SVEA flame

SWEDISH PROFESSIONAL HEATING

Mountain, soil, lake and geothermal heat pump

SF 9i • SF 12i • SF 14i • SF 18i

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Technical data for the heat pump according to EN 14511

	SF 9	SF 9i	SF 12	SF 12i	SF 14	SF 14i	SF 18	SF 18i
Height mm	940	1750	940	1750	940	1750	940	1750
Width mm	650	600	650	600	650	600	650	600
Depth mm	570	480	570	480	570	480	570	480
Weight kg	90	157	97	164	102	172	110	180
Water tank capacity lit		230		230		230		230
Refrigerant (R407C)* kg	1.6 157		1.7 164		1.8 172		2.1 180	
Compressor	Copeland		Copeland		Copeland		Copeland	
Sound effects dB	47		47		46		46	
Power kW	1.56		2.15		2.63		3.16	
The temperature of the hot water/max. °C	55		55		55		55	
The above heating power kW	8.4		11.6		14.2		17.7	
Source water flow m^3/h	1.98		2.71		3.34		4.18	
Heating water flow m^3/h	1.46		2.01		2.46		3.06	
Control	Siemens							
COP14511 10/35 °C	5.4		5.4		5,4		5.6	
SCOP14825 35/55 °C	5,4/3,1		5.4/3,1		5.4/3,1		5.6/3,2	
The warranty on the compressor	2 years *							
The warranty on the heat pump	2 years *							

* Installed water filter and front changer

* Installed surge protector

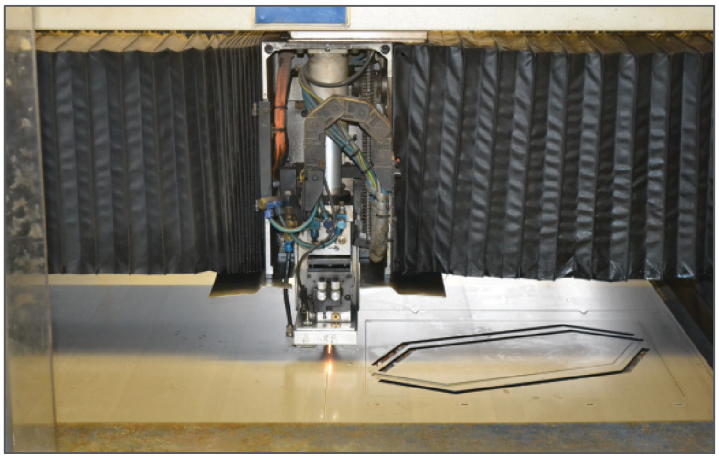
Welcome!

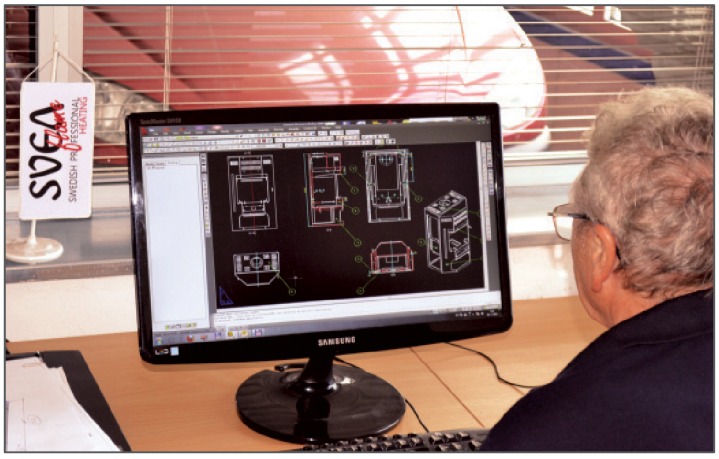
Svea Flame AB is a family company with its residence in the Swedish province of Östergötland, located on the lake Vättern in the city of Motala. Our assortment includes a wide range of stoves while we have also developed other heating methods lately. One of these heating methods are heat pumps. Our assortment includes a wide range of heat pumps. We have focused on a modern design, high quality components as well as education of our distributors and installers.

Svea Flames solutions with its simple Scandinavian design focuses on modern and enviromentally conscious home owners.

Sales are made through retailers and distributors throughout Europe which provides support for the entire process when selecting solutions for your villa to assistance in order to install the heat pumps

DETAILS OF PRODUCTION





SVEA flame
SWEDISH PROFESSIONAL HEATING

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INTRODUCTION

Low operating costs

for heating and domestic hot water compared to conventional boilers.
The heat pump is characterized by reliability and it's saving nature, where the energy comes for free from the environment and the heating costs can be reduced with up to 80%. Depending on factors such as the outside temperature, energy cost and internal heat load, the heat pump performs the intelligent choice between heat pump and / or boiler to gas (which can sometimes to work and at the same time), always choosing the most economic mode for you. If the average European climate is take into account, the largest part of the required heat is achieved by the work of the hybrid system and a heat pump, which increases the efficiency by up to 35%.

Low investment costs

It is not necessary to make replacement of existing nor the pipeline because our heat pump is connected directly to an existing heating system. This will reduce costs and secures in practice that no interruption of operation of the system takes place.

Nature

Nature is one of the main sources of renewed energy sources, such as air, water and land. Decision to use the heat pump will provide better living conditions, not only for us but for future generations as it reduces energy consumption, heating costs, reduces negative effects on the environment, and while the heat remains.

HEAT PUMPS

Heating system with heat pump

Princip rada toplotnih pumpi je poznat. Kod toplotne pumpe je suprotan proces od frižidera. Pumpa oduzima toplotu iz okoline pomoću električne energije, koja napaja kompresor, tu toplotu menja u korisnu energiju. Nju potom možemo da upotrebimo za grejanje ili hlađenje prostora.

Heating in winter, cooling in summer

The technology of heat pumps allows you a system for heating in Winter and at the same time a system for cooling during the Summer. Due to exquisite thermodynamic properties, ability to transfer the maximum amount of heating energy from the environment & an energy efficient way of heating, you can also heat water during the whole year. Moreover, without additional work or investments, the system can be used for cooling as well as for floor heating.

Investment

When investing in heat pump, you are making a long term investment. Besides achieving decreased heating costs, comfort, and many economic and environmental benefits, this decision actually represents an investment in your future.

Management

With the heat pump, we are saving energy, time as well as effort and money for the delivery of other types of fuel. All systems allow highly convenient and simple usage. The whole system can be managed remotely.

Up to 80% lower heating costs

Heat pumps use energy from our environment. In the ground, groundwater or in the outside air, you can find large amounts of thermal energy, which we with the help of the heat pump can convert into energy for heating. Saving potential is drastic in comparison to other conventional heating systems. Specifically, heating pumps spend for their functioning significantly less amount of electricity in comparison to the amount of heating energy that they produce.

New construction, rehabilitation or replacement of the heating system

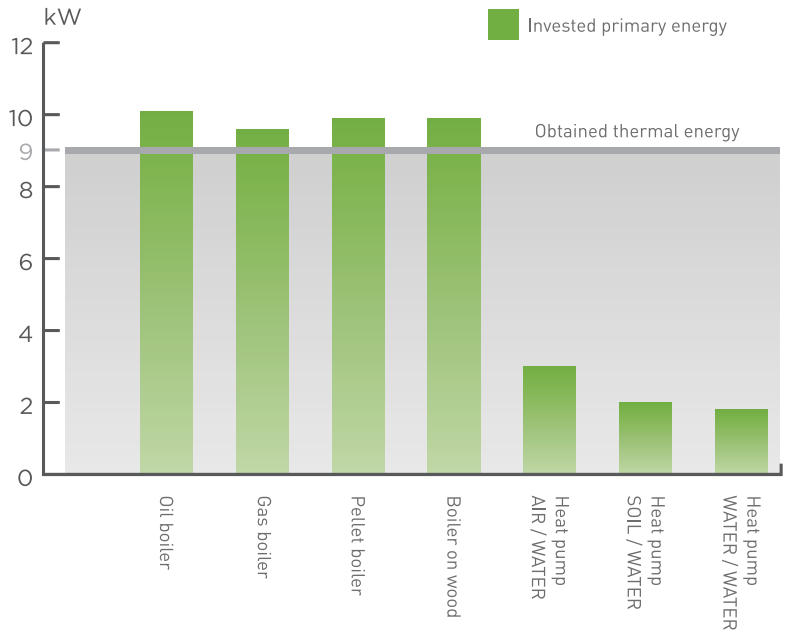
A heat pump is ideal for heating and cooling in new buildings, renovated objects as well as for replacement of old heating system. As the heating pump works on the principle of low-temperature heating, it is suitable for both floor & wall heating and a combination of these two. Heat pumps can also be used at rehabilitated buildings with radiator heating. When in the coldest days, the water temperature for heating is to 55 ° C, heat pumps are the cheapest source of energy for heating.

Compared with competing heating systems, heat pumps operate extremely economically, mainly due to their ability to spend up to three times less primary energy than for example gas or oil fired boilers. How is this possible? Well about 80% of heating pump energy for heating comes from the environment free of charge, so we need barely 20% in the form of electricity in order to produce 100% output power for heating. And as far as the investment costs, the heat pump can be compared with competitive systems, they do not need necessary tanks for oil or gas, chimneys and maintenance costs are significantly lower.

With the heat pumps, following benefits are achieved:

- Economic benefits: Reduction of heating costs by 80%;
- Environmental benefits: At the location where it is installed, the heating pumps does not cause any pollution;
- The heat pump is extremely quiet;
- In addition to the heating, it can be used as a cooling device;
- It does not require for example a gas tank, an oil tank, an area to storage of solid fuel, gas connection nor a chimney
- Its maintenance is simple and cost efficient

Comparison of primary energy invested in various systems in order to achieve a heating of 9 kW



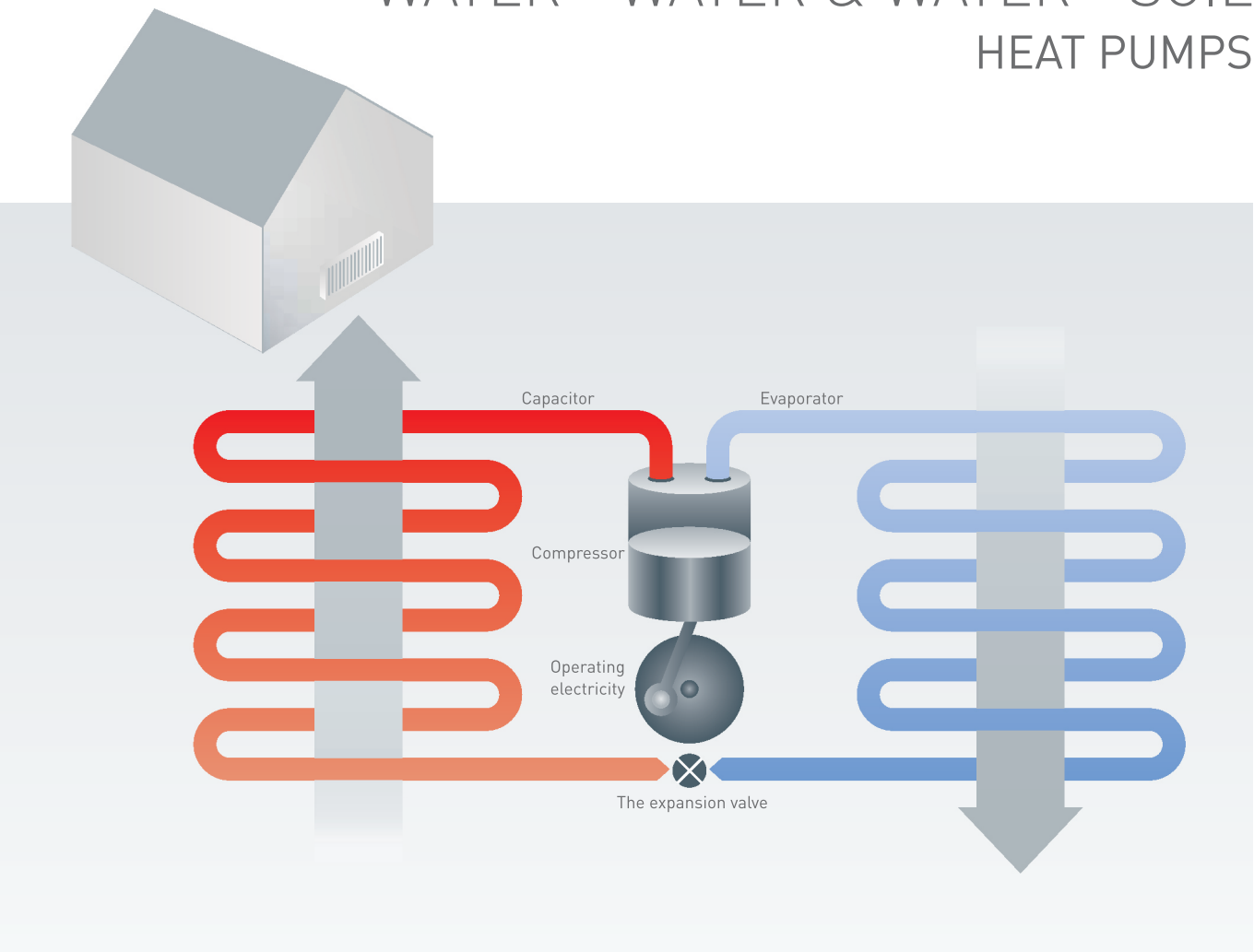
MODES OF HEAT PUMPS

The heat pump is a technologically advanced system, adapted to utilization of renewable energy sources. Its advantage is the ability to recover heat from the air, groundwater or soil. Depending of the energy source, following types of heat pumps exist: water / water, soil / water and air / water.
The heat pump comprises of an evaporator that recovers heat from the environment (water, air, soil). In the evaporator, a temperature of a working medium (refrigerant) transforms to gaseous state and then travels to the compressor. The vapors are compressed and raised to a higher pressure and temperature. Hot vapor is condensed in the condenser and thereafter the condensate heat is released to the heating medium. Then the refrigerant passes through an expansion valve, where the pressure is lowered, then travels back to the evaporator and the process is repeated. All the heat obtained from the environment is free. In order to make heat increase from a low temperature level to a higher temperature level, it is necessary to invest some energy. So for the heat pumps, we need electricity for the power of the generator. Following heat pumps are available: air / water, water / water, ground / water. For labelling of the heat pump, the first word defines the source of which it takes the heat and the second word the medium being heated.

Coefficient or COP

The relationship between paid energy (electricity) and free energy (received from the environment) is typically from 1/3 to 1/5. The relationship between the received heat and energy input is called as the coefficient of heating. Its value depends on the heat pump and the heat source from the environment. The annual coefficient of heating, on average, amount to 3-5 and even more.

WATER - WATER & WATER - SOIL
HEAT PUMPS



Modes of heat pumps

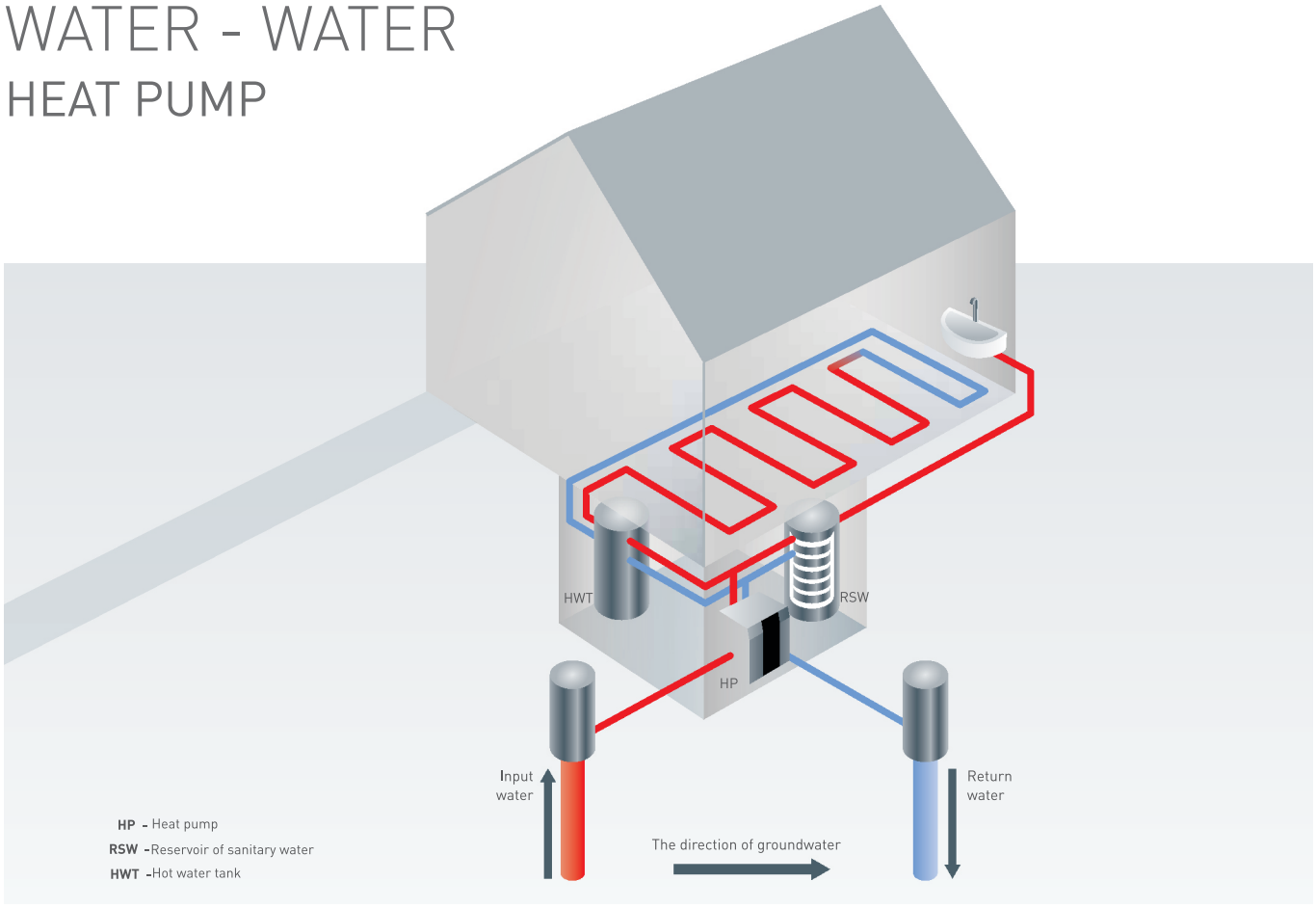
Why choose water - water heat pump?

Simply because it is in relation to the air-water heat pump far more efficient when the average external temperature drops below 3 ° C. Geothermal heat pump has a very stable heating capacity at low outdoor temperatures. This feature provides two main advantages: First, easy installation due to the fact that there is no need for an external unit, and therefore no need of the accompanying pipelines. Secondly there is no phase of seizure which further increases the level of comfort. Water-water heat pump fall into the most efficient energy systems for heating. The heat from the groundwater is in fact a very reliable as well as a constant energy source, given that its temperature is between 7°-14° C.

The water temperature depends from the location where the groundwater is abstracted. The ratio between the invested and achieved heat (COP) in water / water system is very convenient. The COP is higher than 5, measured on an average throughout the year.

One of the key components is the spiral heat exchanger made of stainless steel, which ensures long-term high corrosion protection and prevents collection of deposits on the walls of the exchanger. For the installation of heat pumps, it is necessary to drill two in the soil. This is primarily for pumping of the water and secondary for the return water in the soil. According to experience, the optimum distance between the primary and secondary borehole is approximately 15 meters. Water we withdraw from the ground, we take some of the energy in the heat pump, and then we return it to the ground cooled with 2-4°C. Here no chemical changes of the water take place. Before using water as the primary source of heat, it is necessary to do a pumping test, which will check the amount of water as well as its quality. With the water water heating pump, we can with minor adaptations also achieve passive cooling. In this case, for the cooling we use a relatively low temperature from the groundwater. Here the heat pump does not work, which in turn allows minimum energy consumption for cooling and thus, compared to conventional cooling, also has a much lower electricity bill.

WATER - WATER
HEAT PUMP



Display of the system for the water-water heat pump

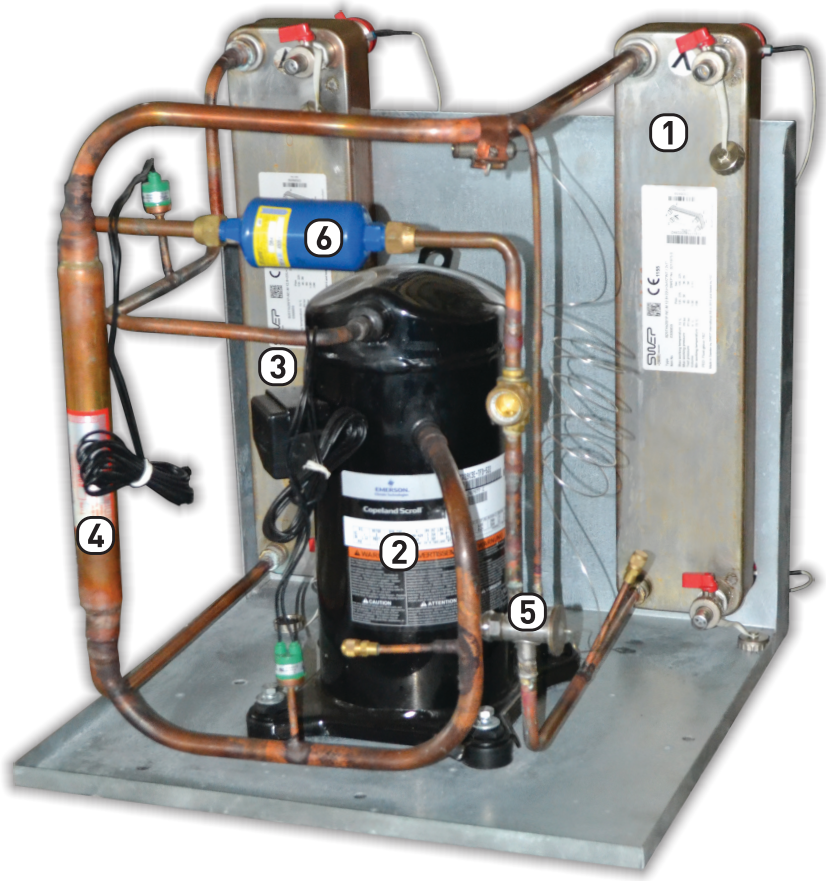
- Minimum groundwater temperature 7°C
- Installation of the heat pump in a dry room with a temperature of 0°C
- Possibility of heating and preparation of hot water
- Availability of source throughout the year
- Simple power supply system using electronics
- Allows two independent hydraulic circuits
- Allows the possibility of passive cooling

Technical characteristics of the heat pump water - water

Model		SF 9	SF 9i	SF 12	SF 12i	SF 14	SF 14i	SF 18	SF 18i
Dimensions (HxWxD)	mm	955x650x575	1750x600x480	955x650x575	1750x600x480	955x650x575	1750x600x480	955x650x575	1750x600x480
Weight	Kg	90	157	97	164	102	172	110	180
Hot water temperature (heating water) (max)	°C	55		55		55		55	
Heating power*	kW	8,4		11,6		14,2		18	
Electric power *	kW	1,56		2,15		2,63		3,16	
Coefficient of heating COP *	/	5,4		5,4		5,4		5,6	
The refrigerant / quantity	/kg	R407C/1,6		R407C/1,7		R407C/1,8		R407C/2,1	
The temperature of the source water	°C	7 do 25		7 do 25		7 do 25		7 do 25	
Sound power of the indoor unit	dB (A)	36-47		36-47		36-46		36-46	
Water flow source	m3/h	1,98		2,71		3,34		4,18	
Water flow heating	m3/h	1,46		2,01		2,46		3,06	
Power / circuit	V/A	400/10		400/10		400/16		400/16	

*Measured on the parameters water-water W10/W35. Standard EN 14511

HEAT GROUP



1. **Evaporator**
   Spiral evaporator developed specifically for heat pump water/water. It is resistant to oxidation and protected from collecting fat.
2. **Compressor**
   The well-known scroll technology has proved to be an excellent choice through years of use as it is silent, delivers higher efficiency and reliable function.
3. **Capacitor**
   Highly efficient capacitor of sheet manufacturing with lower resistance in the flow.
4. **Internal heat exchanger**
   The energy that is otherwise lost in the surrounding returns back into the cooling system and protects the compressor from liquid shock.
5. **The expansion valve**
   The temperature and pressure from the refrigerant decreases to a value which it enables evaporation enters in to the evaporator.
6. **Filter drying**
   The element in the cooling system, which is meant for pumping water from refrigerant is present in order to avoid corrosion of the elements in the system.

12 kW / heating water up to 35˚C

Temperature sources	˚C	7	10	15	20	25
Electrical power	kW	2,2	2,2	2,1	2,1	2,1
Heating power	kW	10,8	11,6	13,3	15,0	15,7
COP	/	5,0	5,4	6,3	7,2	7,5

12 kW / heating water up to 55˚ C

Temperature sources	˚C	7	10	15	20	25
Electrical power	kW	3,4	3,5	3,4	3,4	3,4
Heating power	kW	9,9	10,6	12,0	13,1	14,5
COP	/	2,9	3,1	3,5	3,9	4,3

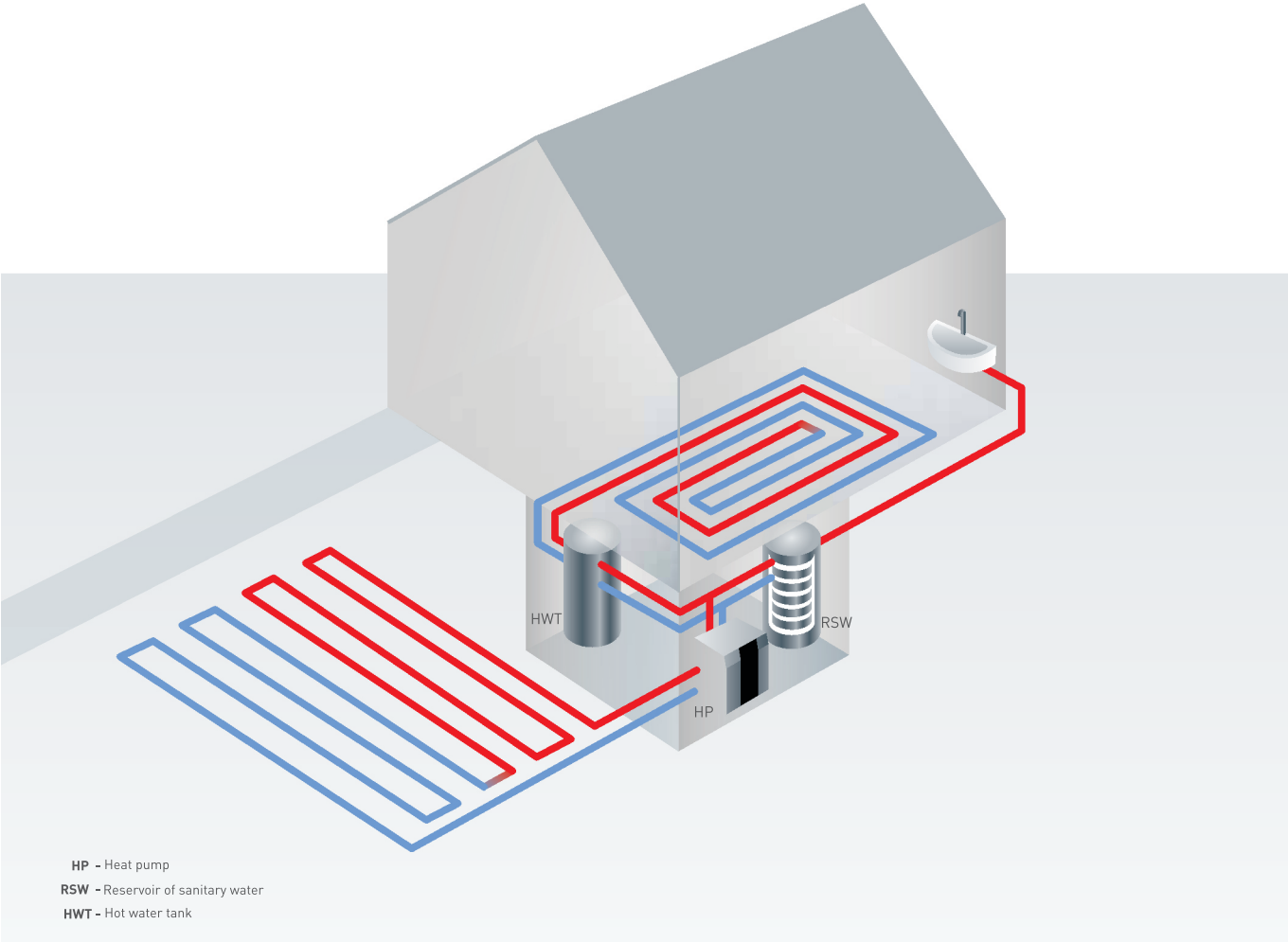
SOIL - WATER
HEAT PUMP

The maximal seasonal efficiency of soil - water heat pump

It has been proven that heat pumps allow an increase of the seasonal efficiency of up to 20% compared to conventional geothermal heat pumps which are included/excluded.

A glycol blend of water and antifreeze, which works as a carrier for the heat pump between the soil and heat pump is held at a higher and more stable temperature. The function of the spare heating devices is kept to a minimum.
A high efficiency of the compressor is achieved at partial load, i.e. situations that don't require operation at full capacity. The lowering of operating costs are achieved this way and the return on the investment is faster as a consequence.

Heat pumps soil/water use soil as a source of heat in which an enormous amount of energy is contained. This energy is generated by rainfall and sun rays. There are two different systems for continuous recovery of energy from the sun rays: soil heat collector and heating exchangers.



Overview of system for heating with heating pump soil - water soil collectors

The soil/water heating pumps are very economical and achieve over COP 4,5. The difference between the input temperature refrigerant (water + glycol) into the heating pump and the output temperature of the collector is approximately 4°C. It's possible to enable passive cooling with the soil/water heating pump with a lower level of adaptation.

Horizontal soil collector

The soil/water heating pumps are using the energy which is accumulated in the earth crust. The energy from the earth crust is taken with the help of the soil collector which is placed on a large amount of soil. The area of the collector has to be close to twice as big as the area of heating for optimal use. The amount of energy that can be retrievable from the soil depends on the soil composition and the location. It is important that the surface on which the soil collector is placed is not masoned, paved and that the water passage is not prevented through the area. The approximate required amount of collectors per m2 is calculated in the following way: the heating power of the heating pump (kW) x 40. The pipe diameter (D=1'') is placed at a depth of approximately 120 cm. The space between the two pipes has to be 0,7 to 0,8 m.

Vertical soil probe

We're able to drill the vertical collector deep when we have an area in which we don't have enough space for making horizontal soil collector. That's how we take advantage of the geothermal energy.The required area for the probe in meters is calculated according to the following process: heatingcapacity of the heat pump (kW) x 14 = depth of the probe (m).

HEATING PUMP SOIL - WATER

- The energy soil uses soil collector or vertical soil probe.
- The temperature at a depth of 1,2 m doesn't drop below 0°C.
- The placement of the TP in a dry room with a temperature above 0°C.
- Possibility of heating and preparing hot water.
- Availability of sources throughout the year.
- Simple supplied system through electronics.
- Jednostavno napajanje sistema putem elektronike.
- Permits two independent hydraulic circles.
- Possibility of passive cooling.

Heating pump soil - water

Technical characteristics for the heating pump soil - water

Model		SF 9	SF 9i	SF 12	SF 12i	SF 14	SF 14i	SF 18	SF 18i
Dimensions (HxWxD)	mm	955x650x575	1750x600x480	955x650x575	1750x600x480	955x650x575	1750x600x480	955x650x575	1750x600x480
Weight	Kg	90	157	97	164	102	172	110	180
Hot water temperature (heating water) (max)	°C	55		55		55		55	
Heating power *	kW	9,2		12		14,4		18	
Electric power *	kW	2,04		2,6		3,2		3,7	
Coefficient of heating COP *	/	4,5		4,5		4,5		4,6	
The refrigerant / quantity	/kg	R407C/2,1		R407C/2,5		R407C/2,3		R407C/2,7	
The temperature of the source water	°C	-5 do 25		-5 do 25		-5 do 25		-5 do 25	
Sound power of the indoor unit	dB (A)	36-47		36-47		36-46		36-46	
Water flow source	m3/h	2,2		2,79		3,46		4,13	
Water flow heating	m3/h	1,59		2,03		2,49		2,95	
Power / circuit	V/A	400/10		400/16		400/16		400/16	

*Measured on the parameters soil-water B0/W35. Standard EN 14511

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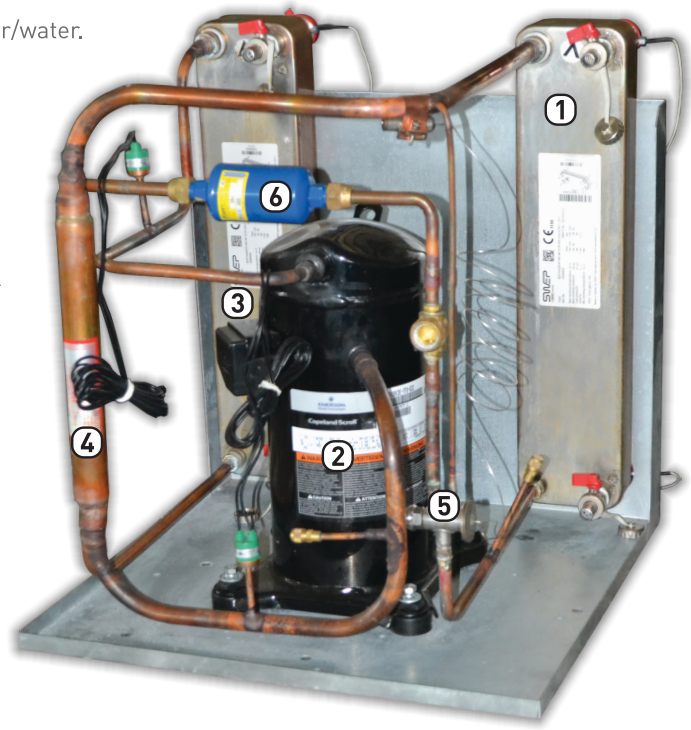
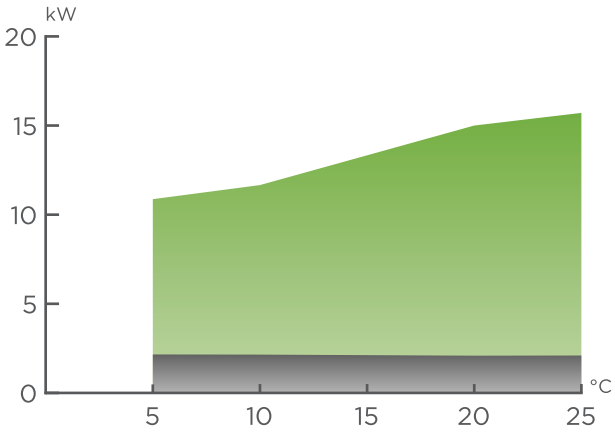
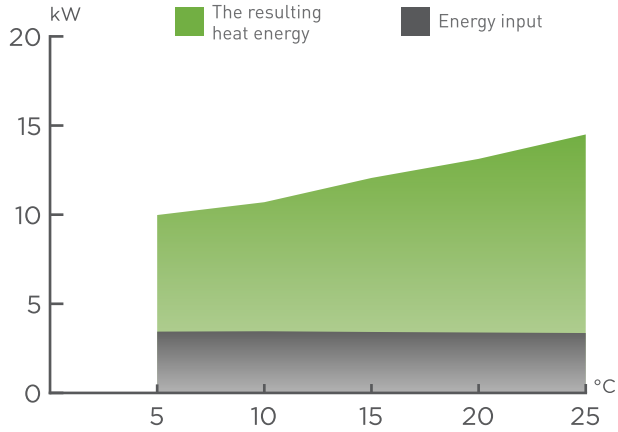


SF 18 – comparison of electrical power and heat sources at different temperatures (temperature of the soil).





18 kW/hot water up to 35˚C

Temperature sources	°C	-5	0	5	10	15	20	25
Electrical power	kW	3,7	3,7	3,7	3,6	3,6	3,6	3,6
Heating power	kW	14,9	17,0	19,2	21,8	24,7	27,7	30,6
COP	/	4,0	4,6	5,2	6,0	6,8	7,7	8,5

18 kW/hot water up to 55˚ C

Temperature sources	°C	-5	0	5	10	15	20	25
Electrical power	kW	6,0	5,9	5,8	5,8	5,8	5,8	5,8
Heating power	kW	13,4	15,3	17,4	19,7	22,3	25,1	28,1
COP	/	2,2	2,6	3,0	3,4	3,8	4,3	4,8

INTELLIGENT ELECTRONIC MANAGEMENT

Basic management

Basic steering supports two independent heating circuits - one direct, one mixed. For each circuit, we have to adjust the heating curve specifically. Basic steering also supports the overall heating of the water with an anti-legionella program as well as it supports alternative sources such as solar panels or wood-fired ovens. Electronic steering is universal for all types of heat pumps and heating ways. By larger systems, upgrading of the basic steering is also very simple. Electronic steering of heating circuits depends on the outside temperature. Adaptation of the heating curve is dependent on the characteristics of the heating facility, which is in fact the only guarantee that the heat pump, regardless of the outdoor temperature, always heats the water to the lowest, but still acceptable temperature level. The temperature level determines the efficiency of the heating system, the lower the heating temperature, the higher the heating coefficient.

Easy operation

The menu is user friendly and simple. Each display is marked with a serial number, which enables the user to know at all time at which page of the menu he or she is currently at. Commands are printed in text form. Control is possible via a user keyboard on the device, or via the room unit. Basic functions can be regulated via a button on the steering device, while the temperature of the heating system can simply be regulated via the button, which is located on the control unit. For more demanding systems, steering can be adjusted via the interface, which can be connected to a computer, or even an intelligent home system.

Energy-efficient operation of the heating device primarily depends on effective steering, which the heat pump must have an intelligent electronic control operation of the heat pump. Regulates the correctness of operation of the device itself due to import-export parameter, and also regulates the circulating pump, stop valves and others

Main control room management
It provides basic steering such as: mode, temperature level, temperature settings, and the on / off button for the device.

Advanced room management unit
Allows exactly the same steering, which you can achieve on the device itself.

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