Technical Guide

for Contractors

PELLEMATIC©
72 — 128 kW

ENGLISH

17392_EN

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1 Pellets — a fuel with strict quality requirements

The raw material for pellets is wood. They are produced from saw and planer shavings, by-products of the sawmill industry.

Due to their high energy content and their shape, pellets are easy to transport and ideally suited to fully automatic heating operation. The high energy content is achieved by enormous compression of the shavings during pellet production. Materials with a high starch content from the food processing industry are used as a compression additive (e. g. corn starch). Other binding agents are not permitted.

Their diameter and length is shaped by pressing through die plates.

The quality of the fuel is of vital importance for ensuring smooth and fully automatic heating operation. Naturally, this also applies to pellets as a fuel.

Wood as a raw material is as different as the trees it comes from. Pelletisation minimises the differences in weight, moisture level and calorific value. Pellets are an unvaryingly homogeneous fuel, the composition, properties and limits of which are regulated by standards.

The quality of wood pellets has been regulated since 2010 by European standard EN ISO 17225–2, whereby not only the quality of the pellets themselves, but also their transportation and storage must comply with the specifications.

EN ISO 17225–2, Class A1:

Calorific value	≥ 4,6 kWh/kg or ≥ 16,5 MJ/kg
Loose density	min. 600 kg/m^3
Water content	max. 10 %
Ash content	max. 0.7%
Length	max. 40 mm
Diameter	6 mm
Fine material	max. 1 %
Contents	100 % natural wood

For fault-free operation, not only the pellet quality, but also storage at the end user is very important. This is regulated by Austrian standards ÖNORM EN ISO 20023.

In order to ensure smoothest possible and low-maintenance heating operation with pellets, the customer must be made aware of the following:

- Only class A1 pellets should be purchased from the pellet dealer and used.
- Pellets should be blown in as gently as possible in order to keep the fines content to a minimum.
- It is essential that the storage room is designed with a sloping floor or flexi tank, so that a continuous reduction in fines content is ensured.
- Regular cleaning of the boiler is very important.

2 Benefits for consumers and heating engineers

Better service
Thanks to its decentralised structure, ÖkoFEN has regional customer service branches. This ensures short travelling distances and quick response times.

Greater convenience	
Upgradable with the ÖkoFEN convenient ash box	Greater convenience when emptying ash 100% dust-free operation
Automatic cleaning	Automatically ensures consistently high efficiency
Reliability	By using a second suction turbine, reliability can be achieved.

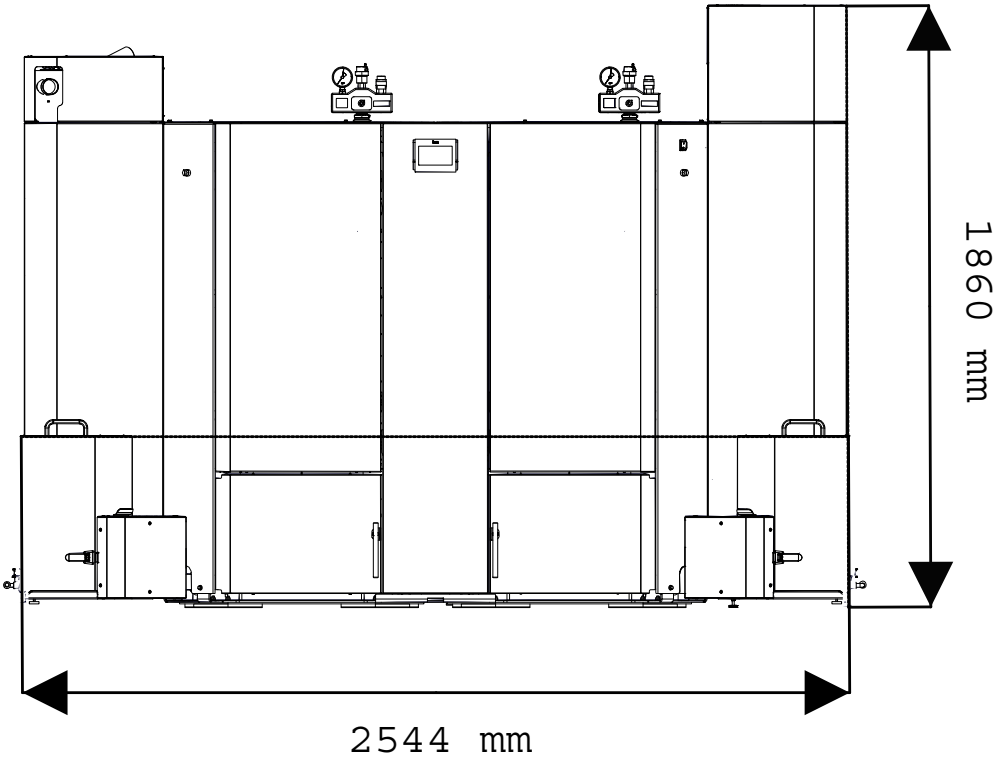
Lower heating costs	
ECO system • Multi-segment burner plate • Combustion chamber sensor • Negative draft control	Saves money and protects the environment with high efficiency and low emissions
Stainless steel combustion chamber	
High efficiency of 94.7% (confirmedby TÜV)	

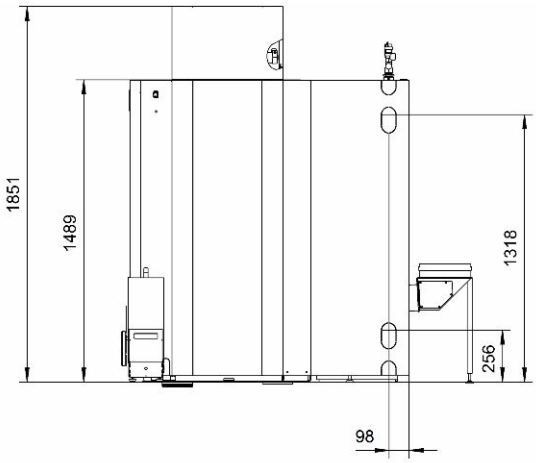
Straightforward cleaning and maintenance	
Integral return water temperature control	• Less installation work • Maintenance-free system is fully integrated and functions without a pump

Flexible planning	
Space-saving design	Possible to bring in through an 80 cm door.
	All components and accumulator pump are located under the casing.
Output adjustment in a few simple steps	Perfect design also in the event of subsequent changes in building heat load (extension/insulation)
Combinable with all ÖkoFEN convenient storage systems	• System design with no compromises • Range of more than 80 different store extraction variants

3 Required space

3.1 Condensing boiler technology

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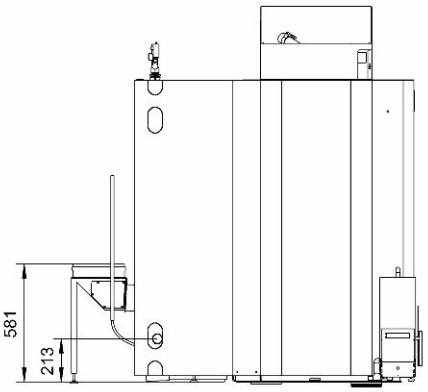
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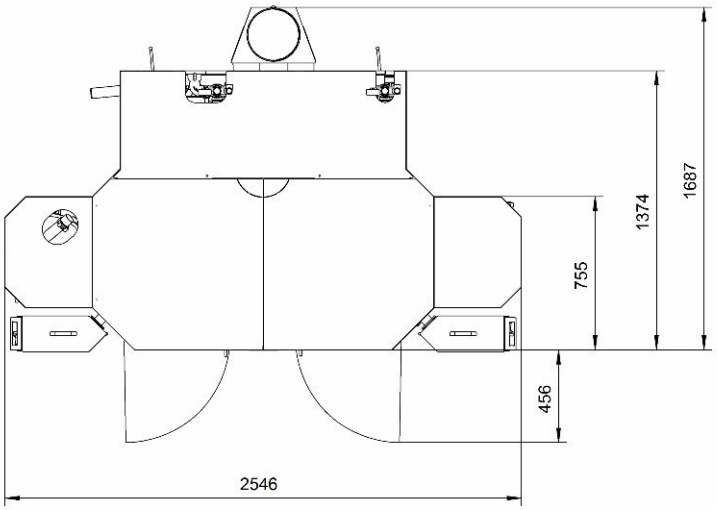
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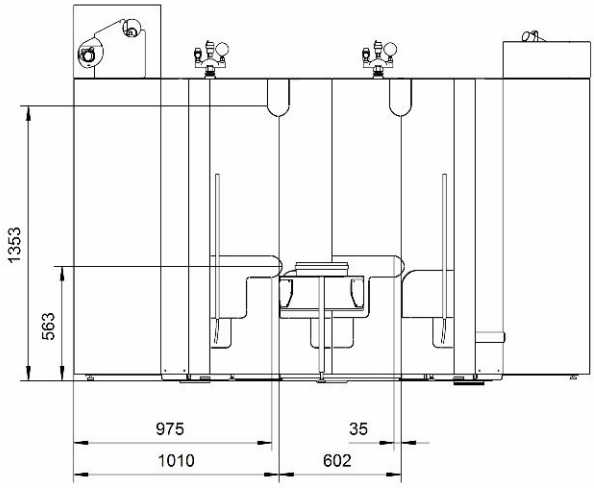
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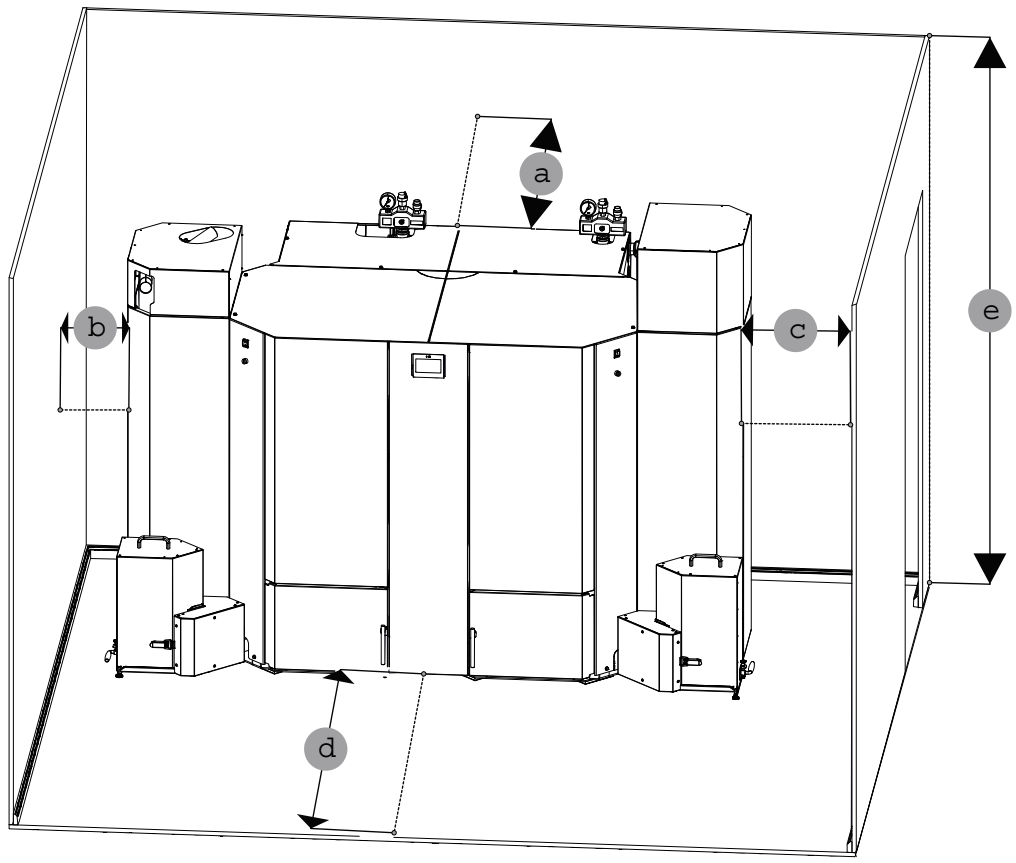
3.1.1 Minimum distances



a	Min. clearance of rear panel from wall or part of building	300 mm
b	Min. clearance of side of boiler from wall or part of building	300 mm
c	Min. clearance of side of boiler from wall or part of building	300 mm
d	Min. clearance of front of boiler from wall or part of building	700 mm
e	Minimum ceiling height	2100 mm

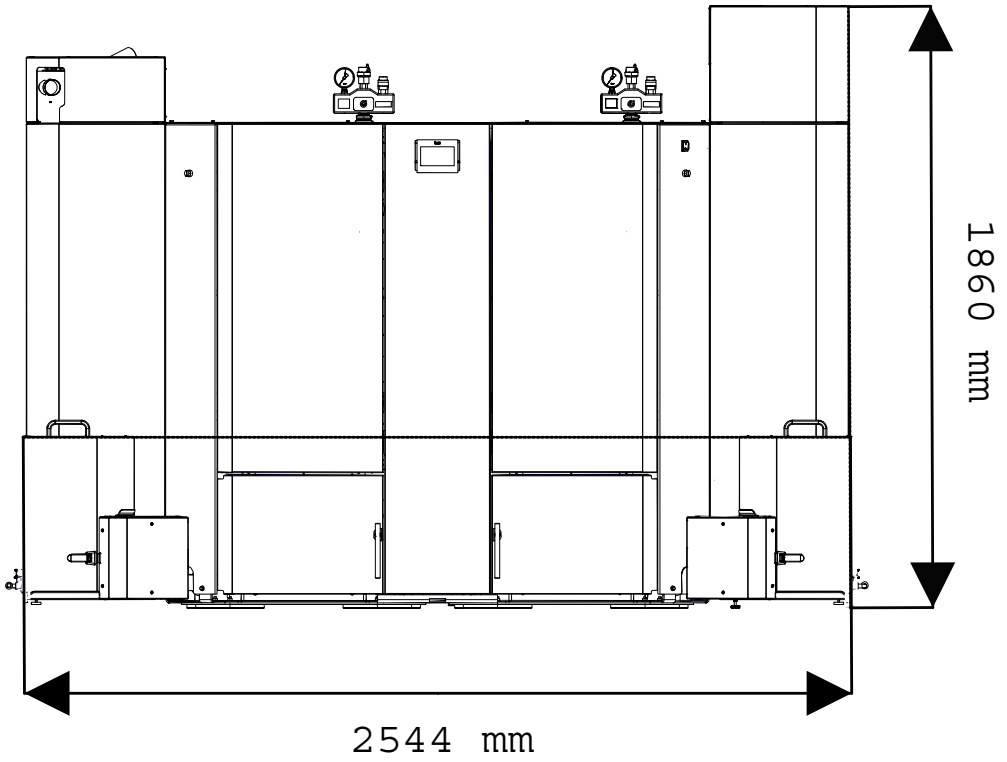
The indicated values must not fall below by piping or other.

NOTICE

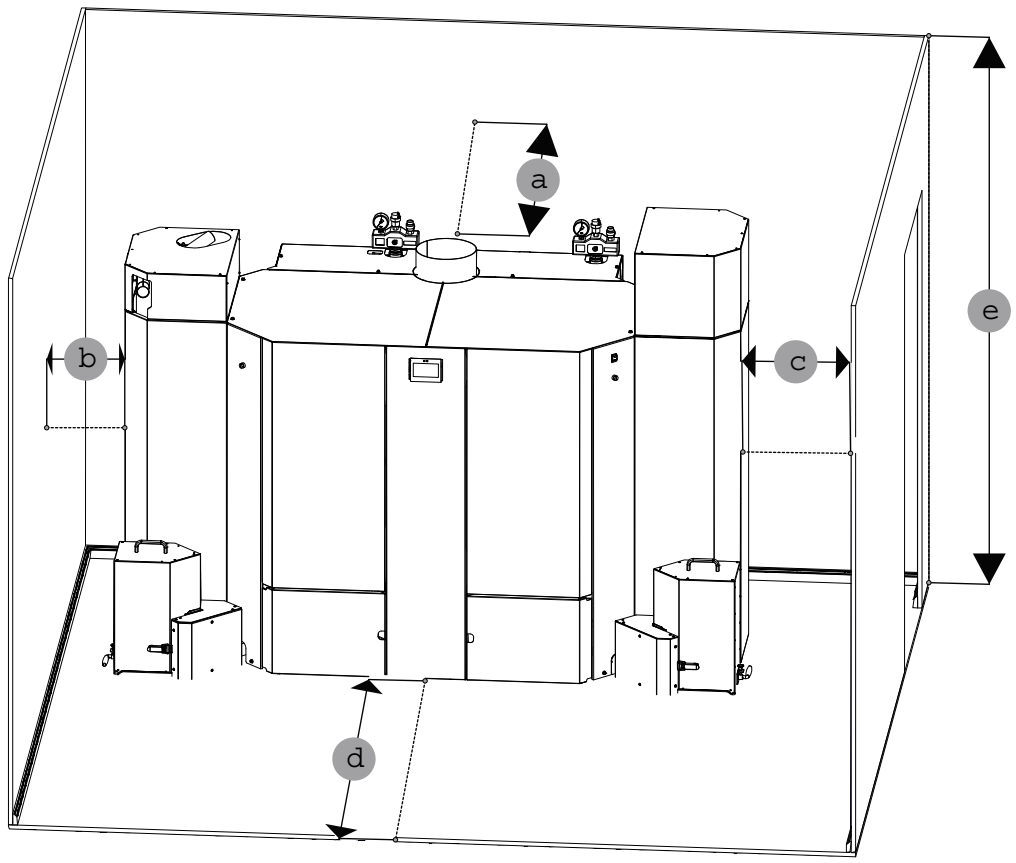
Due to a low boiler surface temperature, the specified minimum distances can be observed.

► Legislation in your country must be observed!

3.2 Conventional technology



3.2.1 Minimum distances



a	Min. clearance of rear panel from wall or part of building	200 mm
b	Min. clearance of side of boiler from wall or part of building	300 mm
c	Min. clearance of side of boiler from wall or part of building	300 mm
d	Min. clearance of front of boiler from wall or part of building	700 mm
e	Minimum ceiling height	2100 mm

The indicated values must not fall below by piping or other.

NOTICE

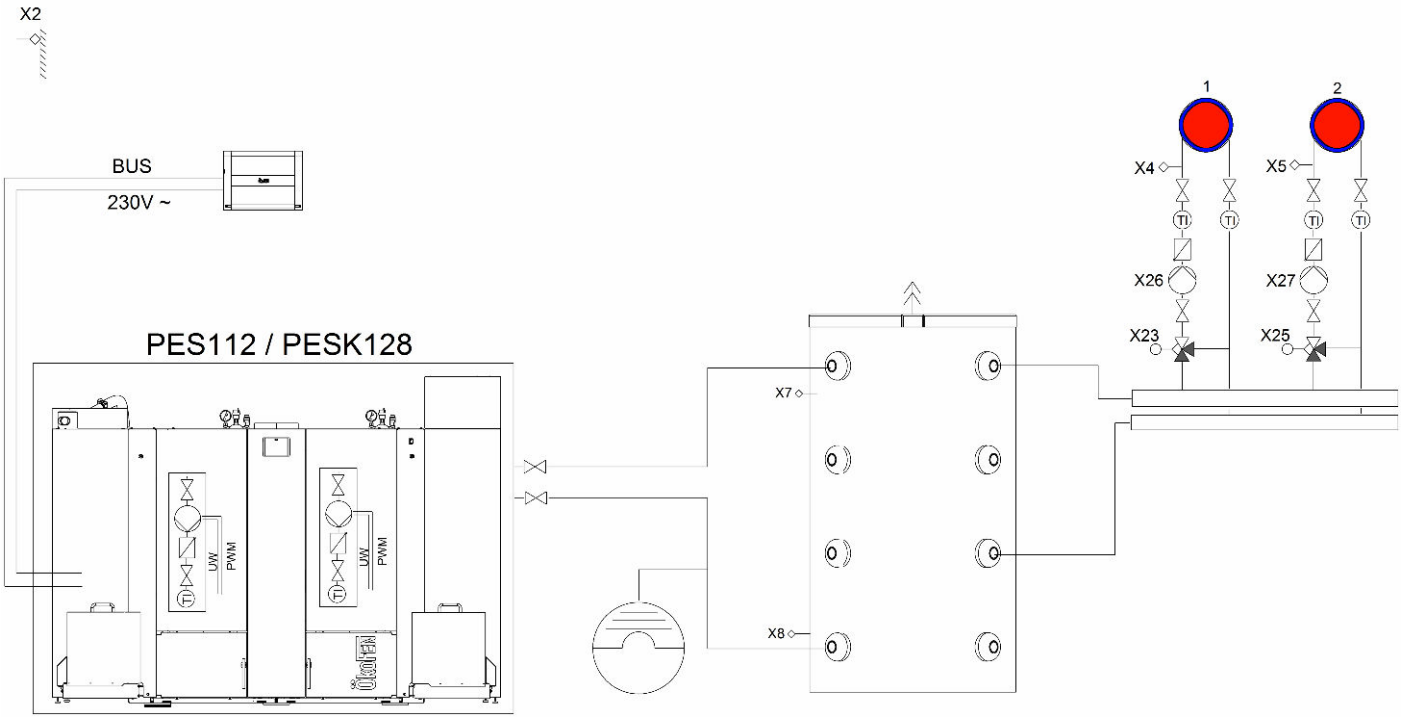
Due to a low boiler surface temperature, the specified minimum distances can be observed.

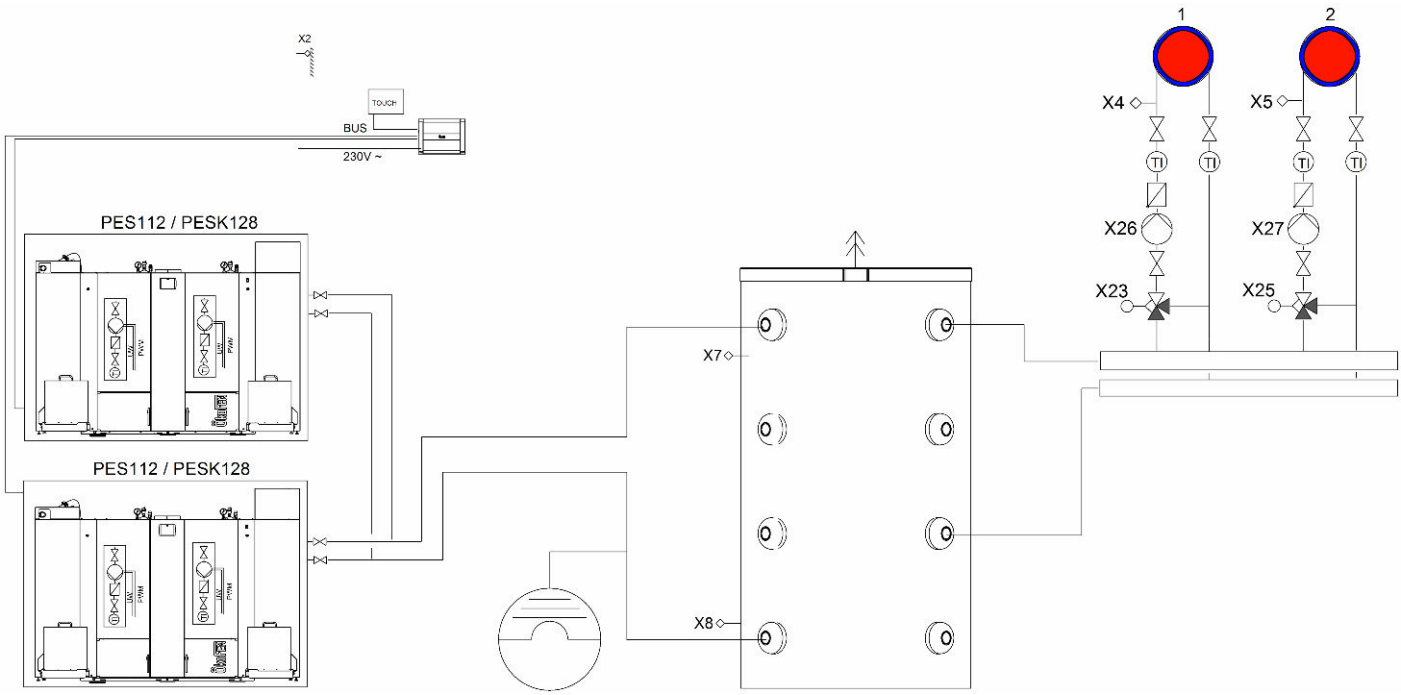
► Legislation in your country must be observed!

4 Configurator for hydraulic diagrams

This document only covers various examples of hydraulic schemes. In the *Ökofen Partnernet* you will find a large selection of hydraulic diagrams.

4.1 Hydraulic diagrams





5 Technical data

5.1 Condensing boiler technology

Information according to EU regulation 2015/1187 and 2015/1189

Designation of the series	Pellematic		
Model designation: Pellematic PESK	82	110	128
Manufacturer and contact details	ÖkoFEN Forschungs- und Entwicklungs GmbH, Gewerbepark 1, 4133 Niederkappel, Austria		
Boiler class	5		
Heat-up mode	Automatically		
Condensing boiler	no		
Solid fuel boiler with cogeneration system	no		
Combined heater	no		
Energy efficiency class	A++		
Energy efficiency index (EEI)	132	137	140
seasonal space heating energy efficiency in active mode η_{son}	94	97	99
Seasonal space heating energy efficiency η_s (based on upper heating value)	90	93	95
Delivered useful heat at nominal heat power P_n [kW]	82,0	110,0	128,0
Delivered useful heat at 30 % of the nominal heat power P_p [kW]	12,0	15,0	19,0
Boiler eff. rated power standard heat. mode [%]*	104,1	106,2	107,5

Further technical data and results of the type test available on request from your ÖkoFEN contact.

Fuel	Pellets made of 100% natural wood according to EN ISO 17225–2, class A1
Colorific value [kWh/kg]	≥ 4,6
Bulk density [kg/m^3]	≥ 600
Water content [Gew.%]	≤ 10
Ash parts [Gew.%]	≤ 0,7
Length [mm]	≤ 40
Diameter [mm]	6 ± 1

Model designation	Pellematic		
	82	110	128
Annual space heating emissions			
PM [mg/m^3]	< 40		
OGC [mg/m^3]	< 20		
CO [mg/m^3]	< 500		
NOx [mg/m^3]	< 200		

Auxiliary power consumption	
Auxiliary power consumption at nominal heat power el_{max} [kW]	0,228
Auxiliary power consumption at 30 % of nominal heat power el_{min} [kW]	0,078
Standby auxiliary power consumption P_{SB} [kW]	0,012

Water area			
Water capacity [l]	270 + 48		
Cleaning connection [inch]	2x 3/4" IG		
Feed / return connection [inch]	2		
Feed / return connection Ø [DN]	50		
Water resistance at 10K [mbar]	90	123	145
Water resistance at 20K [mbar]	43	48	53
Boiler temperature [°C]	65 - 90		
Minimum boiler temperature [°C]	55		
Operating pressure maximum [Bar]	3		
Test pressure [Bar]	4,6		

Model designation	Pellematic		
	82	110	128
Flue gas area (Flue gas = F.g.)			
Combustion chamber temperature [°C]	500 - 870		
Need of draught rated power [mBar]	as per chimney calculation		
Flue gas temperature partial load [mBar]	as per chimney calculation		
F.g. temp. rated power condensation mode [°C]	45 - 80		
F.g. temp. partial load condensation mode [°C]	40 - 80		
F.g. volume rated power at f.g.tem. condensation mode [kg/h]	195	208,5	242,2
F.g. volume partial load at f.g. tem. condensation mode [kg/h]	62	67,3	78
F.g. vol. rated power at AGT condens. mode [m^3/h]	150	162,9	186,4
F.g. vol. partial load at AGT condens. mode [m^3/h]	48	51,8	60,4
Flue gas tube diameter (at the boiler) [mm]	250		
Chimney diameter	as per chimney calculation		
Chimney construction	qualified for condensing, solid fuel, damp resistant, N1 or P1 (depending on chimney calculation)		

Model designation	Pellematic		
	82	110	128
Chimney calculation			
Rated heating power [kW]	82	98	110
Firing thermal capacity nominal load [kW]	78,8	93,1	103,6
CO2 volume concentration nominal load [%]	14,3	14,4	17,3
Flue gas iniertia current for chimney calculation nominal load [kg/s]	0,0542	0,0579	0,0673
Flue gas temperature for chimney calculation nominal load [° C]	55		
Required (+) or maximum (-) delivery pressure nominal load [Pa]	-5	-5	-5
Rated heating power partial load [kW]	12	15	19
Rated thermal power partial load [kW]	11,6	16,1	17,7
CO2 volume concentration partial load [%]	8,6	7,6	12,6
Flue gas iniertia current for chimney calculation partial load [kg/s]	0,0086	0,0094	0,0108
Flue gas temperature for chimney calculation partial load [° C]	50		
Required (+) or maximum (-) delivery pressure partial load [Pa]	-8	-8	-8

Weight	
Weight of boiler packaged on pallet with wooden frame [kg]	2 x 780
Overall Weight [kg]	2 x 734
Boiler Body Weight [kg]	2 x 422
Ash capacity ash box [kg]	60

Model designation	Pellematic		
	82	110	128
Electrical Components			
Connection value	230 VAC, 50Hz, 16A		
Main Drive [W]	80		
Drive Motor [W]	250 / 370		
Vacuum turbine [W]	1400		
Combustion Air Blower [W]	166		
Flue gas fan [W]	64		
Electrical Ignition – [W]	500		
Cleaning Motor [W]	80		
Motor External Ash Box [W]	80		
Motor Burner plate cleaning system [W]	40		
Flame Return Gate [W]	5		
Protection class	IP20		

* Test bench value related to the lower calorific value of the fuel. Determined at continuous full-load ideal operation according to the measurement procedures in EN303-5. Practical values and seasonal efficiencies may deviate due to local conditions, fuel properties and individual modes of operation. The values do not refer to an individual boiler, but serve solely for comparison purposes between the different boiler types.

5.2 Conventional technology

Information according to EU regulation 2015/1187 and 2015/1189

Designation of the series	Pellematic		
Model designation: Pellematic PE(S)	72	96	112
Manufacturer and contact details	ÖkoFEN Forschungs- und Entwicklungs GmbH, Gewerbepark 1, 4133 Niederkappel, Austria		
Boiler class	5		
Heat-up mode	Automatically		
Condensing boiler	no		
Solid fuel boiler with cogeneration system	no		
Combined heater	no		
Energy efficiency class	A+		
Energy efficiency index (EEI)	122	123	
seasonal space heating energy efficiency in active mode η_{son}	87		
Seasonal space heating energy efficiency η_s (based on upper heating value)	83		
Delivered useful heat at nominal heat power P_n [kW]	72,0	96,0	112,0
Delivered useful heat at 30 % of the nominal heat power P_p [kW]	11,0	15,0	17,0
Boiler eff. rated power standard heat. mode [%]*	95,5		95,4

Further technical data and results of the type test available on request from your ÖkoFEN contact.

Fuel	Pellets made of 100% natural wood according to EN ISO 17225–2, class A1
Colorific value [kWh/kg]	≥ 4,6
Bulk density [kg/m^3]	≥ 600
Water content [Gew.%]	≤ 10
Ash parts [Gew.%]	≤ 0,7
Length [mm]	≤ 40
Diameter [mm]	6 ± 1

Model designation	Pellematic		
	72	96	112
Annual space heating emissions			
PM [mg/m^3]	< 40		
OGC [mg/m^3]	< 20		
CO [mg/m^3]	< 500		
NOx [mg/m^3]	< 200		

Auxiliary power consumption	
Auxiliary power consumption at nominal heat power el_{max} [kW]	0,240
Auxiliary power consumption at 30 % of nominal heat power el_{min} [kW]	0,072
Standby auxiliary power consumption P_{SB} [kW]	0,012

Water area			
Water capacity [l]	270		
Feed / return connection [inch]	2		
Feed / return connection Ø [DN]	50		
Water resistance at 10K [mbar]	38,9	51,9	60,5
Water resistance at 20K [mbar]	10,4	13,9	16,2
Boiler temperature [°C]	65 - 90		
Minimum boiler temperature [°C]	55		
Operating pressure maximum [Bar]	3		
Test pressure [Bar]	4,6		

Model designation	Pellematic		
	72	96	112
Flue gas area (Flue gas = F.g.)			
Combustion chamber temperature [°C]	500 - 870		
Need of draught rated power [mBar]	0,08		
Flue gas temperature partial load [mBar]	0,03		
Flue gas temp. rated power [°C]	160		
Flue gas temp. partial load [°C]	100		
F.g. volume rated power at f.g.tem. [kg/h]	146,2	185,8	212,2
F.g. volume partial load at f.g. tem. [kg/h]	62	79,6	91,2
F.g. volume rated power at AGT [m^3/h]	112,5	143,0	163,4
F.g. volume partial load at AGT [m^3/h]	47,7	61,3	70,2
Flue gas tube diameter (at the boiler) [mm]	250		
Chimney diameter	as per chimney calculation		
Chimney construction	as per chimney calculation		

Chimney calculation			
Rated heating power [kW]	72	96	112
Firing thermal capacity nominal load [kW]	75,4	100,5	117,4
CO2 volume concentration nominal load [%]	14,4	15,4	16
Flue gas iniertia current for chimney calculation nominal load [kg/s]	0,0406	0,0516	0,0589
Flue gas temperature for chimney calculation nominal load [° C]	160	160	160
Required (+) or maximum (-) delivery pressure nominal load [Pa]	8	8	8
Rated heating power partial load [kW]	11	15	17
Rated thermal power partial load [kW]	12	16	18
CO2 volume concentration partial load [%]	10,5	10,7	10,8
Flue gas iniertia current for chimney calculation partial load [kg/s]	0,0066	0,0085	0,0098
Flue gas temperature for chimney calculation partial load [° C]	100	100	100
Required (+) or maximum (-) delivery pressure partial load [Pa]	3	3	3

Model designation	Pellematic		
	72	96	112
Weight			
Weight of boiler packaged on pallet with wooden frame [kg]	2 x 650		
Overall Weight [kg]	2 x 605		
Boiler Body Weight [kg]	2x 422		
Ash capacity ash box [kg]	60		

Electrical Components	
Connection value	230 VAC, 50Hz, 16A
Main Drive [W]	80
Drive Motor [W]	250 / 370
Vacuum turbine [W]	1400
Combustion Air Blower [W]	166
Flue gas fan [W]	64
Electrical Ignition – [W]	500
Cleaning Motor [W]	80
Motor External Ash Box [W]	80
Motor Burner plate cleaning system [W]	40
Flame Return Gate [W]	5
Protection class	IP20

* Test bench value related to the lower calorific value of the fuel. Determined at continuous full-load ideal operation according to the measurement procedures in EN303-5. Practical values and seasonal efficiencies may deviate due to local conditions, fuel properties and individual modes of operation. The values do not refer to an individual boiler, but serve solely for comparison purposes between the different boiler types.

6 FAQ

1. Is it also possible to bring the unit into the building when the door size is slightly smaller than the maximum unit dimension?

   - This is not possible without dismantling parts that are not intended to be dismantled. Please contact your ÖkoFEN representative for further information.

2. What is the maximum permissible distance between the Pellematic and the storage room?

   - For solutions with a vacuum suction system, the maximum distance is limited to 20 m hose length.

3. Does anything specific need to be observed for the hydraulic connection?

   - Please observe the guidelines pertaining to safety components according to EN12828 when planning the hydraulics. Use the ÖkoFEN hydraulic recommendations when installing the heating system. See section *4.1 Hydraulic diagrams*, page *11*. Discuss any deviating system configurations in advance with your ÖkoFEN representative.

4. What water quality is required for the Pellematic?

   - Please observe the relevant regulations for heating water (see ÖNORM H5195 and VDI 2035).

5. Does a return water temperature control need to be installed?

   - The Pellematic already has an integral return water temperature control in the form of a Venturi nozzle. Its correct function is only guaranteed in the case of proper hydraulic and electrical connection! Relevant requirements can be found in section *4.1 Hydraulic diagrams*, page *11*.

6. What needs to be observed when making the electrical connection?

   - Observe the state/local regulations (ÖNORM 8001) and technical connection requirements (TAEV).
     Connection values: 230 VAC, 50 Hz; fuse rating: 13 A when using a discharge auger and 16 A when using the vacuum suction system.
     The Pellematic is delivered fully wired. All that is required is a separate power supply connection for the entire system. Detailed information can be found in the ÖkoFEN installation manual or requested from your ÖkoFEN representative.

7. Can the Pellematic be operated briefly (emergency mode) with other fuels, such as woodchips?

   - No. The system is only approved for operation with pellets as per EN 14961-2, class A1.

8. How often is servicing required?

   - ÖkoFEN always recommends servicing/cleaning once a year, after the heating season. More regular servicing is required in the event of higher burner runtimes. The customer is offered a maintenance contract as a service. Please contact your ÖkoFEN representative for further information.

9. How often do I need to empty the ash?

    - This depends on burner runtimes. In detached and two-family houses, usually 1-3 times a year.

10. Is it possible to retrofit the Pellematic with a Stirling engine?

    - No. The Pellematic is not designed for this. Information regarding power generating pellet boilers can be found at *www.okofen-e.com.*

11. Where can I find the warranty and warranty conditions?

    - In the applicable valid price list, section "Delivery and sales conditions".