TÜV Rheinland Energy & Environment GmbH
Test Centre for Energy Appliances

Report No. K 3193 2024 E5
Residential space heating appliances fired by wood pellets
Supplement to type testing

DIN EN 14785

Model:
PF 501

Trademark:
Jøtul

Company:
Jøtul AS

This accreditation is valid only for the listed standards as stated in the accreditation annex of D-PL-11120-04-00

Supplement to type testing reports
K31932021T1,
K32162022Z1
Residential space heating appliances fired by wood pellets
DIN EN 14785: September 2006
Correction 1 DIN EN 14785: 10/2007

Applicant/contractor:	**Jøtul AS** P.o. box 1411, 1602 Fredrikstad- Norway
Trademark:	**Jøtul**
Appliance description:	Residential space heating appliance fired by wood pellets without water heat exchanger, with fan assisted flue discharge and with internal fuel hopper.
Model designation:	**PF 501**
Total heat input:	2,9 kW – 6,3 kW
Total heat output:	2,7 kW – 5,7 kW
Water heat output:	Not applicable.
Test fuel:	Wood pellets Ø 6 mm, Lmax 30 mm, max humidity 6,92%, Norica, class A1 according to EN 17225-2
Type of fuel charging:	Automatic load.
Flue spigot:	80 mm

Remarks:
Upright exhaust flue gas outlet.

Test result:
The technical requirements cl. 4-8 of the above-mentioned standard are fulfilled. The local applicable installation conditions must 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 reports K31932021T1 and K32162022Z1.

Dated in Cologne, 2024-01-29
667 / mc

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

Assessor:

Dipl.-Ing. M. Ciccarelli

Report released after review:

Dipl.-Ing. A. Pomp

1. Task definition

History test report K 3193 2021 T1

The Test Centre for Energy Appliances was instructed to execute the initial type testing on the appliance **Luna** for the operation with wood pellets according to DIN EN 14785:2006, cl. 4-8. The electrical safety cl. 5.9. of the standard was not a part of this initial type testing.

The family appliances **Aria** and **Aria Steel** are all identical to Luna appliance, except than for:
_different external design;
_alternative electrical components;
_Fuel hopper construction.

For more information, see test report K 3193 2021 T1.

The practical tests were carried out by the laboratory CMC Centro Misure Compatibilità S.r.l., via della Fisica 20, Thiene (VI) – Italy, on the 25th and on the 26th of October 2021.

New test report K 3216 2022 Z1

The manufacturer adds a new model to the K31932021T1 report family, named **PF 500**, with the following characteristics:
_different external design;
_different trademark.

New test report K 3193 2024 E5

The manufacturer adds a new model to the K31932021T1 - K32162022Z1 reports family, named **PF 501**, with the following characteristics:
_different external design;
_different control board / display;
_different fuel motor.

The Test Centre for Energy Appliances was instructed to execute a comparison test at nominal load power to verify that combustion results of the new appliance are similar to the appliances listed on K31932021T1 - K32162022Z1 test reports.
The comparison measurements showed that no significant differences can be observed on PF 501 model (see par. “3.1 Comparison test at nominal load power”). As result of the comparison, all the combustion data measured or calculated on reports K31932021T1 - K32162022Z1 are assigned also to the new model PF 501 of the present report.

The practical tests were carried out by the laboratory DEKRA Testing and Certification S.r.l, via della Fisica 20, Thiene (VI) – Italy on 18th of December 2023.

2. Description of the appliance

2.1 Construction

Residential space heating appliance fired by wood pellets without water heat exchanger. The flue discharge for pellet operation is fan assisted. The stove is equipped with an automatic ignition. Upright exhaust flue gas outlet.

2.2 General declared technical data of the pellet appliance

Model name:	**PF 501**
Nominal power:	5,7 kW
Fuel:	Wood pellets Ø 6 mm, Lmax 30 mm, class A1 according to EN 17225-2
Total dimension: Height x Width x Depth	738 x 618 x 660 mm
Flue spigot:	80 mm
Distance from adjacent combustible materials:	Backside distance: 100 mm Side distance: 200 mm Front distance: 800 mm
Max water pressure:	Not applicable.
Max water temperature:	Not applicable.

For more information see test reports K31932021T1 and K32162022Z1.

2.3 Photos of the tested appliance

3. Testing

3.1 Comparison test at nominal load power

_Nominal comparison test

The Test Centre for Energy Appliances was instructed to execute a nominal load comparison test between PF 500 and PF 501 appliances. The comparison combustion measurements shown no significant differences between the two appliances; as listed in the following table:

Model	Input (kW)	Output (kW)	Efficiency (%)	CO* (mg/m³)	NOx* (mg/m³)	CnHm* (mg/m³)
PF 500 (test report K32162022Z1)	6,3	5,7	91,5	45	116	4
PF 501 (test report K31932024E5)	6,5	6,0	91,6	66	114	4

*) Concentration at 13% O_2

As result of the comparison, all data measured or calculated on reports K31932021T1 and K32162022Z1 are assigned also to PF 501 appliance.

3.2 Resume of test results

PF 501		Nominal	Partial	Requirement
Mass of the test fuel fired hourly	kg/h	1,293	0,592	-
Flue gas mass flow	g/s	5,13	3,31	-
Flue gas temperature	°C	120,7	74,1	-
Flue draught	mbar	0,10	0,10	0,12/0,10 +/-0,02 or declared value
CO_2-concentration	Vol.-%	8,6	6,0	-
O_2-concentration	Vol.-%	12,0	14,8	-
CO-concentration	ppm	40	134	-
CO-emission (at 13%-O_2)	mg/m³	45	215	≤ 500/750
CO-emission	mg/kWh	108	511	-
CO-emission	mg/MJ	30	142	-
NOx-concentration	ppm	64	38	-
NOx -emission (at 13%-O_2)	mg/m³	116	101	-
NOx -emission	mg/kWh	277	240	-
NOx -emission	mg/MJ	77	67	-
CnHm-concentration measured acc. to CEN/TS 15883	ppm	3	2	-
CnHm-emission (at 13%-O_2)	mg/m³	4	4	-
CnHm-emission	mg/kWh	10	11	-
CnHm-emission	mg/MJ	3	3	-
Dust concentration measured acc. to CEN/TS 15883 and EN13284-1 *	mg	5	3	-
Dust emission (at 13%-O_2)	mg/m³	15	14	-
Dust emission	mg/kWh	36	34	-
Dust emission	mg/MJ	10	9	-
Total heat input	kW	6,3	2,9	-
Total heat output	kW	5,7	2,7	-
Water heat output	kW	-	-	-
Space heat output	kW	5,7	2,7	-
Efficiency	%	91,5	93,8	≥ 75/70

*) Average of 3 samples, based on separate calculation.

4. Statement of the test results

The appliance

PF 501

of the company

Jøtul AS

with trademark

Jøtul

fulfils the requirements acc. to
EN 14785:2006, clauses 4-8.

The presumption of conformity with the relevant European Directives respectively Regulations could only be confirmed by full compliance with Annex ZA.
Additional details are documented on the Test reports n. K31932021T1 and K32162022Z1.

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 Energy & Environment GmbH test- / certification mark.

5. Test documents

Appendix 1 Fuel data for the comparison test
Appendix 2 Measurement Instruments

TÜV Rheinland Energy & Environment GmbH declines any responsibility derived from missing or wrong information in the documents provided by the applicant.

Appendix	Subject	Reference
A 03	Type label	-
A 04	Extension Declaration	18/01/2024
A 05	Instruction and installation manual	JØTUL PF 501
A 06	List of electrical components	18/01/2024
A 07	Gear motor Mellor	FB1439
A 08	Safety electrical circuit	M31
A 09	Setup parameters	-
A 10	Overview drawings	27/10/2022

Appendix 1

Fuel data for the comparison test

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:	**25/07/2023**	**Analysis No.**	**Fuel sampling date:**
Fuel:	**wood pellets**	**2311641-002**	**04/07/23**

Bestandteil im Brennstoff	Stoffanteil	Sauerstoffbedarf in Nm^3 je kg Bestandteil	Sauerstoffbedarf in Nm^3 je kg Brennstoff	Abgasbestandteile aus Brennstoff in Nm^3/kg Brennstoff							
			Stoffanteil x	CO_2		SO_2		H_2O		N_2	
	Gew. %		Sauerstoff-Bedarf	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	44,700	1,860	0,831	1,850	0,8270	-	-	-	-	-	-
s	0,007	0,700	0,000	-	-	0,680	0,0000	-	-	-	-
h	5,460	5,550	0,303	-	-	-	-	11,100	0,6061	-	-
n	0,100	-	-	-	-	-	-	-	-	0,80	0,0008
o	42,600	-0,700	-0,298	-	-	-	-	-	-	-	-
wasser	6,920	-	-	-	-	-	-	1,240	0,0858	-	-
asche	0,213	-	-	-	-	-	-	-	-	-	-
summe	100,000	O min=	0,836	V CO_2 =	0,8270	V SO_2 =	0,0000	V W =	0,6919	V N_2 =	0,0008

Luftbedarf	L min =	3,9824	Nm^3/kg Brennstoff
trockene stöchiometrische Abgasmenge	V A tr min =	3,9731	Nm^3/kg Brennstoff
Max. Kohlenstoffdioxid-Anteil	CO_2 max =	20,8139	Vol.-%
Wasserdampfmenge	V w =	0,6919	Nm^3/kg Brennstoff
	V A tr min/ L min =	0,9977	
Heizwert, wf	Hu =	18875	kJ/kg
		5,243	kWh/kg

Berechnungen zum Versuchszeitpunkt

wasser	zum Versuchszeitpunkt	w =	6,920	Gew. %
Heizwert, roh	zum Versuchszeitpunkt	Hu	17400	kJ/kg

Appendix 2

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	External calibration
B079	Water flow	Magnetic	ABB Copa-XE DE43FI	0 – 2000 kg/h	± 1% related to the range	Reference flow meter
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	External calibration
B092	Fuel consumption	Gravimetric	Dini Angeo DFWK	0 – 1200 kg	± 10 g	External calibration
B095	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1 % 0 – 5 %	± 1% related to the range	Reference gas
B096	CO_2	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas
	NOx	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas
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
B098	Temperature	K-type thermocouple	Testo 925	0 – 200 °C	± 2 °C	Reference thermometer
B109	Air flow	Flow measurement	CMC / ASA 132826 P13-2800	400 - 4000 l/h	± (2 % FS)	Reference flow meter
B116	Air flow	Flow measurement	Bronkhorst F-111AC-50K-AAD-33-V	0 – 50 l/min	± 0,5 % RD plus ±0,1% FS	External calibration
B118	Gas volume	Diaphragm	CMC	0,016 – 2,5 m^3/h	± 5 %	Air flow
B121	OGC	FID	Siemens Fidamat 6	0 – 3,33 ppm C3 0 – 33,3 ppm C3 0 – 333 ppm C3 0 – 3333 ppm C3	± 1% related to the range	Reference gas
B122	CO_2	Infrared-absorption	Siemens Ultramat 23	0 – 5 % 0 – 25 %	± 1% related to the range	Reference gas
	CO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas
	NO	Infrared-absorption	Siemens Ultramat 23	0 – 1000 ppm 0 – 5000 ppm	± 1% related to the range	Reference gas
B149	Mass	Gravimetric	Kern FKB 15K0.5A	0 – 15 kg	± 0,5 g (reproducibility)	External calibration
B154	Gas volume	Diaphragm	Elster BK-G4M	---	Class 1,5	Air flow
B169	Electrical power	---	Yokogawa WT310E	0 – 2000 W	± 0,5 %	External calibration
B179	Stopwatch	---	RS 8111814	0 – 99 h	0,01 s	---

Index	Measure	Principle	Company	Range	Instrument specification	Reference
B180	Absolute pressure meter	Absolute pressure meter	Testo 511	0 – 999,0 hPa	±3,0 hPa	External calibration
B183	Water flow	Magnetic	ISOIL Industria MS501-T10-1A1A1A + ML210-B0A1B3A0	0 – 2000 kg/h	Accuracy: ± 0,2% r.v.	Reference flow meter
B201 + B123	CO	Infrared-absorption	Siemens Ultramat 6	0 – 100 ppm 0 – 1000 ppm	± 1% related to the range	Reference gas
	CO	Infrared-absorption	Siemens Ultramat 6	0 – 1 % 0 – 10 %	± 1% related to the range	Reference gas
	NO	Infrared-absorption	Siemens Ultramat 6 + Bühler Bünox MV	0 – 100 ppm 0 – 1000 ppm	± 1% related to the range	Reference gas
B203	Dust content	Gravimetric	Ohaus PX125D	0,01/0,1mg – 52/120g	± 0,02 mg	External calibration
B205	Pressure meter	Air flow	Sensirion SDP816-125Pa	-12,5 – 125 Pa	0,5 Pa	Reference pressure meter
B206	Pressure meter	Air flow	Sensirion SDP816-125Pa	-12,5 – 125 Pa	0,5 Pa	Reference pressure meter
B207	CO_2	Infrared-absorption	Siemens Ultramat 6E	0 – 3 % 0 – 30 %	± 1% related to the range	Reference gas
	CO	Infrared-absorption	Siemens Ultramat 6E	0 – 300 ppm 0 – 3000 ppm	± 1% related to the range	Reference gas

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