

# Copeland commercial heat pump solutions

*Delivering hot water for a wide array of applications*





## The many advantages of heat pumps

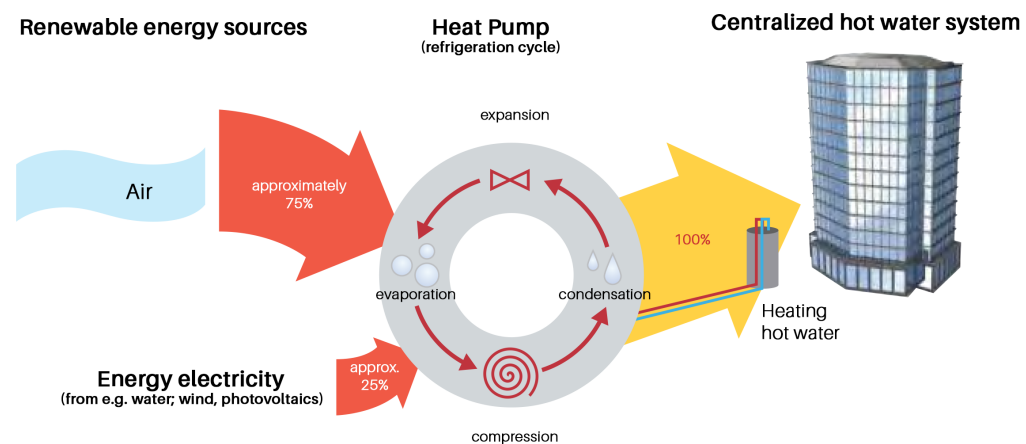
Energy efficient & clean hot water systems

### An eco-friendly alternative

Hot water is an everyday need for modern living. Traditionally, water is heated by burning fossil fuels or using electric heaters. These traditional methods of water heating operate at an energy efficiency of less than 1—meaning that the heating provided is less than electrical energy or fuel consumed.

Increasing energy costs of gas or oil heating systems, coupled with the need to meet CO<sub>2</sub> emission targets has resulted in the growing interest for dedicated heat pumps. Rather than burning fossil fuels to produce heat and consequently CO<sub>2</sub> emissions, dedicated heat pumps use renewable energy from the environment like air, ground and water. They consume up to 70% less primary energy and therefore drastically reduce the pollution resulting from the use of fossil fuels.

### Heat pump water heating: Proven green technology



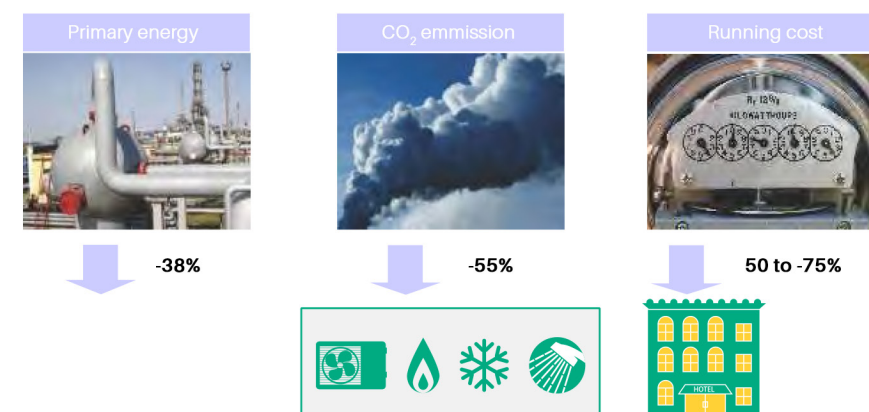
### Heat pump: Need of the hour

#### Solution to today's commercial building industry challenges



Heat pump - an energy efficient & reliable alternative to conventional technologies

### Heat pumps deliver lower CO<sub>2</sub> emission and significant savings for the end-user







## Copeland heat pump series

World class heating product built on proven 150 million scrolls platform



Copeland Heat Pumps have been awarded the prestigious GreenPro Green product certification by CII (Confederation of Indian Industry) making it the only heat pump certified as GreenPro.

Copeland Heat Pump is a significantly more efficient solution for heating water. It utilizes naturally available heat from water, ground and even winter air and applies a vapor compression refrigerant cycle, consuming nearly one quarter of the electrical energy required for traditional water heating. At 75% reduced energy consumption, this contributes to cleaner air.

Copeland has developed a full range (from 300 Liters/Hr To 1000 Liters/Hr) of water heating units; built on heating optimized ZW scroll compressors to provide seasonal efficient heating capacity and effective domestic hot water production in residential and commercial building applications.

Copeland Heat pumps are available for use with multiple refrigerants like R407C and R22. It is designed to deliver

### Heat pump water heating:

**Energy efficient hot water delivery available 24/7 for various applications**

60°C water temperature irrespective of the weather conditions. It can operate from a wide ambient from 10°C to 43°C. Copeland Heat Pumps come fitted with Best-InClass 'Shell & Tube' heat exchanger technology. These are easier to service compared to other available condensers in the field. Shell & Tube heat exchangers are the perfect solution for sites where the water quality is very poor.

Copeland Heat Pumps are designed for simple & easy operation in the field for end-users like Hotels, Hostels, Restaurants etc. These units come with 'Simple User Interface' which allows service teams to get advance warnings about field failures, simple error codes for easy diagnosis & troubleshooting. This reduces the downtime and increases the life of the system.

With all these benefits, the Copeland heat pump series is definitely the most reliable solution available on the market. Copeland also supports water heater contractors around the world by providing specifically designed units for heating water.



ZW water heating scroll; unique compressor design developed to provide a reliable water heating solution



Environmentally friendly design; low ODP refrigerant options available



60°C hot water available 24/7; independent of weather conditions



Reliable hydrophilic evaporator design for coastal/salty conditions



Adjustable water temperature & accurate temperature control



Significant energy savings; upto 75% compared with traditional heating systems



Comes with full electrical protection



Intelligent system controller for unit monitoring; easy to control & system troubleshooting



Designed & manufactured in India; customized for your requirement



Reliable and easy to maintain; designed for safe operation



100% factory tested, inspected at dedicated heat pump testing facility



## What makes Copeland heat pumps unique?


Copeland ZW Scroll: Dedicated scroll for all water heating requirements

The Copeland Scroll ZW compressor provides an energy efficient alternative for hot water heating and space heating—The perfect alternative to electric heaters or fuel-fired boilers. It is designed based on Copeland's strong experience of manufacturing over 150 million scroll compressors, that are recognized globally as reliable and efficient products. On this strong base, ZW applies Scroll Heating™ technology and multiple new product design features. ZW scrolls hold a new patent on the above features and technological advancements.


### High efficiency

Copeland Scroll's efficiency is primarily derived from its axial compliance design. ZW scrolls are required to operate on a much wider range of envelope compared to standard heat pump air-conditioners. This has been accomplished by a new axial compliance pressure balance combination designed especially for ZW scrolls. It also applies a highly efficient, high power motor which can cater to extremes required by Heat Pump Water Heating (HPWH); to generate low internal losses at mild ambient cold tank heating and provide adequate power demanded at ambient tank reheating.







**HOT WATER ASSURED**




**HOT WATER RELIABILITY**



**HIGH EFFICIENCY DESIGN**



**LOW LIFECYCLE COSTS**



**LOW AMBIENT PERFORMANCE**

### Copeland ZW excels over traditional AC compressors

Innovation criteria	Traditional AC scroll	ZW Water heating scroll design innovations
Heating capacity	Standard	15-20% Higher than standard
COP	Standard	15-20% More than standard
Highest water temperature	55°C	60°C (Heating optimized valve designed for high compression ratios)
Hot water reliability	Standard	Stronger & robust scroll design, high power motor to operate at low ambient & higher condensing temperature vs AC compressors

Water heating Copeland Scroll ZW compressors are designed to meet different winter ambient regions in India. For tropical regions and moderate winter ambient regions, the compressor is designed without vapor injection.

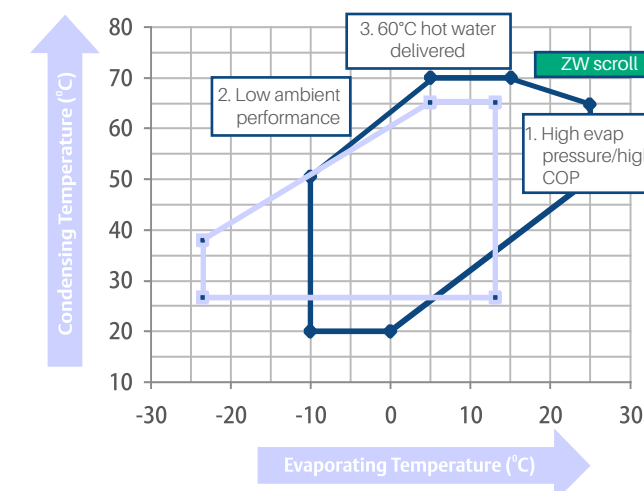
### Hot water reliability

Water heating is characterized by long operating hours at both high load and high compression ratios. Demand for hot water is at its highest when ambients are low and when conventional heat pump capacity falls off. ZW\* \*KA compressors are designed for reliable operation for heavier duty applications where the ambient temperature does not fall below 0°C; with significantly enhanced heating capacity, higher efficiency, and minimal requirement to reduce water outlet temperatures.

### Environment friendly design

Low ODP refrigerants are utilized by the ZW compressor. Using ZW shows commitment in promoting green technology through the direct and indirect reduction of CO<sub>2</sub> emissions.

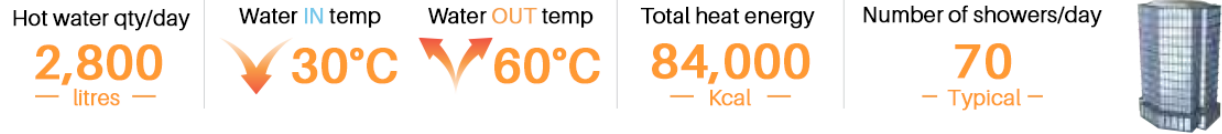
### Copeland ZW scroll scores over traditional AC scrolls



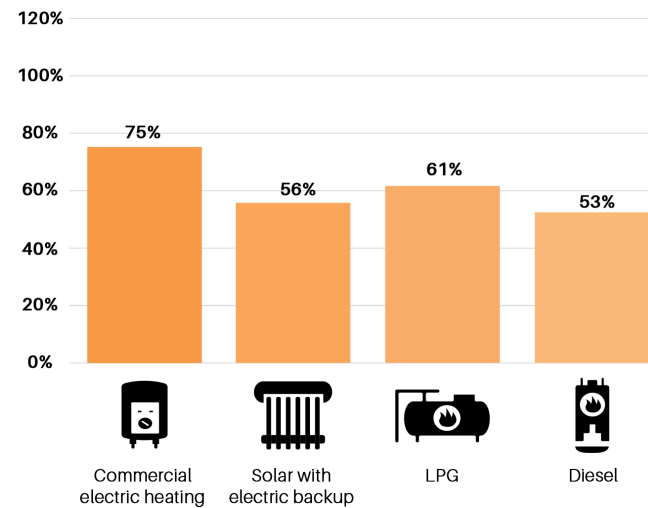
## Copeland heat pump offers best ROI & lower operating costs

Sustainable, energy efficient & a reliable alternative to existing heating technologies

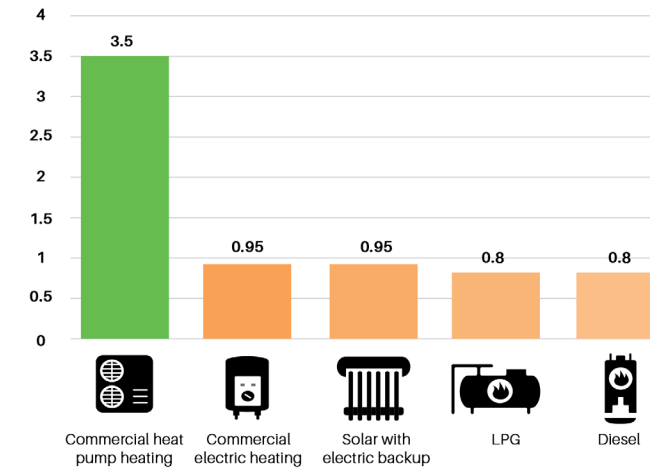
### Delivering up to 75% energy savings vs traditional heating systems



### Annual energy saving in% heat pumps vs other heating systems



### Heating efficiency



**Note:** Results shown from above analysis are designed for comparative purposes only. The assumptions and data used for the analysis may change depending on the market conditions. Copeland cannot be held responsible for any errors, omissions, or misrepresentations in the data represented. If you need confirmation on the detailed analysis, please get in touch with your Copeland Representative.

## Copeland heat pumps comparison versus competing technologies

### Heat pump technology scores across all parameters



Parameters	Commercial heat pump heating	Solar	Electric heating	LPG	Diesel
Energy savings W.R.T conventional	Upto 75%	60-75%	N.A	N.A	N.A
Space requirement	5%OfSolar	N.A	5% Of Solar	5% Of Solar	5% Of Solar
Climate independent	Yes	No	N.A	N.A	N.A
Efficiency	Upto400%	Upto 95%	Upto 95%	Upto 80%	Upto 80%
Maintenance	Minimal	Panel cleaning	High	Moderate	High
Environment friendly	Yes	Yes	Yes	No	No
Safety	Yes	Yes	Moderate	No	Moderate
Depreciation	40% in 1 <sup>st</sup> year	No	No	No	No



## Easy to maintain & service

### Poor water quality leads to scaling issues & abnormal operating conditions

Many a time water quality can cause serious problems in hot water systems. The water should be tested for hardness, acidity and iron content before a heat pump is installed. Your contractor or equipment manufacturer can tell you what level of water is acceptable. Mineral deposits can build up inside the heat pump's heat exchanger.

Some possible issues that can crop up are:

- Scale formation
- Pressure drops
- Efficiency loss
- High discharge pressure and can lead to system failure

### Our solution: Shell & tube condenser for handling poor quality of water

Our units come fitted with best-in-class 'Shell & Tube' heat exchanger technology. These are easier to service compared to other available Heat exchangers like Tube-In-tube, Plate Type heat exchangers etc. Shell & Tube heat exchangers are the perfect solution for the Indian market where the water quality is very poor at site. All condenser models are simple to install and can be easily opened for inspection, cleaning and maintenance purposes



Characteristics	Shell & tube	Tube in tube	Plate type
Heat transfer efficiency	Comparable	Moderate	Moderate
Ability to handle high operating pressures & temperature	✓	Moderate	Limitation due to bonding material
Leakage concerns	Easy to locate leaks	Difficult	Difficult to locate leaks
Corrosion	Moderate	Moderate	More prone (titanium)
Ability to handle impure water / scaling	Can handle any water quality	Needs treated water	Needs treated water
Maintenance	Easier to clean / maintain using brush	Difficult	Difficult

## Individual components easily accessible in field

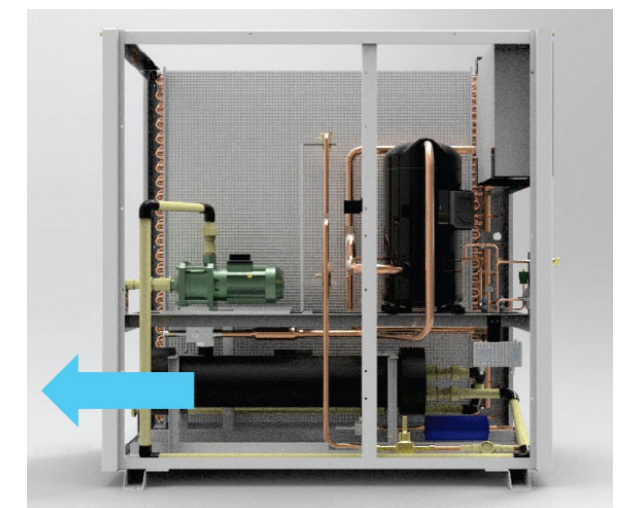
### Designed for easy maintenance in field



Service panels removable for access



Multiple compartment design for easy access to pump, compressor & components



Shell & tube HX slides out after disconnecting valves

## Simple to use & control; complete diagnostic capability & full electrical protection

### Simple to use diagnostics features

The Copeland Heat Pump series is designed for simple & easy operation in the field for end-users like hotels, hostels & restaurants etc. These units come with 'Simple User Interface' which allows service teams to get advance warnings about field failures, simple error codes for easy diagnosis & troubleshooting. This reduces the downtime and increases the life of the system.



Simple to use and control  
LED display for parametric control and fault analysis



Schedule your heat pump daily



Complete electrical protection



100% Component protection with diagnostics & running status



Computer connectivity through rs485



Weather proof enclosure

### Diagnostic features for easy troubleshooting



Control user interface



LED display: probes, parameters, set point, faults etc.

Visual icon indications of components

Keys for user control

Visual indication of phase status

### System protector/end User

1. No incoming water flow
2. High discharge pressure cut off (manual reset only)
3. Low pressure cut off
4. Watertanktemperature
5. Any part / sensor failure
6. Fuse failure display
7. Controller communication error
8. Daily usage programming capability
9. Communication port- to connect to laptop (RS485)
10. Installer password lock
11. Master password lock
12. Memory for last 30 errors occurred

### Complete electrical protection for field issues

- Under/ low voltage protection
- Single phasing/ phase missing & reversal protection
- Compressor overload protector
- Pump overload protector
- MCB/fuse as standard

### Component protection

#### Compressor

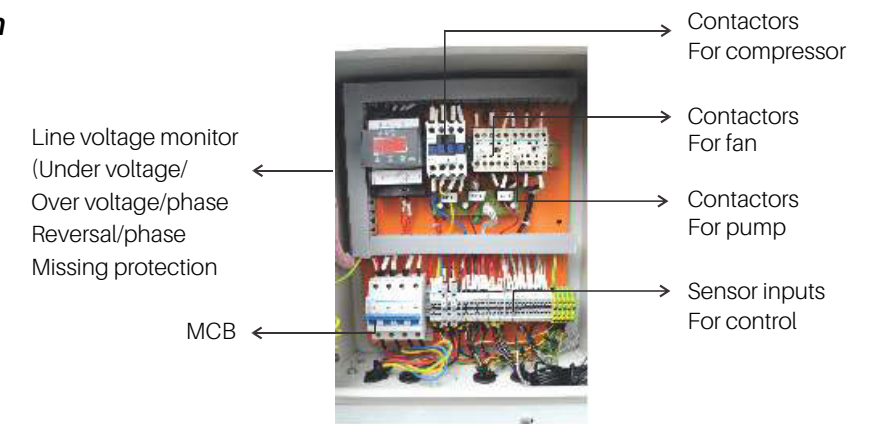
1. Single phase, phase missing/reversal
2. Under/over voltage & current
3. High discharge temperature

#### Water pump

1. Dry run protection
2. High current protection

#### Fan motors

1. Healthy status
2. High current
3. One fan fails







## Copeland heat pumps

Catering to a wide range of applications

### Hotels

**20° to 60°C**

- Sanitary
- Kitchen
- Laundry



### Hostels

**55° to 60°C**

- Sanitary



### Hospitals

**60°C**

- Steam baths
- Laundry



### Spas/Bungalows

**30° to 60°C**

- Swimming pool
- Steam bath



### Restaurants

**20° to 60°C**

- Utensil washing





## Technical data & testing infrastructure

### Technical specifications

Nominal capacity			3 HP	5 HP	10 HP
Model name			EHP-Z030X-TEA/TBA-000	EHP-Z050X-TEA/TBA-000	EHP-Z030X-TEA/TBA-000
Power supply			380V /50HZ/3PH	380V /50HZ/3PH	380V/50HZ/3PH
Operating ambient temperature		°c	10 To 43	10 To 43	10 To 43
Max. Water temperature		°c	60	60	60
Water heating	Capacity #	kw	11	17.4	36
	Input power#	kw	3.2	5.0	10.6
	COP#		3.4	3.4	3.4
	Hot water output#	lph	300	500	1000
	Max. Input current#	A	7.1	10.5	15
	Refrigerant gas#	kg	R22/R407C	R22/R407C	R22/R407C
	Refrigerant qty.# (Recommended)		1.5	2.4	4.2
Compressor	Type	-	SCROLL/ ZW	SCROLL/ ZW	SCROLL/ ZW
	Model		ZW34KAE-TFP-542	ZW61 KAE-TFP-542	ZW125KAE-TFP-522
	Capacity	kw	10.1	18.1	33
	Input power	kw	2.5	4.6	9.1
	Current	A	4.5	8	17.2
Fan motor	Quantity	pcs	1	1	2
	Power	watts	160	200	160
	Supply	volt/ph.	230v/1 ph	230v/1 ph	230v/1 ph
Water pump	Power input	kw	0.17	0.17	0.55
	Head	feet	15	20	20
	Supply	volt/ph.	230v/1 ph	230/50hz	230v/1 ph
	Rating current	A	0.41	0.41	2.7
Heat exchanger	Type / model	-	Shell & tube	Shell & tube	Shell & tube
Water piping	Inlet pipe size	mm/inch	25/1"	25/1"	25/1"
	Outlet pipe size	mm/inch	25/1"	25/1"	25/1"
	Min. Water flow	lph	1400	2800	5000
	(Recommended)				
Dimensions	Dimension (dxwxh)	mm	504 X 1143 x 806	710 X 1232 x 995	710 X 1263 x 1335
	Approx. weight	kg	190	230	400

# Rating condition - at ambient of 25°( & inlet water of 25°c; final water temperature of 55°c  
Final water temperature achieved in re-circulation/re-heating mode.

### Copeland heat pumps: Tested at in-house laboratory for performance & reliability

- Dedicated test lab for heat pump reliability & performance.
- Built at Karad test lab
- Controlled room ambient from 5° to 46°c
- Monitoring of various parameters upto a measurement accuracy of +/-0.5%
- Real field issues simulation & system correction
- Capability to measure water flow, temperature, pressures, electrical and system
- All instruments calibration performed by NABL accredited Labs only
- Certifications of facility
  - QMS - ISO 9000
  - EMS - ISO 14000
  - UL / IEC Stage - 3 / Intertek
- Compliant with Copeland international guidelines



Measurement Panel



Water Chilling Facility



UUT & Control Room





A photograph of a modern office interior. The main feature is a large wall covered in vertical, light-colored slats. The word "COPELAND" is mounted on this wall in large, bold, black, sans-serif capital letters. To the right, a blue wall features the text "ENGINEERED FOR SUSTAINABILITY" in gold, italicized, sans-serif capital letters. The floor is a light-colored tile with a dark grey patterned area.

# COPELAND

*ENGINEERED FOR  
SUSTAINABILITY*

## About Copeland

Copeland, a global provider of sustainable climate solutions, combines category-leading brands in compression, controls, software and monitoring for heating, cooling and refrigeration. With best-in-class engineering and design and the broadest portfolio of modulated solutions, we're not just setting the standard for compressor leadership; we're pioneering its evolution. Combining our technology with our smart energy management solutions, we can regulate, track and optimize conditions to help protect temperature-sensitive goods over land and sea, while delivering comfort in any space. Through energy-efficient products, regulation-ready solutions and expertise, we're revolutionizing the next generation of climate technology for the better. For more information, visit [copeland.com](https://copeland.com).

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**COPELAND**  
Engineered for Sustainability