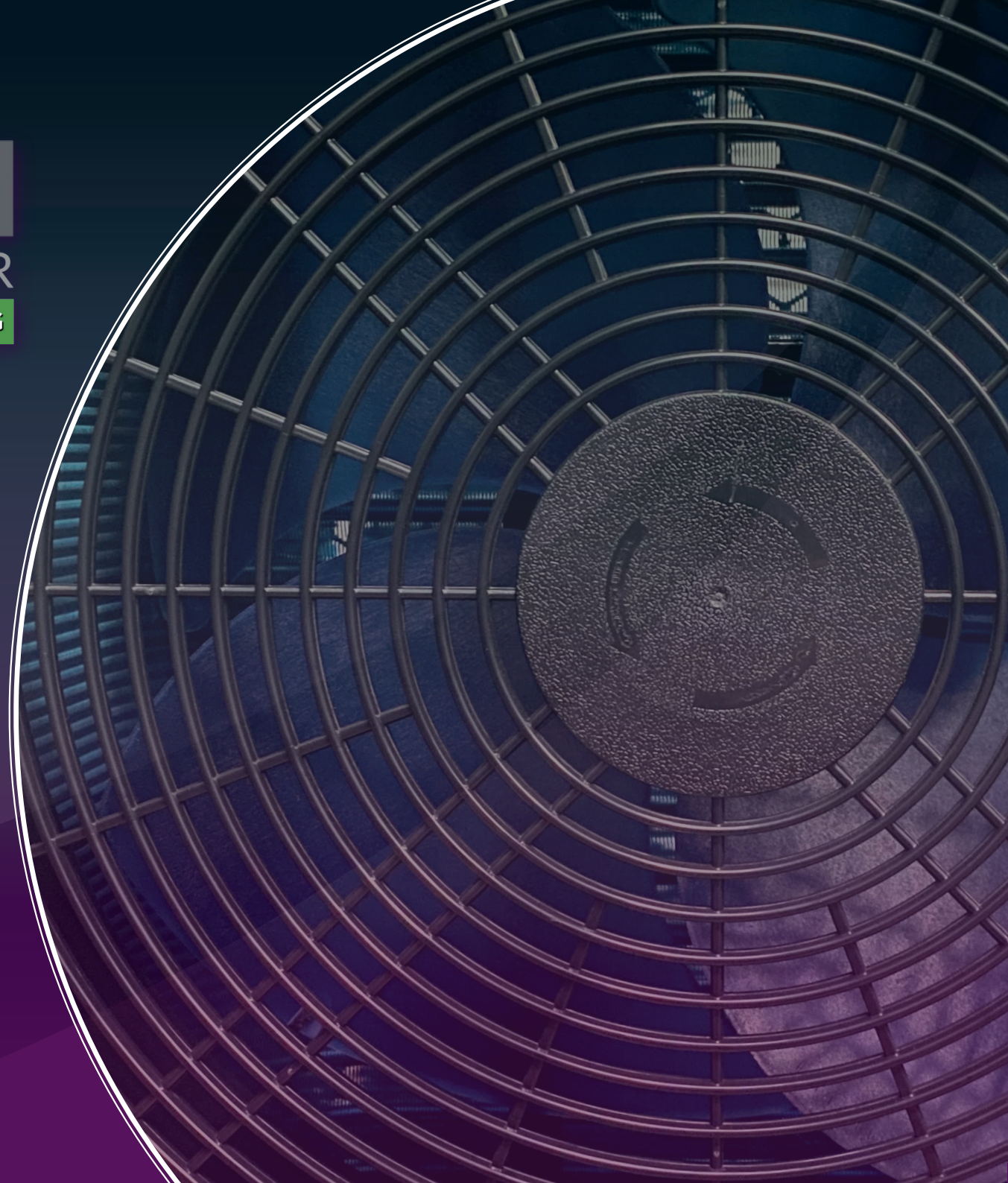




LOW COST HOT TUB HEATING





# LOW COST HOT TUB HEATING

A Vian Power Air Source Heat Pump can be up to 75% more energy efficient than standard heating options. Simply put, they produce more heat (energy) than they use in electricity (energy).

This relationship between the power used by the heat pump and the heat it generates is referred to as Coefficient of Performance (CoP). For example, if a heat pump has a CoP of 8, then it will produce 8 x units of heat for every one unit of electricity consumed.

The electric heater in a hot tub or swim spa is known as a resistance heater and is very much like the element in a kettle. This resistance heater can only ever have a CoP of 1. This means for every 1 x kilowatt of power used by the electric heater then only 1 x kilowatt of heat is produced. If compared with a standard electric heater in a hot tub, then we can easily see that an air source heat pump is a far more efficient and cost-effective way of heating your hot tub or swim spa. This is because using the example CoP of 8 then for every 1 kilowatt of power consumed by the heat pump, then 8 x kilowatts of heat are produced.

The CoP of an air source heat pump will vary depending on the ambient temperature and the mode function set on the air source heat pump.

## DIFFERENT TYPES OF TECHNOLOGY:

**ON/OFF heat pumps.** When 'on', these models will draw a constant amount of power to operate, they can be considered to always be at maximum power when working.

**INVERTER models** have the benefit of being able to have their power consumption varied and, in some cases, this is done smartly by the machine itself based on the ambient temperature and heating demand. Sometimes referred to as stepped inverter, these models may have stages or steps of power use. Step 1 for example would be a very low power mode, step 3 a medium power use and step 5 would be full power. They also have the added benefit of being quieter than an ON/OFF heat pump.

**FULL DC INVERTER models** can regulate the power consumption over a much more fluid range so rather than steps or stages of power draw like a stepped inverter machine, they can vary the power they consume across their whole range. This technology makes full DC inverter heat pumps the most efficient types of machine over the long term. Full DC Inverter models are also very quiet.

By using far less energy than traditional heating methods, an air source heat pump is not only good for the environment but will save hot tub and swim spa owners a considerable amount of money. It is no wonder why hundreds of owners are opting to have an air source heat pump fitted to their hot tub or swim spa.

For further details and enquiries please feel free to contact an authorised Vian Power Heat Pump Installer.



C5



C5+



S7+



S9+

	HP-VP500		HP-VP501		HP-VP700		HP-VP900	
	On/Off Heat Pump		Full DC Inverter Heat Pump		Full DC Inverter Heat Pump		Full DC Inverter Heat Pump	
	kW Out	CoP @	kW Out	CoP @	kW Out	CoP @	kW Out	CoP @
<b>CAPACITY @°C</b>	<b>On/Off Model</b>	<b>100% Power</b>	<b>100-20% Power</b>	<b>100-20% Power</b>	<b>100-20% Power</b>	<b>100-20% Power</b>	<b>100-20% Power</b>	<b>100-20% Power</b>
Plus 40°C	6.39	7.89	5.87 - 1.17	6.89 - 12.06	9.88 - 1.98	8.32 - 24.32	12.4 - 2.48	8.51 - 25.9
Plus 30°C	5.45	6.77	5.43 - 1.08	6.18 - 10.52	7.86 - 1.57	6.8 - 19.81	10.1 - 1.91	6.9 - 20.1
Plus 25°C	4.78	6.16	5.03 - 1.01	5.95 - 10.4	7.02 - 1.4	6.14 - 14.61	9.26 - 1.75	6.2 - 14.8
Plus 15°C	3.68	4.72	4.13 - 0.83	4.9 - 8.56	5.4 - 1.08	4.9 - 7.82	7.9 - 1.51	5.2 - 8.3
Plus 10°C	3.16	4.14	3.68 - 0.74	4.48 - 7.84	4.77 - 0.95	4.35 - 6.08	6.88 - 1.38	4.45 - 6.22
0.0°C	2.12	2.94	3.38 - 0.67	4.08 - 7.14	4.06 - 0.88	3.65 - 5.11	5.76 - 1.15	3.76 - 5.26
Minus 5°C	1.68	2.31	2.85 - 0.57	3.46 - 6.06	3.54 - 0.71	3.08 - 4.61	4.8 - 0.96	3.13 - 4.68
Minus 10°C	/	/	2.15 - 0.43	2.96 - 5.18	3.03 - 0.61	2.48 - 4.07	3.89 - 0.78	2.5 - 4.1
<b>Capacity kW 27/24 (DB/WB)</b>	<b>5 kW</b>		<b>2.1 kW - 5.1 kW</b>		<b>1.5 kW - 7.21 kW</b>		<b>1.8 kW - 9.48 kW</b>	
<b>Usage</b>	Hot Tub		Hot Tub		Hot Tub & Swim Spa		Hot Tub & Swim Spa	
<b>Type</b>	On/Off		Full DC Inverter		Full DC Inverter		Full DC Inverter	
<b>Max Power Draw</b>	0.806 kW		0.168 - 0.898 kW		0.09 - 1.09 kW		0.11 - 1.44 kW	
<b>Power Supply</b>	220-240 V 50 Hz Single Phase		220-240 V 50 Hz Single Phase		220-240 V 50 Hz Single Phase		220-240 V 50 Hz Single Phase	
<b>Power Cable</b>	5 m H07RN-F Cable		5 m H07RN-F Cable		5 m H07RN-F Cable		5 m H07RN-F Cable	
<b>Ambient Temp Operating Range</b>	Minus 5°C to Plus 40°C		Minus 10°C to Plus 43°C		Minus 10°C to Plus 43°C		Minus 10°C to Plus 43°C	
<b>Heating Range</b>	15°C to 40°C		15°C to 40°C		15°C to 40°C		15°C to 40°C	
<b>Ability To Cool Water</b>	X		✓		✓		✓	
<b>Max Water Volume</b>	15 m <sup>3</sup> (15,000 L)		20 m <sup>3</sup> (20,000 L)		30 m <sup>3</sup> (30,000 L)		40 m <sup>3</sup> (40,000 L)	
<b>Refrigerant Type</b>	R32		R32		R32		R32	
<b>Compressor Type</b>	Rotary		Rotary		Rotary		Rotary	
<b>Heat Exchanger</b>	Titanium		Titanium		Titanium		Titanium	
<b>Gas Control</b>	Capillary		(EEV) Electronic Expansion Valve		(EEV) Electronic Expansion Valve		(EEV) Electronic Expansion Valve	
<b>Sound @ 1 m dB</b>	48		32 to 45		32 to 45		33 to 47	
<b>Required Flow Rate</b>	2.5 m <sup>3</sup> /hr (41.6 l/min)		2.5 m <sup>3</sup> /hr (41.6 l/min)		3.1 m <sup>3</sup> /hr (51.6 l/min)		4.1 m <sup>3</sup> /hr (68.3 l/min)	
<b>Input Line Control</b>	X		✓		✓		✓	
<b>Pump Power Circuit 1.59 (A) Max</b>	X		✓		✓		✓	
<b>Wi-Fi</b>	X		✓		✓		✓	
<b>Unit Size (L-D-H) mm</b>	505 / 360 / 545		470 / 290 / 430		910 / 355 / 620		910 / 355 / 620	
<b>Net Weight kg</b>	27 kg		23.5 kg		35 kg		37 kg	

All Specifications and capacity data supplied by the manufacturers testing


Warranty: 5 Years Compressor & Heat Exchanger / 2 Years All Other Components

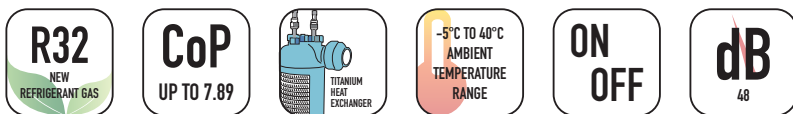
# VIAN C5

SKU: HP-VP500



The Vian Power C5 hot tub heat pump is a compact heat pump and a great choice as an entry level Air Source Heat Pump. This model is classed as an ON/Off heat pump, whilst not quite as efficient as our Full DC Inverter heat pump, it will be far more efficient than the electric heater in your hot tub. It is capable of operating down to -5°C ambient temperature.

 CAPACITY @°C	On/Off Heat Pump	
	kW Out	CoP @
Plus 27°C	5	6.2
Plus 10°C	3.16	4.14
Capacity kW 27/24 (DB/WB)	5 kW	
Usage	Hot Tub	
Max Power Draw	0.806 kW	
Ambient Temp Operating Range	-5°C to 40°C	
Heating Range	15°C to 40°C	
Ability To Cool Water	No	
Sound @ 1 m dB	48	
Required Flow Rate	2.5 m3/hr (41.6 l/min)	
Wi-Fi	No	
Unit Size (L-D-H) mm	505 / 360 / 545	




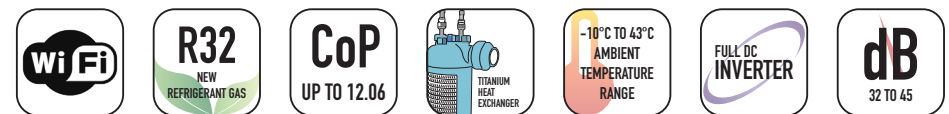
# VIAN C5 PLUS

SKU: HP-VP501



The Vian Power C5-PLUS hot tub heat pump is an advanced and compact heat pump that is perfect for hot tubs. This Full DC Inverter heat pump is capable of operating down to -10°C ambient temperature. This feature-packed high-performance model is a great choice due to its compact size. A new model for 2023, we believe will become the most popular option for hot tubs.

 CAPACITY @°C	Full DC Inverter Heat Pump	
	kW Out	CoP @
Plus 27°C	5.1 - 1.05	6.02 - 10.6
Plus 10°C	3.68 - 0.74	4.48 - 7.84
Capacity kW 27/24 (DB/WB)	2.1 kW - 5.1 kW	
Usage	Hot Tub	
Max Power Draw	0.168 - 0.898 kW	
Ambient Temp Operating Range	-10°C to 43°C	
Heating Range	15°C to 40°C	
Ability To Cool Water	Yes	
Sound @ 1 m dB	32 to 45	
Required Flow Rate	2.5 m3/hr (41.6 l/min)	
Wi-Fi	Yes	
Unit Size (L-D-H) mm	470 / 290 / 430	




# VIAN S7 PLUS

SKU: HP-VP700



The Vian Power S7-PLUS hot tub and swim spa heat pump is an advanced heat pump that is a crossover model for hot tubs and swim spas. This Full DC Inverter heat pump is capable of operating down to -10°C ambient temperature.

	Full DC Inverter Heat Pump	
	kW Out	CoP @
<b>CAPACITY @°C</b>	100%-20% Power	100%-20% Power
Plus 27°C	7.21 - 1.6	6.4 - 16.9
Plus 10°C	4.77 - 0.95	4.35 - 6.08
Capacity kW 27/24 (DB/WB)	1.5 kW - 7.21 kW	
Usage	Hot Tub & Swim Spa	
Max Power Draw	0.09 - 1.09 kW	
Ambient Temp Operating Range	-10°C to 43°C	
Heating Range	15°C to 40°C	
Ability To Cool Water	Yes	
Sound @ 1 m dB	32 to 45	
Required Flow Rate	3.1 m3/hr (51.6 l/min)	
Wi-Fi	Yes	
Unit Size (L-D-H) mm	910 / 355 / 620	




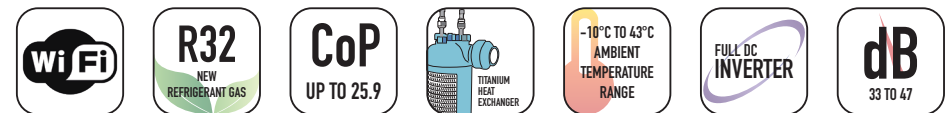
# VIAN S9 PLUS

SKU: HP-VP900



The Vian Power S9-PLUS hot tub and swim spa heat pump is an advanced heat pump that is again a crossover model for hot tubs and swim spas. This model has been used on hot tubs but is really designed for use on swim spas. This Full DC Inverter heat pump is capable of operating down to -10°C ambient temperature.

	Full DC Inverter Heat Pump	
	kW Out	CoP @
<b>CAPACITY @°C</b>	100%-20% Power	100%-20% Power
Plus 27°C	9.48 - 2.2	6.5 - 17.1
Plus 10°C	6.88 - 1.38	4.45 - 6.22
Capacity kW 27/24 (DB/WB)	1.8 kW - 9.48 kW	
Usage	Hot Tub & Swim Spa	
Max Power Draw	0.11 - 1.44 kW	
Ambient Temp Operating Range	-10°C to 43°C	
Heating Range	15°C to 40°C	
Ability To Cool Water	Yes	
Sound @ 1 m dB	33 to 47	
Required Flow Rate	4.1 m3/hr (68.3 l/min)	
Wi-Fi	Yes	
Unit Size (L-D-H) mm	910 / 355 / 620	



# INSTALLATION / HOW IT WORKS

## INSTALLATION

### Electrical requirements:

The heat pump does not need any additional electrical installation on site as the unit can take its power from the hot tub or swim spa.

### Location:

The heat pump requires a minimum of 500mm of inlet space and is recommended to have 1m of unobstructed space for the fan outlet.

### Planning:

Each installation will vary, and a site survey to review and discuss the best fitment and location for the heat pump can be arranged. This is a great opportunity to discuss the best option for the installation of the heat pump and answer any questions.

### Fitment:

When installing the heat pump some basic modifications to your hot tub or swim spa will be made. This is to plumb the heat pump into the heating and circulation system. There will be an inlet and an outlet pipe plumbed into the hot tub base or cabinet to provide circulation through the heat pump.

## HOW DOES AN AIR SOURCE HEAT PUMP WORK?

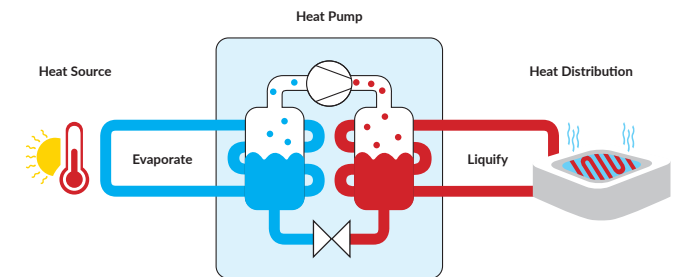
The fan in the air source heat pump draws air over a network of tubes that look a little like a car radiator.

These tubes are filled with an eco-friendly R32 refrigerant. The air then passes over the tubes warming up the refrigerant and turning it from a liquid into a gas.

This gas is passed through a compressor which increases the pressure and significantly raises the temperature of the gas, which is then passed through a titanium heat exchanger.

The swim spa or hot tub's water circulation system is plumbed through the air source heat pump and the heat from the gas travels through the heat exchanger, which in turn heats the water from the hot tub or swim spa as it passes over it.

The refrigerant then cools and turns back into a liquid and starts the process all over again.

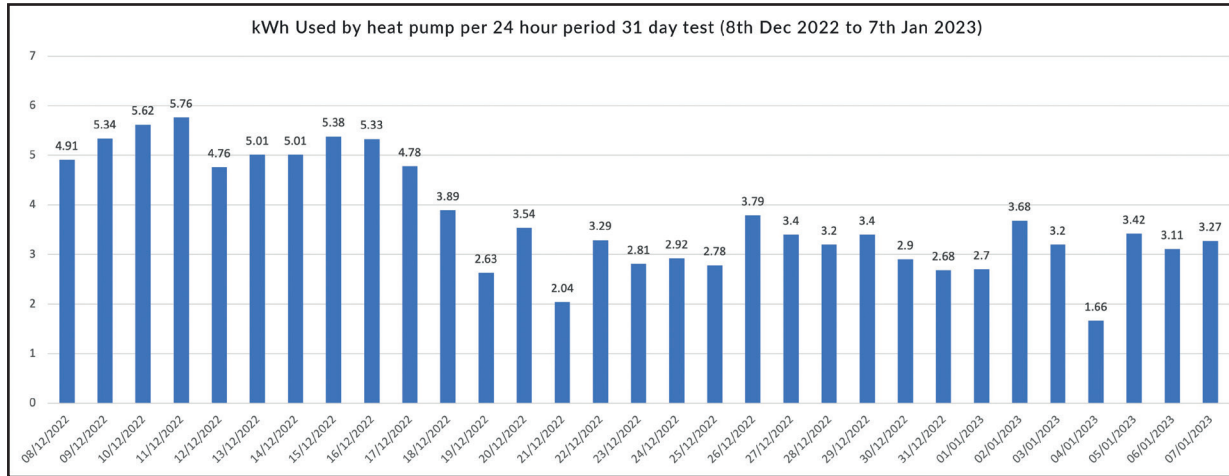


Due to how the system works, our air source heat pumps will still produce heat even if the ambient air temperature is below zero as the compression process of the refrigerant gas creates a lot of heat.

Not only is this a far more cost-effective solution to heat your hot tub or swim spa, but it is also a much more eco-friendly option.



# REAL WORLD TESTING

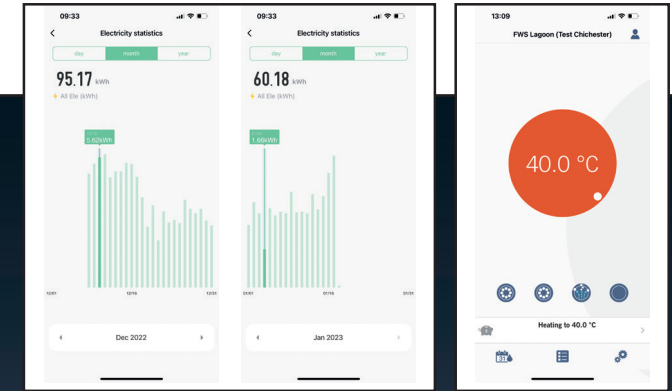


The chart above shows the kWh used by the heat pump to maintain the set point of 40°C. The test period is for 31 days between the 8th Dec 2022 and the 7th January 2023.

This was an ideal test period as the beginning of the test on the 8th Dec 2022 the UK experienced a very cold spell with temperatures dropping several degrees below zero.

Figure 1 shows the recorded temperature on the 10th of Dec 2022 of -3.1°C and the chart shows the kWh usage of 5.62kWh. Compared to figure 2 showing the temperature for the 4th of Jan 2023 being 11.5°C the kWh usage reduced to only 1.66 kWh.

The total kWh used by the heat pump over this period was 116.21 and this equates to an average of 3.75 kWh per day. As the ambient temperature rises, we can easily see that the efficiency of the heat pump increases significantly.



- Test Location is Chichester, West Sussex, UK. - All figures are just relating to the heating. - The hot tub is outdoors and not under a gazebo or shelter.
- The electric heater is disconnected so all heating is supplied by the heat pump only. - We are testing a Vian 7kW S7 Plus Air Source Heat Pump
- The heat pump is set to boost mode. - The hot tub is a mid-specification model of approx 1550 litres of water. - The hot tub is set to heat to 40°C.
- We have used an older cover for these tests that is slightly waterlogged (to mimic real world) - The pipes to the heat pump are not insulated.
- The heat pump is within 1 metre of the hot tub. (The hot tub has economy cycles set as follows: Tub goes into economy from 10.00pm to 10.00am, so does not heat for 12 hours overnight, 7 days per week. Then a second economy mode from 1.00pm to 4.00pm it also won't heat)

*These recordings and data are only for representative purposes as there are so many variables with different locations, temperatures and usage that could result in different figures. Whilst not independently vetted, we have performed a test to measure the kWh power consumption of our Vian 7kw S7 plus heat pump to show some of the real-world results. We used a simple inline kWh meter that connects to a smart home system to measure and record the usage.*

*We chose to undertake this testing during the colder months and incorporate a very cold period of weather to record the results in these conditions. As the ambient temperature increases through the seasons then the efficiency of the heat pumps will increase, and the kWh usage will reduce.*

*Even at the time of testing being the colder months, we believe it is clear to see that a Vian Power Heat Pump is an extremely efficient heating solution for your hot tub or swim spa.*



Figure 1

Figure 2

To equate these kWh figures to a cost, we simply multiply the figure by the current kWh rate. At the time of publishing the kWh rate is capped at £0.34.

10.12.2022 – Ambient temp = -3.1°C / 5.62 kWh used / £1.91 Heating cost

04.01.2023 – Ambient temp = 11.5°C / 1.66 kWh used / £0.56 Heating Cost

If we take the average daily kWh usage over the test period of 3.75 kWh per day then this would equate to £1.27 cost per day for heating.

# VIAN

POWER

LOW COST HOT TUB HEATING



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