# BUILDING PREPARATION FOR FIREPLACE INSERTS AND FIREPLACESTOVES WITH A HOT-WATER EXCHANGER

## INTRODUCTION

For today's heating requirements, fireplace inserts and stoves with a hot-water exchanger are a leading source of heat for buildings with low heat losses. To ensure they work well, choosing the right appliance is very important. When choosing a hot-water fireplace insert or stove, it is vital to consider the ratio of heat transmitted by the appliance to its surroundings and to the heating medium (heating water).

The selection of a fireplace insert or stove depends on the investor's requirements and the heat loss of the building.

The appliance utilises the heat created in the furnace to the maximum and uses the large heat transfer surface to transfer this heat to the heating water.

*ADVANTAGES:*

- High efficiency
- Easy operation - regulation using a single controller
- High heat capacity
- Cost-saving and efficient
- Heats evenly, reliably and safely

## DESCRIPTION OF HOT-WATER EXCHANGER FUNCTION

When heating in a fireplace insert or stove, the circulation pump which extracts heat from the exchanger is activated when the hot water exchanger reaches the required temperature. Installation must ensure the optimum temperature of return water using a thermostatic mixing valve valve that maintains a return water temperature of at least 55°C; the optimum temperature is around 65°C depending on the temperature of the heating system.

## DESCRIPTION OF FUNCTION USING AN ACCUMULATION TANK

If the control unit detects the need to start heating based on the external temperature, the heating system pump is activated and the three-way mixing valve with a servo drive opens, delivering heating water into the heating system. This usually applies for installations with an accumulation tank and automatic heating system control unit.

If the system includes an accumulation tank and the heating system reaches the required temperature, excess heat is stored in the accumulation tank.

**The system must include safety elements, namely:**

- *Expansion tanks* - the installation of expansion tanks of a corresponding volume for the heating system, solar system and for drinking water.



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- *Safety valves* - the installation of safety valves for the heating system, solar system and at the water inlet to the hot-water exchanger reservoir.
- *Cooling loop* -the installation of an aftercooling thermostatic valve on the cooling loop.
- *Backup power source* - for the control unit, capable of extracting heat in the fireplace insert (stove) during a power outage.

*TIP*: the circulation pump is connected to a backup power source. There are also pumps with additional battery power available on the market. In case of a power outage (no power in the socket), the backup power source connected to the pump starts automatically. After the power comes back on, the backup power source turns off automatically and is kept fully charged. The operating time of the backup power source is not unlimited - it depends on the capacity of the batteries used. It is primarily intended to cover a temporary outage, which could pose a risk to the safety of the system by not allowing heat to be extracted from the stove or insert (at the end of the combustion phase), leading to overheating.

## PRODUCT DESCRIPTION

Fireplace inserts and fireplace stoves consist of many parts.

The **doors** are equipped with a self-closing safety element (return spring, hydraulic mechanism, etc.) that partially or fully closes the door if it is left open. This prevents the dangerous consequences of a hot piece of wood falling out of the fireplace.

To prevent over-heating of the interior, some of our products are equipped with double or triple glazed doors. The outer glass is equipped with a modern black print, while the inner glass includes a reflexive coated layer that reflects heat radiation back into the fireplace. This combination minimizes the radiation entering the room through the glass and thus increases user comfort. When moving near the insert, you won't feel the heat as strongly as near inserts with single glazing. Double or triple glazing with reflexive glass also maintains the maximum temperature in the fireplace, which ensures perfect fuel combustion.

The **external air intake (EAI)** is a modern and effective means of supplying the appliance with the air required for combustion; when it is installed, air is not supplied from the interior. Another aspect of installing EAI is the creation of a closed circuit of air from the outside, which limits the problem of having to install a fume hood and air ventilation. Primary and secondary air can be fully controlled using one convenient control element. This can be connected to fittings at the rear or bottom of the stove/insert. At the same, EAI enables the installation of automatic burning regulation. This method of air intake is optional.

The **flue gas exhaust i**s designed to allow easy connection of the product to the chimney or draught system. The neck of the smoke flue is made of solid cast iron.

**Air intake (primary and secondary)** is regulated using a single controller. Primary air facilitates the start of fuel combustion when lighting the fire; secondary air improves burning efficiency and decreases CO emissions. If automatic burning regulation is installed, it controls all air flows. The air intake regulation system was designed to ensure that air intake can never be completely closed for combustion. This is very important in terms of safety, since otherwise, under certain conditions, if the door is opened carelessly, the gases created during combustion could explode.

**Pre-heating combustion air** takes place in a large chamber lined with channels under the furnace, where the secondary air needed for combustion is pre-heated. These channels improve the combustion process and increase efficiency.

**Chamotte (Vermiculite) panels in the furnace** ensure a high temperature and optimum combustion in the furnace, as well as maximum transfer of heat to the hot-water exchanger. In addition, chamotte is not an expensive material and therefore there is no risk of high investment if it is damaged.

**The hot-water casing and flue gas exchanger** are tested to an overpressure of 5 bar; the permitted operating overpressure is 2.0 bar. There are two thermowells for thermosensors and an air-escape valve in the upper part of the hot water exchanger. In order to reduce losses due to heat escaping the exchanger into the interior, the hot water exchanger is thermally insulated.

**The cooling loop (copper)** is part of the exchanger and guarantees safe and fast cooling of the insert exchanger in case of overheating. Copper is one of the best heat conductors and allows the loop to quickly dissipate excessive heat. This situation may occur in case of a power outage and stoppage of the circulation pumps of the heating system. The cooling loop must lead into a wastewater outlet; maximum operating overpressure is determined by the aftercooling valve used.

**Insulation of the hot water exchanger** is located on the casing of the hot-water exchanger and minimizes heat radiation from the exchanger into its surroundings. A large amount of heat therefore remains in the hot-water system. The high-quality insulation used is highly heat resistant (to approximately 1,000°C), it has low heat conductivity, is safe to human health and its fibers are biodegradable.

## PARAMETERS OF FIREPLACE INSERTS WITH A HOT-WATER EXCHANGER

| **FIREPLACE INSERT WITH A HOT-WATER EXCHANGER** | Nominal output | Nominal hot-water exchanger output | Efficiency | Maximum operating overpressure | Tank volume | Weight | Average wood consumption |
|---|---|---|---|---|---|---|---|
| | kW | kW | % | bar | l | kg | kg/hour |
| **DW2M 01** | 11.7 | 8.2 | 89.0 | 2.0 | 71 | 300 | 3.12 |
| **DW2M 01P** | 11.6 | 8.7 | 88.0 | 2.0 | 71 | 310 | 3.12 |
| **DWB2M 01** | 11.8 | 7.6 | 86.8 | 2.0 | 50 | 300 | 3.14 |
| **DWB2M 01P** | 12.0 | 8.1 | 86.2 | 2.0 | 50 | 310 | 3.14 |
| **HW2N 01** | 13.0 | 9.3 | 86.7 | 2.0 | 51 | 205 | 3.54 |
| **HW2Z 01** | 14.5 | 10.3 | 89.1 | 2.0 | 61 | 245 | 4.0 |
| | | | | | | | |

## PARAMETERS OF FIREPLACE STOVES WITH A HOT-WATER EXCHANGER

| FIREPLACE STOVES WITH A HOT-WATER EXCHANGER | Nominal output | Nominal hot-water exchanger output | Efficiency | Maximum operating overpressure | Tank volume | Weight | Average wood consumption |
|---|---|---|---|---|---|---|---|
| | kW | kW | % | bar | l | kg | kg/hour |
| **ESPERA** | 10.0 | 7.0 | 80.14 | 2.0 | 28 | 214 - 245 | 2.9 |
| **LUGO W** | 8.0 | 5.0 | 88.04 | 2.0 | 29.7 | 299 - 360 | 2.1 |
| **RIANO W** | 13.3 | 9.3 | 83.42 | 2.0 | 58 | 256 - 291 | 3.7 |

## INSTALLATION PROCESS

1. *Preparation and selection phase* - selection of a fireplace insert (fireplace stove), accumulation tank, heating system – based on this selection, it is then necessary to ensure sufficient space in the utility room and a corresponding chimney.
2. *Shell construction phase* - preparation of EAI leading to the location of the fireplace insert (stove), laying a solid concrete foundation under the fireplace insert and accumulation tank.
3. *Pipes and wiring phase* - during electrical installation, ensure there is sufficient cabling for sensors, thermostats, pumps, control units, etc.
   When installing the heating system, prepare piping of the corresponding size and lay the backbone network and connecting pipes between the fireplace insert (stove) and accumulation tank. Preparation of a feed-through for solar system piping.
4. *Installation phase* - the whole system is installed on completion of the utility room (completed flooring, painting, ...). The completion stage of the room with the heating unit depends on whether you are installing a fireplace stove or insert. Water and power connection to the building is essential.
5. *Enclosure* – the enclosure of the fireplace insert depends on the investor's design requirements and must be built by specialists in compliance with applicable standards.

**Fireplace stoves and fireplace inserts are equipped with a hot-water exchanger. They cannot be used without connection to a hot-water distribution system and must be filled with a heat carrying medium (water or frost-resistant fluid)!**

## CONNECTION DIAGRAM

- *Fireplace insert (stove) with a hot-water exchanger –* based on current offer
- *Heating system*
- *Cold tap water inlet*
- *Wastewater outlet*
- *Filter*
- *Shut-off valve*
- *Safety valve*
- *Thermomanometer (thermometer and manometer)*
- *Thermostatic mixing valve*
- *Aftercooling thermostatic valve*
- *Aftercooling two-way thermostatic valve (DBV)*
- *Circulation pump*
- *Expansion tank*

## Detail of connection scheme of stoves and fireplaces directly to heating circuit

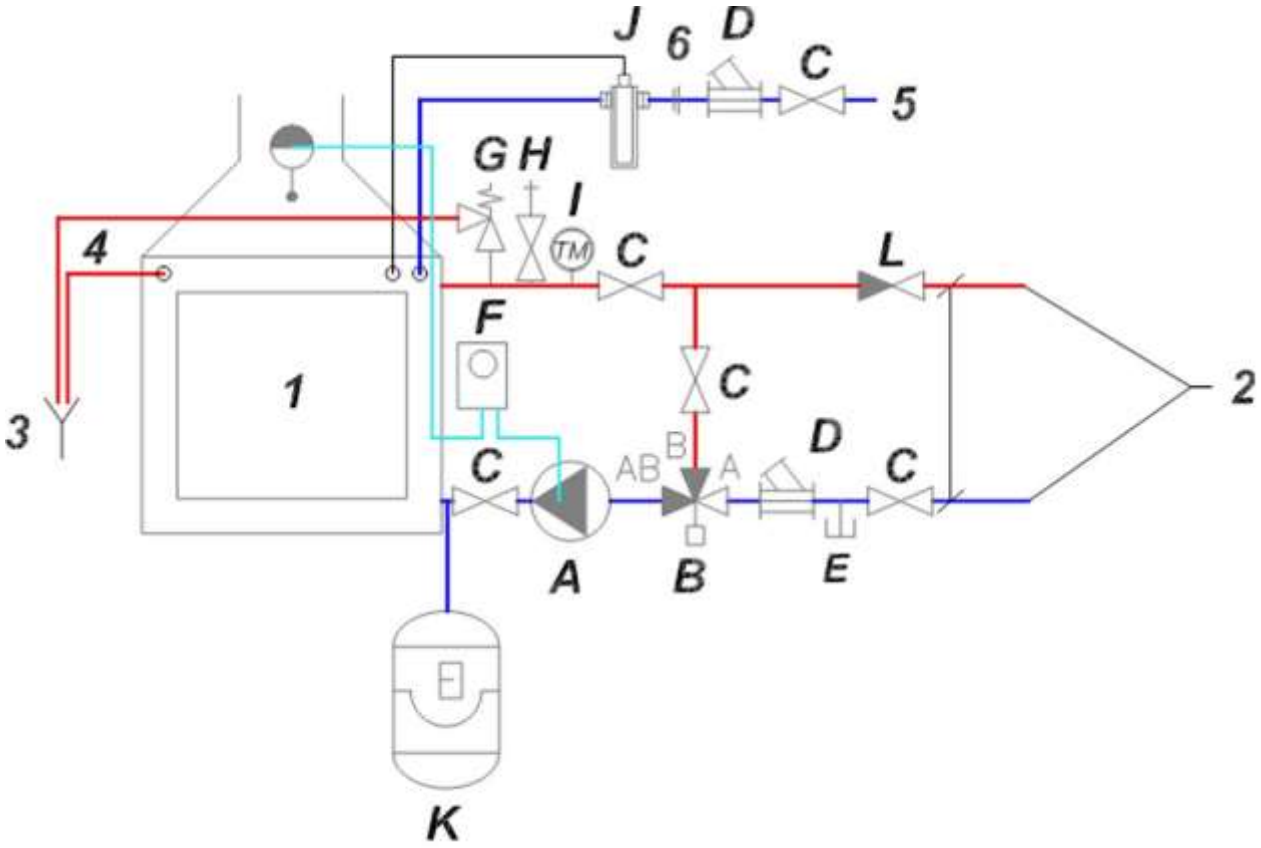


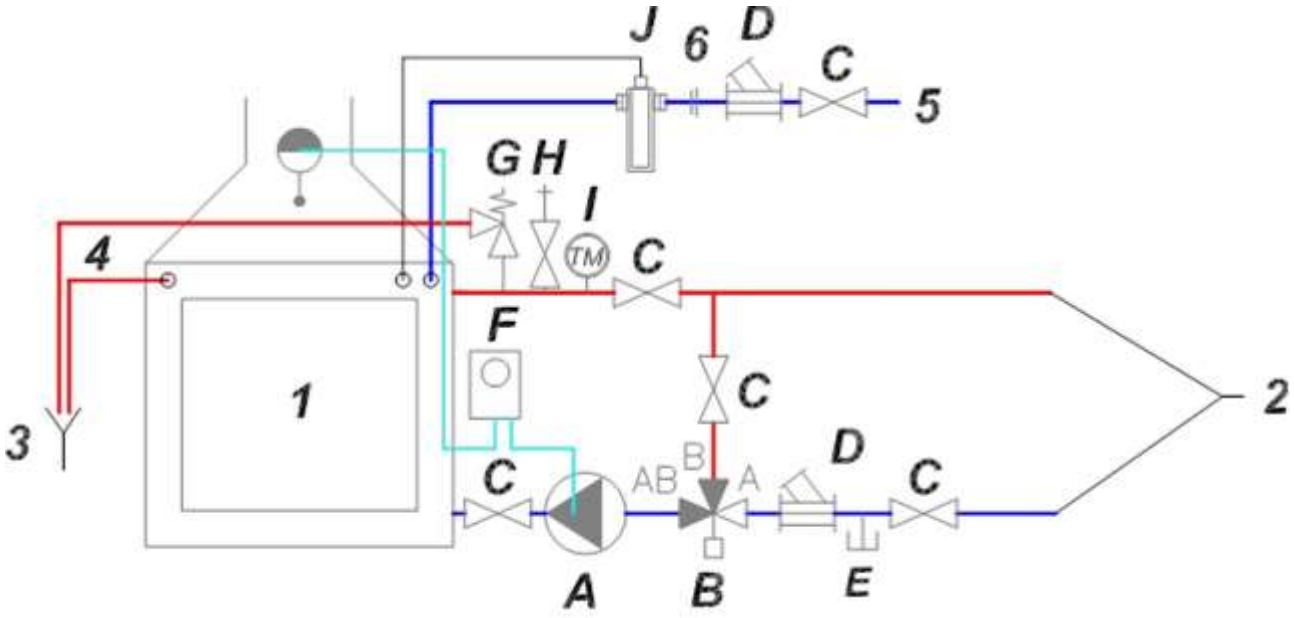

**Table of descriptions:**

| | |
|---|---|
| **1** | *Stove/fireplace with hot water exchanger* |
| **2** | *Connection to accumulation tank* |
| **3** | *Connection to drain* |
| **4** | *Drain pipe* |
| **5** | *Connection to cold water – central house piping* |
| **6** | *Transition from polypropylene to copper piping* |

**Table of fittings:**

| | |
|---|---|
| **A** | *Circulation pump - fireplace* |
| **B** | *Thermostatic mixing valve 65°C* |
| **C** | *Ball valve* |
| **D** | *Filter* |
| **E** | *Dump valve* |
| **F** | *Capillary thermostat* |
| **G** | *Safety valve – 2 bar* |
| **H** | *Automatic air vent valve* |
| **I** | *Thermomanometer* |
| **J** | *Thermostatic safety valve - with capillary* |
| **K** | *Expansion tank* |
| **L** | *Reverse throttle valve or flap* |

## Detail of connection scheme of stoves and fireplaces with accumulation tank

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**Armature table:**

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## PRODUCT LOCATION

The fireplace stove (insert) must be installed on a floor with a corresponding load-bearing capacity. If the current situation does not meet this requirement, appropriate measures (such as the use of a mat to distribute the weight) must be taken to meet this requirement. It is important to ensure adequate access for cleaning the product, smoke flue and chimney during installation, if these cannot be cleaned from another location (e.g., from the roof or a door specially designed for this purpose). When placing and installing the product, it is important to follow the installation manual and/or the technical sheet for the given product. Individual technical sheets and manuals are freely available on https://www.romotop.com/

If the fireplace stove is not installed on a **100%** non-flammable floor, it is necessary to place it on a fireproof insulation mat (such as a metal sheet, at least 2 mm thick), ceramic, reinforced glass and/or stone, so that the temperature of the flammable flooring does not exceed **50°C** during operation.

The insulation mat must cover an area that extends at least

- **30 cm** in a vertical direction from the stoking door of the fireplace stove.
- **10 cm** in a horizontal direction from the stoking door of the fireplace stove.

Flammable items must not be placed on top of, or at a less-than-safe distance from fireplace inserts (stoves).

**No structural changes or modifications of the appliance are permitted. All local regulations, including regulations relating to national and European standards, must be observed during installation. You should order a professional project prior to installation. Fireplace inserts and stoves with a hot-water exchanger cannot be used without connecting the hot water exchanger to the heating system and without ensuring the correct function of the hot-water exchanger.**

## PREPARATION OF THE INSTALLATION SITE

### a) Heating part

**Aftercooling valve:**

Install the recommended shut-off valve, solid particle filter and aftercooling valve on the water pipe inlet at the entry point to the cooling loop, so that the aftercooling valve can be removed and replaced in case of damage. Insert the valve thermosensor into one of the thermowells.

**Air-escape valve:**

The air-escape valve is installed at the highest point of the hot-water exchanger (this applies to fireplace stoves, where the air escape valve is part of the hot-water exchanger). For fireplace inserts, it is recommended the air-escape valve is installed at the highest point of the connection of individual

branches. It may be replaced by an automatic air-escape valve. Its maximum permitted operating temperature is 110°C.

**Safety valve:**

The installation point of safety equipment (safety valve, thermometer, manometer, and potentially an air escape valve) is the upper part of the heat source and part of the outlet pipe leading from the heat source that ends at a distance equal to at least 20 times the diameter of outlet piping from the neck of the source.

**Circulation pump and thermostatic mixing valve:**

The circulation pump with thermostatic mixing valve to protect the return water of the fireplace stove or insert with a hot-water exchanger is placed close to heat source to maintain the correct hydraulics of the medium in the heating system, while at the same time protecting the heat source from low-temperature corrosion. Installation must ensure the optimum temperature of return water using a thermostatic mixing valve that maintains the temperature of return water above at least 55°C; the optimum temperature is around 65°C depending on the heating system temperature.

***Safety and expansion equipment:***

Safety and expansion piping must utilize a pressure gradient so that air can be vented automatically, or it must be equipped with an automatic air escape device. Every source must be equipped with a non-closable connected safety device. Every heating system must be equipped with an expansion device. Pressure expansion tanks with an air cushion without a membrane or sack are not recommended. The expansion device may also be connected outside the secured section.

**b) Flue gas exhaust**

All local regulations, including regulations concerning national and European standards for this type of appliances, must be adhered to.

In addition to basic technical parameters, the chimney draught is also affected by various factors such as weather, location, chimney moisture, chimney age, chimney placement in the room. So, in case of doubt about whether the chimney will suffice, seek advice from a professional chimney sweeper.

Use a removable flue gas pipe to connect to the chimney.

Before starting the fire for the first time, everything needs to be inspected by a chimney sweeper, who will issue an inspection report.

**c) Air intake**

Fireplace stoves are equipped with an external air intake (EAI) for supplying the air necessary for combustion from the outside or alternatively from another room or a cellar.

EAI is connected to the fireplace insert by at least a 1m long flexible aluminium pipe with an inner diameter corresponding to the outer diameter of the EAI flange, which may then be continued by any pipe (including plastic) resistant to a temperature of 80°C. The length of the inlet pipe should not exceed 5 - 7 m. We recommend insulating the outer surface to prevent condensation of air humidity from the interior at low temperatures of intake air (air from outside in winter). Try to avoid bends (elbows), each bend exceeding 90° could reduce the chimney draught by up to 15 %.

### d) Electrical wiring

**Electrical connection of fireplace stoves and inserts**

In order to ensure the transfer of heat energy from the hot-water exchanger to the heating system and accumulation tank, we recommend using regulation that ensures logical switching of the fireplace stove circulation pump. A regulation thermosensor must be installed in the thermowell, so that regulation receives information about the current temperature in the stove. In addition, it is advisable to install an additional backup thermostat on the hot water outlet pipe from the exchanger, which is connected in parallel to the fireplace stove circulation pump. In case of regulation failure, the thermostat ensures that the fireplace stove circulation pump switches on at high temperatures. One shared safety breaker is recommended for the regulation and backup thermostat.

**Electrical connection of the heating system**

Automatic regulation of the building's heating system is recommended.

**All electrical installations must be performed by a qualified professional.**

# Conclusion

The use of fireplace inserts (stoves) with a hot water exchanger is a modern trend, strongly promoted by manufacturers and retailers. The view of the flames in a fireplace is soothing and pleasant.

The most important thing is to comply with all standards governing the safe operation of the heating system.

*CAUTION:* It is always better to have a fireplace insert installed by professionals. It is vital to ensure that the hot-water exchanger is protected from overheating (i.e. water boiling). It is also advisable to protect the heating system against power outages, since this would stop the operation of the circulation pump. In this case, the exchanger would not be able to cool down, which could lead to damage. One suitable solution, for instance, is to connect the circulation pump to a backup power source.