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Confirmation

Energy Efficiency Index (EEI)

of solid fuel boilers

Manufacturer	Thermo FLUX D.O.O. Skela b.b., 70101 Jajce Bosna i Hercegovina
Name of the device	„Pelling 35 ECO"
Testing Fuel	Wood pellets (EN plus A1)
Thermal output total kW	35
Partial load kW	10,7
Test reports for the evaluation[1]:	PL-14023-P-Korrektur from 31.06.2015 of the Test Laboratory for Combustion Plants at the Institute of Chemical, Environmental & Bioscience Engineering of the Vienna University of Technology.
Appendix	Calculation of EEI (Energy Efficiency Index)

Based on the test reports and according to the „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 EEI (Energy Efficiency Index) results:

EEI (Energy Efficiency Index)	119
Energy efficiency class	A+

Vienna, 02.03.2020

Person responsible for testing

Dipl.-Ing. S. Diem

Head of Laboratory

Univ. Prof. Dr. H. Hofbauer

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

Appendix: Calculation of EEI (Energy Efficiency Index) for the boiler „Pelling 35 ECO“

η_n	84,8	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	85,0	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}	0,085	Electric power requirement at maximum heat output [kW] [2]
e_{lmin}	0,034	Electric power requirement at minimum heat output [kW] [2]
P_{SB}	0,01	Standby mode power consumption [kW] [2]
P_n	35	Thermal output total [kW]
P_p	10,7	Partial load [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)	0,010	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}	85,0	is the seasonal space heating energy efficiency in active mode $\eta_{son} = 0.85 \times \eta_p + 0.15 \times \eta_n$ [%]
η_s	82	Seasonal space heating energy efficiency, rounded to the nearest integer: $\eta_s = \eta_{son} - F(1) - F(2) + F(3)$
EEI	119	The Energy Efficiency Index (EEI) of solid fuel boilers shall be calculated for the preferred fuel and rounded to the nearest integer as: $EEI = \eta_{son} \times 100 \times BLF - F(1) - F(2) \times 100 + F(3) \times 100$

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

[2] Specification according to manufacturer

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Confirmation

seasonal space heating emissions (E_s)

of solid fuel boilers

Manufacturer	Thermo FLUX D.O.O. Skela b.b., 70101 Jajce Bosna i Hercegovina
Name of the device	„Pelling 35 ECO"
Testing Fuel	Wood pellets (EN plus A1)
Thermal output total kW	35
Partial load kW	10,7
Test reports for the evaluation[1]:	PL-14023-P-Korrektur from 31.06.2015 of the Test Laboratory for Combustion Plants at the Institute of Chemical, Environmental & Bioscience Engineering of the Vienna University of Technology.
Appendix	Calculation of seasonal space heating emissions (E_s)

Based on the test reports 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	22	mg/m^3
organic gaseous compounds	6	mg/m^3
carbon monoxide	269	mg/m^3
nitrogen oxides	151	mg/m^3

Vienna, 02.03.2020

Person responsible for testing

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

Appendix: Calculation of seasonal space heating emissions (E_s) for the boiler „Pelling 35 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:

Es,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;

Es,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	14	23	22	mg/m^3
organic gaseous compounds	3	6	6	mg/m^3
carbon monoxide	80	302	269	mg/m^3
nitrogen oxides	176	146	151	mg/m^3