SUNNIVA™

Create • Conserve • Sustain

# Heat Pumps by Sunniva
# Designed & Manufactured in India

www.sunnivaencon.com

# Director's Desk

**Dear Customer/Channel Partner/ Friend,**

It gives me immense pleasure to state that Sunniva in a short span of time has created a niche for itself. We offer a wide variety of heat pumps as per our customers' specifications and match their expectations in quality. We have an edge in designing and that has enabled us to execute challenging projects in a seamless way.

I sincerely appreciate all our channel partners for their constant support. We assure to be always on their side with the best of technology, price, marketing inputs and technical assistance.

I am also thankful to our clients for their patronage. We are committed to save energy, increase your ROI, reduce your carbon footprints and contribute to make this earth a greener planet.

## Kashyap Anandpara
Founder

*Mtech Mechanical*
*MBA Marketing*

Member of

BNI IGSHPA ISHRAE GRIHA

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## Nishith Shah

With a strong experience of 37 years in the field of Heating, Drying and Combustion equipment, Nishith is a science and management graduate who oversees Sunniva's equipment manufacturing units.

## Paras Shah

A qualified chemical engineer with 25 years of experience in execution and project management, Paras leads the Service and Execution Teams at Sunniva

## Samkit Shah

With 7 years of experience in the Engineering field, Samkit heads the Sales and Marketing teams at Sunniva and specializes in providing energy conservation solutions.

# Index



## About us

Sunniva Encon is a Heat Pump manufacturing company based out of Mumbai, India. We have a complete range of Heat pumps catering to various industries since 2013 across India with production capacity of 50 machines per month and a focus on service and customer satisfaction. Our machines are well built for Indian conditions.

### Vision

To be a world-class heat-pump manufacturer with all its allied products and services under one roof.

### Mission

To be a leading provider of clean technologies in energy conservation, enabling our clients to reduce their carbon footprint with attractive ROI

# Certificates

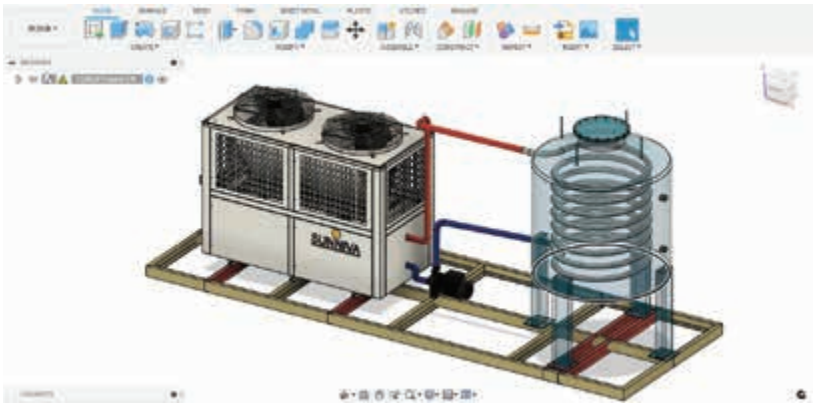




# Design

Our experience of over 30 years in manufacturing heating equipments has enabled us to design and build heat pumps with performance characteristics substantially superior to those available in the market.

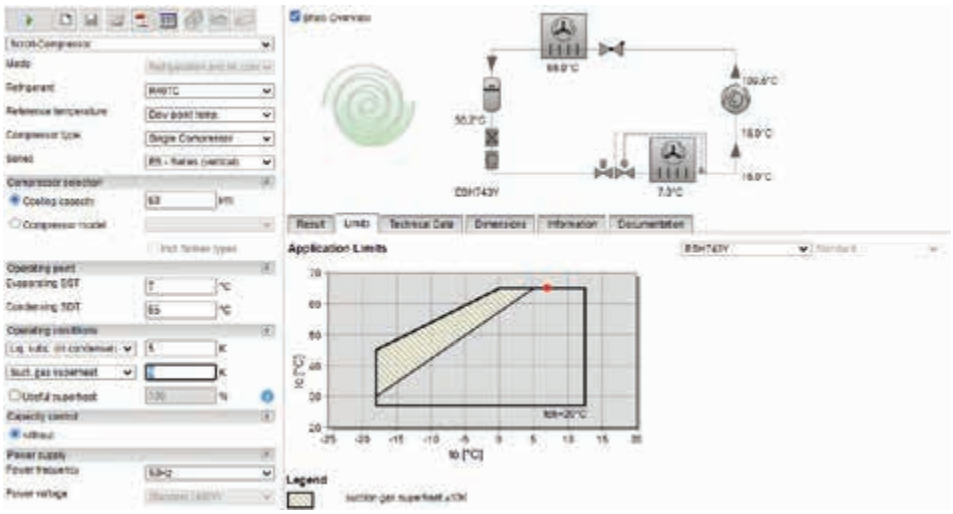
Our In-house Design team has designed highly efficient heat pumps for Indian conditions. We are continuously evolving our heat pump designs using advanced design softwares to improve efficiency and life cycle of our machines even further.



# Software

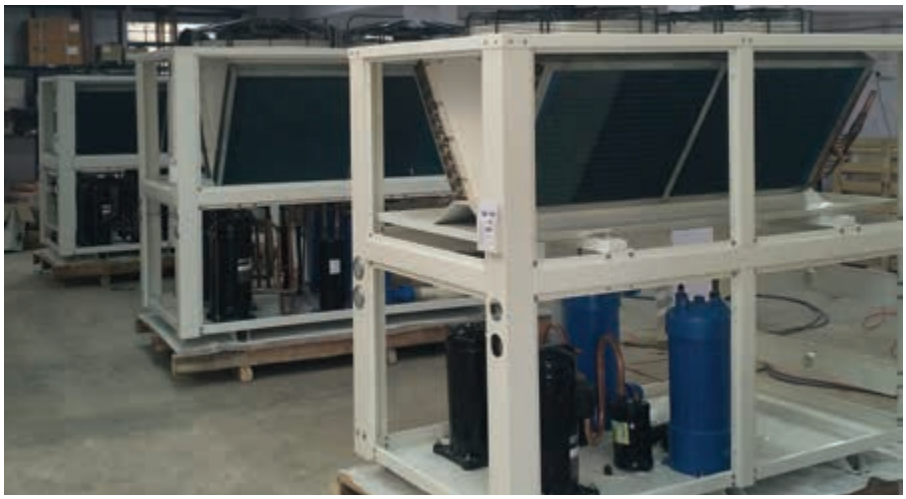
Selecting the components of a heat pump based on its application and heating capacity is the most crucial part of the process.

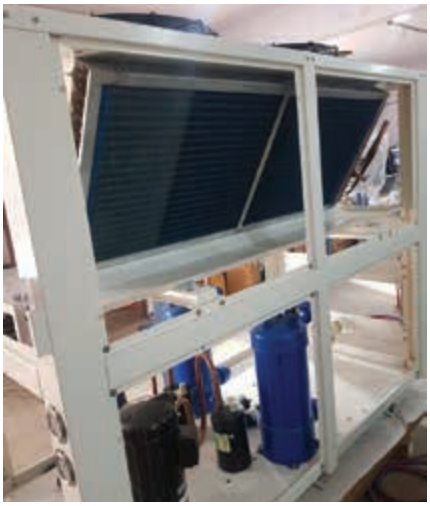
Our components are selected only based on either software or data sheets provided by the manufacturer. Software helps to select the compressor which is the heart of the heat pump. After selecting compressor all other components are selected.



# Manufacturing

A state-of-the-art unit based in Asangaon, Maharashtra and a team with over 30 years of experience, Sunniva is an expert in designing and manufacturing of heat pumps. Exposure of Good Manufacturing Practice (GMP) from heat pump industry has helped us get EN14511 certification for heat pumps. Our products have a superior world-class quality which are much sought after in domestic, commercial and industrial sectors.





# Main Components

## Compressor

**Scroll Compressor**
The advantage of a scroll compressor is that it has fewer moving parts and less torque variation which offers smooth and quiet operation. These compressors are ideal for Mid-range heating capacity. (15KW-250KW).

**Rotary Compressor**
The rotary compressor used in HVAC applications for air conditioning and heating systems offers some of the most efficient heat pump systems. These compressors are suitable for lesser heating capacities. (3.5KW-10KW)

**Screw Compressor**
This compressor has been known for its high specific output. Maintenance is easier due to fewer parts. Generally, this compressor is used for bigger capacities such as district heating or cooling. (Heating Load ≥ 250KW)

**Reciprocating Compressor**
The reciprocating compressor is easier to maintain and works very well at high pressure. These compressors are suitable where a lower condensing temperature is needed approximately 45-50°C

## Condenser

**PVC Shell Titanium Condenser**
Titanium exhibits outstanding resistance to corrosion supporting its use in swimming pool heat pump. Rifled titanium tube further provide better heat transfer.

**Brazed Plate Heat Exchanger(BPHE)**
BPHE offers highest heat exchanging capability taking much lesser space. The plates are made up of SS316 alloy which have higher corrosion resistance.

**Tube-in-Shell Condenser**
The compact structure is helpful to save space for the heat pump and thus reduce the size of the unit. The compact helix structure of the coil ensures sufficient heat transfer between refrigerant and water.

**Co-axial Condenser**
This condenser is composed of concentric inner tubes and outer tubes which is evenly separated. The refrigerant and water flow through the inner tube and outer tube transferring heat.

## Blue Finned Evaporator Coil

Blue Fin technology is the practice of coating the evaporator and condenser fins with epoxy, a kind of resin. Epoxy is a hydrophilic compound that does not allow water to settle on it for too long. It has low surface tension, meaning it has low friction which makes water droplets slide off easily.

## Expansion Valve

**Thermostatic Expansion Valve**
Movable valve pin controlled precisely to allow refrigerant flow to evaporator coil. Stable performance and longer service life.

**Electronic Expansion Valve**
An EEV controls refrigerant flow into evaporator coil more precisely than the traditional TXV, providing more efficiency

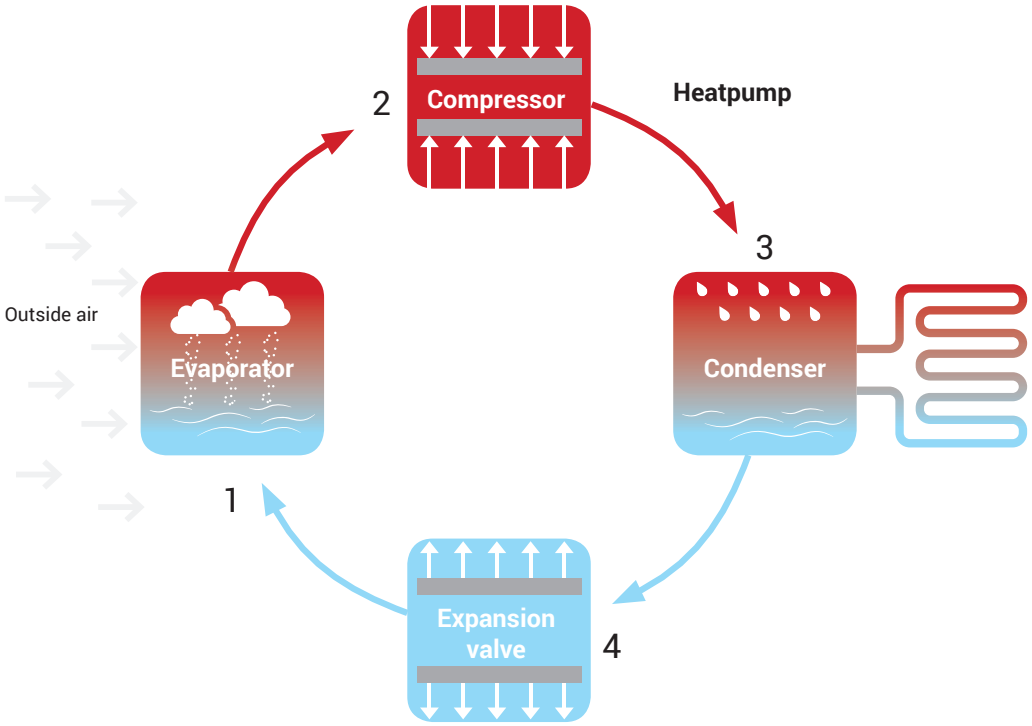
## Anti Vibration Element

This component is used in larger capacity heat pumps. The stiffness and mass of the absorber are designed in order to produce “anti-resonance” in the total system response.

## High Pressure/Low Pressure Switch

Ensure safe operation of heat pump if circulation pump stops working or refrigerant leaks.

# Working Principle




A compressor pumps the refrigerant between two heat exchanger coils.

1-2 In evaporator coil, the refrigerant is evaporated at low pressure and absorbs heat from its surroundings.

2-3 The refrigerant is then compressed en route to the other coil.

3-4 Here it condenses at high pressure and it releases the heat it absorbed, earlier in the cycle.

4-1 The high pressure low temperature refrigerant will be converted into low pressure low temperature refrigerant when it passes through the expansion valve and the cycle will recommence.

# Benefits of Heat Pump

- ✓ Reduced water heating costs upto 75%
- ✓ Reliable hot water round the year
- ✓ Reduced carbon emissions
- ✓ Negligible maintenance costs
- ✓ Quick payback & return on investment
- ✓ Longest product life
- ✓ Silent operation
- ✓ Space saving

# Economic Benefits of Heat Pump

*Operating cost per 100 liters of hot water*

| | ₹37 | ₹32 | ₹26 | ₹10 |
|---|---|---|---|---|
| | **Electric** | **LPG** | **PNG** | **Heat Pump** |
| **Efficiency** | 95% | 90% | 90% | 350% |
| **Heat Required in Kcals** | 150000 | 150000 | 150000 | 150000 |
| **Calorific Value** | - | 11200 | 8400 | - |
| **Power Required Kilowatt** | 174.42 | - | - | 174.42 |
| **Power Consumption In KWh** | 183.60 | - | - | 49.83 |
| **Heat Delivered In per Kg** | - | 9520 | 7140 | - |
| **Total Fuel Required Kg/Ltrs** | - | 17.5 | 23.34 | - |
| **Cost/Unit ₹** | 10 | 90 | 48 | 10 |
| **Total Cost/Day ₹** | 1,836 | 1,576 | 1,120 | 498 |
| **Total Cost/Month ₹** | 55,080 | 47,269 | 33,613 | 14,950 |
| **Total Cost/Year ₹** | 660,954.7 | 567,226.9 | 403,361.3 | 179,402.0 |

*Above Calculations are based on following Data*
*Quantity of Hot water Estimated (Liters.) 5000; Cold Water Inlet Temperature (Degree centigrade) 20; Hot water Temperature (Degree centigrade) 50*

# All in One Heat Pumps


## Applications

Bungalows

Villas

Farm Houses

## Description

In an all-in-one heat pump water heater, the heated refrigerant is usually conveyed through a heat exchanger that's wrapped around the outside of the tank, under the insulation. The refrigerant heats the tank by conduction, transferring heat from the condenser coil through the tank shell, to the water inside.

Heat pump is a device in which the refrigerant R134a is continuously changing the shape from gas to liquid. It pumps out the solar energy from the air in the room and together with electrical energy consumed by compressor it gives out the total heating capacity which is accumulated in the water storage tank.

Evaporator is an air-refrigerant heat exchanger. In the evaporator the refrigerant is vaporized at low pressure and relatively low temperature. Because of vaporization the heat transfer from air to refrigerant begins. Vaporized refrigerant comes in the compressor where the pressure increases and so does temperature. From compressor the vaporized and high temperature steam goes in the condenser (refrigerant-water) where again the heat is transferred from refrigerant to water. The refrigerant is now in liquid shape at a high pressure. After it flows thought the expansion valve it reaches the basic shape and the process begins again. The circuit is in process until the water temperature in the water storage tank reaches the set point.

## Features

High efficiency micro channel heat exchanger

Glass enamel water tank

High efficiency compressor with defrosting

Silent operation

Smart touch control

Intelligent control electronic expansion valve

| | | SE-AH-1-80 | SE-AH-2-150 |
|---|---|---|---|
| Rated volume | L | 80 | 150 |
| Inner tank material | | Enameled steel (Steel BTC340R, 1.8mm) | Enameled steel ( 2.5mm) |
| Outer casing | | Painted galvanized steel | |
| Insulation | | Polyurethane foam, 45mm | |
| Working temp. | °C | 5~45 | 0~45 |
| Color | | White | Grey or white |
| COP(W/W) | | 3.4 | 3.85 |
| Power supply | | ~220-240V/50Hz/1Ph | |
| Heating capacity (W) | W | 750 | 1600 |
| Rated hot water output | L/H | 16 | 36 |
| Max. water temp. | °C | 55 | 75 |
| Max. working power | W | 2450 | 3200 |
| Max. working current | A | 12 | 16 |
| Rated working power | W | 220 | 415 |
| Electric heater power | W | 2000 | 2500 |
| Water pressure | MPa | 0.8 | |
| Noise | dB(A) | 40 | 48 |
| Net weight | kg | 70 | 102 |
| Refrigerant | | R134a | |
| Compressor brand | | Panasonic | |
| Condenser | | Micro-channel heat exchanger | |
| Control method | | Remote display | Touch screen |
| Product size | mm | Ø470 × 1075 | Φ525 × 1735 |

*Note : Colour subject to change*

| | | SE-AH-2-200 | SE-AH-3-300 |
|---|---|---|---|
| Rated volume | L | 200 | 300 |
| Inner tank material | | Enameled steel (2.5mm) | Enameled steel (Steel BTC340R, 2.5mm) |
| Outer casing | | Painted galvanized steel | |
| Insulation | | Polyurethane foam, 45mm | Polyurethane foam, 50mm |
| Working temp. | °C | 0~45 | -5~43 |
| Color | | Grey or white | |
| COP(W/W) | | 3.85 | 4.0 |
| Power supply | | ~220-240V/50Hz/1Ph | |
| Heating capacity (W) | W | 1600 | 3300 |
| Rated hot water output | L/H | 36 | 75 |
| Max. water temp. | °C | 75 | |
| Max. working power | W | 3200 | 4000 |
| Max. working current | A | 16 | 19 |
| Rated working power | W | 415 | 827 |
| Electric heater power | W | 2500 | |
| Water pressure | MPa | 0.8 | |
| Noise | dB(A) | 48 | |
| Net weight | kg | 114 | 129 |
| Refrigerant | | R134a | |
| Compressor brand | | Panasonic | |
| Condenser | | Micro-channel heat exchanger | |
| Control method | | Touch screen | Wired remote controller |
| Product size | mm | Φ525 × 1955 | Φ650 × 1950 |

*Note : Colour subject to change*

| | | SE-AH-6-350 | SE-AH-6-420 |
|---|---|---|---|
| Rated volume | L | 350 | 420 |
| Inner tank material | | Enameled steel (Steel BTC340R, 2.5mm) | |
| Outer casing | | Painted galvanized steel | |
| Insulation | | Polyurethane foam, 50mm | |
| Working temp. | °C | -5~43 | |
| Color | | Grey | |
| COP(W/W) | | 4.08 | |
| Power supply | | ~220-240V/50Hz/1Ph | |
| Heating capacity (W) | W | 5300 | |
| Rated hot water output | L/H | 118 | |
| Max. water temp. | °C | 75 | |
| Max. working power | W | 5000 | |
| Max. working current | A | 23 | |
| Rated working power | W | 1300 | |
| Electric heater power | W | 2500 | |
| Water pressure | MPa | 0.8 | |
| Noise | dB(A) | 45 | |
| Net weight | kg | 192 | 207 |
| Refrigerant | | R134a | |
| Compressor brand | | Panasonic | |
| Condenser | | Micro-channel heat exchanger | |
| Control method | | Wired remote controller | |
| Product size | mm | 675×937×1720 | 735×1006×1720 |

*Note : Colour subject to change*

# Monoblock Heat Pumps

## Applications

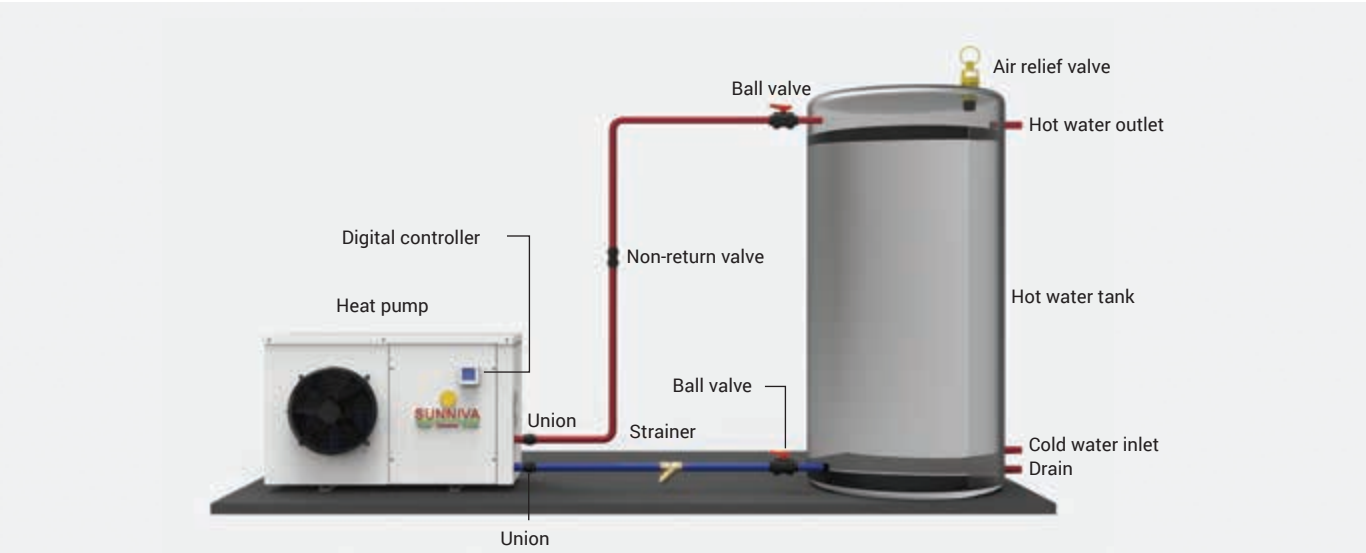
**Hotels**

**Motels**

**Boarding Houses**

**Back-up for Solar Water Heaters**

## Schematic Diagram




## Description

Specifically designed for Indian conditions, these heat pumps comes with inbuilt wilo water circulation pump so we only need to connect the pipes and plug the machine. This range of heat pumps comes with Panasonic rotary compressor for high life.

## Features

- Panasonic (highly efficient rotary compressor)
- Automatic defrosting
- Low noise & vibration
- Inbuilt circulation pump
- Closed loop system possible
- Long working life
- Safe, reliable and stable running
- Easy to install
- Intelligent control

| | | SE-AH-4M | SE-AH-7M | SE-AH-10M |
|---|---|---|---|---|
| HP | | 1 HP | 2 HP | 2.5 HP |
| Heating capacity | KW | 3.5 | 7.4 | 9.3 |
| COP | | 4.12 | 4.0 | 4.00 |
| Rated heated water output | L/H | 105 | 215 | 280 |
| Rated outlet water temp. | ℃ | 55 | | |
| Max outlet water temp. | ℃ | 60 | | |
| Rated power input | KW | 0.85 | 1.85 | 2.33 |
| Rated current | A | 4.07 | 8.85 | 11.20 |
| Power supply | | ~220-240V/50Hz/1Ph | | |
| Compressor type | | Rotary | | |
| Throttling device | | Electronic expansion valve | | |
| Fan quantity | | 1 | | |
| Fan input | W | 25 | 40 | 50 |
| Fan speed | RPM | 830 | 850 | |
| Ambient temperature | ℃ | -7~43 | | |
| Refrigerant | | R410A | | |
| Circulation pump | | Wilo | | |
| Noise at 1m distance | dB(A) | ≤54 | ≤55 | ≤57 |
| Water pipe size | inch | Rc3/4 | | R1 |
| Product dimension (L×W×H) | mm | 930 × 350 × 550 | 1005 × 350 × 620 | 1110 × 400 × 750 |
| Net weight | kg | 48 | 66 | 85 |

*Testing condition: Ambient temp.(DB/WB) = 30℃/25℃, Input/output water temp. = 25℃/55℃*

# Commercial Heat Pumps

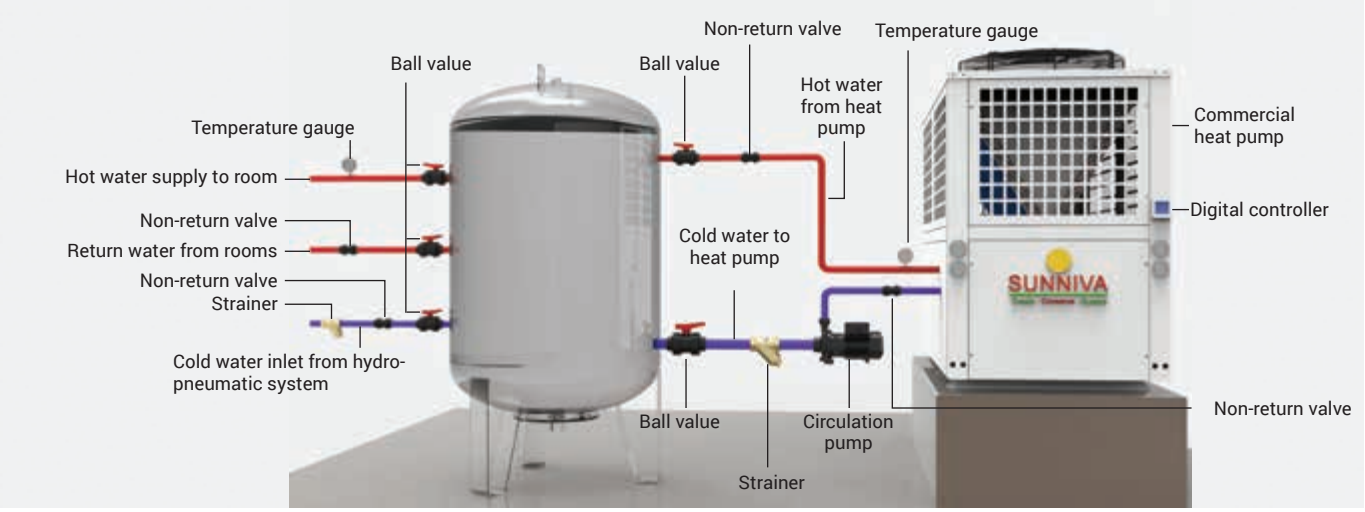

## Applications

- Hotels
- Resorts
- Hospitals
- Boarding Schools
- Apartment Complexes

| | | SE-AH-19U | SE-AH-25U | SE-AH-37U | SE-AH-37V | SE-AH-45U | SE-AH-45V |
|---|---|---|---|---|---|---|---|
| HP | | 5 HP | 7 HP | 10 HP | 10 HP | 12HP | 12HP |
| Heating Capacity | KW | 19 | 25 | 37 | 37 | 45 | 45 |
| COP | | 4.2 | 4.15 | 4.2 | 4.2 | 4.16 | 4.18 |
| Rated Hot water output | L/H | 540 | 710 | 1070 | 1070 | 1270 | 1270 |
| Rated water temp | °C | 55 | | | | | |
| Max Water Temp | °C | 60 | | | | | |
| Input Power | KW | 4.4 | 6 | 8.8 | 8.8 | 11.1 | 11.1 |
| Current | A | 8.4 | 11.4 | 16.7 | 16.7 | 20.1 | 20.1 |
| Power Supply | | 380~415V/50Hz/3Ph | | | | | |
| Compressor` | | Scroll (Emerson Copeland/Panasonic) | | | | | |
| Number of compressor | | 1 | 1 | 1 | 1 | 1 | 1 |
| Heat exchanger (Condenser) | | Tube-in-Shell Heat Exchanger / Brazed Plate Heat Exchanger | | | | | |
| Evaporator | | Blue Finned Evaporator Coil | | | | | |
| Throttling Device | | Thermostatic Expansion Valve | | | | | |
| Water Flow | $m^3$ | 3.2 | 4.3 | 6.3 | 6.3 | 7.5 | 7.5 |
| Fan Quantity | Piece | 1 | 1 | 1 | 1 | 1 | 1 |
| Refrigerant | | R407C | | | | | |
| Noise at 1 Meter | dB(A) | ≤65 | ≤65 | ≤65 | ≤65 | ≤66 | ≤67 |
| Pipe Size | inch | R1 | R1 | R1-1/2 | R1-1/2 | R1-1/2 | R1-1/2 |
| Dimension (L × W × H) | mm | 800 × 800 × 1025 | 800 × 800 × 1025 | 1100 × 1100 × 1295 | 1340 × 950 × 1675 | 1100 × 1100 × 1295 | 1340 × 950 × 1675 |
| Weight | kg | 170 | 180 | 300 | 320 | 325 | 355 |

*Test condition: Ambient temp.(DB/WB) = 30°C/25°C, Inlet/Outlet water temp.= 25°C/55°C*

## Schematic Diagram




## Description

This series is splendid for centralized hot water system and is capable of generating hot water upto 55 ℃ It is the ideal hot-water solution for Hotels, Hospitals, Resorts, Boarding Schools and Apartment Complexes.

## Features

- American Copeland/Panasonic scroll compressor
- Stainless steel brazing plate heat exchanger
- Thermostatic expansion valve
- Automatic defrosting (optional)
- Super intelligence
- Low noise and vibration
- Stable running, safe and reliable
- Smart-touch control/wireless controller

| | | SE-AH-50V | SE-AH-70V | SE-AH-90V | SE-AH-140V | SE-AH-180V |
|---|---|---|---|---|---|---|
| HP | | 15HP | 20HP | 25HP | 40HP | 50HP |
| Heating Capacity | KW | 50 | 70 | 90 | 140 | 180 |
| COP | | 4.2 | 4.1 | 4.15 | 4.1 | 4.15 |
| Rated Hot water output | L/H | 1480 | 2030 | 2600 | 4060 | 5220 |
| Rated water temp | °C | 55 | | | | |
| Max Water Temp | °C | 60 | | | | |
| Input Power | KW | 12.1 | 17.1 | 21.7 | 34.1 | 43.4 |
| Current | A | 23.1 | 32.4 | 41.2 | 64.9 | 82.4 |
| Power Supply | | 380~415V/50Hz/3Ph | | | | |
| Compressor | | Scroll (Emerson Copeland/Panasonic) | | | | |
| Number of compressor | | 2 | 2 | 2 | 4 | 4 |
| Heat exchanger (Condenser) | | Tube-in-Shell Heat Exchanger / Brazed Plate Heat Exchanger | | | | |
| Evaporator | | Blue Finned Evaporator Coil | | | | |
| Throttling Device | | Thermostatic Expansion Valve | | | | |
| Water Flow | $m^3$ | 8.7 | 12 | 15.4 | 24 | 30.9 |
| Fan Quantity | Piece | 2 | 2 | 2 | 4 | 4 |
| Refrigerant | | R407C | | | | |
| Noise at 1 Meter | dB(A) | ≤67 | ≤70 | ≤72 | ≤75 | ≤78 |
| Pipe Size | inch | R1-1/2 | R2 | R2-1/2 | R3 | R3 |
| Dimension (L X W X H) | mm | 1650 × 950 × 1635 | 1990 × 980 × 2045 | 1990 × 980 × 2045 | 2200 × 2100 × 2150 | 2200 × 2100 × 2150 |
| Weight | kg | 430 | 610 | 740 | 1150 | 1300 |

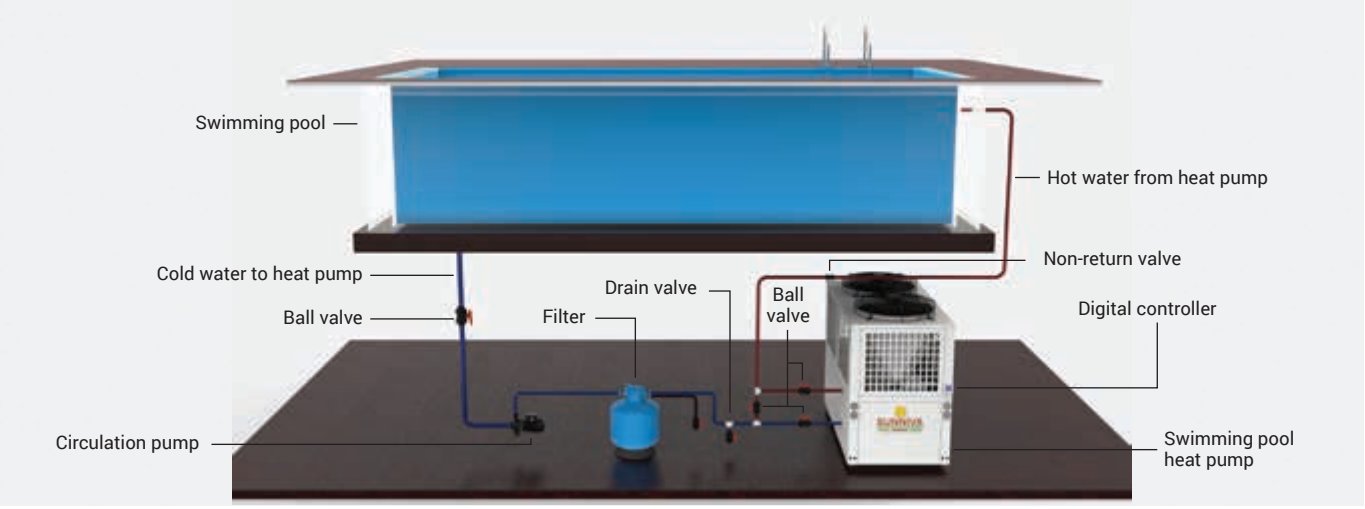
*Test condition: Ambient temp.(DB/WB) = 30°C/25°C, Inlet/Outlet water temp.= 25°C/55°C*

# Swimming Pool Heat Pumps


| | | SE-SP-11U | SE-SP-14U | SE-SP-21U | SE-SP-27U | SE-SP-35U | SE-SP-45V | SE-SP-55V |
|---|---|---|---|---|---|---|---|---|
| HP | | 2.5 | 3 | 5HP | 6HP | 8HP | 10HP | 12HP |
| Heating Capacity | KW | 11 | 14 | 21 | 27 | 35 | 45 | 55 |
| COP | | 3.93 | 4 | 4.87 | 4.84 | 4.86 | 4.84 | 4.82 |
| Max Output Water Temp | °C | 45 | | | | | | |
| Power Supply | | 380~415V/50Hz/3Ph | | | | | | |
| Input Power | KW | 2.8 | 3.5 | 4.4 | 5.28 | 7.3 | 9.4 | 10.95 |
| Current | A | 5 | 5.9 | 8.3 | 10 | 13.9 | 17.9 | 20.8 |
| Max Input Power | KW | 4.5 | 5.3 | 6.1 | 7.5 | 10 | 13.5 | 15.1 |
| Max Current | A | 8.2 | 10.3 | 11.6 | 14.4 | 19 | 25.6 | 28.7 |
| Evaporator Coil | | Blue Finned Evaporator Coil | | | | | | |
| Throttling Valve | | Thermostatic Expansion Valve | | | | | | |
| Heat Exchanger (Condenser) | | PVC Shell Titanium Condenser | | | | | | |
| Refrigerant | | R407C | | | | | | |
| Compressor | | Reciprocating | | Scroll (Emerson Copeland/Panasonic) | | | | |
| Number of Compressor | | 1 | | | | | 2 | |
| Fan Quantity | Piece | 1 | | | | | 2 | |
| Fan Discharging | | Horizontal | | Vertical | | | | |
| Water Flow | $m^3/H$ | 4.8 | 6 | 9 | 12.5 | 15 | 20 | 23 |
| Pipe Size | inch | Rc1-1/2 | | | Rc2 | | | |
| Noise at 1 Meter | db(A) | ≤53 | ≤55 | ≤56 | ≤58 | ≤61 | | ≤66 |
| Dimension (L × W × H) | mm | 1250 x 660 x 725 | 1250 x 660 x 725 | 800 × 800 × 1025 | 800 × 800 × 1025 | 1100 × 1100 × 1295 | 1650 × 950 × 1625 | 1650 × 950 × 1625 |
| Weight | kg | 120 | 130 | 150 | 170 | 244 | 284 | 316 |

*Heating test condition: Ambient temp.(DB/WB)=24°C /19°C , 65.2%RH, Inlet water temp.=26°C*
*Cooling test condition: Ambient temp.(DB/WB)=43°C /37°C , Inlet water temp.=32°C*

## Schematic Diagram




## Description

This series applies titanium heat exchanger and heat pump technology which can move heat from surroundings to the pool water. It is especially suitable for commercial swimming pools.

## Features

- All range of capacity from 11KW to 220KW
- American Copeland/Panasonic scroll compressor
- Titanium tube in PVC shell heat exchanger
- Thermostatic expansion valve
- Intelligent defrosting (optional)
- Easy installation and operation
- Stable running, economic and durable
- Heating in winter & optional cooling in summer
- Smart touch/wireless controller

| | | SE-SP-70V | SE-SP-90V | SE-SP-110V | SE-SP-140V | SE-SP-180V | SE-SP-220V |
|---|---|---|---|---|---|---|---|
| HP | | 15HP | 20HP | 25HP | 30HP | 40HP | 50HP |
| Heating Capacity | KW | 70 | 90 | 110 | 140 | 180 | 220 |
| COP | | 4.83 | 4.84 | 4.82 | 4.83 | 4.81 | 4.82 |
| Max Output Water Temp | °C | 45 | 45 | | | | |
| Power Supply | | 380~415V/50Hz/3Ph | | | | | |
| Input Power | KW | 14.4 | 18.6 | 22.82 | 28.9 | 36.5 | 45.64 |
| Current | A | 26 | 34.5 | 43.3 | 55.1 | 69.1 | 86.7 |
| Max Input Power | KW | 18.9 | 25.4 | 31.5 | 38.8 | 51 | 63 |
| Max Current | A | 35.9 | 48.2 | 59.8 | 73.7 | 97 | 120 |
| Evaporator Coil | | Blue Finned Evaporator Coil | | | | | |
| Throttling Valve | | Thermostatic Expansion Valve | | | | | |
| Heat Exchanger (Condenser) | | PVC Shell Titanium Condenser | | | | | |
| Refrigerant | | R407C | | | | | |
| Compressor | | Scroll (Emerson Copeland/Panasonic) | | | | | |
| Number of Compressor | | 2 | | | | 4 | |
| Fan Quantity | Piece | 2 | | | | 4 | |
| Fan Discharging | | Vertical | | | | | |
| Water Flow | $m^3/H$ | 28 | 37 | 47 | 60 | 75 | 95 |
| Pipe Size | inch | Rc2 | Rc2-1/2 | Rc3 | | | |
| Noise at 1 Meter | db(A) | ≤66 | ≤66 | ≤68 | ≤70 | ≤75 | ≤76 |
| Dimension (L × W × H) | mm | 1850 × 950 × 1635 | 1990 × 980 × 2045 | 2250 × 1090 × 1785 | 2250 × 1090 × 1785 | 2200 × 1120 × 2295 | 2200 × 1120 × 2295 |
| Weight | kg | 510 | 540 | 730 | 870 | 1160 | 1200 |

*Heating test condition: Ambient temp.(DB/WB)=24°C /19°C , 65.2%RH, Inlet water temp.=26°C*
*Cooling test condition: Ambient temp.(DB/WB)=43°C /37°C , Inlet water temp.=32°C*

# High Temperature Heat Pumps


## Applications

**Laundries**

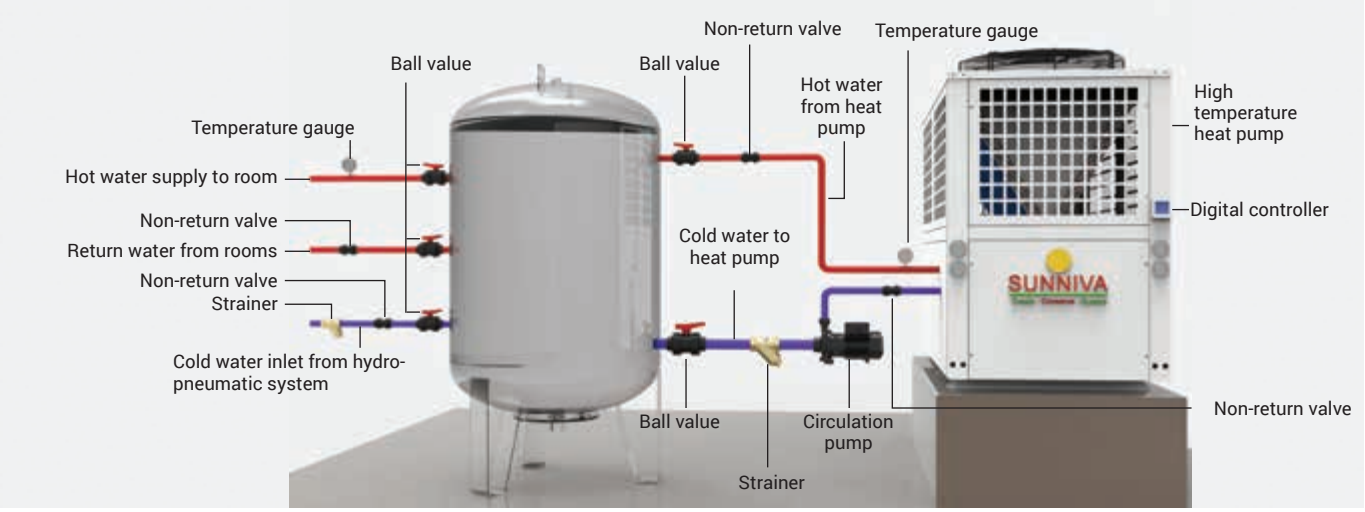
**Commercial Kitchens**

**Pharma Industry**

**Industrial Processes**

| | | SE-HT-14U | SE-HT-19U | SE-HT-29V | SE-HT-35V |
|---|---|---|---|---|---|
| HP | | 5 HP | 7 HP | 10 HP | 12 HP |
| Heating Capacity @ 60 | KW | 13.9 | 18.4 | 28.6 | 34.9 |
| Heating Capacity @ 70 | KW | 13.2 | 17.2 | 26.8 | 32.6 |
| Heating Capacity @ 80 | KW | 12.5 | 16.2 | 25.2 | 30.6 |
| COP | | 2.85 | 2.85 | 2.85 | 2.85 |
| Power Supply | | 380~415V/50Hz/3Ph | | | |
| Input Power | KW | 5.1 | 8.3 | 9.82 | 12 |
| Rated Current | A | 9.3 | 14 | 18.7 | 22.7 |
| Rated Water Temperature | °C | 80 | | | |
| Heat Exchanger (Condenser) | | Brazed Plate Heat Exchanger / Co-axial Condenser | | | |
| Evaporator | | Blue Finned Evaporator Coil | | | |
| Throttling Valve | | Thermostatic Expansion Valve | | | |
| Refrigerant | | R134a | | | |
| Compressor | | Scroll (Emerson Copeland/Panasonic) | | | |
| Number of compressor | | 1 | | | |
| Fan Quantity | Piece | 1 | | | |
| Rated Hot water output | L/H | 201 | 270 | 401 | 487 |
| Water Flow | L/H | 2675 | 5775 | 8025 | 9745 |
| Water Pressure Drop | KPa | ≤45 | ≤50 | ≤55 | ≤56 |
| Weight | kg | 174 | 205 | 290 | 350 |
| Noise at 1 Meter | db(A) | ≤58 | ≤62 | ≤68 | ≤69 |
| Pipe Size | inch | R1 | R1 | R1-1/4 | R1-1/2 |
| Dimension (L × W × H) | mm | 800 × 800 × 1025 | 800 × 800 × 1025 | 1100 × 1100 × 1295 | 1100 × 1100 × 1295 |

## Schematic Diagram




## Description

This series of heatpumps can generate hot water at 80 °C at high COP. These heatpumps are ideal for industrial applications and processes requiring water at high temperature.

## Features

- Water outlet temperature up to 75/80 °C
- Capacity available up to 200 KW
- Wide ambient range 10 to 45 °C
- Environment friendly green refrigerant
- Protective system with thermostat and pressure switch
- Overload protection
- Smart touch/wireless controller

| | | SE-HT-38V | SE-HT-58V | SE-HT-70V | SE-HT-115V |
|---|---|---|---|---|---|
| HP | | 14 HP | 20 HP | 25 HP | 40 HP |
| Heating Capacity @ 60 | KW | 36.8 | 57.2 | 69.8 | 114.4 |
| Heating Capacity @ 70 | KW | 34.8 | 53.6 | 65.2 | 107.2 |
| Heating Capacity @ 80 | KW | 32.4 | 50.4 | 61.2 | 100.8 |
| COP | | 2.84 | 2.84 | 2.86 | 2.86 |
| Power Supply | | 380~415V/50Hz/3Ph | | | |
| Input Power | KW | 14.8 | 19.4 | 24.1 | 39.8 |
| Rated Current | A | 28 | 36.5 | 45.7 | 75.4 |
| Rated Water Temperature | °C | 80 | | | |
| Heat Exchanger (Condenser) | | Brazed Plate Heat Exchanger / Co-axial Condenser | | | |
| Evaporator | | Blue Finned Evaporator Coil | | | |
| Throttling Valve | | Thermostatic Expansion Valve | | | |
| Refrigerant | | R134a | | | |
| Compressor | | Scroll (Emerson Copeland/Panasonic) | | | |
| Number of compressor | | 2 | | | 4 |
| Fan Quantity | Piece | 2 | | | 4 |
| Rated Hot water output | L/H | 563 | 816 | 974 | 1605 |
| Water Flow | L/H | 11480 | 16325 | 19490 | 32158 |
| Water Pressure Drop | KPa | ≤58 | ≤65 | ≤70 | ≤75 |
| Weight | kg | 375 | 510 | 610 | 1040 |
| Noise at 1 Meter | db(A) | ≤74 | ≤76 | ≤78 | ≤81 |
| Pipe Size | inch | R1-1/2 | R2 | R2 | R2-1/2 |
| Dimension (L × W × H) | mm | 1650 X 950 X 1625 | 1850 X 1000 X 1950 | 2000 X 1100 X 2080 | 2200 X 2100 X 2150 |

# Cascading Heat Pumps


## Applications

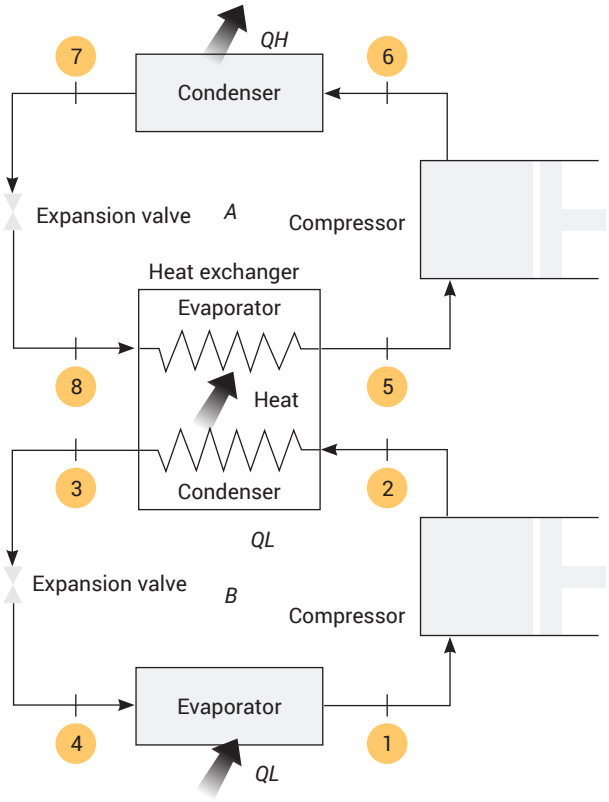
- Textiles
- Chemicals
- Pharma Industry
- Food
- Dairy

## Description

Cascading heatpumps are capable of generating steam upto 120 degrees °C using R245fa refrigerant. This makes it an ideal choice for industrial applications that require steam for their processes.

The cascading heat pumps works in two loops of Refrigeration system. Refrigerant R134a helps to push the water temperature up to 80 °C then R245fa heat the water above 100 °C in order to produce a steam.

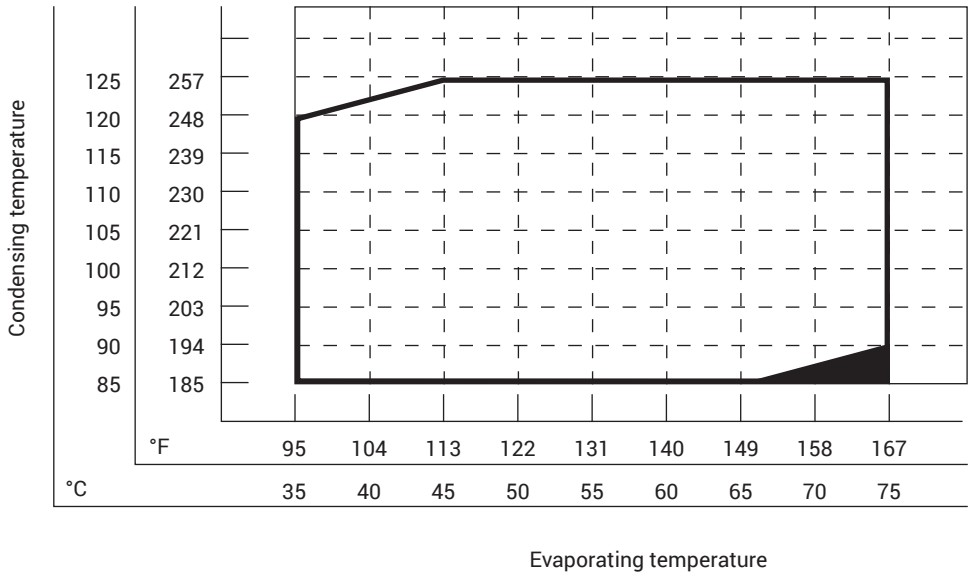
## Cascade Heat Pump Integration




**Cycle 1-2-3-4: Low Temperature Circuit**
**Cycle 5-6-7-8: High Temperature Circuit**

| | |
|---|---|
| 4-1 | The refrigerant R134a takes heat from the hot well water and evaporates. |
| 1-2 | The compressor compresses the refrigerant and boosts it to high temperature and high pressure refrigerant. |
| 2-3 | The refrigerant gas now passes through the condenser where gives its heat to the refrigerant inside the high temperature circuit. |
| 3-4 | In order to be able to start the cycle again, the refrigerant must be depressurized, and so it is passed through an expansion valve, where it returns to a low- pressure liquid / gas mix and the cycle can recommence. |
| 8-5 | The refrigerant R245fa takes heat from the low temperature circuit and evaporates into superheated vapour. |
| 5-6 | The compressor pushes the refrigerant to high pressure and high temperature gas. |
| 6-7 | The high temperature gas condenses and looses the heat to the water circulating through the condenser. |
| 7-8 | Then the liquid refrigerant is depressurized in to a low-pressure liquid / gas mix and the cycle continues. |

## R245fa application limits



# EVI Heat Pumps


## Applications

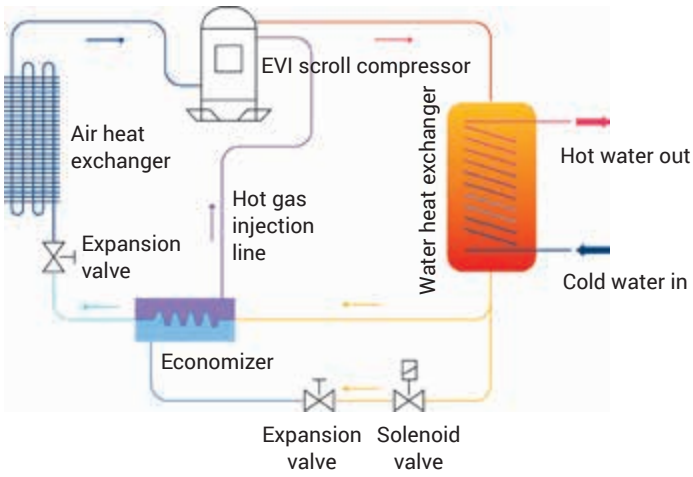
- Hotels
- Resorts
- Hospitals
- Boarding Schools
- Apartment Complexes

## Description

EVI Air Source heat pumps transfer heat from the ambient air to water, providing hot water up to 60°C. The unique Low ambient-temperature heat pump is widely used for house warming. With innovative & advanced technology, the direct-heating heat pump can operate very well at -25°C ambient temperature with high output temperatures up to 60°C, which ensures the compatibility with normal sized radiator based systems without supplementation. Compared with traditional Oil/LPG boilers, high-temperature heat pump produces up to 50% less CO2 whilst saves 80% running cost. EVI heat pumps are not only highly efficient, but also easy and safe to operate.

## Features

1. Low running costs and high efficiency
   - A high coefficient of performance (COP) of up to 5 results in lower running costs compared with traditional ASHP technology.
   - No immersion heater supplement is required.
2. Reduced Capital Costs
   - Simple installation
   - Compatible with traditional radiator systems, eliminating the expense of installing under floor heating or changing to oversized radiators.
3. High Comfort Levels
   - High storage temperature results in increased hot water availability.
4. No potential danger of any inflammable, gas poisoning, explosion, fire, electrical shock which are associated with other heating systems.
5. Long-life and corrosion resistant composite cabinet stands up to severe climates.
6. American Copeland/ Panasonic. scroll compressor ensures outstanding performance, ultra energy efficiency, durability and quiet operation.
7. Self-diagnostic digital control panel monitors and troubleshoots heat pump operations to ensure safe and reliable operation.



| | | SE-EVI-10U | SE-EVI-18U | SE-EVI-37U | SE-EVI-43U | SE-EVI-70U |
|---|---|---|---|---|---|---|
| Heating capacity | KW | 10.3 | 17.8 | 37.4 | 43.4 | 69.8 |
| COP | | 4.42 | 4.44 | 4.41 | 4.51 | 4.58 |
| Rated Heated water output | L/H | 220 | 381 | 800 | 930 | 1500 |
| Rated outlet water temp. | °C | 55 | | | | |
| Max outlet water temp | °C | 60 | | | | |
| Rated power input | KW | 2.32 | 4.02 | 8.48 | 9.63 | 15.23 |
| Rated current | A | 11.10 | 7.63 | 16.11 | 18.29 | 28.93 |
| Power supply | | 220-240V/ 50Hz/1Ph | 380-415V/50hz/3Ph | | | |
| Compressor type | | Scroll | | | | |
| Number of compressors | | 1 | | 2 | | |
| Throttling device | | Emerson thermal expansion valve/EEV | | | | |
| Fan type | | Low noise high efficiency axial type | | | | |
| Fan discharging | | Vertical | | | | |
| Fan quantity | | 1 | | 2 | | |
| Fan input | W | 70 | 250 | | | 750 |
| Fan speed | RPM | 850 | 880 | | | 940 |
| Ambient temperature | °C | -25-43 | | | | |
| Refrigerant | | R22/R407C | | | | |
| Circulation flow | $m^3/h$ | 1.76 | 3.07 | 6.44 | 7.47 | 12 |
| Circulation pressure drop | kPa | 30 | 60 | 65 | | |
| Noise at 1 Meter distance | dB(A) | 59 | 62 | 63 | | 68 |
| Water pipe size | inch | R1 | | R1-1/2 | | Rc2-1/2 |
| Cabinet | | Stainless steel/steel with powder coated | | | | |
| Dimension (L × W × H) | mm | 710 × 710 × 795 | 810 × 810 × 995 | 1340 × 695 × 1160 | | 1990 × 980 × 2045 |
| Net weight | kg | 107 | 129 | 268 | 305 | 552 |

*Testing condition: Ambient temp.(DB/WS)= 20°C/15°C, Input/output water temp. = 15°C/55°C*

# Water Source Heat Pumps


## Applications

- Hotels
- Resorts
- Hospitals
- Boarding Schools
- Villas

## Description

Water-source heat pumps require a suitable local water source, such as a lake, river, well etc contrary to the air source heatpumps that use air as the heat source.This series of heatpump generates hot and chilled water simultaneously and is one of the most efficient and environment friendly systems available for heating and cooling. These units are highly efficient and available in various sizes and configurations

## Benefits

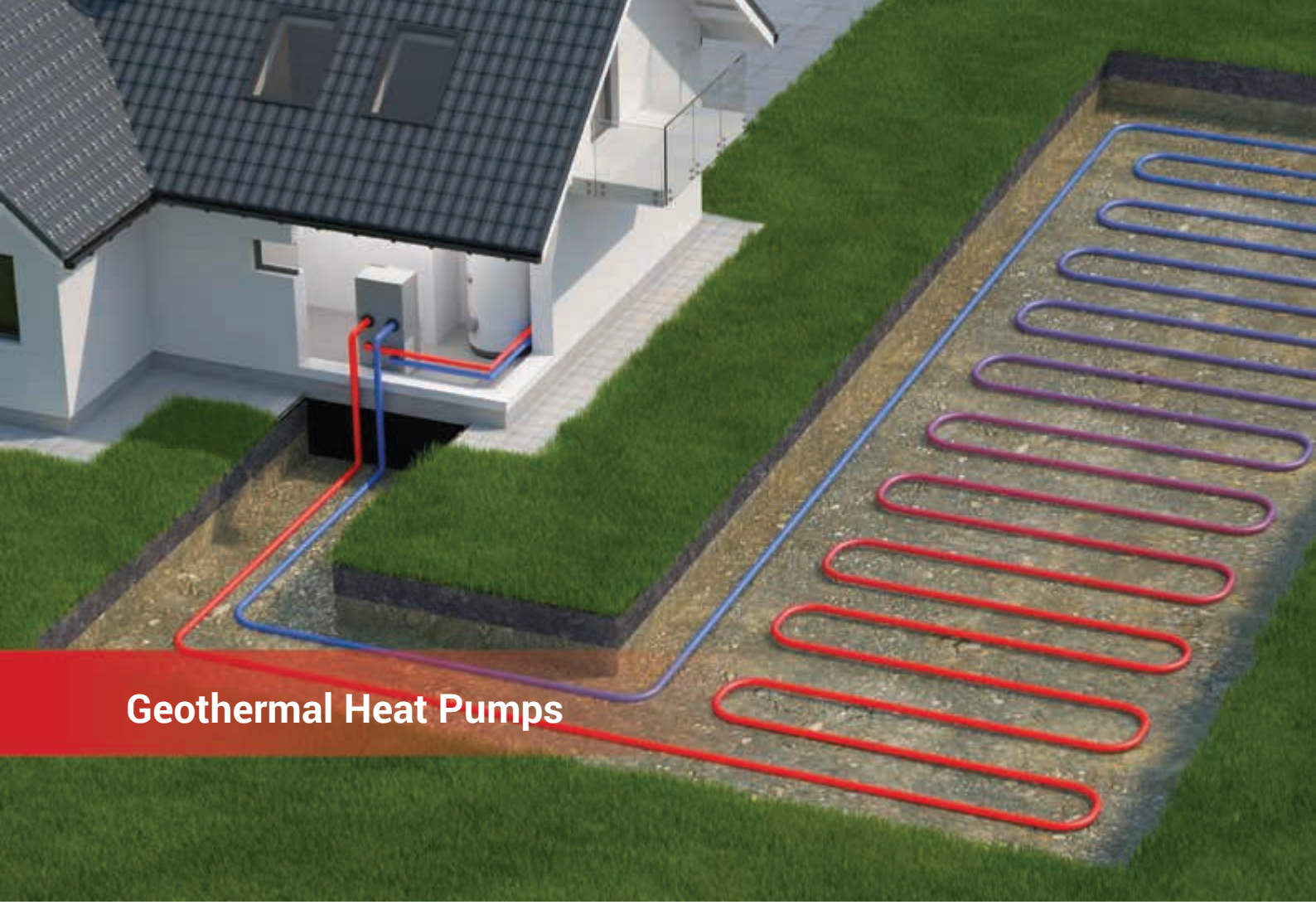
- Reduced water heating costs upto 75%
- Quick payback and return on investment
- Reliable hot water round the year
- Longest product life
- Reduced carbon emissions
- Silent operations
- Negligible maintenance costs

## Features

- Hot water temperature 60 °C for sanitary use
- Chilled water temperature 7 °C for cooling
- Environment friendly refrigerant
- Compact size as no air fans
- Automatic controls
- Touch screen multi-functional controller
- Efficient scroll compressor
- Highly efficient shell and tube heat exchanger

| | | SE-WW-55V | SE-WW-80V | SE-WW-95V | SE-WW-120V | SE-WW-190V |
|---|---|---|---|---|---|---|
| Power heating | V/Ph/Hz | 415/3/50 | | | | |
| Rated heating output | KW | 55 | 80 | 95 | 120 | 190 |
| Rated hot water output | L/H | 1182 | 1720 | 2043 | 2580 | 4085 |
| Input power | KW | 11.6 | 16.0 | 19.4 | 24.9 | 38.8 |
| Rated water outlet temperature | °C | 55 | | | | |
| Max. water outlet temperature | °C | 60 | | | | |
| Compressor | | Copeland scroll | | | | |
| Heat exhange (use side) | | Shell and tube | | | | |
| Rated water flow rate | $m^3/h$ | 9.4 | 13.8 | 16.3 | 20.6 | 32.7 |
| Heat exchanger (source side) | | Shell and tube | | | | |
| Rated water flow rate | $m^3/h$ | 7.3 | 10.7 | 12.7 | 16.1 | 25.5 |
| Protections | | High/low pressure, anti-freeze, high temperature, overload, lack of phase, reverse phase | | | | |
| Noise at 1 Meter distance | dB(A) | <62 | <64 | >65 | >68 | >72 |
| Dimension (L × W × H) | mm | 1100 × 800 × 800 | 1800 × 1150 × 1050 | | | 2000 × 1200 × 1000 |
| Net weight | kg | 320 | 700 | 730 | 780 | 880 |

*Testing conditions: Source side water 15°C use side inlet water 15°C/outlet water 55°C (max. 60°C)*

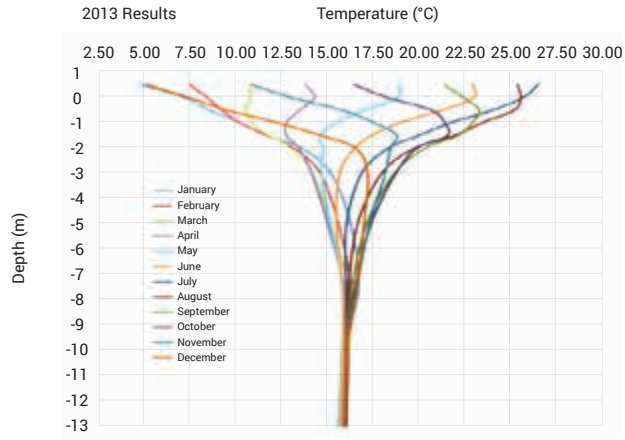


# Geothermal Heat Pumps

## Description

Geothermal HVAC and power systems use earth's temperature for heat exchange. While temperature variation occurs in atmosphere, temperatures underground remain constant.

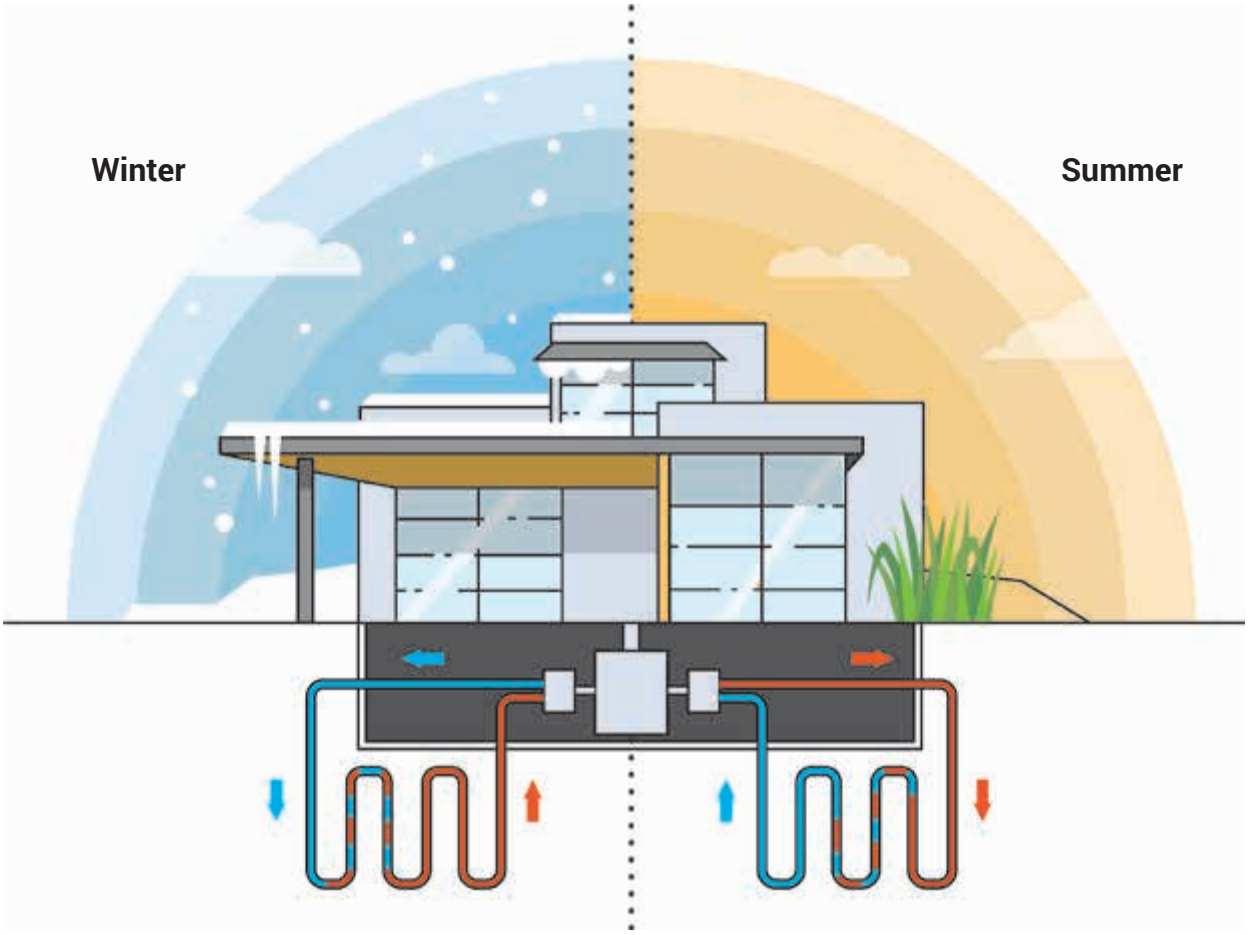
In a geothermal HVAC system, an electrically powered heat pump cycles fluid, usually water or refrigerant, through long loops of underground pipes. It is through this process that heat is transferred from ambient air in the building to the ground and vice versa.





## Applications of Geothermal Heatpumps

- Space heating and cooling
- Water heating and cooling
- Industrial processes




## How it works

The geothermal heat pump, also known as the ground source heat pump, is a highly efficient renewable energy technology that is gaining wide acceptance for both residential and commercial buildings. Geothermal heat pumps are used for space heating and cooling, as well as water heating. The benefit of ground source heat pumps is they concentrate naturally existing heat, rather than by producing heat through the combustion of fossil fuels.

## Energy 101: Geothermal Heat Pumps

The technology relies on the fact that the earth (beneath the surface) remains at a relatively constant temperature throughout the year, warmer than the air above it during the winter and cooler in the summer, very much like a cave. The geothermal heat pump takes advantage of this by transferring heat stored in the earth or in ground water into a building during the winter, and transferring it out of the building and back into the ground during the summer. The ground, in other words, acts as a heat source in winter and a heat sink in summer.

## The system includes three principal components:

### Earth Connection Subsystem

Using the earth as a heat source/sink, a series of connected pipes, commonly called a "loop," is buried in the ground near the building to be conditioned. The loop can be buried either vertically or horizontally. It circulates a fluid (water, or a mixture of water and antifreeze) that absorbs heat from, or relinquishes heat to, the surrounding soil, depending on whether the ambient air is colder or warmer than the soil.

### Heat Pump Subsystem

For heating, a geothermal heat pump removes the heat from the fluid in the earth connection, concentrates it, and then transfers it to the building. For cooling, the process is reversed.

### Heat Distribution Subsystem

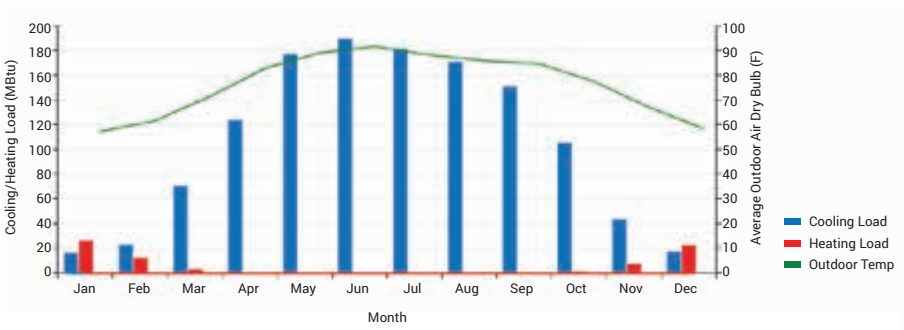
Conventional ductwork is generally used to distribute heated or cooled air from the geothermal heat pump throughout the building.

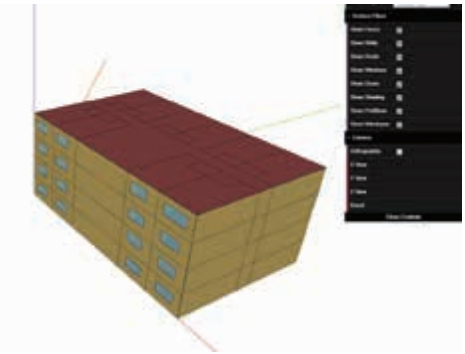
## Services and products we provide

### Energy Modelling (8760 analysis)

Complete energy modelling analysis of premises which includes 8760 hours of energy simulation with 3D modelling of structure

Based on Geographical data, peak load and total HVAC load of all the months are simulated for given site conditions.



### Resistivity survey of plot

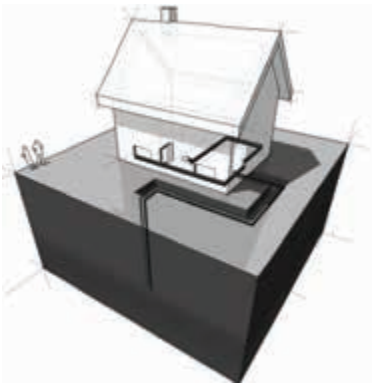
To determine:

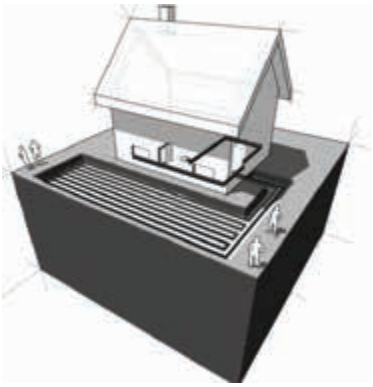
1.Heat Dissipating ability of earth layers and formations up to a dept of 500ft

2. Depth of Confined Aquifers

3. Possibility and Probability of Unconfined aquifers

### Geothermal loop design & installation





## Benefits of using Ground Coupled System

Reasons for using a ground coupled system.

- Unlike a standard solar system, the loop operates day or night, rain or shine all year, delivering heat to and from the heat pump.
- It is cost effective in northern or southern climates.
- Because the water circulates through a sealed closed-loop of high strength plastic pipe, it eliminates scaling, corrosion, water shortage, pollution, waste and disposal problems possible in some open well water system
- Saves up-to 70 % of operating cost compared to conventional HVAC systems
- ROI is between 2 to 5 years

# Air Source Dryers

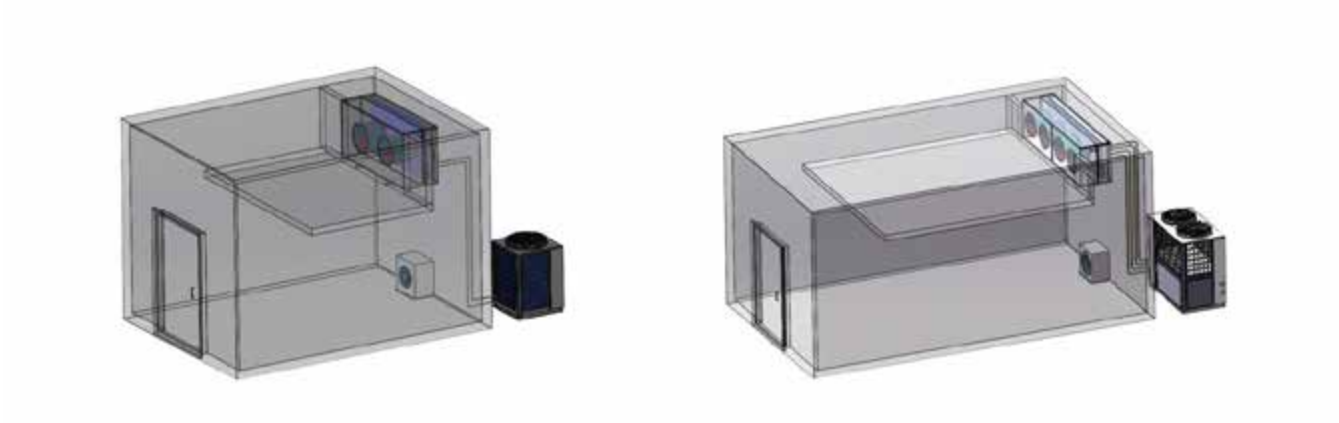

## Description

The dryer operates using a heat pump where both sensible and latent heats are recovered from the exhaust air. The heat is then recycled back through the dryer by heating the air entering the dryer, thus increasing the efficiency of the system. The heat pump drying system is a combination of two sub-systems: a heat pump and a dryer.

| | | SE-AA-5-DR | SE-AA-6-DR | SE-AA-11-DR | SE-AA-14-DR |
|---|---|---|---|---|---|
| Rated dehydration | kg/h | 15 | 18 | 36 | 44 |
| Rated heating capacity | KW | 14 | 25 | 45 | 54 |
| Rated power input | KW | 4.3 | 5.6 | 11 | 13.2 |
| Rated current | A | 8.1 | 10.5 | 20.7 | 24.8 |
| Rated discharge air temp. | °C | 70 | | | |
| Max discharge air temp. | °C | 80 | | | 0 |
| Power supply | | 3Ph/380V/50Hz | | | |
| Working ambient temp. | °C | −25 – 43 | | | |
| Supply air volume | $m^3/h$ | 4800 | 6500 | 12500 | 16500 |
| Supply air static pressure | Pa | 200 | | | |
| Noise | dB (A) | ≤56 | | ≤58 | ≤60 |
| Net weight | kg | 185 | 215 | 430 | 490 |
| Product size (L × W × H) | mm | 920 × 710 × 1800 or 1100 × 750 × 1820 | 1100 × 750 × 1820 | 1900 × 1100 × 1980 | 1900 × 1100 × 1980 |

*Rated dehydration working conditions: dray bulb temperature 50°C, relative humidity 80%*

## Schematic Diagram



## Benefits

1. Closed loop drying in enclosed chamber prevents contamination from outer air and maintains high level of hygiene since no outside air is exchanged during the drying process.
2. Drying at medium temperature maintains the colour, aroma/taste and quality of the dried product.
3. Uniform drying can be achieved with reduced time of drying increasing the process efficiency.
4. Automatization of the process ensures less manual intervention/exposure. Over drying is avoided with no risk of fire hazard,related to heater burnt-out etc.
5. The energy saved is more than 60% in terms of electricity consumed as compared to conventional heater drying systems thus assured saving in electricity bill.

## Application fields like

**Pharmaceutical industries**
For drying grains, medicinal plants, herbs, resins and bulk drugs etc

**Food industries**
For drying ready to cook (RTC), ready to eat (RTE) foods, pasta, snacks, noodles vermicelli, potato & banana chips, coconut etc.

**Spices industry**
All type of spices like black pepper, curry leaves, green/red chilli, turmeric etc.

**Agro industries**
For drying fruits & leafy, gourd and exotic vegetables, onion, garlic, ginger, chilly and other spices etc,

**Non food**
Woods, incense - dhoop sticks, porcelain, composite sheets, murti (idol).

# Glass Lined Tanks

## New Technology

Water storage tanks are adapted to the advanced technology of vitreous enamel inner tank, which fuses to solid steel at about 900 °C . The result is a smooth and tough surface that effectively resists the corrosive attacks of hot water chemicals, thus ensuring a long life span of water tank, especially suitable for the areas of hard water.


## Insulation protection

CFC free polyurethane foam insulation is injected and surrounds the inner tank, filling the space between the inner tank and outer tank thus providing an exceptionally good heat retention barrier. This helps to reduce the energy cost by minimizing standby heat loss.

## Electric Element

Low density Incoloy 800 immersion type element ensures long lasting performance with choice of various heat input (kw) offering different hot water recovery rates.

## Anode Protection

Each tank is provided with a magnesium anode rod to protect it against corrosion, a process well proven in years of application.

## Safety Protection

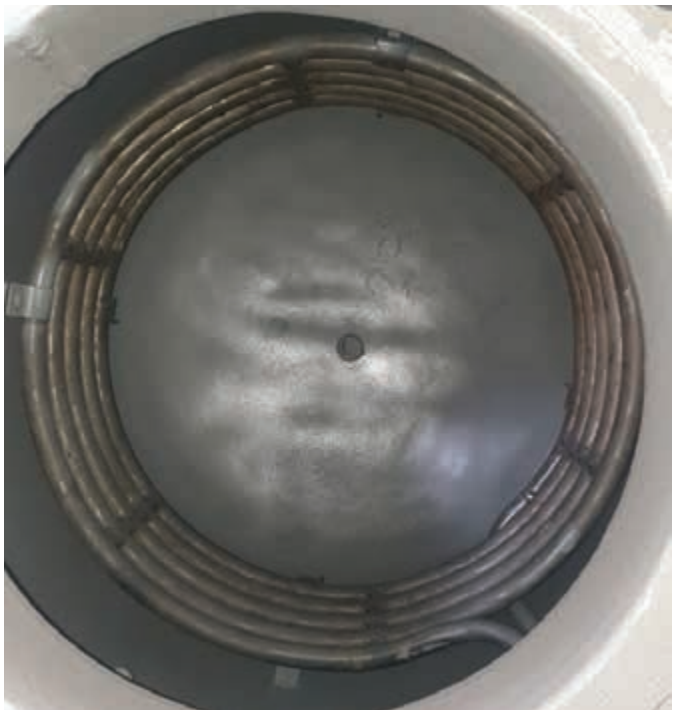
Each tank is provided with a pressure and temperature relief valve (P/T valve). It protects the tank against excessive pressure and temperature by releasing its contents safely to the floor trap via the drain pipe.

## Wide Application

Water tank can be working standalone as an electric water heater, and it can also be working with solar collector, heat pump, gas, etc.

| | | 100L | 150L | 200L | 250L | 300L | 400L | 500L |
|---|---|---|---|---|---|---|---|---|
| Inner tank | | Enameled Steel | | | | | | |
| Thickness | mm | 1.8 | 2.5 | | | | | |
| Outer tank | | Galvanized steel | | | | | | |
| Color | | White, Grey | | | | | | |
| Insulation | mm | Polyurethane 45 | | | Polyurthane 50 | | | |
| Inlet/Outlet size | | 3/4' | | | | | | |
| Rated working pressure | | 700 kPa | | | | | | |
| Electric heater | KW | 1.5 | | 2.5 | | | 3.0 | |
| Thermostat | | Included | | | | | | |
| P/T Valve | | Included | | | | | | |
| Magnesium anode | | Included | | | | | | |

# Ceramic Lined Tanks

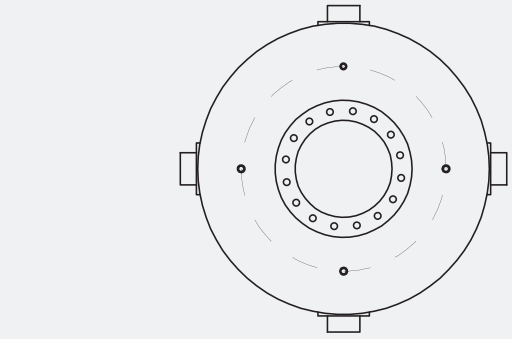


## Description

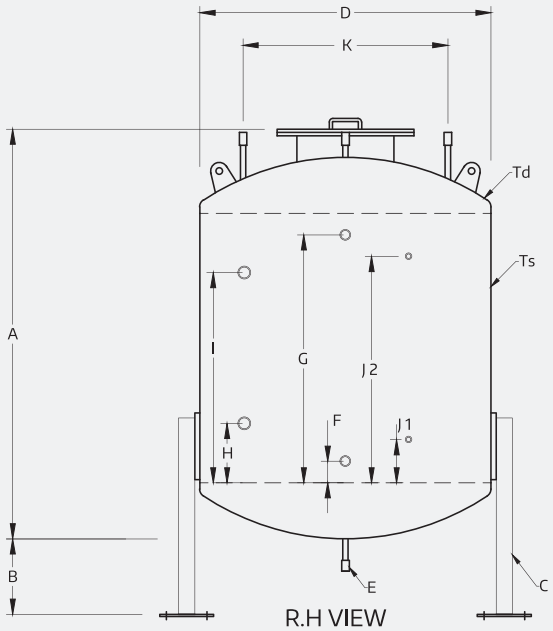
Hot Water Storage Tanks of MS/SS are designed to work for a pressurized/non-pressurized system. The MS tanks have a special ceramic coating which prevents corrosion. For applications with higher TDS water, we manufacture specially designed tanks with SS Calorifiers. These tanks are insulated with 50 mm thick rockwool insulation and aluminum cladding.

| | | 500P | 1000P | 1500P | 2000P | 3000P | 4000P | 5000P |
|---|---|---|---|---|---|---|---|---|
| Total length (A) | mm | 800 | 1250 | 1800 | 2300 | 2600 | 3200 | 3600 |
| Ground clearance (B) | mm | 350 | 350 | 350 | 350 | 350 | 350 | 350 |
| Diameter of tank (D) | mm | 800 | 1000 | 1140 | 1350 | 1500 | 1600 | 1600 |
| Shell thickness (Ts) | mm | 5 | | | | | | |
| Dishend/flatend thickness (Td) | mm | 6 | | | | | | |
| Weight of tank | Kg | 300 | 435 | 575 | 660 | 840 | 950 | 1180 |

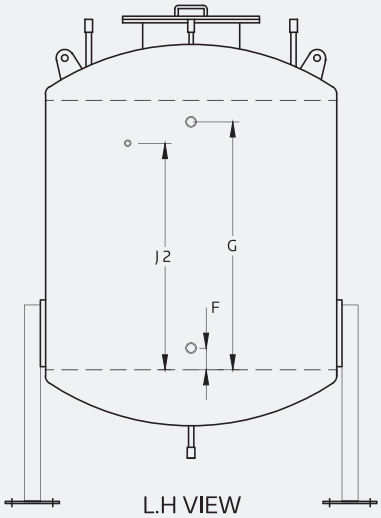
## Orthographic Drawing



TOP VIEW




R.H VIEW



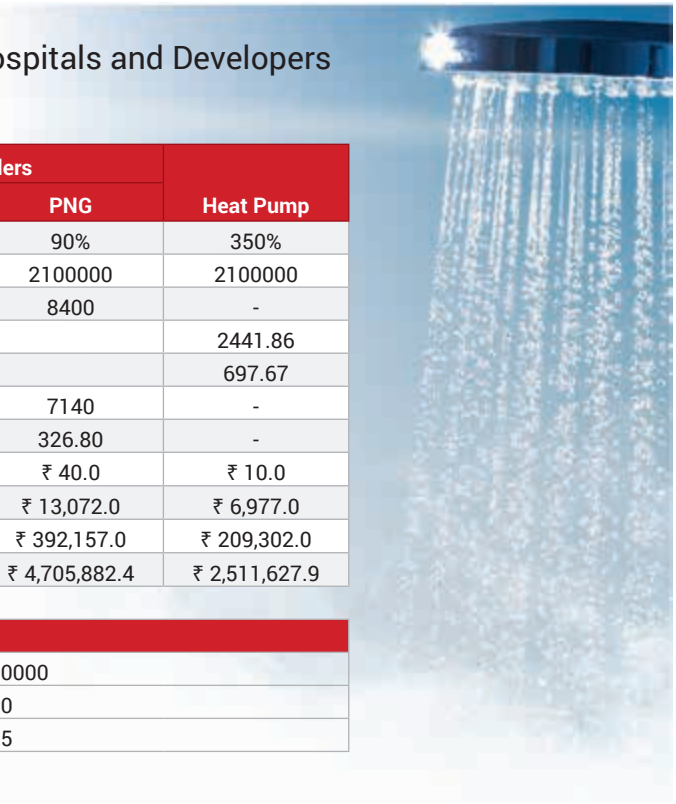

L.H VIEW

| | | 500NP | 1000NP | 1500NP | 2000NP | 3000NP | 4000NP | 5000 NP |
|---|---|---|---|---|---|---|---|---|
| Total length (A) | mm | 1250 | 1250 | 1500 | 1600 | 1800 | 2100 | 2100 |
| Ground clearance (B) | mm | 350 | 350 | 350 | 350 | 350 | 350 | 350 |
| Diameter of tank (D) | mm | 800 | 1100 | 1200 | 1400 | 1500 | 1600 | 1800 |
| Shell thickness (Ts) | mm | 3 | | | | | | |
| Dishend/flatend thickness (Td) | mm | 4 | | | | | | |
| Weight of tank | Kg | 225 | 350 | 500 | 600 | 700 | 820 | 975 |

# Case Studies

## Case Study for Sanitary Hot Water for Hotels, Hospitals and Developers

Anutham - Mulund

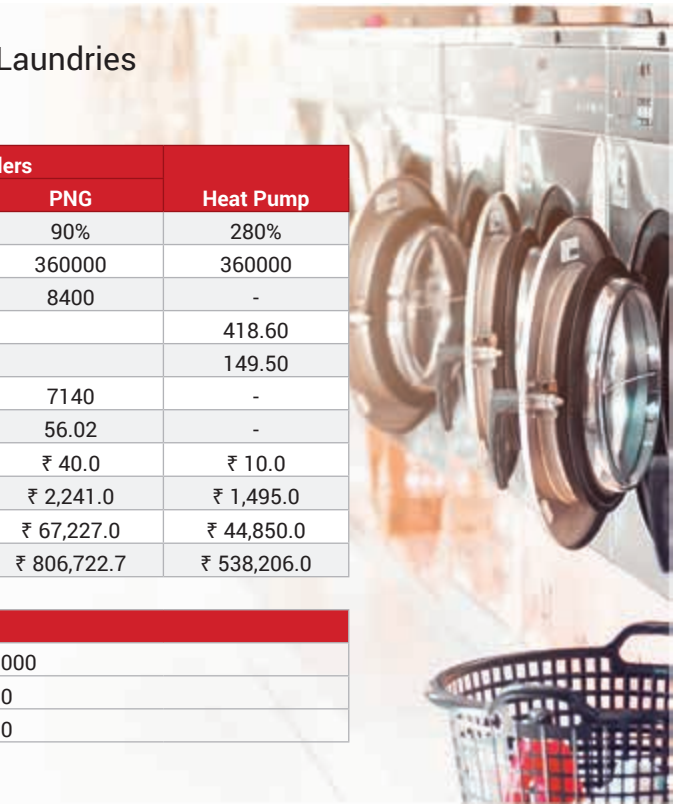


| Products | Electric Geyser | Gas Boilers | | Heat Pump |
|---|---|---|---|---|
| | | LPG | PNG | |
| Efficiency | 95% | 90% | 90% | 350% |
| Heat Required in Kcals | 2100000 | 2100000 | 2100000 | 2100000 |
| Calorific Value | - | 11200 | 8400 | - |
| Power Required Kilowatt | 2441.86 | | | 2441.86 |
| Power Consumption In KWh | 2570.38 | | | 697.67 |
| heat Delivered In per Kg | - | 9520 | 7140 | - |
| Total Fuel Required Kg / Ltrs | - | 245.1 | 326.80 | - |
| Cost / Unit | ₹ 10.0 | ₹ 90.0 | ₹ 40.0 | ₹ 10.0 |
| Total Cost /Day | ₹ 25,704.0 | ₹ 22,059.0 | ₹ 13,072.0 | ₹ 6,977.0 |
| Total Cost/ Month | ₹ 771,114.0 | ₹ 661,765.0 | ₹ 392,157.0 | ₹ 209,302.0 |
| Total Cost/Year | ₹ 9,253,366.0 | ₹ 7,941,176.5 | ₹ 4,705,882.4 | ₹ 2,511,627.9 |

| Above Calculations are based on following Data | |
|---|---|
| Quantity of Hot water Estimated (Ltrs.) | 60000 |
| Cold Water Inlet Temperature (Degree centigrade) | 20 |
| Hot water Temperature (Degree centigrade) | 55 |

## Case Study for High Temperature Hot Water for Laundries

Hyatt Kolkata

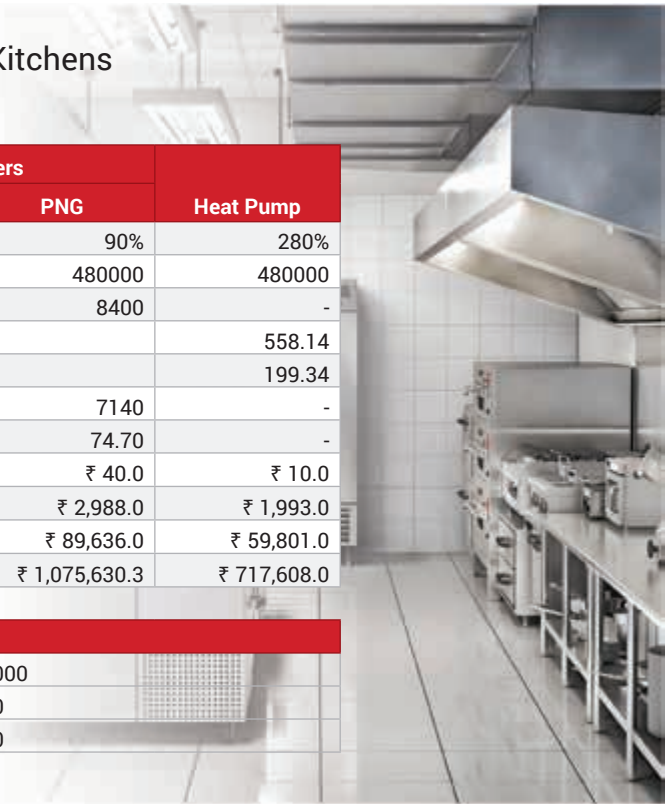


| Products | Electric Geyser | Gas Boilers | | Heat Pump |
|---|---|---|---|---|
| | | LPG | PNG | |
| Efficiency | 95% | 90% | 90% | 280% |
| Heat Required in Kcals | 360000 | 360000 | 360000 | 360000 |
| Calorific Value | - | 11200 | 8400 | - |
| Power Required Kilowatt | 418.60 | | | 418.60 |
| Power Consumption In KWh | 440.64 | | | 149.50 |
| Heat Delivered In per Kg | - | 9520 | 7140 | - |
| Total Fuel Required Kg / Ltrs | - | 42.0 | 56.02 | - |
| Cost / Unit | ₹ 10.0 | ₹ 90.0 | ₹ 40.0 | ₹ 10.0 |
| Total Cost /Day | ₹ 4,406.0 | ₹ 3,782.0 | ₹ 2,241.0 | ₹ 1,495.0 |
| Total Cost/ Month | ₹ 132,191.0 | ₹ 113,445.0 | ₹ 67,227.0 | ₹ 44,850.0 |
| Total Cost/Year | ₹ 1,586,291.3 | ₹ 1,361,344.5 | ₹ 806,722.7 | ₹ 538,206.0 |

| Above Calculations are based on following Data | |
|---|---|
| Quantity of Hot water Estimated (Ltrs.) | 6000 |
| Cold Water Inlet Temperature (Degree centigrade) | 20 |
| Hot water Temperature (Degree centigrade) | 80 |

## Case Study for High Temperature Hot Water for Kitchens

Akshay Patra Foundation

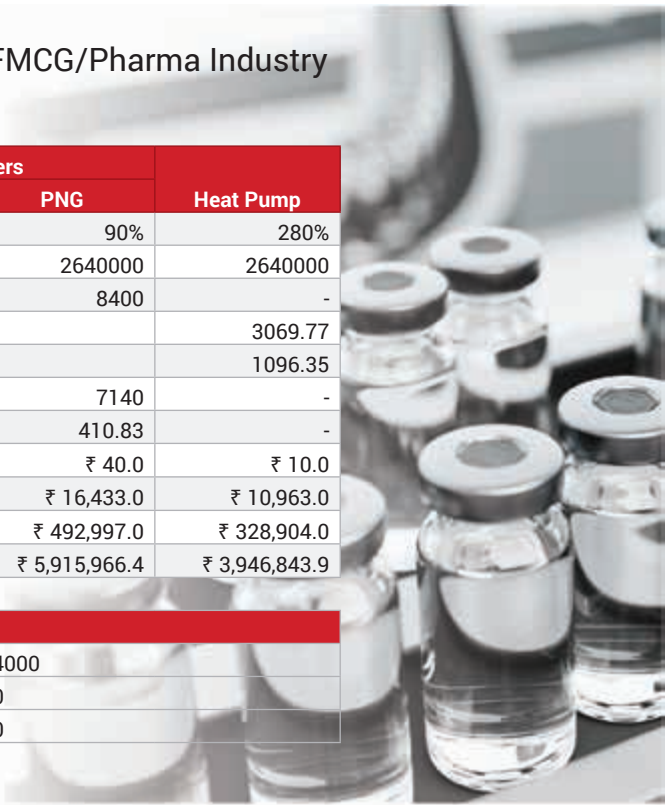


| Products | Electric Geyser | Gas Boilers | | Heat Pump |
|---|---|---|---|---|
| | | LPG | PNG | |
| Efficiency | 95% | 90% | 90% | 280% |
| Heat Required in Kcals | 480000 | 480000 | 480000 | 480000 |
| Calorific Value | - | 11200 | 8400 | - |
| Power Required Kilowatt | 558.14 | | | 558.14 |
| Power Consumption In KWh | 587.52 | | | 199.34 |
| Heat Delivered In per Kg | - | 9520 | 7140 | - |
| Total Fuel Required Kg / Ltrs | - | 56.0 | 74.70 | - |
| Cost / Unit | ₹ 10.0 | ₹ 90.0 | ₹ 40.0 | ₹ 10.0 |
| Total Cost /Day | ₹ 5,875.0 | ₹ 5,042.0 | ₹ 2,988.0 | ₹ 1,993.0 |
| Total Cost/ Month | ₹ 176,255.0 | ₹ 151,261.0 | ₹ 89,636.0 | ₹ 59,801.0 |
| Total Cost/Year | ₹ 2,115,055.1 | ₹ 1,815,126.1 | ₹ 1,075,630.3 | ₹ 717,608.0 |

| Above Calculations are based on following Data | |
|---|---|
| Quantity of Hot water Estimated (Ltrs.) | 8000 |
| Cold Water Inlet Temperature (Degree centigrade) | 20 |
| Hot water Temperature (Degree centigrade) | 80 |

## Case Study for High Temperature Hot Water for FMCG/Pharma Industry

Reckitt Benckiser



| Products | Electric Geyser | Gas Boilers | | Heat Pump |
|---|---|---|---|---|
| | | LPG | PNG | |
| Efficiency | 95% | 90% | 90% | 280% |
| Heat Required in Kcals | 2640000 | 2640000 | 2640000 | 2640000 |
| Calorific Value | - | 11200 | 8400 | - |
| Power Required Kilowatt | 3069.77 | | | 3069.77 |
| Power Consumption In KWh | 3231.33 | | | 1096.35 |
| Heat Delivered In per Kg | - | 9520 | 7140 | - |
| Total Fuel Required Kg / Ltrs | - | 308.1 | 410.83 | - |
| Cost / Unit | ₹ 10.0 | ₹ 90.0 | ₹ 40.0 | ₹ 10.0 |
| Total Cost /Day | ₹ 32,313.0 | ₹ 27,731.0 | ₹ 16,433.0 | ₹ 10,963.0 |
| Total Cost/ Month | ₹ 969,400.0 | ₹ 831,933.0 | ₹ 492,997.0 | ₹ 328,904.0 |
| Total Cost/Year | ₹ 11,632,802.9 | ₹ 9,983,193.3 | ₹ 5,915,966.4 | ₹ 3,946,843.9 |

| Above Calculations are based on following Data | |
|---|---|
| Quantity of Hot water Estimated (Ltrs.) | 44000 |
| Cold Water Inlet Temperature (Degree centigrade) | 20 |
| Hot water Temperature (Degree centigrade) | 80 |

# Client List

## Hotels

- Ferns Group
- Mango Group of Hotel
- Sai Palace Group of Hotel
- Marine Plaza Group of Hotel
- Sea Palace Group of Hotel
- Ramee Group of Hotel
- Hotel Rudra Shelter International
- Landmark Group of Hotel
- 7/11 Club
- Summer Plaza
- GCC Club
- Citizen Hotel
- Hilton Shillim Estate Retreat and Spa
- Hyatt Hotels
- Otters Club
- Zuper Hotels

## Builders

- Arihant Developers
- Goshar Ventures
- Suntek Realty
- Avighna Towers
- Priparth Developers
- Gundecha Builders Residence
- Parkland Residence
- Anita Dongre's Residence
- Mr. Dilip Sanghavi's Residence
- Priparth Developers
- Goshar Ventures
- Airoli Sports Association
- Rosa Group
- Kumkum Building
- Laxmi Group
- Embassy Group
- Anutham

## Industry

- Lubrizol Industries
- Raman & Weil
- ONGC Oil Rigs
- Dahanu Rubber
- Adwal Palkar Associates
- Akshay Patra Foundation
- Reckitt Benckiser Group

## Hospitals

- Suasth Hospital
- Lifeline Hospital
- AIMS Hospital
- Sadhguru Seva Sang Trust
- Eye Care Hospital
- Thunga Hospital

## Swimming Pools

- Isprava Realty, Mumbai
- Over 500 Individual Swimming Pools
- Ishwar Exports, Alibaug
- Bombay Paints, Lonavala

## Physiotherapy Clinics

- Dr. Prachi Shah Arora, Mumbai
- Children's Hospital, Mumbai
- Dr. Tejas Patel, Ahmedabad
- Rotary Sewa Kendra, Kolhapur

## Ashrams

- Aagam Mandir
- Manas Mandir
- Chitrakoot Mandir

# Gallery














# Pan-India Network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