

HEATING GUIDE

HEATING SYSTEMS FOR YOUR HOUSE



Pellets Stove Pine White 10 kW

STEP BY STEP

ALL YOU NEED
TO KNOW

ARE YOU LOOKING FOR AN EFFICIENT AND ECONOMIC HEATING SYSTEM FOR YOUR HOME?

This guide explains everything you need to know from the different types of energy sources to more technical questions, so that you can buy the best heating system for you and your home.

STEP 1

WHICH SOURCE OF ENERGY?



01 DIFFERENT TYPES OF ENERGY

02 EVOLUTION OF THE ELECTRICITY PRICE

03 SUSTAINABILITY

04 BIOMASS

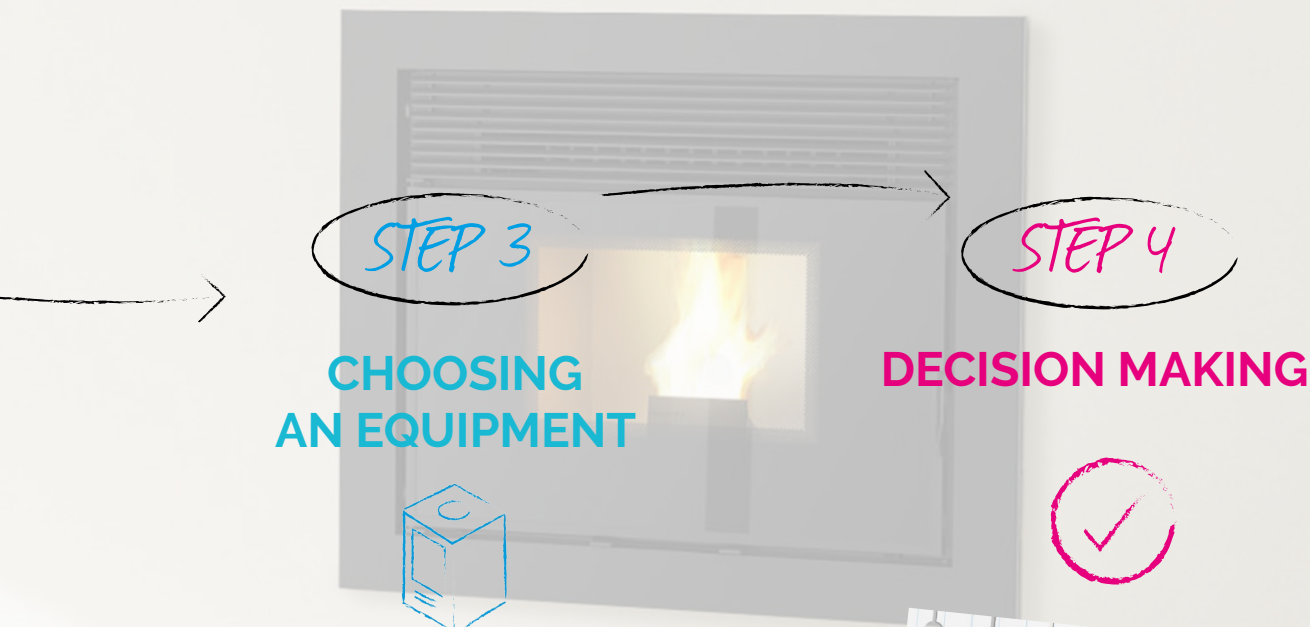
STEP 2

HOW MANY ROOMS DO YOU WANT TO HEAT?



05 LOCAL OR CENTRAL HEATING?

06 WHAT IS THE RIGHT HEAT OUTPUT FOR YOUR HOME?



- 07 EXAMPLES OF AVAILABLE SOLUTIONS
- 08 CARES TO BARE IN MIND DURING THE INSTALLATION PROCESS
- 09 CENTRAL HEATING INSTALLATION ELEMENTS

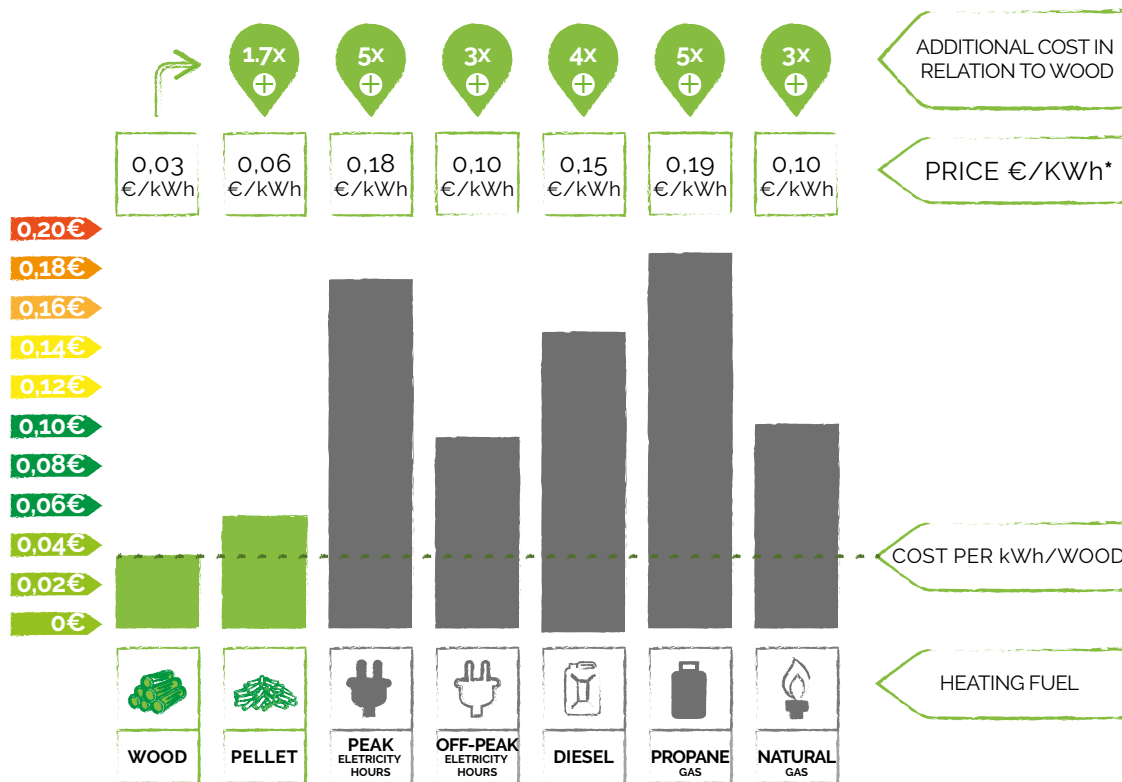
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WHICH SOURCE OF ENERGY?

01 DIFFERENT TYPES OF ENERGY

From the different types of energy analyzed, biomass (in the form of pellets or wood) is the most economical heating solution in comparison to the traditional sources most used.



**INSERTS
STOVES
BOILERS**

**AIR CONDITIONING
ELECTRICAL HEATERS
GAS HEATERS
THERMAL ACCUMULATORS
HEAT PUMP**

**70%
Reduction in the
electricity bill with
the use of pellets****

**Comparison kWh full value.

*Prices calculated based on current market prices and the average value of the equipment efficiency.



02 EVOLUTION OF THE ELECTRICITY PRICE

Over the past 10 years **the price per kWh of electricity has doubled** as prices for renewable energy such as **wood or pellets have remained stable**. The prices of other fossil fuels traditionally used for heating, such as **diesel or gas, have also had a high price volatility in the recent years** and constitute a risk option if the goal is to achieve significant savings in the energy bill.

PRICE €/kWh

0,25€

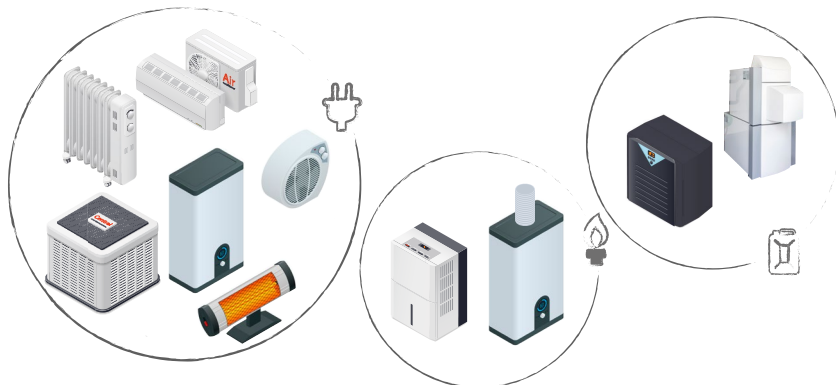
0,20€

0,15€

0,10€

*Data source: Pordata

2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

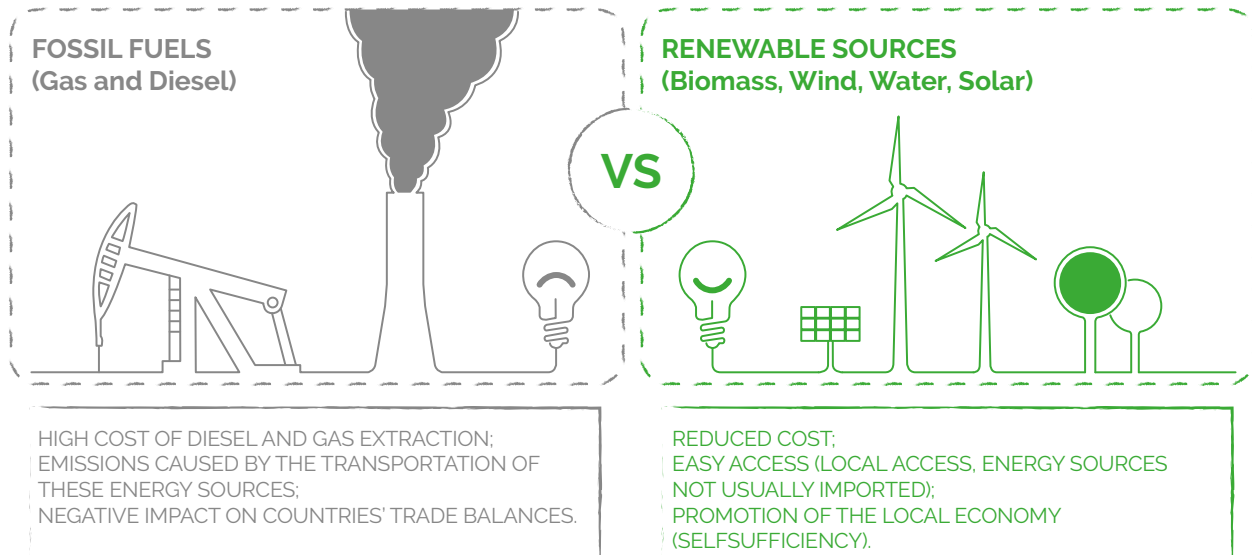


0,11€/kWh
Average price increase
in the last 10 years
in Portugal.

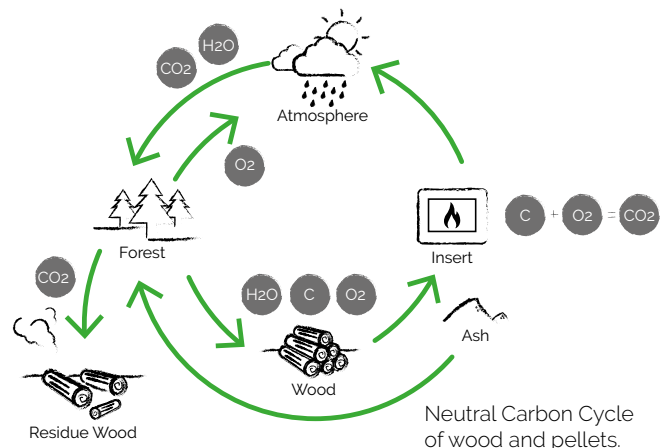


03 SUSTAINABILITY

Besides the economical factors, the usage of non-renewable energy sources has an extremely negative impact on the environment and the economy of many countries.



People all over the world are making efforts to reduce carbon emissions and there are ambitious goals set globally that will require greater use of renewable energy sources. Biomass thus emerges as a source of clean energy.





04 BIOMASS

Biomass is, by definition, organic matter. It is considered an important renewable energy reserve because it consists essentially of carbohydrates. The most common heat energy sources associated with biomass are wood and its derivatives such as pellets. It is about these sources of energy that we will talk about in this guide.

<20%

Humidity recommended
for a wood log



Moisture meter

The moisture content should be measured inside the trunk. To do this, the trunk should be split in half and measured with an appropriate instrument. The exterior is always drier and as so not a good indicator.

CHECK THE MOISTURE
LEVEL OF THE WOOD
WITH YOUR SUPPLIER

WOOD

OR

PELLETS

* Always accordingly to regulation
EN 14961-2 PLUS A1

ECONOMY



ECOLOGY



CONFORT

WOOD

- ⊕ ECONOMICAL
- ⊕ LOW EQUIPMENT COST
- ⊕ COZY

- ⊖ AUTONOMY
- ⊖ EFFICIENCY

PELLETS

- ⊕ AUTONOMY
- ⊕ EFFICIENCY
- ⊕ EASY TO USE

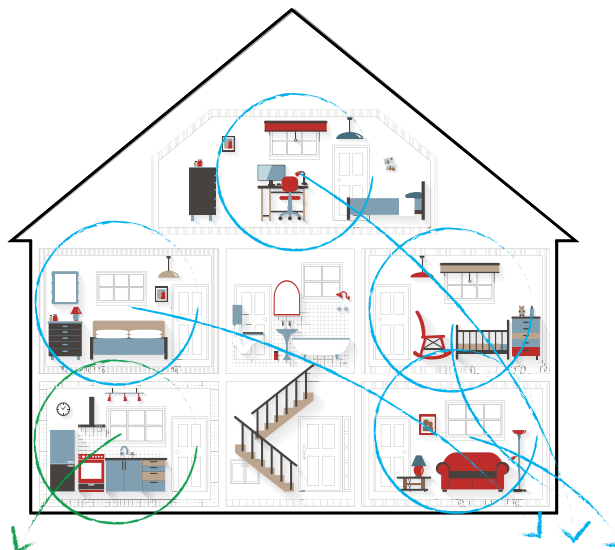
- ⊖ MAINTENANCE
- ⊖ HIGH EQUIPMENT COST



HOW MANY ROOMS DO YOU WANT TO HEAT?

05 LOCAL OR CENTRAL HEATING?

The first thing you should do, depending on the number of rooms to be heated, is choose between **local heating** and **central heating**. There are wood and pellet solutions for both types of heating.



1 ROOM
LOCAL HEATING

MULTIPLE ROOMS
CENTRAL HEATING



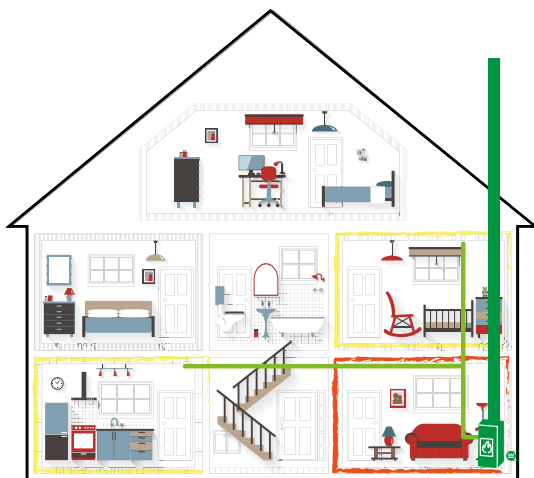


HOW MANY ROOMS DO YOU WANT TO HEAT?

05 LOCAL OR CENTRAL HEATING?

With **central heating** solutions you will be able to warm your home evenly. You can install your equipment inside the house (in the case of central heating inserts or stoves) or in a technical area (in the case of boilers).

In opposition, through **local heating** solutions you will mainly be able to heat a single room, even though some equipments have the option of channeling air to adjacent rooms.



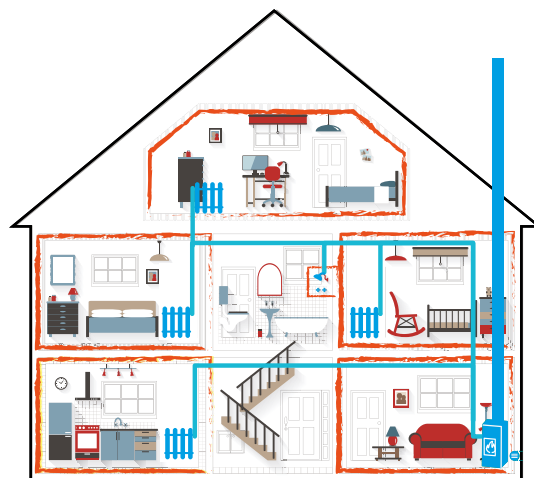
1 ROOM
LOCAL HEATING



Insert
with optional fan



Stove
with optional fan



MULTIPLE ROOMS
CENTRAL HEATING



Insert



Stove



Boiler



Water
heating



Radiator



Fan coil



Ducts



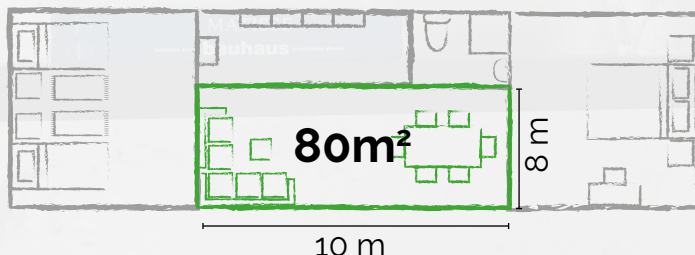
Radiant
floor



06 WHAT IS THE RIGHT HEAT OUTPUT FOR YOUR HOME?

If you have chosen a **LOCAL HEATING** solution, depending on the type of insulation of the house and the volume of the room(s) to be heated, you must determine the heat output of the equipment to be purchased.

STEP 1 - WHAT AREA DO YOU WANT TO HEAT?



$$10 \text{ m} \times 8 \text{ m} = 80 \text{ m}^2$$

STEP 2 - WHAT VOLUME NEEDS TO BE HEATED?



To measure the volume (e.g.):

Room area 80 m^2 x Height (A) $2.50 \text{ m} = 200 \text{ m}^3$

STEP 3 - DETERMINE THE INSULATION LEVEL OF YOUR HOME



HIGH INSULATION

New houses or on the coast

36 W/m^3



AVERAGE INSULATION

Refurbished houses
or on the coast

44 W/m^3



LOW INSULATION

Old Houses, on the
Mountains or on the Interior

52 W/m^3

STEP 4 - WHAT IS THE EQUIPMENT'S HEAT OUTPUT?

To measure the heat output required
(e.g. house with average insulation):

Insulation Level 44W/m^3 x Volume 200m^3 =
8800W

and finally

$8800\text{ w} / 1000 = \underline{\underline{8,8\text{ kW}}}$

**EQUIPMENT'S REQUIRED
HEAT OUTPUT:**

8,8 kW
(for local heating)

The calculations are based on theoretical values to help with the sizing. They require a detailed project, made by a certified technician.



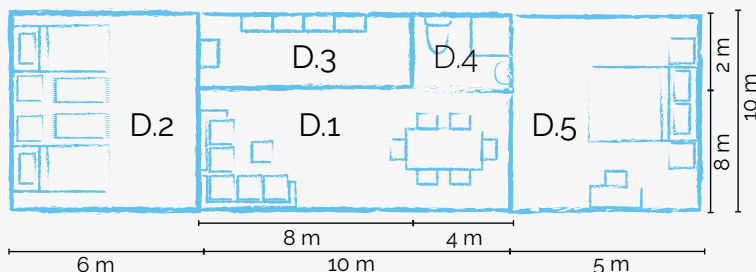


HOW MANY ROOMS DO YOU WANT TO HEAT?

06 WHAT IS THE RIGHT HEAT OUTPUT FOR YOUR HOME?

If you have chosen a **CENTRAL HEATING** solution, depending on the type of insulation of the house and the volume of the room(s) to be heated, you must determine the heat output of the equipment to be purchased.

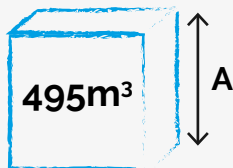
STEP 1 - WHAT AREA DO YOU WANT TO HEAT?



D. 1: 10m x 8m =	80m² +
D.2: 6m x 10m=	60m² +
D.3: 8m x 2m=	16m² +
D.4: 4m x 2m=	8m² +
D.5: 5m x 10m=	50m² =

HOUSE AREA= 198 m²

STEP 2 - WHAT VOLUME NEEDS TO BE HEATED?



To measure the volume (e.g.):

Room area **198m²** x Height (A) **2,50 m= 495 m³**

STEP 3 - DETERMINE THE INSULATION LEVEL OF YOUR HOME



HIGH INSULATION

New houses or on the coast

For Radiators:

36W/m³

or

For Radiant Floor
and Fan Coils:

28W/m³



AVERAGE INSULATION

Refurbished houses
or on the coast

44W/m³

or

32W/m³



LOW INSULATION

Old Houses, on the
Mountains or in the Interior

52W/m³

or

36W/m³

STEP 4 - WHAT IS THE EQUIPMENT'S HEAT OUTPUT?

To measure the heat output required
(e.g.: house with average insulation):

For Heating through Radiators:

Insulation level $44\text{W/m}^3 \times \text{Volume } 495\text{ m}^3 =$
21780W (Heat output required for the installation)

and finally

$21780\text{ W}/1000 = 21,8\text{ kW} \times 15\%$ (safety factor) =
25 kW Equipment Heat Output

(e.g.: house with high isolation):

For Heating through Radiant Floor and Fan Coils:

Insulation level $28\text{W/m}^3 \times \text{Volume } 495\text{ m}^3 =$
13860W (Heat output required for the installation)

and finally

$13860\text{ W}/1000 = 13,9\text{ kW} \times 15\%$ (safety factor) =
16 kW Equipment Heat Output

SIZING OF HEAT SINKS

RADIATORS:

1 radiator element with 600mm between connections has a heat output of 177W for an advance temperature of 60°

21780W
(Heat output required for the installation)
/ **177W**
(heat output of 1 radiator element)
= **123 n° Required Radiator Elements**

FAN COILS:

1200W of heating heat output

13860W
(Heat output required for the installation)
/ **1200W**
(Heat output of 1 radiator element)
= **12 n° Ventilococonvectores Necessários**

RADIANT FLOOR:

For radiant floor with 28W/m^3 heating needs we need approximately 3.4 linear meters of pipe per m^3

495 m³ (Installation Volume) / **3,4 m**
= **1683 m Required Tube**

Alternatively you can do the calculations room by room for more detailed information



07 EXAMPLES OF AVAILABLE SOLUTIONS: LOCAL HEATING

WHAT ARE THE DIFFERENCES BETWEEN THE EQUIPMENTS?

INSERT

Equipment that can be installed in an existing fireplace or in a structure created for this purpose, which saves up to 8x the wood consumed by a traditional fireplace.



STOVE

Equipment that can be assembled in any ventilated room (except for sanitary facilities), without needing a fireplace or structure previously created. It needs, however, a chimney. This equipment takes advantage of natural or forced convection to warm the environment efficiently.



BOILER

Central heating equipment, usually installed in technical area, with greater autonomy.



WOOD



Juno Insert



Tek System Stove

PELLETS



Fire Insert



Himalaia Stove

07 EXAMPLES OF AVAILABLE SOLUTIONS: CENTRAL HEATING



Acqua Insert



IW34kW Boiler

WOOD



Douro 12 kW Stove



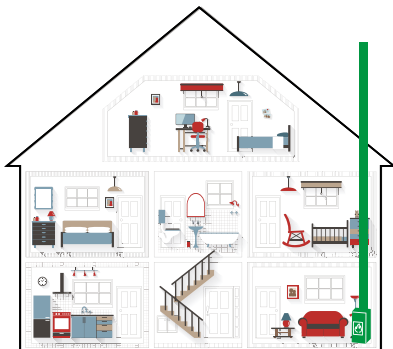
Automatic Boiler 24Kw

PELLETS

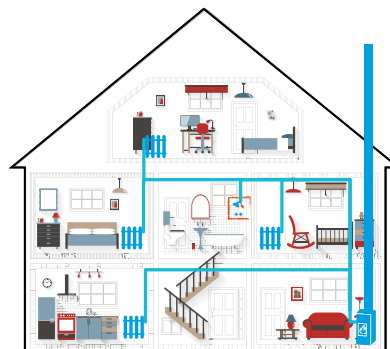


WHAT EQUIPMENT SHOULD I CHOOSE?

08 CARES TO BARE IN MIND DURING THE INSTALLATION PROCESS



LOCAL HEATING



CENTRAL HEATING

CHIMNEY

The installation of a good chimney is essential for the proper functioning of local and central heating equipments. You should ensure the recommended depression accordingly to the instruction manual. You should also ensure that the chimney installation schemes are respected.

AIR INTAKE

For efficient combustion, all equipments require oxygen. Proper air intake must be ensured as specified in the instruction manual. Installing this type of equipment near the hoods (e.g. kitchen, bathroom) can draw the air from your chimney into the house and thus hamper the combustion.

SAFETY DISTANCES

As specified in the instruction manuals, safety distances must be respected.

DUCTILE AIR DUCTS

CORRECT SIZING OF RADIATORS, RADIANT FLOOR AND FAN COILS

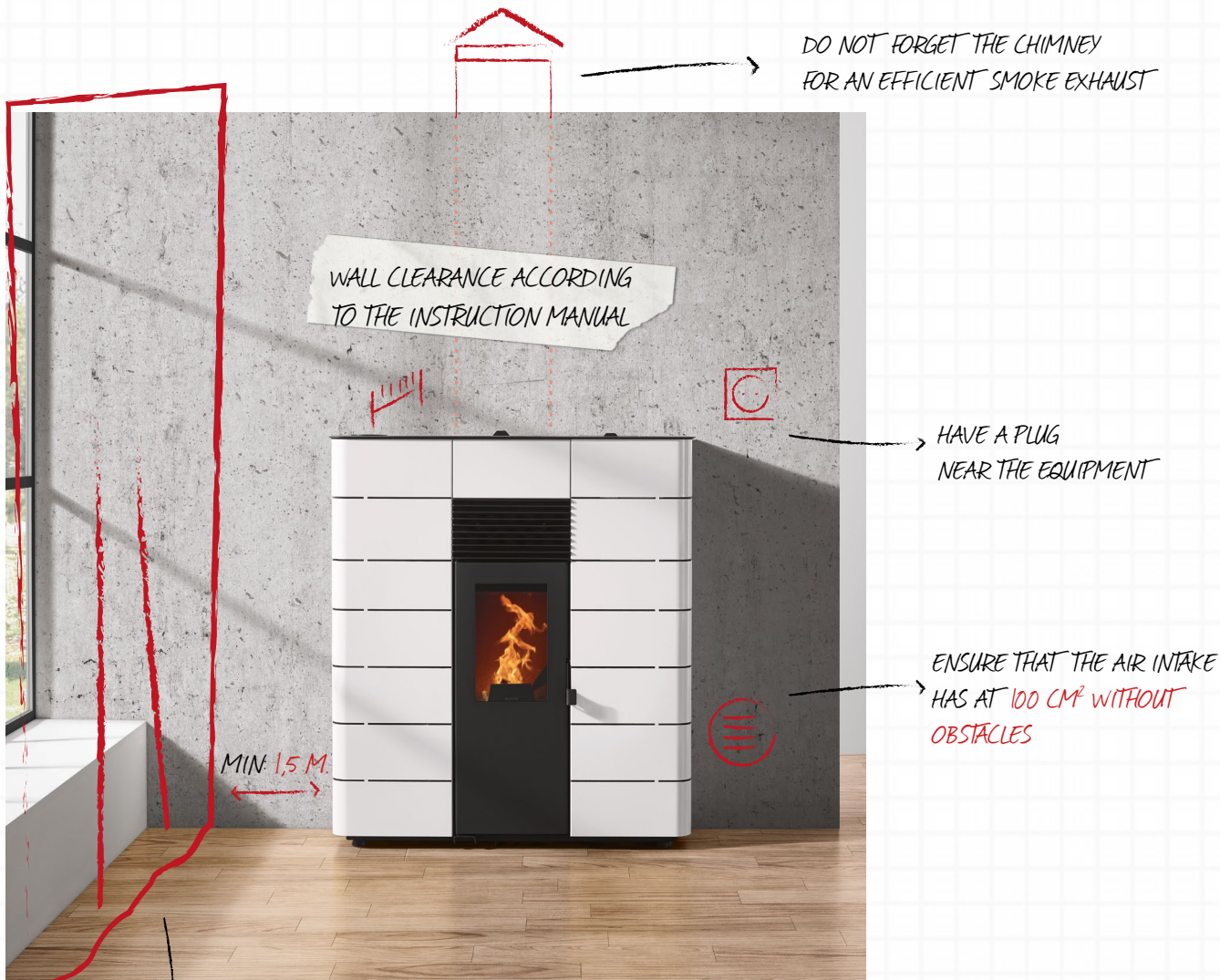
SAFETY VALVES

EXPANSION VESSEL

HYDRAULIC CIRCUIT / PUMP

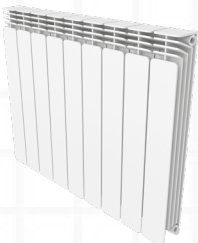



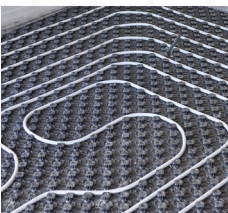




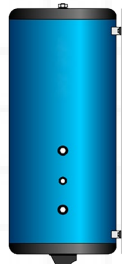



08 CARES TO BARE IN MIND DURING THE INSTALLATION PROCESS





09 CENTRAL HEATING INSTALLATION ELEMENTS

		DISSIPADOR DE CALOR	HEAT SOURCE	INERTIA TANK	DHS
WOOD	INSERTS	 RADIATOR		 IT Inertia Tank	 DHW Domestic Hot Water
	BOILERS	 RADIANT FLOOR		MANDATORY in wood boilers Volume: 30-50 L/kW	OPTIONAL in any equipment
PELLETS	BOILERS	 FAN COIL		 IT Inertia Tank	 DHW Domestic Hot Water
	STOVES			MANDATORY in radiant floor Volume: 15-20 L/kW	OPTIONAL in any equipment

**CHECK THESE
ELEMENTS WITH
YOUR CERTIFIED
INSTALLER**

SAFETY ELEMENTS*



Thermal Safety Valve



Anti-Condensation Valve



Room Thermostat



Pressure Safety Valve



Mixing Valve



Combustion Regulator



Automatic Air Vent



Motorized 3 Way Valve



Open Expansion Vessel



Radiant Floor Controller



Release valve



Combistat



Circulation Pump



Closed Expansion Vessel



Pressure Safety Valve



Anti-Condensation Valve



Motorized 3 Way Valve



Closed Expansion Vessel



Diferencial Thermostat



Room Thermostat



Pressure Sensor



Automatic Air Vent



Mixing Valve



Circulation Pump



Radiant Floor Controller

* The definition of the various safety elements can be found in the glossary.



WHAT EQUIPMENT SHOULD I CHOOSE?

09 CENTRAL HEATING INSTALLATION ELEMENTS



BACKBOILERS:



To prevent condensation, set up the circulation pump to start at $T > 60^{\circ}\text{C}$, as shown in **illustration 1**.

The combustion regulator must be tuned to completely close the combustion air intake (oxygen) at 80°C , as shown in **illustration 2**.

The thermofluid must enter the equipment by the intake of the stove (a or a') and exit through the outlet (b or b'). However, this path requires to be crossed, as shown in **illustration 3**. That is, if you set the thermofluid to enter into a, it will have to exit through b. However, if it enters the a' it must exit through b'. This crossing prevents condensation and increases the efficiency of the appliance.

Whenever the chimneys are outside the house, it is recommended to use a double wall insulated chimney pipe, especially in wood burning equipments. This will avoid condensation problems in the chimney.

RADIATORS:

They should preferably be placed below the windows.

In case of placing more than one radiator per division, these should be placed facing each other.

The inlet of the thermal fluid should always be placed on top of the radiator.

Preferably do not install radiators with more than 10 elements.

If you need larger radiators you should cross the Input and Output, as shown in **illustration 4**.

RADIANT FLOOR:

It is necessary to always install an inertia tank and a thrust mixer. The drive temperature cannot exceed $35\text{--}40^{\circ}\text{C}$.



Illustration 1

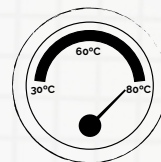


Illustration 2

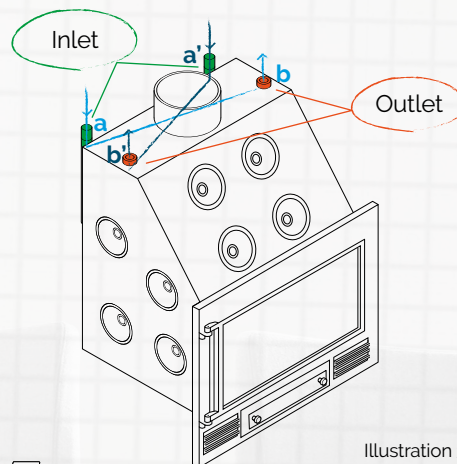


Illustration 3

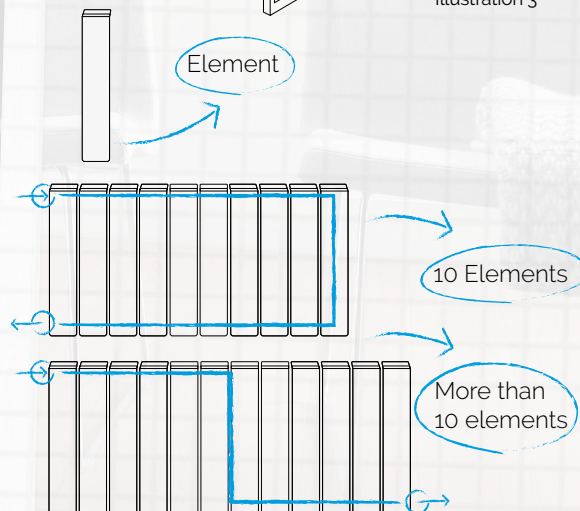
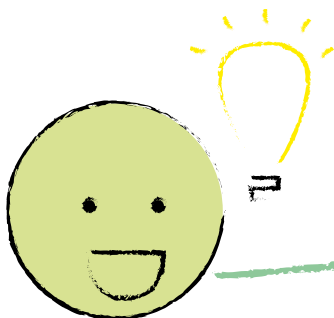


Illustration 4

CHECK THESE
ELEMENTS WITH
YOUR CERTIFIED
INSTALLER



10 DECISION MAKING



**YOU ARE INFORMED AND DECIDED
TO BUY A HEATING SYSTEM FOR
YOUR HOME.**

**YOU DECIDED THAT A WOOD OR
PELLETS SOLUTION IS THE
MOST APPROPRIATE.**

YOU EVALUATED THAT:

**YOU WANT
A LOCAL HEATING SOLUTION**



Insert
with optional fan



Stove
with optional fan

**YOU WANT
A CENTRAL HEATING SOLUTION**



Insert



Stove



Boiler



Water
heating



Radiator



Fan coil



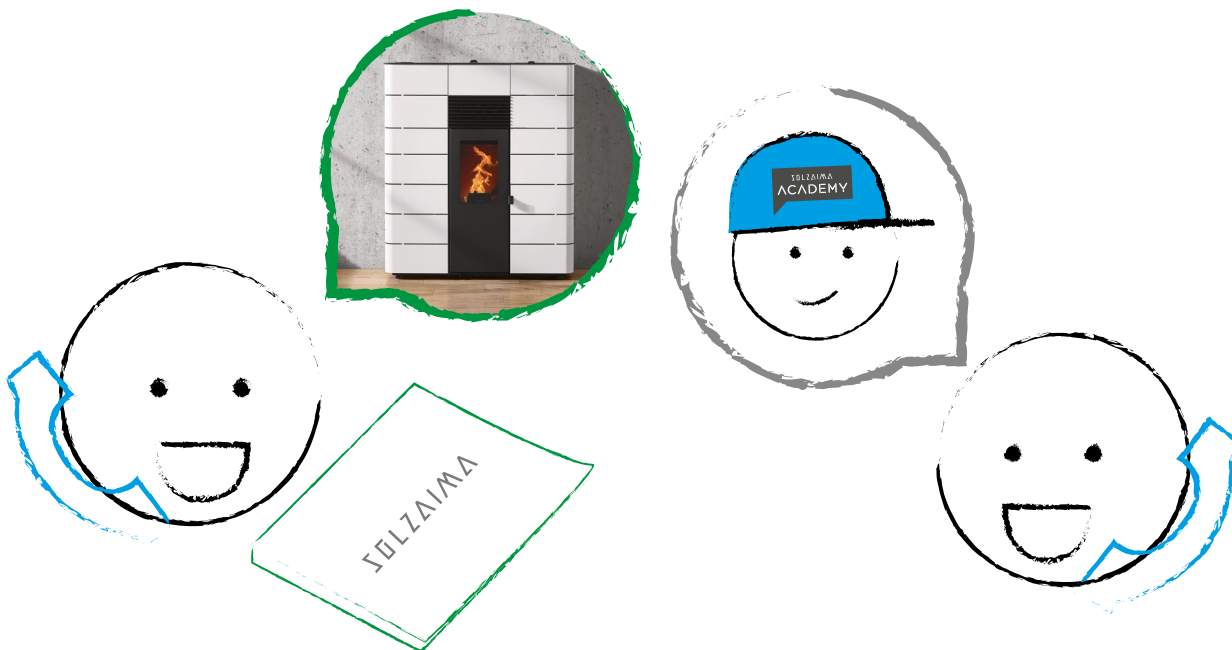
Ducts



Radiant
floor



11 WHERE TO BUY?



CONTACT THE BRAND

You have already chosen the model you want or you still have doubts and want to see the product. Simply go to **www.solzaima.co.uk/onde-comprar** and we will send you the details of the nearest installer.

CONTACT AN INSTALLER

In order for your equipment to function without any problem, it is very important that you choose a certified installer. He will perform the installation with all the cares required in terms of the chimney, and safety devices. This way, you will be able to enjoy your equipment to the fullest.

DO NOT FORGET:



Always use dry wood with less than 20% of moisture content and certified pellets according to EN 14961-2 plus A1.



ENSURE THAT YOU HAVE THE RIGHT
HEAT OUTPUT

VERIFY THAT THE INSTALLATION
IS WELL MADE

ALWAYS READ THE INSTRUCTION
MANUAL BEFORE USING THE
EQUIPMENTS AT
www.welcome.solzaima.com

IN CASE OF DOUBT,
CONSULT YOUR INSTALLER





**GUILHERME
AWARD'16**



Find these
and other models
in our catalog

SOLZAIMA

www.solzaima.co.uk



12 CHECK LIST: LOCAL HEATING

HEATING AREA: _____

INSULATION LEVEL: _____

EQUIPMENT HEAT OUTPUT: _____

INSTALLATION PLACE: _____

SELECTED EQUIPMENT: _____

☐ AIR INTAKE

☐ ELETRICITY
(Pellets stoves and inserts;
wood inserts with forced ventilation)

☐ SAFETY DISTANCES

☐ CHIMNEY



12 CHECK LIST: CENTRAL HEATING

HEATING AREA: _____

INSULATION LEVEL: _____

EQUIPMENT HEAT OUTPUT: _____

INSTALLATION PLACE: _____

SELECTED EQUIPMENT: _____

☐ AIR INTAKE

☐ ELETRICITY
(Pellets stoves and inserts;
wood inserts with forced ventilation.)

☐ SAFETY DISTANCES

☐ CHIMNEY

☐ HYDRAULIC CIRCUIT

☐ HEAT SINKS
(e.g.: Radiators, fan coils, radiant floor)

☐ INERTIA TANK
(especially wood boilers and radiant floor)

☐ THERMAL ACCUMULATOR

☐ WOOD SAFETY DEVICES
(Combustion regulator, 3 bar safety valve,
expansion vessel, circulating pump,
anti-condensation valve)

☐ PELLETS SAFETY DEVICES
(Expansion Vessel)

☐ CONTROL DEVICES
(Thermostat start pump 60°C, boilers and wood inserts)

☐ ADDITIONAL CONTROL DEVICES
(Differential thermostat with programmable hysteresys > 15°C;
Inertia tank; Thermal accumulator)

13 GLOSSARY

Anti-Condensation Valve	Mechanical device that allows to control the mixing flows, in order to ensure that the water temperature that returns to the boiler is higher than the pre regulation value of the valve itself. This valve is classified by dimension and kvs (measurement unit for condensing valves).
Area	Measurement of a surface in IS units (International System) - m ² .
Automatic Air Vent	Device that expels the air left in the heating fluid. The air can have very negative effects on the reliability and efficiency of the heating installations. In extreme conditions, it can cause noise in the installation, cavitation of pumps, oxidation, among others.
Biomass	Different forms of organic matter that can be converted into energy by combustion processes.
Boiler	Wood or pellet equipment in which the heat produced in the combustion is transferred to a properly insulated water chamber.
Central Heating	Type of heating for multiple rooms in a building.
Chimney	Smoke evacuation conduit for the combustion of wood or pellets. It is usually displayed in circular stainless steel.
Circulation Pump	Device that ensures the circulation of hot water in the installation. Allows to counteract the estimated circuit loss of load. It must be chosen accordingly to the curves and the manometric height of the installation.
Closed Expansion Vessel	Device that allows to soften the thermal expansion of the fluid (increase or decrease of pressure) that occurs as a consequence of the increase and decrease of central heating temperature.
Combistat	Device used in wood equipment to start the circulation pump when there is temperature in the equipment. Usually it is programmed to start at T > 60°C.

13 GLOSSARY

Combustion Regulator	Device that controls the supply of combustion air.
Differential Thermostat with Programmable Hysteresys	Device applied in inertia tanks and thermoaccumulators with a programmable temperature differential, to avoid the systematic start. It should be programmed between 15 and 20°C.
Heat Output	Energy per unit of time generated in the equipment that goes into the air or to the installation (water circuit), depending on the type of heating being local or central.
Heat Sinks	Elements used to dissipate heat produced in inserts, boilers and stoves. It can take various forms, such as radiators, fan coils and radiant floor. Among these, the radiator is the most commonly used.
Hydraulic System	Definition applied to everything that constitutes the installation circuit through which water passes.
Insert	Equipment that can be installed in an existing fireplace or in a structure created for this purpose, which saves up to 8x the wood consumed by a traditional fireplace.
Inertia Tank	Tank that accumulates the heat that goes to the central heating water circuit.
Isolated Chimney	Smoke evacuation conduit for the combustion of wood or pellets. It is usually displayed in circular stainless steel. It has a double wall insulated with rock wool inside to prevent thermal losses.
Isolation Level	Factor taken into account in the sizing process, according to the type of the house and local area (coastal or mountainous).
Local Heating	Type of heating for a building's single room.
Mixing Valve	Device that controls the central heating system by mixing the water that comes out of the boiler with the water returning from the system. This allows to obtain the desired water flow temperature supplied to the user.

13 GLOSSARY

Moisture Content	Quantity of water in percent of weight available in pellets or wood.
Motorized 3 Way Valve	Device that allows prioritizing the supply of thermal fluid according to the needs. For example, to prioritize heating hot water instead of central heating.
Open Expansion Vessel	Device that allows to soften the thermal expansion of the fluid when the water is in direct contact with the external environment and, therefore, can expand freely.
Pellets	Type of biomass consisting of small cylinders of pressed wood used to generate thermal energy through a combustion process. It should be used with a maximum moisture content of 5-8%.
Pressure Safety Valve	Valve that opens automatically when a certain pressure is applied, preventing the heating equipment from damaging due to the excess of pressure in the hydraulic circuit.
Pressure Sensor	Device that senses and measures pressure (usually in the form of gas or liquids). This device when in electronical circuits takes the form of an integrated circuit acting as a transducer. It replicates (as an electric signal) the signal received in the form of applied pressure.
Radiant Floor Controller	Electronic device that controls heating areas. The device allows the reception of room temperature information (compares and decides) while acting on zone valves (closure/opening). It also controls the heating thermofluid flow according to the defined set point.
Release Valve	Ball valve that allows drainage of the thermal fluid inside the equipment.
Room Thermostat	Device applied in central heating installations, used to control the temperature of the room and set the start and stop point of the boiler according to its needs. Preferably it should be programmed with 1°C between the start and stop commands.

13 GLOSSARY

Stove	Equipment that can be assembled in any ventilated room (except for sanitary facilities), without needing a fireplace or a previously created structure. It needs, however, a chimney. This equipment takes advantage of natural or forced convection to warm the environment efficiently.
Thermal Safety Valve	Valve that opens automatically when a certain temperature is applied, preventing the heating equipment from damaging due to the excess of temperature in the hydraulic circuit.
Thermoaccumulators of DHW	Deposit that accumulates the heat used in domestic hot water (DHW).
Ventilated	Term applied to inserts and stoves that include fans to accelerate the circulation of air in the room.
Volume	Measure that expresses the size of a body. The IS unit (International System) is m ³ .
Wood	Type of biomass consisting of wood fragments used to generate thermic energy through a combustion process. It should be used with a maximum moisture content of 15-20%.

This guide was designed by Solzaima to help people choose the best heating solution for their home. Pictograms, photos and sizings are merely exemplary and all solutions must be designed by suitably trained installation professionals. This guide may contain inaccuracies or errors and may be changed at any time without notice.



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www.solzaima.co.uk