

Confirmation
of seasonal space heating energy efficiency (η_s)
and Energy Efficiency Index (EEI)

Manufacturer	ThermoFLUX d.o.o. Bage 3 70101 Jajce Bosnia and Hercegovina
Name of the device	PELLING 20 ECO
Testing fuel	Wood pellets (EN plus A1)
Thermal output total kW	20,9
Partial load kW	6,8
Test report for the evaluation ¹ :	PL-20067-P from 08.06.2021, of the Test Laboratory for Combustion Plants at the Institute of Chemical, Environmental & Bioscience Engineering at the Vienna University of Technology.
Calculation η_s , EEI and E_s	Appendix (2 pages)

Based on the test report and according to the "COMMISSION DELEGATED REGULATION (EU) 2015/1187 of 27 April 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of solid fuel boilers and packages of a solid fuel boiler, supplementary heaters, temperature controls and solar devices" following results:

Seasonal space heating energy efficiency (η_s)	79
Energy Efficiency Index (EEI)	116
Energy efficiency class	A+

¹ The test results relate only to the test object at the time of testing.

Confirmation of seasonal space heating emissions (E_s)

Based on the test report and according to the "COMMISSION REGULATION (EU) 2015/1189 of 28 April 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for solid fuel boilers" following seasonal space heating emissions results:

Emissions	Seasonal space heating emission (E_s)	Unit
Particulate matter	13	mg/m ³
Organic gaseous compounds	4	mg/m ³
Carbon monoxide	222	mg/m ³
Nitrogen oxides	165	mg/m ³

Vienna, 08.06.2021

Person responsible for testing

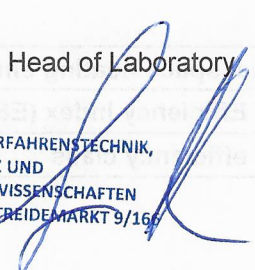


Dipl.-Ing. S. Diem

Head of Laboratory



INSTITUT FÜR VERFAHRENSTECHNIK,
UMWELTECHNIK UND
TECHNISCHE BIOWISSENSCHAFTEN
A-1060 WIEN, GETREIDEMARKT 9/166



Ing. Dipl.-Ing. Dr. S. Müller

Appendix: Calculation of η_s and EEI for the boiler “PELLING 20 ECO“

η_n	81,6	The ratio of the useful heat output and the total energy input of a solid fuel boiler, whereby the total energy input is expressed in terms of GCV (gross calorific value).
η_p	82,5	The ratio of the useful heat output and the partial energy input of a solid fuel boiler, whereby the partial energy input is expressed in terms of GCV (gross calorific value).
e_{lmax}	0,029	Electric power requirement at maximum heat output expressed in kW.
e_{lmin}	0,018	Electric power requirement at minimum heat output expressed in kW.
P_{SB}	0,002	Standby mode power consumption expressed in kW.
P_n	20,9	Thermal output total expressed in kW.
P_p	6,8	Partial load expressed in kW.
$F(1)$	3	$F(1)$ accounts for a negative contribution to the energy efficiency index due to adjusted contributions of temperature controls; $F(1) = 3$.
$F(2)$	0,006	$F(2)$ accounts for a negative contribution to the energy efficiency index by auxiliary electricity consumption: $F(2) = 2.5 \times (0.15 \times e_{lmax} + 0.85 \times e_{lmin} + 1.3 \times P_{SB}) / (0.15 \times P_n + 0.85 \times P_p)$.
$F(3)$	0	$F(3)$ accounts for a positive contribution to the energy efficiency index by the electrical efficiency of solid fuel cogeneration boilers, not relevant, $F(3) = 0$.
BLF	1,45	BLF is the biomass label factor, which is 1.45 for biomass boilers.
η_{son}	82,3	is the seasonal space heating energy efficiency in active mode $\eta_{son} = 0.85 \times \eta_p + 0.15 \times \eta_n$ expressed in %.
η_s	79	Seasonal space heating energy efficiency, rounded to the nearest integer: $\eta_s = \eta_{son} - F(1) - F(2) + F(3)$.
EEI	116	The Energy Efficiency Index of solid fuel boilers shall be calculated for the preferred fuel and rounded to the nearest integer as: $EEI = \eta_{son} \times BLF - F(1) - F(2) \times 100 + F(3) \times 100$.

Energy efficiency class	EEI
A+++	≥ 150
A++	≥ 125
A+	≥ 98
A	≥ 90
B	≥ 82
C	≥ 75
D	≥ 36
E	≥ 34
F	≥ 30
G	< 30

Appendix: Calculation of seasonal space heating emissions (E_s) for the boiler “PELLING 20 ECO“

The seasonal space heating emissions E_s of respectively particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides are calculated for manually stoked solid fuel boilers that can be operated at 50 % of the rated heat output in continuous mode, and for automatically stoked solid fuel boilers as follows:

$$E_s = 0,85 \times E_{s,p} + 0,15 \times E_{s,n}$$

where:

$E_{s,p}$ are the emissions of respectively particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides measured at 30 % or 50 % of rated heat output, as applicable;

$E_{s,n}$ are the emissions of respectively particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides measured at rated heat output.

Emissions of particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides shall be expressed standardised to a dry flue gas basis at 10 % oxygen and standard conditions at 0 °C and 1 013 millibar.

Emissions	$E_{s,n}$	$E_{s,p}$	E_s	Unit
Particulate matter	11	13	13	mg/m ³
Organic gaseous compounds	1	4	4	mg/m ³
Carbon monoxide	53	252	222	mg/m ³
Nitrogen oxides	197	159	165	mg/m ³