	P
6.4	Flue draught_ <u>Testing at nominal heat output</u> Required: 12 ± 2 Pa Measured: 12,0 Pa	P
	<u>Safety test</u> Required: 15 Pa Measured: 15 Pa	P
	<u>Test at slow or reduced combustion</u> Target: ___ Pa Actual ___ Pa	N
6.5	Recovery test	N
6.6	Refuelling intervals at nominal heat output (acc. Table 8) <u>Minimum refuelling interval</u> Target: 2700 s Actual: 2709 s	P
6.7	Water heating output Measured value: _ kW Manufacturer's specifications: _ kW	N
6.8	Space heating output: Measured value: 7,21 kW Manufacturer`s specifications: 7,2 kW	P

A 4.7	Testing of nominal heat output, measurement test results		
Model		Gloria 2016	
Fuel		wood logs	
		Required	Achieved
			Average (tests)
Heating input	KW	-	8,72
Nominal heat output	kW	-	7,21
Efficiency	%	EN > 50 / Art 15 a > 80	82,64
CO ₂ - content in flue gas	Vol. %	no requirements	12,63
CO-emission, measured value	ppm	no requirements	1055,8
CO-emission, measured value	mg/kWh	no requirements	1899,8
CO-emission, measured value	mg/MJ	Art 15 a ≤ 1100	527,7
CO-emission ref. to 13 Vol.-% O ₂	mg/m ³	no requirements	812,7
CO-emission ref. to 13 Vol.-% O ₂	Vol. %	1 Vol. % at 13 Vol. % O ₂ in Flue gas	0,065
NO _x -emissions, measured value	ppm	no requirements	83,3
NO _x -emissions, measured value	mg/kWh	no requirements	246,9
NO _x -emissions, measured value	mg/MJ	Art 15 a ≤ 150	68,6
NO _x -emissions ref. 13 Vol. % O ₂	mg/m ³	no requirements	105,6
OGC-concentration measured acc. CEN/TS 15883	ppm	no requirements	45,3
OGC-emissions ref. to 13 Vol.-% O ₂	mg/m ³	no requirements	45,9
OGC-emissions, measured value	mg/kWh	no requirements	107,3
OGC-emissions, measured value	mg/MJ	Art 15 a ≤ 50	29,8
Dust concentration measured acc. CEN/TS 15883 and EN13284-1	mg	no requirements	20,4
Dust emissions to 13 Vol. % O ₂	mg/m ³	no requirements	24,8
Dust emissions	mg/kWh	no requirements	57,9
Dust emissions	mg/MJ	Art 15 a ≤ 35	16,1
Flue gas mass flow	g/s	no requirements	5,0
Flue gas temperature	°C	no requirements	286,9
Pressure on flue gas	Pa	12 ± 2	12,0

DIN EN 13240	Description	Test results
7	Appliance instructions	
7.2 (cont.)	<ul style="list-style-type: none"> - Notification that the appliance may only be erected on floors with an adequate load-bearing capacity and that and if an existing construction does not meet this prerequisite, suitable measures are to be taken - The setting of the temperature controller and adjustment in a cold state - Means of dissipating excess heat from the boiler in the case of malfunction - Instructions on the installation of recirculation grilles with regard to the ambient temperatures of walls, floors and ceilings or adjacent components - Reference as to whether the suitability of sharing a flue is given - Water volume and instructions for fitting a drain-cock in the lowest part of the system (where applicable); 	<p>P</p> <p>P</p> <p>N</p> <p>N</p> <p>P</p> <p>N</p>
7.3	<p>User operating instructions</p> <ul style="list-style-type: none"> - Reference to the requisite national and European standards and local regulations which are to be complied with when the appliance is installed - National and local operation conditions particular to the country of distribution, and on the permitted types of fuel - A list of all recommended fuels, their types and sizes, in accordance with DIN EN 13240 - Max. fuel load at nominal heat input for the recommended fuels, instruction for refuelling and ash removing - Description of the correct and safe operation of the appliance including the ignition procedure - Notification that the appliance is not to be used as a waste incinerator and that no unsuitable/impermissible fuels or liquid fuels may be burnt - Instructions regarding the correct operation of any adjusting devices and controls with instructions for refuelling and de-ashing - Instructions regarding the correct operation of the appliance in particular during adverse weather conditions or malfunctioning of delivery pressure, notification of the risk of frost - Warning that the firebox must always be kept closed except during ignition, when refuelling and during de-ashing (does not apply to appliances with open firebox) - Instructions regarding the correct operation with open firebox, where applicable - Information on the correct operation of any thermal discharge control - Ventilation requirements for simultaneous operation with other heating appliances, if applicable 	<p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>N</p> <p>N</p> <p>P</p>

DIN EN 13240	Description	Test results
7	Appliance instructions	
7.3 (cont.)	<ul style="list-style-type: none"> - Information regarding the regular cleaning of the appliance as well as particular reference to the risk of the chimney flue blocking particularly after a prolonged period of shutdown - Instructions regarding the adequate provision of combustion air and or ventilation air, and that the combustion air - inlet openings may not be closed - Instructions regarding the safe removal of flue gases - Fault finding and the procedure for safe shut down of the appliance in the event of malfunction e.g. overheating or interruption of the water supply. - A warning stating that parts of the appliance, in particular the external surfaces, get hot during operation and that corresponding due care should be taken - Safety and protection measures against the risk of fire for combustible materials - Warning against any unauthorized modification of the appliance - Recommendation that only replacement parts approved and authorised by the manufacturer may be used - Advice about part load operation - Advice about action in the event of a chimney fire - Instructions as to whether the appliance may be used in continuous or intermittent operation and instructions on how this is achieved - Advice whether the appliance is suitable for installation in a shared flue system; - Specifications on setting recirculation grilles, if applicable - Notification that regular inspection by a specialist is recommended 	<p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>P</p> <p>N</p> <p>P</p> <p>P</p> <p>N</p> <p>P</p>

DIN EN 13240	Description	Test results
8	Marking	
	<ul style="list-style-type: none"> - Permanent and legible, abrasion-proof, no discolouration possible once the appliance is in its final position and in operation - Manufacturer and/or trademark - Type designation / model designation - Nominal heat output (min., max, for the approved fuels) - Number of test standard - Space heating output in kW or in W - Water heating output in kW or in W - CO- content in flue gas at 13 Vol. % O₂ - Max. perm. operating water pressure in bar, as applicable - whether or not the appliance can be used in a shared flue; - Reference “read and follow the operating instructions“ is clearly visible - Reference “use only recommended fuels“ is clearly visible - Reference as to whether appliance is suitable for continuous or intermittent operation - Reference to minimum distances to combustible components 	<p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">N</p> <p style="text-align: center;">P</p> <p style="text-align: center;">N</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p> <p style="text-align: center;">P</p>

DIN EN 13240	Description	Test results
9	Conformity verification	
9.1	General	P
9.2	Type testing	
9.2.1	-Initial type testing	P
9.2.2	-Further type testing	N
9.3	Factory production control (FPC)	
9.3.1	- General	
9.3.2	- Raw materials and components	
9.3.3	- Control of inspection, meas. and test equipment	
9.3.4	- Process control	
9.3.5	- Product inspection, testing and evaluation	
9.3.5.1	- Material of construction	
9.3.5.2	- Insulation material	
9.3.5.3	- Seals and sealant materials	
9.3.5.4	- Manufacturing checks	
9.3.5.4.1	- Construction and dimensions	
9.3.5.4.2	- Other checks	
9.3.6	- Non conforming products	
9.3.7	- Corrective and preventive action	
9.3.8	- Handling, storage, packaging, preservation and delivery	

4 Statement of the test results

The appliances

**Gloria 2016, Gloria 2 2016, Gloria Forno 2016,
Gloria 2 Forno 2016, Norah, Norah Forno, Blues
2016, Dafne 2016, Dafne Forno 2016, Giulia 2016,
Miss 2016**

of the company

Edilkamin S.p.A.

complies for the operation with wood logs with the requirements
acc. EN 13240: April 2005, cl.4-8.

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.

5 Test documents

Appendix	Subject	
A01	Fuel data	
A02	Test results	
A03	Measuring devices	
A04	Type Labels	1691601/ 1691602
A05	Essential requirements declarations	17/09/2015
A06	Declaration of Performances	n. 41 / n. 42
A07	Cast iron datasheet	GJL 200
A08	Gasket datasheets	
A09	Technical data glass	
A10	Manual	1692001 - Rev. 10
A11	Drawings with dimensions	1611610-21-07-2015 1611640-21-07-2015
A12	Overview drawings with flueways	1611610_170904_DE_AT 1611640_150904_DE_AT
A13.1	Ombretta 13 EVO photo	
A13.2	Ombretta Forno 13 EVO photo	

Appendix A01

Fuel data

Verbrennungsrechnung aus der Elementaranalyse											
nach DIN EN 304 Teil 2, Ausgabe 01/2004											
nach DIN 4702 Teil 2, Ausgabe 3/1990											
Analysis from:		02/10/2015		Analysis No:		Fuel sampling date:					
Fuel:		wood logs		201503520		11/09/15					
Bestandteil im Brennstoff	Stoffanteil	Sauerstoffbedarf		Abgasbestandteile aus Brennstoff in Nm ³ /kg Brennstoff							
		in Nm ³ je kg Bestandteil	in Nm ³ je kg Brennstoff	CO ₂		SO ₂		H ₂ O		N ₂	
	Gew. %		Sauerstoffbedarf	in Nm ³ je kg Bestandteil	in Nm ³ je kg Brennstoff	in Nm ³ je kg Bestandteil	in Nm ³ je kg Brennstoff	in Nm ³ je kg Bestandteil	in Nm ³ je kg Brennstoff	in Nm ³ je kg Bestandteil	in Nm ³ je kg Brennstoff
c	43.000	1.860	0.800	1.850	0.7955	-	-	-	-	-	-
s	0.010	0.700	0.000	-	-	0.680	0.0001	-	-	-	-
h	5.200	5.550	0.289	-	-	-	-	11.100	0.5772	-	-
n	0.450	-	-	-	-	-	-	-	-	0.80	0.0036
o	38.040	-0.700	-0.266	-	-	-	-	-	-	-	-
wasser	12.800	-	-	-	-	-	-	1.240	0.1587	-	-
asche	0.500	-	-	-	-	-	-	-	-	-	-
summe	100.000	O min=	0.822	V CO ₂ =	0.7955	V SO ₂ =	0.0001	V W =	0.7359	V N ₂ =	0.0036
Luftbedarf				L min =		3.9152 Nm ³ /kg Brennstoff					
trockene stöchiometrische Abgasmenge				V A tr min =		3.8886 Nm ³ /kg Brennstoff					
Max. Kohlenstoffdioxid-Anteil				CO ₂ max =		20.4574 Vol.-%					
Wasserdampfmenge				V w =		0.7359 Nm ³ /kg Brennstoff					
				V A tr min/ L min =		0.9932					
Heizwert, wf				Hu =		18386 kJ/kg					
						5.107 kWh/kg					
Berechnungen zum Versuchszeitpunkt											
wasser	zum Versuchszeitpunkt			w =	12.800 Gew. %						
Heizwert, roh	zum Versuchszeitpunkt			Hu	15720 kJ/kg						

Appendix A 2
Test results

Report- No.		K18762016T1			
TÜV- order- No.		21235221			
Manufacture		Edilkamin S.p.A.			
Type		Gloria 2016			
Model		Room heater for wood logs without ambient fan and without water parts			
Specifics		combustion air is taken from the room Manual load			
Nominal heat output		7,2 kW			
Test place		Thiene			
Test date		23.05.2016			
Type of test		Test at nominal load acc. EN 13240			
		1. test	2. test	3. test	Average
Test date		23.05.2016	23.05.2016	23.05.2016	
Time		12:34-23:13:19:29	13:21:03-14:06:03	14:07:44-14:53:07	
Ambient:					
Barometric pressure	mbar	1012	1012	1012	1012
Temperature of combustion air	°C	24,4	25,0	24,5	24,6
Ambient rel. humidity	%	44	44	44	44
Ambient temperature (room)	°C	24,4	25,0	24,5	24,6
Fuel:					
Type of fuel		wood logs	wood logs	wood logs	-
Number of fuel loadings		1	1	1	1
Total weight of appliance at start	kg	141,35	141,39	141,38	141,37
Weight of additional loads	kg	139,85	139,89	139,87	139,87
Total weight of appliance at end	kg	0,00	0,00	0,00	0,00
Fuel consumption, calculated of the difference	kg	1,50	1,50	1,51	1,50
Test duration	sec	2705	2700	2723	2709
Fuel consumption "B"	kg/h	1,996	2,000	1,996	1,998
Combustible constituents in material passing through the grate "b", analyse	Gew. %	0,0	0,0	0,0	0,0
Residue passing through the grate, measurement	kg	0,000	0,000	0,000	0,000
Residue passing through the grate "R"	Gew. %	0,00	0,00	0,00	0,00
Carbon content of the residue passing through the grate "Cr" depending of 1kg fuel	Gew. %	0,23	0,23	0,23	0,23
Water part (average values)					
flow temperature	°C	0,0	0,0	0,0	0,0
return temperature	°C	0,0	0,0	0,0	0,0
delta-T	K	0,0	0,0	0,0	0,0
Cold water flow	kg/h	0,0	0,0	0,0	0,0
Additional energy of the pump	kW	0,000	0,000	0,000	0,000
Flue, average					
Flue gas temperature	°C	284,4	290,0	286,3	286,9
Flue gas draught	Pa	12,0	12,0	12,0	12,0
O ₂ - concentration (measurement)	Vol.-%	8,50	7,81	7,78	8,03
CO ₂ - concentration (calculation)	Vol.-%	12,18	12,85	12,88	12,63
lambda value, λ	-	1,675	1,588	1,585	1,62
CO - concentration (measurement)	ppm	924,9	1145,8	1096,6	1055,8
CO - concentration (measurement)	Vol.-%	0,092	0,115	0,110	0,106
CO - concentration (measurement)	mg/m ³	1156,2	1432,3	1370,8	1319,7
CO - concentr. (at reference - O ₂)	Vol.-%	0,059	0,069	0,066	0,065
CO - concentr. (at reference - O ₂)	mg/m ³	739,9	868,7	829,5	812,7
CO - concentration rel. to fuel input	mg/kWh	1729,6	2030,6	1939,0	1899,8
CO - concentration rel. to fuel input	mg/MJ	480,5	564,1	538,6	527,7
NO _x - concentration (measurement)	ppm	87,5	83,2	79,3	83,3
NO _x - concentration (measurement)	mg/m ³	179,4	170,6	162,5	170,9
NO _x - concentr. (at reference - O ₂)	mg/m ³	114,8	103,5	98,4	105,6
NO _x - concentration rel. to fuel input	mg/kWh	268,4	241,9	230,4	246,9
NO _x - concentration rel. to fuel input	mg/MJ	74,5	67,2	64,0	68,6
CnHm - concentration (measurement)	ppm	64,8	36,3	34,8	45,3
CnHm concentr. (at reference - O ₂)	mg/m ³	67,6	35,9	34,3	45,9
CnHm - concentration (total C) rel. to fuel input	mg/kWh	157,9	84,0	80,1	107,3
CnHm - concentration (total C) rel. to fuel input	mg/MJ	43,9	23,3	22,3	29,8
Dust (measurement*)	mg	20,4	0,0	0,0	20,4
Dust concentration (measurement*)	mg/m ³	46,1	0,0	0,0	46,1
Dust (at reference - O ₂)*	mg/m ³	24,8	0,0	0,0	24,8
Dust* rel. to fuel input	mg/kWh	57,9	0,0	0,0	57,9
Dust* rel. to fuel input	mg/MJ	16,1	0,0	0,0	16,1
PME concentration (measurement*)	mg/m ³	41,6			41,6

Calculation					
"Qa" loss free heating flue gas	kJ/kg	2625,2	2556,7	2520,8	2567,6
"qa" loss flue gas	%	16,70	16,26	16,04	16,3
"Qb" loss fix heating in flue gas	kJ/kg	76,0	89,2	85,2	83,5
"qb" loss fix heating in flue gas	%	0,48	0,57	0,54	0,5
"Qr" losses due to combustible constituents in the residue passing through the grate	kJ/kg	0,0	0,0	0,0	0,0
"qr" losses due to combustible constituents in the residue passing through the grate	%	0,50	0,50	0,50	0,5
"m" flue gas mass flow	g/s	5,1	4,9	4,9	5,0
cpm, acc. DIN 4702-2, version 03.90 for dry flue gas	kJ/(m³K)	1,38	1,38	1,38	1,4
cpm-H ₂ O	kJ/(m³K)	1,54	1,54	1,54	1,5
"eta" Efficiency (direct), to consider only water heating output P _w	%	entfällt	entfällt	entfällt	entfällt
"eta" Efficiency (indirect)	%	82,32	82,67	82,92	82,64
Heating input	kW	8,72	8,73	8,72	8,72
"P" heating output, total	kW	7,18	7,22	7,23	7,21
"P _w " water heating output	kW	0,00	0,00	0,00	0,00
Space heating output: P _{STR} = P - P _w	kW	7,18	7,22	7,23	7,21
Space heating output, relating to heat input	%	82,32	82,67	82,92	82,64
Water heating output, relating to heat input	%	0,00	0,00	0,00	0,00
Settings					
Primary air	open/closed	1 mm open	1 mm open	1 mm open	-
Firedoor	open/closed	closed	closed	closed	-

The tests were carried out under the conditions of DIN EN 13240:10/2005

Appendix A 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	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

Index	Measure	Principle	Company	Range	Uncertainty	Reference
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
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
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.