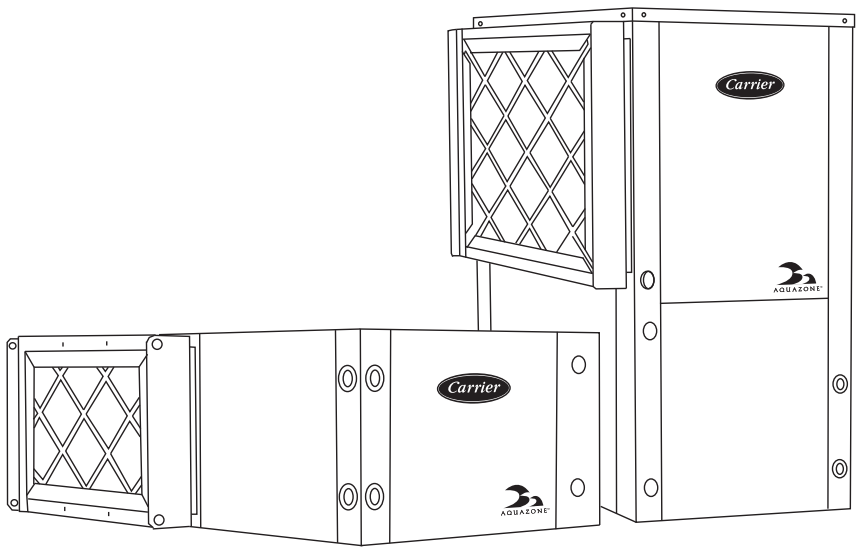
Product Data

Aquazone™ 50PCH,PCV009-070 Compact Water Source Heat Pumps with Puron® Refrigerant (R-410A) 50 Hz

1.8 to 21.1 Nominal kW

AQUAZONE™



ASHRAE 90.1 COMPLIANT

Puron®

Single-package horizontally mounted water source heat pumps (WSHPs) with solid-state controls.

- Unique double isolation compressor mounting via vibration isolating rubber grommets for quiet operation
- Insulated divider and separate compressor/air handler compartments
- Two service panels for compressor section
- Suitable for geothermal (with extended range option) and boiler/tower use with an operating temperature range of –6.7 to 43.3 C
- Backward compatibility for replacing older units from various manufacturers
- Field convertible discharge air arrangement for horizontal units
- PSC three-speed fan motor with optional ECM
- Mute package for quiet operation
- Non-ozone depleting Puron refrigerant (R-410A)

Features/Benefits

Carrier's Aquazone WSHPs are an efficient, compact alternative for all boiler/tower and retrofit applications

Operating efficiency

Aquazone WSHP units offer cooling EERs (energy efficiency ratios) to 5.43 and heating COPs (coefficients of performance) to 4.98.

Features/Benefits (cont)

All efficiencies stated are in accordance with standard conditions under ISO (International Organization for Standardization) Standard 13256-1 and provide among the highest ratings in the industry, exceeding ASHRAE (American Society of Heating, Refrigerant and Air-Conditioning Engineers) 90.1 Energy Standards.

High quality construction and testing

All units are manufactured to meet extensive quality control standards. An automated control system provides continuous monitoring of each unit and performs quality control checks as equipment progresses through the production process. Standard construction features of the Aquazone™ units include:

Cabinet — Heavy gage galvanized sheet metal cabinet construction enables part standardization (i.e., minimal number of parts) and modular design. Cabinet interior surfaces are lined with 12.7 mm thick, acoustic type insulation with a clear acoustic coating. Sheet metal surfaces are treated for maximum corrosion protection to provide resilience for long term vitality. Compact cabinet dimensions fit tight space limitations in both horizontal and vertical configurations.

Compressor — Aquazone standard efficiency units include a rotary compressor in sizes 009-015, a reciprocating compressor in sizes 018-048, a scroll compressor in sizes 060 and 070 units. Compressors are mounted on an isolated system (i.e., from the cabinet) that maximizes vibration isolation and minimizes transmission to the unit structure.

Blower and motor assembly — Permanent split capacitor (PSC) motors are standard for sizes 009 and 012 for both ETL and CE rated units, and standard on sizes 015-070 for ETL rated units. All PSC motors are 3-speed motors.

Electronically Commutated Motors (ECM) are standard for all CE rated units sizes 015-070.

Hanging brackets — All horizontal units come standard with hanging bracket kits for suspending the unit from field-supplied hanger rods. These kits include heavy duty steel brackets and rubber grommets for sound and vibration isolation from the building structure.

Water connections — All water connections are heavy duty bronze FPT fittings securely fastened to the unit corner post. This allows connecting to a flexible hose kit without the use of a backup wrench making for easier, faster installation.

Refrigeration/water circuit — Most units have a sealed refrigerant circuit including a high-efficiency rotary, reciprocating or scroll compressor. Also, standard are a reversing valve (4-way valve), water-to-refrigerant coaxial (tube-in-tube) coil, and enhanced aluminum fin/rifled copper tube air-to-refrigerant heat exchanger coil.

CE — Aquazone units have CE (Communauté Européenne) labels and are factory tested under normal operating conditions at nominal water flow rates.

Quiet operation

All 50PC units have a unique floating-basepan; the compressor is mounted on a heavy steel plate which rests on a high density rubber pad on the base of the unit. In addition, compressors are mounted on rubber grommets. This double isolation is standard in all 50PC units preventing vibration and noise transmission from the compressor to the unit structure, resulting in exceptionally quiet operation.

Cabinets are fully insulated to reduce noise transmission, low speed blowers are used for quiet operation through reduced outlet air velocities, and air-to-refrigerant coils are designed for lower airflow coil face velocities. A mute package is also available for extremely noise sensitive applications.

Evaporator coils

All units come standard with a copper coil aluminum fin evaporator coil. These evaporator coils employ lanced fin and rifled tubing for maximum heat transfer. Large face areas result in lower face velocity reducing sound while ensuring high latent heat removal for maximum dehumidification in the cooling mode.

Design flexibility

Airflow configurations for horizontal units are available in patterns including left or right return, and top, straight, end, or bottom discharge. Horizontal units are field convertible from left or right discharge to back discharge.

Safe, reliable operation

Standard safety features for the refrigerant circuit include a high-pressure switch and low-pressure sensor to detect refrigerant loss. Equipment safety features include water loop temperature monitoring, voltage protection, water coil freeze protection, and standard electronic condensate overflow shutdown. All safety features are tested and run at the factory to assure proper operation of all components and safety switches.

All components are carefully designed and selected for endurance, durability, and carefree day-to-day operation.

Table of contents

The Aquazone™ unit is shipped to provide internal and external equipment protection. Shipping supports are placed under the blower housing and compressor feet. In addition, horizontal units are both mounted on oversized pallets with lag bolts for sturdiness and maximum protection during transit.

Ease of installation

The Aquazone unit is packaged for simple low cost handling and requires minimal installation. All units are prewired and factory charged with refrigerant. Horizontal units include factory-installed hanger isolation brackets. Water connections (FPT) and condensate drains (FPT) are 19.05 mm in diameter and are anchored securely to the unit cabinet.

Simple maintenance and serviceability

The Aquazone WSHP units are constructed to provide easy maintenance. All units allow easy access to the compressor section from 2 sides with large removable panels. Additional panels allow access to the blower and control box sections.

The blower housing assembly can be serviced without disconnecting ductwork from the dedicated blower access panel. Blower units come with permanently lubricated bearings for worry-free performance. Blower inlet rings allow blower wheel removal without having to remove the housing or ductwork connections.

Electrical disconnection of the blower motor and control box is easily accomplished via quick disconnects on each component.

Easy removal of the control box from the unit provides access to all refrigeration components.

The refrigeration circuit is easily tested and serviced through high and low pressure ports integral to the refrigeration circuit.

Maximum control flexibility

Aquazone water source heat pumps provide reliable control operation using a standard microprocessor board with flexible alternatives for many direct digital controls (DDC) applications.

Carrier's Aquazone standard unit solid-state control system, the Complete C, provides control of the unit compressor, reversing valve, fan, safety features, and troubleshooting fault indication features. The Complete C control system is a user friendly, low cost, advanced WSHP control board. Many features are field selectable to maximize flexibility in field installation. The overall features of this standard control system include:

50-va transformer assists in accommodating accessory loads.

Anti-short cycle timer provides a minimum off time to prevent the unit from short cycling. The 5-minute timer energizes when the compressor is deenergized, resulting in a 5-minute delay before the unit can be restarted.

Random start relay provides a random delay in energizing each different WSHP unit. This option minimizes peak electrical demand during start-up from different operating modes or after building power outages. Each controller has a unique random start delay ranging from 270 to 300 seconds after power is applied to the board.

High and low pressure refrigerant protection safeguards against unreliable unit operation and prevents refrigerant from leaking.

Condensate overflow sensor is an electronic sensor mounted to the drain pan. When condensate pan liquid reaches an unacceptable level, the unit is automatically deactivated and placed in a lockout condition. The sensor recognizes 30 continuous seconds of overflow as a fault condition.

High and low voltage protection provides safety protection from excessive or low voltage conditions.

Automatic intelligent reset will automatically restart unit 5 minutes after shutdown if the fault has cleared. Should a fault occur 3 times sequentially, lockout will occur.

Accessory output (24-v) is provided to cycle a motorized water valve or damper actuator with compressor in applications such as variable speed pumping arrangements.

Performance monitor (PM) is a feature that monitors water temperatures to warn when the heat pump is operating inefficiently or beyond typical operating range. Field selectable switch initiates a warning code on the unit display.

Water coil freeze protection (selectable for water or antifreeze) provides a field selectable switch for water and water/glycol solution systems which initiates a fault when temperatures exceed the selected limit for 30 continuous seconds.

Air coil freeze protection (check filter operation) provides a field selectable switch for assessing excessive filter pressure drop. The switch initiates a fault when temperatures exceed the selected limit for 30 continuous seconds.

Alarm relay setting is a selectable 24-v or pilot duty dry contact for activating a remote alarm.

Low pressure bypass timer — The low pressure switch is bypassed for 120 seconds after a call for compressor operation to prevent nuisance low pressure lockouts during cold start-up in the heating mode.

Service Test mode with diagnostic LED (light-emitting diode) allows service personnel to check the operation of the WSHP and control system efficiently. Upon entering Test mode, time delays speed up, and the Status LED flashes a code to indicate the last fault experienced. This mode provides easy fault diagnosis; based on the fault code that the status LED flashes, Carrier troubleshooting tables provide easy reference to typical problems.

Puron® refrigerant (R-410A)

Puron refrigerant (R-410A) is a non-chlorine based enviromentally balanced, non-ozone depleting refrigerant. Puron refrigerant characteristics, compared to R-22, have:

- Binary and near azeotropic mixture of 50% R-32 and 50% R-125.
- Higher efficiencies (50 to 60% higher operating pressures).
- Virtually no glide. Unlike other alternative refrigerants, the two components in Puron refrigerant have virtually the same leak rates. Therefore, refrigerant can be added if necessary without recovering the charge.

Model number nomenclature

50PCH 024 B C C 7 B C A 1

Puron® Single-Stage Water Source Heat Pump
50PCH – Horizontal Configuration
50PCV – Vertical Configuration

Nominal Capacity - kW (Tons)

009 –	1.8 kW (3/4 Ton)	**036** –	10.6 kW (3 Ton)
012 –	3.5 kW (1 Ton)	**042** –	12.3 kW (3 1/2 Ton)
015 –	4.4 kW (1 1/4 Ton)	**048** –	14.1 kW (4 Ton)
018 –	5.3 kW (1 1/2 Ton)	**060** –	17.6 kW (5 Ton)
024 –	7.0 kW (2 Ton)	**070** –	21.1 kW (6 Ton)
030 –	8.8 kW (2 1/2 Ton)		

Airflow Configuration

50PCH

	Return	Discharge	Blower Motor
B –	Right	Back	PSC
E –	Left	Right	PSC
N –	Right	Left	ECM
P –	Right	Back	ECM
S –	Left	Back	PSC
W –	Left	Right	ECM
Y –	Left	Back	ECM
Z –	Right	Left	PSC

50PCV

	Return	Discharge	Blower Motor
J –	Left	Top	ECM
K –	Right	Top	ECM
L –	Left	Top	PSC
R –	Right	Top	PSC

Factory Installed Options
1 – None

Operating Range/Sound Option
A – Extended Range (6.7 to 43.3 C)
J – Extended Range with Mute Package

Valve Options
C – None

Revision Code
B – ETL Rated Units
C – CE Rated Units
(50PCH sizes 009-070 and 50PCV sizes 015-070)

Voltage
7 – 220/240-1-50 (sizes 009-036)
9 – 380/540-3-50 (sizes 030-070)

Refrigerant Circuit Options
C – Copper (Standard)
N – Cupronickel

Control
C – Standard Complete C Microprocessor Control

LEGEND
ECM — Electronically Commutated Motor
PSC — Permanent Split Capacitor

Performance ratings

50PC UNIT SIZE	PSC MOTOR (BASE)											
	WATER LOOP HEAT PUMP						GROUND LOOP HEAT PUMP					
	COOLING 30 C			HEATING 20 C			COOLING 25 C			HEATING 0 C		
	Cooling Cap (kW)	Cooling Power (kW)	EER	Heating Cap (kW)	Heating Power (kW)	COP	Cooling Cap (kW)	Cooling Power (kW)	EER	Heating Cap (kW)	Heating Power (kW)	COP
009	1.94	0.52	3.75	2.46	0.57	4.29	2.04	0.47	4.30	1.46	0.54	2.69
012	2.64	0.75	3.52	3.17	0.79	4.00	2.73	0.68	4.04	1.97	0.74	2.67
015	3.24	0.86	3.76	3.96	0.94	4.20	3.34	0.77	4.37	2.46	0.88	2.80
018	5.00	1.15	4.34	5.90	1.39	4.25	5.30	1.08	4.89	3.10	1.14	2.72
024	5.93	1.40	4.23	6.97	1.73	4.03	6.23	1.30	4.79	3.77	1.38	2.73
030	7.06	1.76	4.02	8.34	2.01	4.14	7.46	1.65	4.52	4.74	1.61	2.94
036	9.32	2.04	4.56	10.58	2.44	4.34	9.82	1.93	5.08	5.98	1.97	3.03
042	9.97	2.51	3.97	11.93	2.94	4.06	10.47	2.33	4.50	6.73	2.47	2.73
048	11.59	2.78	4.16	14.11	3.50	4.03	12.29	2.55	4.82	8.51	2.82	3.02
060	14.29	3.47	4.12	16.61	4.56	3.64	14.79	3.23	4.59	10.41	4.04	2.57
070	15.84	3.87	4.09	18.36	4.63	3.96	16.44	3.54	4.65	11.56	4.14	2.79

50PC UNIT SIZE	ECM MOTOR (BASE)											
	WATER LOOP HEAT PUMP						GROUND LOOP HEAT PUMP					
	COOLING 30 C			HEATING 20 C			COOLING 25 C			HEATING 0 C		
	Cooling Cap (kW)	Cooling Power (kW)	EER	Heating Cap (kW)	Heating Power (kW)	COP	Cooling Cap (kW)	Cooling Power (kW)	EER	Heating Cap (kW)	Heating Power (kW)	COP
015	3.33	0.83	3.99	3.93	0.84	4.67	3.43	0.75	4.58	2.43	0.78	3.13
018	4.93	1.13	4.35	5.93	1.20	4.95	5.23	1.08	4.85	3.13	0.94	3.33
024	6.05	1.40	4.32	7.15	1.48	4.84	6.35	1.29	4.92	3.95	1.16	3.40
030	7.26	1.72	4.21	8.56	1.87	4.58	7.66	1.59	4.80	4.76	1.46	3.27
036	9.47	2.00	4.73	10.77	2.16	4.98	9.97	1.84	5.43	6.17	1.74	3.54
042	10.28	2.39	4.30	12.18	2.53	4.82	10.78	2.20	4.89	6.88	2.10	3.28
048	11.89	2.70	4.41	14.39	3.02	4.77	12.59	2.51	5.03	8.79	2.39	3.68
060	14.41	3.32	4.34	16.81	3.71	4.54	14.91	3.08	4.84	10.61	3.23	3.29
070	16.01	3.63	4.41	18.61	3.92	4.74	16.71	3.41	4.90	11.71	3.42	3.42

LEGEND
COP — Coefficient of Performance
EER — Energy Efficiency Ratio

NOTES:
1. Ground loop ratings based on 15% PG solution.
2. Ratings based upon entering air conditions of 27/19 C db/wb.

Physical data

PHYSICAL DATA — 50PCH,PCV009-070 UNITS ETL RATED

50PCH,PCV UNIT	009	012	015	018	024	030
COMPRESSOR (1 each)	Rotary			Reciprocating		
Maximum Water Working Pressure (kPa)	2758					
PSC FAN MOTOR AND BLOWER						
Fan Motor Type/Speeds	PSC/3					
Fan Motor (W)	75			186		
Blower Wheel Size (Dia x W) (mm)	114.3 x 114.3	139.7 x 114.3	228.6 x 177.8			
WATER CONNECTION SIZE						
FPT (mm)	19.05					
Coaxial Coil Volume (L)	0.22	0.30	0.34	0.54		0.91
VERTICAL CABINET						
Refrigeration Charge (kg)	0.43	0.51	0.54	0.79	0.82	1.05
Air Coil Dimensions (cm) (H x W)	25.4 x 35.6	25.4 x 35.6	30.5 x 41.9	40.6 x 41.9	50.8 x 41.9	50.8 x 41.9
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	25.4 x 40.6	25.4x40.6	40.6 x 50.8	40.6 x 50.8	50.8 x 50.8	50.8 x 50.8
Weight - Operating (kg)	47	48	56	79	81	87
Weight - Shipping (kg)	59	60	69	91	93	99
HORIZONTAL CABINET						
Refrigeration Charge (g)	539	539	539	822	822	1049
Air Coil Dimensions (cm) (H x W)	25.4 x 35.6	25.4 x 35.6	30.5 x 41.9	40.6 x 41.9	40.6 x 52.1	40.6 x 52.1
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	25.4 x 40.6	25.4 x 40.6	40.6 x 50.8	40.6 x 50.8	40.6 x 63.5	40.6 x 63.5
Weight - Operating (kg)	45	48	62	79	82	86
Weight - Shipping (kg)	60	61	72	94	96	102

50PCH,PCV UNIT	036	042	048	060	070
COMPRESSOR (1 each)	Reciprocating		Scroll		
Maximum Water Working Pressure (kPa)	2758				
PSC FAN MOTOR AND BLOWER					
Fan Motor Type/Speeds	PSC/3				
Fan Motor (W)	373		559		
Blower Wheel Size (Dia x W) (mm)	228.6 x 177.8	254 x 203.2		279.4 x 228.6	
WATER CONNECTION SIZE					
FPT (mm)	19.05		25.4		
Coaxial Coil Volume (L)	1.04		1.85	2.33	
VERTICAL CABINET					
Refrigeration Charge (kg)	1.36	1.36	1.47	1.67	20.7
Air Coil Dimensions (cm) (H x W)	61.0 x 51.4	61.0 x 51.4	61.0 x 68.0	61.0 x 68.0	81.3 x 68.0
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	61.0 x 61.0	61.0 x 61.0	61.0 x 76.2	61.0 x 76.2	40.6 x 76.2 (2)
Weight - Operating (kg)	104	108	130	140	153
Weight - Shipping (kg)	116	120	142	150	164
HORIZONTAL CABINET					
Refrigeration Charge (g)	1304	1219	1247	1814	1729
Air Coil Dimensions (cm) (H x W)	45.7 x 69.9		50.8 x 81.3		50.8 x 106.7
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	45.7 x 76.2		50.8 x 87.6		50.8 x 60.9 (2)
Weight - Operating (kg)	103	105	124	131	143
Weight - Shipping (kg)	123	120	136	144	166

LEGEND

FPT — Female Pipe Thread
PSC — Permanent Split Capacitor

Physical data (cont)

PHYSICAL DATA — 50PCH,PCV009-070 UNITS CE RATED

50PCH,PCV UNIT	009	012	015	018	024	030
COMPRESSOR (1 each)	Rotary	Rotary	Rotary	Reciprocating	Reciprocating	Reciprocating
Maximum Water Working Pressure (kPa)	2758	2758	2758	2758	2758	2758
PSC FAN MOTOR AND BLOWER						
Fan Motor Type/Speeds	PSC/3	PSC/3	ECM	ECM	ECM	ECM
Fan Motor (W)	75	75	249	249	249	249
Blower Wheel Size (Dia x W) (mm)	114.3 x 114.3	139.7 x 114.3	228.6 x 177.8	228.6 x 177.8	228.6 x 177.8	228.6 x 177.8
WATER CONNECTION SIZE						
FPT (in.)	3/4	3/4	3/4	3/4	3/4	3/4
Coaxial Coil Volume (L)	0.22	0.30	0.34	0.54	0.54	0.91
VERTICAL CABINET						
Refrigeration Charge (kg)	0.43	0.51	0.54	0.79	0.82	1.05
Air Coil Dimensions (cm) (H x W)	25.4 x 35.6	25.4 x 35.6	30.5 x 41.9	40.6 x 41.9	50.8 x 41.9	50.8 x 41.9
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	25.4 x 40.6	25.4 x 40.6	40.6 x 50.8	40.6 x 50.8	50.8 x 50.8	50.8 x 50.8
Weight - Operating (kg)	47	48	56	79	81	87
Weight - Shipping (kg)	59	60	69	91	93	99
HORIZONTAL CABINET						
Refrigeration Charge (kg)	0.54	0.54	0.54	0.82	0.82	1.05
Air Coil Dimensions (cm) (H x W)	25.4 x 35.6	25.4 x 35.6	30.5 x 41.9	40.6 x 41.9	40.6 x 52.1	40.6 x 52.1
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	25.4 x 40.6	25.4 x 40.6	40.6 x 50.8	40.6 x 50.8	40.6 x 63.5	40.6 x 63.5
Weight - Operating (kg)	45	48	62	79	82	86
Weight - Shipping (kg)	60	61	72	95	96	102

50PCH,PCV UNIT	036	042	048	060	070
COMPRESSOR (1 each)	Reciprocating	Reciprocating	Scroll	Scroll	Scroll
Maximum Water Working Pressure (kPa)	2758	2758	2758	2758	2758
PSC FAN MOTOR AND BLOWER					
Fan Motor Type/Speeds	ECM	ECM	ECM	ECM	ECM
Fan Motor (W)	373	373	559	559	559
Blower Wheel Size (Dia x W) (mm)	228.6 x 177.8	254 x 203.2	254 x 203.2	279.4 x 228.6	279.4 x 228.6
WATER CONNECTION SIZE					
FPT (in.)	3/4	3/4	1	1	1
Coaxial Coil Volume (L)	1.04	1.04	1.85	2.33	2.33
VERTICAL CABINET					
Refrigeration Charge (kg)	1.36	1.36	1.47	1.67	2.07
Air Coil Dimensions (cm) (H x W)	61.0 x 51.4	61.0 x 51.4	61.0 x 68.0	61.0 x 68.0	81.3 x 68.0
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	61.0 x 61.0	61.0 x 61.0	61.0 x 76.2	61.0 x 76.2	40.6 x 76.2 (2)
Weight - Operating (kg)	104	108	130	140	153
Weight - Shipping (kg)	116	120	142	150	164
HORIZONTAL CABINET					
Refrigeration Charge (kg)	1.30	1.22	1.25	1.81	1.73
Air Coil Dimensions (cm) (H x W)	45.7 x 69.9	45.7 x 69.9	50.8 x 81.3	50.8 x 81.3	50.8 x 106.7
Standard Filter - 2.5 cm Throwaway (cm) (L x H)	45.7 x 76.2	45.7 x 76.2	50.8 x 87.6	50.8 x 87.6	50.8 x 61.0 (2)
Weight - Operating (kg)	103	105	125	131	144
Weight - Shipping (kg)	123	120	136	145	166

LEGEND

ECM — Electronicaly Commutated Motor
FPT — Female Pipe Thread
PSC — Permanent Split Capacitor

Factory-installed options

Cupronickel heat exchangers are available for higher corrosion protection for applications such as open tower, geothermal, etc. Consult the water quality guidelines for proper application and selection of this option.

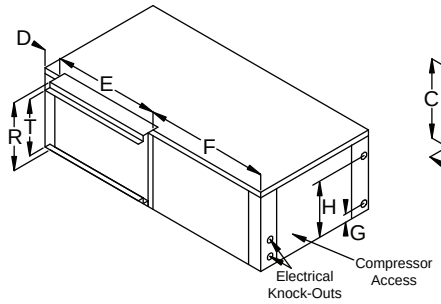
Extended range units insulate the coaxial coil to prevent condensation in applications where the entering water temperature is below the normal operating range (less than 15.5 C). Units are capable of operating at a range of –3.8 to 43.3 C. Thermal expansion valves (TXVs) come with the optional extended range units and are designed to vary the flow of refrigerant depending on the load. The TXVs provide unit optimization and more stable control over a wider range of operating conditions.

Sound attenuation package (mute package) is available on unit sizes 024 and above for applications that require especially low noise levels. With this option, a compressor blanket is installed.

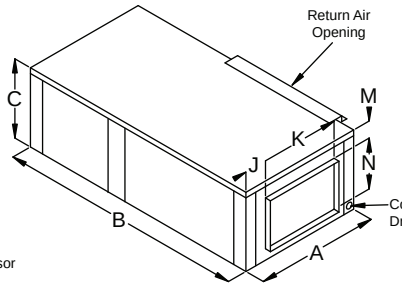
Constant airflow ECMs are optional on sizes 015-070 and will maintain constant unit airflow as the static pressure in the system increases. Constant airflow ECMs provide three available speed settings.

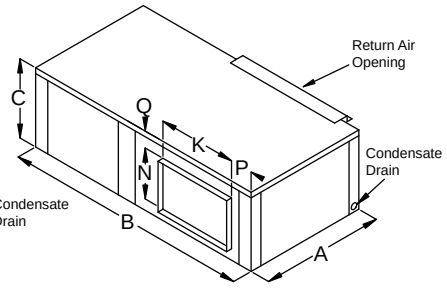
Dimensions

50PCH UNIT



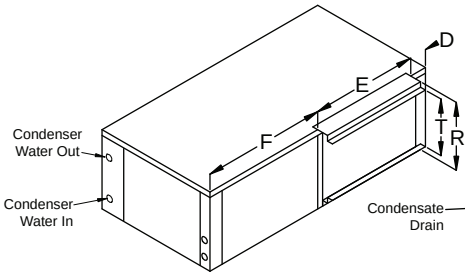
Left Hand Return End Blow

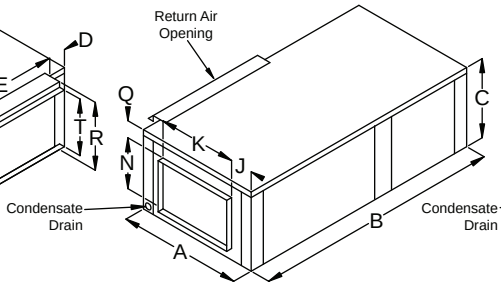




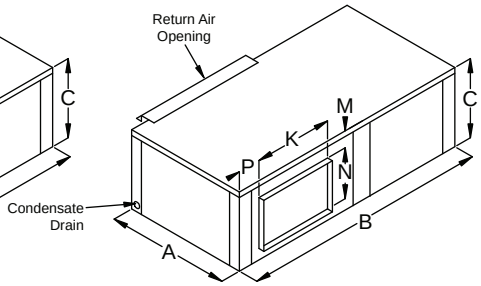
Left Hand Return Straight Through

NOTE: Models 048 and 060 Left Hand Return units have condenser water connections on the front right and electrical knockouts on the front left.





Right Hand Return End Blow

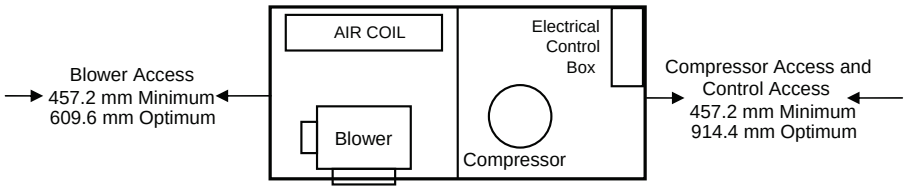


Right Hand Return Straight Through

LEGEND

R/A — Return Air

Service Clearances



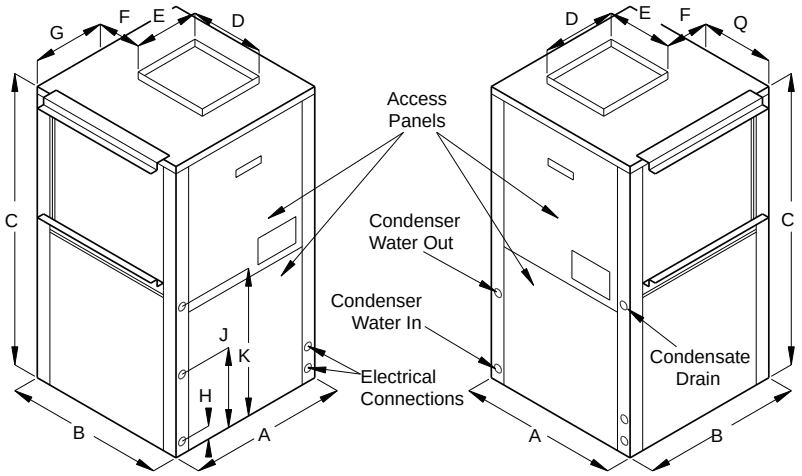
50PCH009-070 UNITS

50PCH UNIT SIZE	A WIDTH	B DEPTH	C HEIGHT	D CAB END TO FILTER RACK	E R/A DUCT WIDTH	F CAB FRONT TO FILTER RACK	G WATER INLET	H WATER OUTLET	J SIDE TO DISC. WIDTH	K DISC. WIDTH	M TOP TO DISC.	N DISC. HEIGHT	P END TO DISC.	Q TOP TO DISC.	R FILTER RACK HEIGHT	T R/A DUCT FLANGE HEIGHT	CONDENSER WATER CONNECTIONS FPT (in.)	RECOMMENEDED REPLACEMENT NOMINAL FILTER SIZE
009	482.5	838.2	292.1	38.1	410.2	389.9	60.5	241.3	136.5	160.0	151.6	104.1	123.8	35.8	287.0	218.4	3/4	254x406.4x25.4
012	482.5	838.2	292.1	38.1	410.2	389.9	60.5	241.3	133.3	163.3	160.3	104.1	120.6	28.9	287.0	218.4	3/4	254x406.4x25.4
015	558.8	1092.2	431.8	38.1	511.8	542.3	72.6	381.0	207.0	163.3	242.6	104.1	194.3	86.3	426.7	381.0	3/4	406.4x508x25.4
018	558.8	1092.2	431.8	38.1	511.8	542.3	72.6	358.9	137.7	231.9	155.2	245.1	124.9	31.2	426.7	381.0	3/4	406.4x508x25.4
024	558.8	1092.2	431.8	38.1	635.0	419.1	72.6	358.9	137.7	231.9	155.2	245.1	124.9	31.2	426.7	381.0	3/4	406.4x635x25.4
030	558.8	1092.2	431.8	38.1	635.0	419.1	62.7	381.0	137.7	231.9	155.2	245.1	124.9	31.2	426.7	381.0	3/4	406.4x635x25.4
036	558.8	1384.3	482.6	38.1	765.8	580.4	72.6	409.7	164.3	231.9	190.5	261.1	151.6	30.7	477.5	431.8	3/4	457.2x762x25.4
042	558.8	1384.3	482.6	38.1	765.8	580.4	72.6	409.7	133.9	265.4	164.1	287.0	121.1	30.9	477.5	431.8	3/4	457.2x762x25.4
048	635.0	1384.3	533.4	38.1	878.8	467.4	72.6	470.4	184.1	265.4	189.5	288.5	171.5	54.8	528.3	482.6	1	508x876.3x25.4
060	635.0	1384.3	533.4	38.1	878.8	467.4	72.6	470.4	160.5	298.7	172.9	317.5	147.8	42.6	528.3	482.6	1	508x876.3x25.4
070	635.0	1651.0	533.4	38.1	1221.7	391.1	72.6	470.4	160.5	298.7	172.9	317.5	147.8	42.6	528.3	482.6	1	508x609.6x25.4 (2)

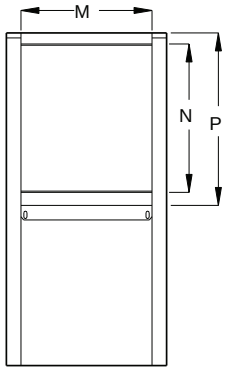
NOTES:

1. All dimensions are metric (mm) unless stated otherwise.
2. All condensate drain connections are 3/4 in. FPT.
3. Specifications subject to change without notice.
4. The 25.4 mm filter rack extends 31.24 mm beyond the side of the unit. The 50.8 mm filter rack extends 73.4 mm beyond the side of the unit. The 50.8 mm filter rack is 4-sided with a filter access door on one end and can accept either a 25.4 mm or 50.8 mm filter.

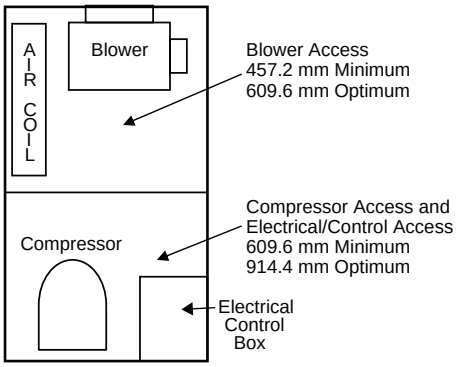
50PCV UNIT



Left Hand Return **Right Hand Return**



Return Air (Filter) View



Front of Unit
Service Clearances

LEGEND
R/A — Return Air

50PCV009-070 UNITS

50PCV UNIT SIZE	A WIDTH	B DEPTH	C HEIGHT	D DISC. DEPTH	E DISC. WIDTH	F CABINET EDGE TO DISC.	G LEFT SIDE TO DISC.	H WATER INLET	J WATER OUTLET	K CONDEN-SATE DRAIN	M R/A DUCT WIDTH	N R/A DUCT FLANGE HEIGHT	P FILTER RACK HEIGHT	Q	CONDENSER WATER CONNECTIONS FPT (in.)	RECOMMENEDED REPLACEMENT NOMINAL FILTER SIZE
009	482.6	482.6	615.95	254.0	203.2	114.3	236.2	61.98	245.87	352.30	406.4	203.2	254.0	137.2	3/4	254x406.4x25.4
012	482.6	482.6	615.95	254.0	203.2	114.3	236.2	61.98	245.87	352.30	406.4	203.2	254.0	137.2	3/4	254x406.4x25.4
015	546.1	546.1	819.15	254.0	203.2	147.3	254.0	72.39	214.63	403.10	508.0	355.6	406.4	88.9	3/4	406.4x508x25.4
018	546.1	546.1	819.15	355.6	355.6	78.7	132.1	72.39	214.63	403.10	508.0	355.6	406.4	132.1	3/4	406.4x508x25.4
024	546.1	546.1	996.95	355.6	355.6	78.7	132.1	71.12	214.63	479.30	508.0	457.2	508.0	132.1	3/4	508x508x25.4
030	546.1	546.1	996.95	355.6	355.6	78.7	132.1	71.12	214.63	479.30	508.0	457.2	508.0	132.1	3/4	508x508x25.4
036	546.1	660.4	1098.55	406.4	355.6	101.6	127.0	69.85	273.56	479.30	609.6	558.8	609.6	127.0	3/4	609.6x609.6x25.4
042	546.1	660.4	1098.55	406.4	355.6	101.6	127.0	69.85	273.56	479.30	609.6	558.8	609.6	127.0	3/4	609.6x609.6x25.4
048	609.6	825.5	1149.35	457.2	355.6	177.8	157.5	82.80	335.28	530.10	762.0	558.8	609.6	157.5	1	609.6x762x25.4
060	609.6	825.5	1149.35	457.2	355.6	177.8	157.5	82.80	335.28	530.10	762.0	558.8	609.6	157.5	1	609.6x762x25.4
070	660.4	844.6	1479.55	457.2	406.4	198.1	182.9	74.17	339.34	657.10	762.0	762.0	812.8	182.9	1	406.4x762x25.4 (2)

NOTES:
1. All dimensions are metric (mm) unless stated otherwise.
2. All condensate drain connections are 3/4 in. FPT.
3. Specifications subject to change without notice.
4. The 25.4 mm filter rack extends 31.24 mm beyond the side of the unit. The 50.8 mm filter rack extends 73.4 mm beyond the side of the unit. The 50.8 mm filter rack is 4-sided with a filter access door on one end and can accept either a 25.4 mm or 50.8 mm filter.

Dimensions (cont)

50PCH009-070 CORNER WEIGHTS (kg)

UNIT SIZE	TOTAL (kg)	LEFT HAND EVAPORATOR				RIGHT HAND EVAPORATOR			
		LEFT FRONT*	RIGHT FRONT*	LEFT BACK	RIGHT BACK	LEFT FRONT*	RIGHT FRONT*	LEFT BACK	RIGHT BACK
009	47	13	10	12	11	10	13	11	12
012	48	13	11	12	12	11	13	12	12
015	58	16	13	15	13	13	16	13	15
018	80	26	16	22	17	16	26	17	22
024	82	26	17	22	17	17	26	17	22
030	88	28	18	23	19	18	28	19	23
036	108	32	22	30	24	22	32	24	30
042	105	32	21	29	23	21	32	23	29
048	122	39	27	28	27	27	39	27	28
060	131	40	29	31	30	29	40	30	31
070	143	44	32	35	32	32	44	32	35

* Front is control box end.

Performance data

50PC009 — 165 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.063	1.5	23.9/17.2	2.7	2.3	3.1	0.52	-1.1	15.6	1.7	1.2	0.5	3.1
			26.7/19.4	2.8	2.3	3.3	0.52		21.1	1.7	1.1	0.6	2.9
			29.4/21.7	3.0	2.4	3.5	0.52		26.7	1.6	1.1	0.6	2.6
	0.126	5.4	23.9/17.2	2.8	2.3	3.2	0.44		15.6	1.9	1.4	0.6	3.4
			26.7/19.4	3.0	2.4	3.4	0.44		21.1	1.8	1.3	0.6	3.1
			29.4/21.7	3.2	2.5	3.6	0.43		26.7	1.8	1.2	0.6	2.8
	0.189	11.4	23.9/17.2	2.9	2.3	3.3	0.42		15.6	2.0	1.5	0.6	3.6
			26.7/19.4	3.1	2.4	3.5	0.41		21.1	1.9	1.3	0.6	3.2
			29.4/21.7	3.3	2.5	3.7	0.40		26.7	1.9	1.3	0.6	2.9
15.6	0.063	1.5	23.9/17.2	2.5	2.2	3.0	0.57	4.4	15.6	2.0	1.5	0.6	3.6
			26.7/19.4	2.7	2.3	3.2	0.57		21.1	2.0	1.4	0.6	3.3
			29.4/21.7	2.8	2.4	3.4	0.57		26.7	1.9	1.3	0.7	2.9
	0.126	5.4	23.9/17.2	2.7	2.3	3.1	0.50		15.6	2.2	1.7	0.6	3.9
			26.7/19.4	2.9	2.3	3.3	0.50		21.1	2.1	1.6	0.6	3.5
			29.4/21.7	3.0	2.4	3.5	0.49		26.7	2.1	1.5	0.7	3.2
	0.189	10.8	23.9/17.2	2.8	2.3	3.2	0.48		15.6	2.3	1.8	0.6	4.1
			26.7/19.4	2.9	2.4	3.4	0.47		21.1	2.2	1.6	0.6	3.6
			29.4/21.7	3.1	2.5	3.5	0.46		26.7	2.2	1.5	0.7	3.3
21.1	0.063	1.5	23.9/17.2	2.4	2.1	2.9	0.62	10	15.6	2.3	1.8	0.6	4.0
			26.7/19.4	2.5	2.2	3.1	0.63		21.1	2.2	1.7	0.6	3.6
			29.4/21.7	2.7	2.3	3.3	0.63		26.7	2.2	1.6	0.7	3.3
	0.126	5.1	23.9/17.2	2.5	2.2	3.0	0.56		15.6	2.5	2.0	0.6	4.4
			26.7/19.4	2.7	2.3	3.2	0.56		21.1	2.5	1.9	0.6	4.0
			29.4/21.7	2.9	2.4	3.4	0.56		26.7	2.4	1.8	0.7	3.6
	0.189	10.5	23.9/17.2	2.6	2.2	3.1	0.54		15.6	2.6	2.1	0.6	4.6
			26.7/19.4	2.8	2.3	3.3	0.53		21.1	2.5	2.0	0.6	4.1
			29.4/21.7	3.0	2.4	3.5	0.53		26.7	2.5	1.8	0.7	3.7
26.7	0.063	1.5	23.9/17.2	2.3	2.1	2.8	0.68	15.6	15.6	2.6	2.1	0.6	4.5
			26.7/19.4	2.4	2.1	3.0	0.69		21.1	2.5	1.9	0.6	4.0
			29.4/21.7	2.5	2.2	3.2	0.69		26.7	2.5	1.8	0.7	3.7
	0.126	4.8	23.9/17.2	2.4	2.1	3.0	0.62		15.6	2.9	2.3	0.6	5.0
			26.7/19.4	2.6	2.2	3.1	0.62		21.1	2.8	2.2	0.6	4.4
			29.4/21.7	2.7	2.3	3.3	0.62		26.7	2.7	2.1	0.7	3.9
	0.189	10.2	23.9/17.2	2.5	2.1	3.0	0.60		15.6	3.0	2.5	0.6	5.2
			26.7/19.4	2.6	2.3	3.2	0.60		21.1	2.9	2.3	0.6	4.6
			29.4/21.7	2.8	2.3	3.3	0.60		26.7	2.8	2.1	0.7	4.1
29.4	0.063	1.5	23.9/17.2	2.2	2.0	2.8	0.71	21.1	15.6	2.9	2.3	0.6	5.0
			26.7/19.4	2.3	2.1	3.0	0.72		21.1	2.8	2.2	0.6	4.4
			29.4/21.7	2.5	2.2	3.1	0.72		26.7	2.8	2.1	0.7	4.0
	0.126	4.8	23.9/17.2	2.3	2.1	2.9	0.65		15.6	3.2	2.7	0.6	5.6
			26.7/19.4	2.5	2.1	3.1	0.65		21.1	3.1	2.5	0.6	4.9
			29.4/21.7	2.7	2.3	3.2	0.65		26.7	3.0	2.4	0.7	4.3
	0.189	9.9	23.9/17.2	2.4	2.1	2.9	0.63		15.6	3.4	2.8	0.6	5.9
			26.7/19.4	2.5	2.2	3.1	0.63		21.1	3.3	2.6	0.6	5.1
			29.4/21.7	2.7	2.3	3.3	0.63		26.7	3.2	2.5	0.7	4.5
32.2	0.063	1.5	23.9/17.2	2.1	2.0	2.8	0.74	26.7	15.6	3.2	2.7	0.6	5.5
			26.7/19.4	2.3	2.1	2.9	0.75		21.1	3.1	2.5	0.6	4.9
			29.4/21.7	2.4	2.1	3.1	0.75		26.7	3.0	2.4	0.7	4.3
	0.126	4.8	23.9/17.2	2.3	2.1	2.8	0.68		15.6	3.6	3.1	0.6	6.2
			26.7/19.4	2.4	2.1	3.0	0.69		21.1	3.5	2.9	0.7	5.4
			29.4/21.7	2.6	2.2	3.2	0.69		26.7	3.4	2.7	0.7	4.7
	0.189	9.9	23.9/17.2	2.3	2.1	2.9	0.67		15.6	3.8	3.3	0.6	6.5
			26.7/19.4	2.5	2.1	3.0	0.67		21.1	3.6	3.0	0.7	5.6
			29.4/21.7	2.6	2.3	3.2	0.66		26.7	3.5	2.9	0.7	4.9
37.8	0.063	1.2	23.9/17.2	2.0	1.9	2.7	0.80	Operation Not Recommended					
			26.7/19.4	2.1	2.0	2.8	0.81						
			29.4/21.7	2.3	2.1	3.0	0.82						
	0.126	4.5	23.9/17.2	2.1	2.0	2.8	0.75						
			26.7/19.4	2.3	2.1	2.9	0.75						
			29.4/21.7	2.4	2.1	3.1	0.75						
	0.189	9.6	23.9/17.2	2.1	2.0	2.8	0.73						
			26.7/19.4	2.3	2.1	2.9	0.73						
			29.4/21.7	2.5	2.1	3.1	0.73						
43.3	0.063	1.2	23.9/17.2	1.8	1.8	2.6	0.86						
			26.7/19.4	2.0	1.9	2.7	0.87						
			29.4/21.7	2.1	2.0	2.9	0.88						
	0.126	4.5	23.9/17.2	2.0	1.9	2.6	0.82						
			26.7/19.4	2.1	2.0	2.8	0.82						
			29.4/21.7	2.2	2.1	3.0	0.83						
	0.189	9.3	23.9/17.2	2.0	1.9	2.7	0.80						
			26.7/19.4	2.1	2.0	2.8	0.80						
			29.4/21.7	2.3	2.1	3.0	0.81						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

Performance data (cont)

50PC012 — 189 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.095	3.2879	23.9/17.2	3.7	2.8	4.3	0.67	-1.1	15.6	2.4	1.7	0.8	3.2
			26.7/19.4	3.9	2.9	4.5	0.67		21.1	2.3	1.6	0.8	2.9
			29.4/21.7	4.1	3.0	4.8	0.67		26.7	2.3	1.5	0.9	2.7
	0.158	8.3692	23.9/17.2	3.8	2.9	4.4	0.61		15.6	2.5	1.8	0.8	3.3
			26.7/19.4	4.0	3.0	4.6	0.60		21.1	2.5	1.7	0.8	3.0
			29.4/21.7	4.3	3.0	4.9	0.60		26.7	2.4	1.6	0.9	2.8
	0.221	15.2439	23.9/17.2	3.8	2.9	4.4	0.58		15.6	2.6	1.9	0.8	3.5
			26.7/19.4	4.1	3.0	4.7	0.57		21.1	2.5	1.8	0.8	3.1
			29.4/21.7	4.4	3.1	5.0	0.57		26.7	2.5	1.6	0.9	2.8
15.6	0.095	3.2879	23.9/17.2	3.5	2.8	4.2	0.74	4.4	15.6	2.8	2.0	0.8	3.6
			26.7/19.4	3.7	2.8	4.4	0.75		21.1	2.7	1.9	0.8	3.3
			29.4/21.7	4.0	2.9	4.7	0.75		26.7	2.6	1.8	0.9	3.0
	0.158	8.0703	23.9/17.2	3.6	2.8	4.2	0.69		15.6	2.9	2.2	0.8	3.8
			26.7/19.4	3.9	2.9	4.5	0.68		21.1	2.8	2.1	0.8	3.4
			29.4/21.7	4.1	3.0	4.8	0.68		26.7	2.8	1.9	0.9	3.1
	0.221	14.6461	23.9/17.2	3.7	2.8	4.3	0.66		15.6	3.0	2.3	0.8	3.9
			26.7/19.4	3.9	2.9	4.5	0.66		21.1	2.9	2.1	0.8	3.5
			29.4/21.7	4.2	3.0	4.8	0.65		26.7	2.8	2.0	0.9	3.1
21.1	0.095	2.989	23.9/17.2	3.3	2.7	4.0	0.82	10.0	15.6	3.1	2.4	0.8	4.0
			26.7/19.4	3.5	2.8	4.3	0.82		21.1	3.0	2.3	0.9	3.6
			29.4/21.7	3.8	2.9	4.5	0.83		26.7	3.0	2.1	0.9	3.2
	0.158	7.7714	23.9/17.2	3.4	2.8	4.1	0.76		15.6	3.3	2.6	0.8	4.2
			26.7/19.4	3.7	2.8	4.4	0.77		21.1	3.3	2.4	0.9	3.8
			29.4/21.7	3.9	2.9	4.6	0.76		26.7	3.2	2.3	0.9	3.4
	0.221	14.3472	23.9/17.2	3.5	2.8	4.2	0.75		15.6	3.4	2.7	0.8	4.3
			26.7/19.4	3.7	2.9	4.4	0.74		21.1	3.3	2.5	0.9	3.9
			29.4/21.7	4.0	2.9	4.7	0.74		26.7	3.3	2.4	0.9	3.5
26.7	0.095	2.989	23.9/17.2	3.1	2.6	4.0	0.89	15.6	15.6	3.5	2.8	0.8	4.4
			26.7/19.4	3.3	2.7	4.2	0.90		21.1	3.5	2.6	0.9	4.0
			29.4/21.7	3.5	2.8	4.4	0.91		26.7	3.4	2.5	1.0	3.6
	0.158	7.4725	23.9/17.2	3.3	2.7	4.0	0.85		15.6	3.8	3.0	0.8	4.7
			26.7/19.4	3.5	2.8	4.2	0.85		21.1	3.7	2.8	0.9	4.2
			29.4/21.7	3.7	2.8	4.5	0.85		26.7	3.6	2.7	1.0	3.7
	0.221	13.7494	23.9/17.2	3.3	2.7	4.0	0.83		15.6	3.9	3.1	0.8	4.8
			26.7/19.4	3.5	2.8	4.3	0.83		21.1	3.8	3.0	0.9	4.3
			29.4/21.7	3.8	2.8	4.5	0.83		26.7	3.7	2.8	1.0	3.8
29.4	0.095	2.989	23.9/17.2	3.0	2.6	3.9	0.93	21.1	15.6	3.9	3.2	0.8	4.9
			26.7/19.4	3.3	2.7	4.1	0.94		21.1	3.8	3.0	0.9	4.3
			29.4/21.7	3.5	2.8	4.3	0.95		26.7	3.8	2.8	1.0	3.9
	0.158	7.4725	23.9/17.2	3.1	2.6	4.0	0.89		15.6	4.2	3.5	0.8	5.2
			26.7/19.4	3.4	2.7	4.2	0.89		21.1	4.1	3.3	0.9	4.5
			29.4/21.7	3.6	2.8	4.4	0.90		26.7	4.0	3.0	1.0	4.1
	0.221	13.4505	23.9/17.2	3.2	2.6	4.0	0.87		15.6	4.4	3.6	0.8	5.3
			26.7/19.4	3.4	2.7	4.2	0.87		21.1	4.2	3.4	0.9	4.7
			29.4/21.7	3.6	2.8	4.5	0.88		26.7	4.1	3.2	1.0	4.1
32.2	0.095	2.989	23.9/17.2	3.0	2.5	3.8	0.98	26.7	15.6	4.4	3.6	0.8	5.3
			26.7/19.4	3.1	2.6	4.0	0.99		21.1	4.2	3.4	0.9	4.7
			29.4/21.7	3.4	2.7	4.3	1.00		26.7	4.2	3.2	1.0	4.2
	0.158	7.1736	23.9/17.2	3.0	2.6	3.9	0.93		15.6	4.7	3.9	0.8	5.6
			26.7/19.4	3.3	2.7	4.1	0.94		21.1	4.6	3.7	0.9	4.9
			29.4/21.7	3.5	2.8	4.3	0.94		26.7	4.5	3.5	1.0	4.4
	0.221	13.4505	23.9/17.2	3.1	2.6	3.9	0.92		15.6	4.9	4.1	0.8	5.8
			26.7/19.4	3.3	2.7	4.1	0.91		21.1	4.7	3.8	0.9	5.1
			29.4/21.7	3.5	2.8	4.4	0.92		26.7	4.6	3.6	1.0	4.5
37.8	0.095	2.6901	23.9/17.2	2.8	2.5	3.7	1.06	Operation Not Recommended					
			26.7/19.4	3.0	2.6	3.9	1.07						
			29.4/21.7	3.2	2.6	4.1	1.08						
	0.158	7.1736	23.9/17.2	2.8	2.5	3.8	1.02						
			26.7/19.4	3.0	2.6	4.0	1.03						
			29.4/21.7	3.3	2.7	4.2	1.03						
	0.221	12.8527	23.9/17.2	2.9	2.5	3.8	1.01						
			26.7/19.4	3.1	2.6	4.0	1.01						
			29.4/21.7	3.3	2.7	4.2	1.01						
43.3	0.095	2.6901	23.9/17.2	2.6	2.4	3.6	1.15						
			26.7/19.4	2.8	2.5	3.8	1.16						
			29.4/21.7	2.9	2.6	4.0	1.17						
	0.158	6.8747	23.9/17.2	2.6	2.4	3.6	1.11						
			26.7/19.4	2.8	2.5	3.8	1.12						
			29.4/21.7	3.0	2.6	4.1	1.13						
	0.221	12.5538	23.9/17.2	2.7	2.4	3.7	1.10						
			26.7/19.4	2.9	2.5	3.9	1.10						
			29.4/21.7	3.1	2.6	4.1	1.11						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

50PC015 — 236 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.126	5.978	23.9/17.2	4.5	3.4	5.2	0.77	-1.1	15.6	3.0	2.1	0.9	3.2
			26.7/19.4	4.8	3.5	5.5	0.76		21.1	2.9	2.0	1.0	2.9
			29.4/21.7	5.1	3.6	5.8	0.75		26.7	2.9	1.8	1.1	2.7
	0.189	12.5538	23.9/17.2	4.6	3.4	5.2	0.71		15.6	3.1	2.2	0.9	3.3
			26.7/19.4	4.9	3.5	5.6	0.70		21.1	3.0	2.1	1.0	3.0
			29.4/21.7	5.2	3.7	5.9	0.68		26.7	3.0	1.9	1.1	2.8
	0.284	25.7054	23.9/17.2	4.7	3.5	5.3	0.67		15.6	3.2	2.3	0.9	3.4
			26.7/19.4	5.0	3.6	5.6	0.65		21.1	3.1	2.1	1.0	3.0
			29.4/21.7	5.4	3.7	6.0	0.63		26.7	3.1	2.0	1.1	2.8
15.6	0.126	5.6791	23.9/17.2	4.2	3.3	5.1	0.86	4.4	15.6	3.4	2.5	1.0	3.6
			26.7/19.4	4.5	3.4	5.4	0.86		21.1	3.3	2.3	1.0	3.2
			29.4/21.7	4.9	3.5	5.7	0.85		26.7	3.3	2.2	1.1	2.9
	0.189	11.956	23.9/17.2	4.4	3.3	5.1	0.81		15.6	3.5	2.6	1.0	3.6
			26.7/19.4	4.7	3.5	5.4	0.80		21.1	3.5	2.5	1.1	3.3
			29.4/21.7	5.0	3.6	5.7	0.78		26.7	3.4	2.3	1.1	3.0
	0.284	24.8087	23.9/17.2	4.5	3.4	5.2	0.77		15.6	3.7	2.8	1.0	3.8
			26.7/19.4	4.8	3.5	5.5	0.76		21.1	3.6	2.6	1.1	3.4
			29.4/21.7	5.1	3.6	5.8	0.74		26.7	3.5	2.3	1.1	3.1
21.1	0.126	5.6791	23.9/17.2	4.0	3.2	4.9	0.96	10.0	15.6	3.9	2.9	1.0	3.9
			26.7/19.4	4.3	3.3	5.2	0.96		21.1	3.9	2.7	1.1	3.6
			29.4/21.7	4.6	3.4	5.5	0.95		26.7	3.7	2.5	1.2	3.2
	0.189	11.6571	23.9/17.2	4.2	3.3	5.0	0.91		15.6	4.0	3.1	1.0	4.0
			26.7/19.4	4.5	3.4	5.3	0.90		21.1	3.9	2.9	1.1	3.7
			29.4/21.7	4.8	3.5	5.6	0.89		26.7	3.8	2.7	1.2	3.3
	0.284	24.8087	23.9/17.2	4.2	3.3	5.0	0.88		15.6	4.2	3.3	1.0	4.2
			26.7/19.4	4.5	3.4	5.3	0.86		21.1	4.1	3.0	1.1	3.8
			29.4/21.7	4.9	3.5	5.7	0.85		26.7	4.0	2.8	1.2	3.4
26.7	0.126	5.3802	23.9/17.2	3.8	3.1	4.8	1.06	15.6	15.6	4.3	3.4	1.0	4.3
			26.7/19.4	4.1	3.3	5.1	1.06		21.1	4.2	3.2	1.1	3.9
			29.4/21.7	4.4	3.3	5.4	1.06		26.7	4.1	3.0	1.2	3.5
	0.189	11.3582	23.9/17.2	3.9	3.1	4.9	1.01		15.6	4.6	3.6	1.0	4.6
			26.7/19.4	4.2	3.3	5.1	1.01		21.1	4.5	3.3	1.1	4.1
			29.4/21.7	4.5	3.4	5.4	1.00		26.7	4.3	3.2	1.2	3.6
	0.284	24.8087	23.9/17.2	4.0	3.2	4.9	0.98		15.6	4.8	3.7	1.0	4.7
			26.7/19.4	4.3	3.3	5.2	0.97		21.1	4.7	3.5	1.1	4.2
			29.4/21.7	4.6	3.4	5.5	0.96		26.7	4.5	3.3	1.2	3.7
29.4	0.126	5.3802	23.9/17.2	3.7	3.0	4.7	1.11	21.1	15.6	4.8	3.9	1.0	4.8
			26.7/19.4	4.0	3.2	5.0	1.11		21.1	4.8	3.6	1.1	4.4
			29.4/21.7	4.2	3.3	5.3	1.11		26.7	4.7	3.4	1.2	3.9
	0.189	11.0593	23.9/17.2	3.8	3.1	4.8	1.07		15.6	5.2	4.1	1.0	5.1
			26.7/19.4	4.1	3.3	5.1	1.06		21.1	5.1	3.8	1.1	4.6
			29.4/21.7	4.4	3.3	5.4	1.05		26.7	5.0	3.5	1.2	4.1
	0.284	24.8087	23.9/17.2	3.9	3.1	4.8	1.04		15.6	5.3	4.3	1.0	5.2
			26.7/19.4	4.2	3.3	5.1	1.03		21.1	5.2	4.0	1.1	4.7
			29.4/21.7	4.5	3.4	5.4	1.02		26.7	5.1	3.7	1.2	4.2
32.2	0.126	5.3802	23.9/17.2	3.6	3.0	4.7	1.16	26.7	15.6	5.4	4.4	1.0	5.3
			26.7/19.4	3.9	3.1	4.9	1.16		21.1	5.3	4.1	1.1	4.7
			29.4/21.7	4.1	3.3	5.2	1.16		26.7	5.3	3.8	1.2	4.3
	0.189	10.7604	23.9/17.2	3.7	3.0	4.7	1.12		15.6	5.7	4.7	1.0	5.6
			26.7/19.4	4.0	3.2	5.0	1.12		21.1	5.6	4.4	1.1	4.9
			29.4/21.7	4.2	3.3	5.3	1.11		26.7	5.5	4.1	1.2	4.5
	0.284	24.8087	23.9/17.2	3.8	3.1	4.7	1.09		15.6	6.0	4.8	1.0	5.8
			26.7/19.4	4.0	3.2	5.0	1.09		21.1	5.8	4.6	1.1	5.1
			29.4/21.7	4.3	3.3	5.3	1.08		26.7	5.7	4.2	1.3	4.6
37.8	0.126	5.0813	23.9/17.2	3.4	2.9	4.5	1.27	Operation Not Recommended					
			26.7/19.4	3.6	3.0	4.8	1.27						
			29.4/21.7	3.9	3.2	5.0	1.27						
	0.189	10.4615	23.9/17.2	3.5	2.9	4.6	1.23						
			26.7/19.4	3.7	3.1	4.8	1.23						
			29.4/21.7	4.0	3.2	5.1	1.23						
	0.284	24.8087	23.9/17.2	3.5	3.0	4.6	1.21						
			26.7/19.4	3.8	3.1	4.9	1.20						
			29.4/21.7	4.1	3.2	5.2	1.20						
43.3	0.126	5.0813	23.9/17.2	3.1	2.8	4.4	1.38						
			26.7/19.4	3.4	2.9	4.6	1.38						
			29.4/21.7	3.6	3.0	4.9	1.39						
	0.189	10.1626	23.9/17.2	3.2	2.8	4.4	1.34						
			26.7/19.4	3.5	3.0	4.7	1.34						
			29.4/21.7	3.7	3.1	5.0	1.34						
	0.284	24.8087	23.9/17.2	3.3	2.9	4.5	1.32						
			26.7/19.4	3.5	3.0	4.7	1.32						
			29.4/21.7	3.8	3.1	5.0	1.31						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

Performance data (cont)

50PC018 — 307 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.158	3.6	23.9/17.2	6.5	4.7	7.6	1.24	-1.1	15.6	3.6	2.6	1.1	3.2
			26.7/19.4	7.1	4.8	8.2	1.25		21.1	3.4	2.4	1.2	3.0
			29.4/21.7	7.6	5.0	8.7	1.26		26.7	3.2	2.2	1.2	2.7
	0.252	8.7	23.9/17.2	6.9	4.8	7.9	1.15		15.6	3.8	2.9	1.1	3.4
			26.7/19.4	7.4	5.0	8.5	1.15		21.1	3.6	2.6	1.2	3.1
			29.4/21.7	8.0	5.1	9.1	1.15		26.7	3.4	2.3	1.2	2.8
	0.315	12.9	23.9/17.2	7.0	4.8	8.0	1.12		15.6	3.9	3.0	1.2	3.4
			26.7/19.4	7.6	5.0	8.6	1.12		21.1	3.7	2.7	1.2	3.1
			29.4/21.7	8.2	5.2	9.2	1.11		26.7	3.5	2.4	1.2	2.8
15.6	0.158	3.6	23.9/17.2	6.2	4.5	7.4	1.33	4.4	15.6	4.3	3.3	1.2	3.6
			26.7/19.4	6.7	4.7	7.9	1.34		21.1	4.1	3.0	1.2	3.3
			29.4/21.7	7.2	4.8	8.4	1.36		26.7	3.9	2.8	1.3	3.0
	0.252	8.4	23.9/17.2	6.5	4.6	7.6	1.25		15.6	4.6	3.5	1.2	3.8
			26.7/19.4	7.0	4.8	8.2	1.26		21.1	4.4	3.3	1.3	3.5
			29.4/21.7	7.6	5.0	8.7	1.26		26.7	4.2	3.0	1.3	3.2
	0.315	12.3	23.9/17.2	6.6	4.7	7.7	1.22		15.6	4.7	3.7	1.2	3.8
			26.7/19.4	7.2	4.8	8.3	1.22		21.1	4.5	3.4	1.3	3.5
			29.4/21.7	7.7	5.0	8.9	1.22		26.7	4.2	3.1	1.3	3.2
21.1	0.158	3.3	23.9/17.2	5.8	4.3	7.0	1.42	10.0	15.6	5.2	3.9	1.3	4.1
			26.7/19.4	6.3	4.5	7.5	1.44		21.1	4.9	3.6	1.3	3.7
			29.4/21.7	6.8	4.6	8.1	1.46		26.7	4.6	3.4	1.4	3.4
	0.252	8.1	23.9/17.2	6.1	4.5	7.3	1.35		15.6	5.5	4.2	1.3	4.3
			26.7/19.4	6.6	4.6	7.8	1.36		21.1	5.3	3.9	1.4	3.9
			29.4/21.7	7.2	4.7	8.4	1.37		26.7	5.0	3.6	1.4	3.5
	0.315	12.0	23.9/17.2	6.2	4.5	7.4	1.32		15.6	5.6	4.5	1.3	4.3
			26.7/19.4	6.7	4.7	7.9	1.33		21.1	5.4	4.0	1.4	3.9
			29.4/21.7	7.3	4.8	8.5	1.33		26.7	5.1	3.7	1.4	3.6
26.7	0.158	3.3	23.9/17.2	5.4	4.1	6.7	1.50	15.6	15.6	5.9	4.7	1.3	4.5
			26.7/19.4	5.9	4.3	7.2	1.53		21.1	5.7	4.3	1.4	4.1
			29.4/21.7	6.3	4.5	7.7	1.55		26.7	5.4	4.1	1.5	3.7
	0.252	7.8	23.9/17.2	5.7	4.2	6.9	1.44		15.6	6.3	5.1	1.4	4.6
			26.7/19.4	6.2	4.4	7.5	1.46		21.1	6.1	4.7	1.5	4.2
			29.4/21.7	6.7	4.6	8.0	1.47		26.7	5.8	4.3	1.5	3.8
	0.315	11.7	23.9/17.2	5.8	4.3	7.0	1.42		15.6	6.5	5.3	1.4	4.7
			26.7/19.4	6.3	4.5	7.6	1.43		21.1	6.3	4.8	1.5	4.3
			29.4/21.7	6.9	4.6	8.1	1.44		26.7	6.0	4.4	1.5	3.9
29.4	0.158	3.3	23.9/17.2	5.2	4.0	6.5	1.54	21.1	15.6	6.8	5.4	1.4	4.8
			26.7/19.4	5.7	4.2	7.0	1.57		21.1	6.4	5.1	1.5	4.3
			29.4/21.7	6.1	4.4	7.5	1.60		26.7	6.2	4.8	1.6	3.9
	0.252	7.8	23.9/17.2	5.5	4.2	6.8	1.49		15.6	7.3	5.9	1.4	5.1
			26.7/19.4	5.9	4.4	7.3	1.51		21.1	7.0	5.4	1.5	4.6
			29.4/21.7	6.4	4.5	7.8	1.53		26.7	6.7	5.0	1.6	4.1
	0.315	11.4	23.9/17.2	5.6	4.2	6.9	1.47		15.6	7.4	6.2	1.5	5.1
			26.7/19.4	6.1	4.4	7.4	1.49		21.1	7.2	5.6	1.5	4.6
			29.4/21.7	6.6	4.5	7.9	1.50		26.7	6.9	5.2	1.6	4.2
32.2	0.158	3.3	23.9/17.2	5.0	4.0	6.4	1.58	26.7	15.6	7.6	6.2	1.5	5.2
			26.7/19.4	5.4	4.2	6.8	1.62		21.1	7.3	5.9	1.6	4.7
			29.4/21.7	5.9	4.3	7.3	1.65		26.7	7.0	5.5	1.7	4.2
	0.252	7.5	23.9/17.2	5.3	4.0	6.6	1.53		15.6	8.2	6.7	1.5	5.5
			26.7/19.4	5.7	4.3	7.1	1.56		21.1	7.9	6.3	1.6	4.9
			29.4/21.7	6.2	4.4	7.6	1.58		26.7	7.5	5.9	1.7	4.4
	0.315	11.4	23.9/17.2	5.4	4.1	6.7	1.51		15.6	8.4	7.0	1.5	5.5
			26.7/19.4	5.8	4.3	7.2	1.53		21.1	8.1	6.4	1.6	5.0
			29.4/21.7	6.3	4.5	7.7	1.55		26.7	7.6	6.1	1.7	4.4
37.8	0.158	3.0	23.9/17.2	4.6	3.8	5.9	1.65	Operation Not Recommended					
			26.7/19.4	5.0	4.0	6.4	1.70						
			29.4/21.7	5.4	4.1	6.9	1.74						
	0.252	7.2	23.9/17.2	4.8	3.9	6.2	1.61						
			26.7/19.4	5.3	4.1	6.7	1.65						
			29.4/21.7	5.7	4.2	7.2	1.68						
	0.315	10.8	23.9/17.2	4.9	4.0	6.3	1.60						
			26.7/19.4	5.4	4.1	6.8	1.63						
			29.4/21.7	5.9	4.3	7.3	1.66						
43.3	0.158	3.0	23.9/17.2	4.1	3.6	5.5	1.72						
			26.7/19.4	4.5	3.8	6.0	1.77						
			29.4/21.7	4.9	4.0	6.4	1.81						
	0.252	7.2	23.9/17.2	4.4	3.7	5.7	1.69						
			26.7/19.4	4.8	3.9	6.2	1.73						
			29.4/21.7	5.2	4.1	6.7	1.77						
	0.315	10.5	23.9/17.2	4.4	3.8	5.8	1.68						
			26.7/19.4	4.9	3.9	6.3	1.72						
			29.4/21.7	5.3	4.1	6.8	1.75						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

50PC024 — 401 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10	0.189	5.4	23.9/17.2	7.5	5.4	8.8	1.44	-1.1	15.6	4.5	3.3	1.4	3.3
			26.7/19.4	8.1	5.6	9.4	1.45		21.1	4.3	3.0	1.4	3.0
			29.4/21.7	8.6	5.8	10.0	1.45		26.7	4.1	2.7	1.5	2.7
	0.315	13.5	23.9/17.2	7.9	5.6	9.1	1.33		15.6	4.8	3.5	1.4	3.4
			26.7/19.4	8.5	5.8	9.7	1.33		21.1	4.5	3.3	1.5	3.1
			29.4/21.7	9.1	6.0	10.3	1.31		26.7	4.3	2.9	1.5	2.8
	0.441	24.5	23.9/17.2	8.1	5.7	9.2	1.28		15.6	4.9	3.7	1.4	3.4
			26.7/19.4	8.7	5.9	9.8	1.27		21.1	4.7	3.4	1.5	3.1
			29.4/21.7	9.3	6.1	10.5	1.25		26.7	4.4	3.0	1.6	2.9
15.6	0.189	5.1	23.9/17.2	7.1	5.3	8.5	1.55	4.4	15.6	5.3	3.9	1.5	3.6
			26.7/19.4	7.6	5.4	9.1	1.56		21.1	5.0	3.7	1.6	3.3
			29.4/21.7	8.2	5.6	9.6	1.58		26.7	4.8	3.4	1.6	3.0
	0.315	12.9	23.9/17.2	7.5	5.4	8.8	1.45		15.6	5.7	4.3	1.5	3.7
			26.7/19.4	8.1	5.6	9.4	1.45		21.1	5.4	4.0	1.6	3.4
			29.4/21.7	8.7	5.8	10.0	1.45		26.7	5.1	3.7	1.7	3.1
	0.441	23.6	23.9/17.2	7.6	5.5	8.9	1.40		15.6	5.9	4.5	1.6	3.8
			26.7/19.4	8.2	5.7	9.5	1.40		21.1	5.6	4.1	1.6	3.4
			29.4/21.7	8.9	5.9	10.1	1.38		26.7	5.3	3.8	1.7	3.2
21.1	0.189	5.1	23.9/17.2	6.7	5.1	8.2	1.66	10.0	15.6	6.1	4.7	1.6	3.9
			26.7/19.4	7.2	5.3	8.7	1.68		21.1	5.9	4.4	1.7	3.5
			29.4/21.7	7.8	5.4	9.3	1.70		26.7	5.7	4.0	1.7	3.3
	0.315	12.6	23.9/17.2	7.1	5.2	8.4	1.57		15.6	6.6	5.1	1.6	4.0
			26.7/19.4	7.6	5.4	9.0	1.58		21.1	6.3	4.7	1.7	3.7
			29.4/21.7	8.2	5.6	9.6	1.58		26.7	6.2	4.3	1.8	3.4
	0.441	23.0	23.9/17.2	7.2	5.3	8.6	1.53		15.6	6.8	5.3	1.7	4.1
			26.7/19.4	7.8	5.5	9.2	1.53		21.1	6.5	4.9	1.7	3.7
			29.4/21.7	8.4	5.7	9.8	1.53		26.7	6.3	4.5	1.8	3.5
26.7	0.189	4.8	23.9/17.2	6.3	4.9	7.8	1.77	15.6	15.6	7.0	5.5	1.7	4.2
			26.7/19.4	6.8	5.1	8.4	1.80		21.1	6.8	5.2	1.8	3.8
			29.4/21.7	7.3	5.2	8.9	1.83		26.7	6.6	4.7	1.9	3.6
	0.315	12.0	23.9/17.2	6.6	5.0	8.1	1.69		15.6	7.6	6.0	1.7	4.4
			26.7/19.4	7.1	5.2	8.6	1.71		21.1	7.3	5.6	1.8	4.0
			29.4/21.7	7.7	5.4	9.2	1.72		26.7	7.1	5.1	1.9	3.7
	0.441	22.1	23.9/17.2	6.7	5.1	8.2	1.65		15.6	7.9	6.2	1.8	4.5
			26.7/19.4	7.3	5.3	8.8	1.66		21.1	7.5	5.8	1.9	4.1
			29.4/21.7	7.9	5.5	9.4	1.67		26.7	7.2	5.4	2.0	3.7
29.4	0.189	4.8	23.9/17.2	6.1	4.8	7.6	1.83	21.1	15.6	7.9	6.3	1.8	4.5
			26.7/19.4	6.6	5.0	8.2	1.86		21.1	7.7	6.0	1.9	4.1
			29.4/21.7	7.1	5.2	8.7	1.89		26.7	7.4	5.6	2.0	3.7
	0.315	12.0	23.9/17.2	6.4	4.9	7.9	1.75		15.6	8.6	6.9	1.8	4.7
			26.7/19.4	6.9	5.1	8.5	1.77		21.1	8.3	6.5	2.0	4.3
			29.4/21.7	7.4	5.3	9.0	1.79		26.7	7.9	6.0	2.0	3.9
	0.441	21.8	23.9/17.2	6.5	5.0	8.0	1.71		15.6	8.9	7.2	1.8	4.8
			26.7/19.4	7.1	5.2	8.6	1.73		21.1	8.6	6.7	2.0	4.4
			29.4/21.7	7.6	5.4	9.2	1.74		26.7	8.2	6.2	2.1	3.9
32.2	0.189	4.8	23.9/17.2	5.9	4.7	7.5	1.88	26.7	15.6	8.9	7.2	1.8	4.8
			26.7/19.4	6.3	4.9	8.0	1.92		21.1	8.6	6.8	2.0	4.4
			29.4/21.7	6.8	5.0	8.5	1.95		26.7	8.3	6.4	2.1	4.0
	0.315	11.7	23.9/17.2	6.2	4.8	7.7	1.81		15.6	9.6	7.9	1.9	5.1
			26.7/19.4	6.7	5.0	8.3	1.84		21.1	9.3	7.4	2.0	4.6
			29.4/21.7	7.2	5.2	8.8	1.86		26.7	8.9	6.9	2.2	4.1
	0.441	21.5	23.9/17.2	6.3	4.9	7.8	1.78		15.6	10.0	8.2	1.9	5.2
			26.7/19.4	6.8	5.1	8.4	1.80		21.1	9.6	7.7	2.1	4.7
			29.4/21.7	7.4	5.2	9.0	1.81		26.7	9.2	7.1	2.2	4.2
37.8	0.189	4.5	23.9/17.2	5.4	4.5	7.1	1.98	Operation Not Recommended					
			26.7/19.4	5.8	4.7	7.6	2.03						
			29.4/21.7	6.3	4.9	8.1	2.07						
	0.315	11.4	23.9/17.2	5.7	4.6	7.3	1.92						
			26.7/19.4	6.1	4.8	7.8	1.96						
			29.4/21.7	6.6	5.0	8.4	1.99						
	0.441	20.9	23.9/17.2	5.8	4.7	7.4	1.89						
			26.7/19.4	6.3	4.9	7.9	1.93						
			29.4/21.7	6.8	5.1	8.5	1.95						
43.3	0.189	4.5	23.9/17.2	4.9	4.3	6.6	2.08						
			26.7/19.4	5.3	4.5	7.1	2.13						
			29.4/21.7	5.7	4.7	7.6	2.19						
	0.315	11.1	23.9/17.2	5.1	4.4	6.9	2.03						
			26.7/19.4	5.6	4.6	7.4	2.08						
			29.4/21.7	6.1	4.8	7.9	2.12						
	0.441	20.3	23.9/17.2	5.2	4.4	6.9	2.01						
			26.7/19.4	5.7	4.6	7.5	2.05						
			29.4/21.7	6.2	4.9	8.0	2.09						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

Performance data (cont)

50PC030 — 445 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.221	5.1	23.9/17.2	10.0	7.4	11.5	1.65	-1.1	15.6	5.4	4.1	1.5	3.7
			26.7/19.4	10.8	7.6	12.3	1.66		21.1	5.1	3.8	1.5	3.4
			29.4/21.7	11.5	7.9	13.1	1.66		26.7	4.9	3.4	1.6	3.1
	0.378	13.5	23.9/17.2	10.6	7.6	12.0	1.50		15.6	5.8	4.5	1.5	3.8
			26.7/19.4	11.4	7.9	12.7	1.48		21.1	5.5	4.1	1.6	3.5
			29.4/21.7	12.2	8.1	13.6	1.46		26.7	5.2	3.7	1.6	3.2
	0.567	27.8	23.9/17.2	10.8	7.8	12.2	1.42		15.6	6.1	4.7	1.5	3.9
			26.7/19.4	11.7	8.0	13.0	1.40		21.1	5.7	4.3	1.6	3.6
			29.4/21.7	12.5	8.3	13.8	1.36		26.7	5.4	3.9	1.7	3.2
15.6	0.221	4.8	23.9/17.2	9.5	7.2	11.1	1.80	4.4	15.6	6.4	5.0	1.6	4.0
			26.7/19.4	10.2	7.4	11.9	1.81		21.1	6.1	4.6	1.7	3.7
			29.4/21.7	10.9	7.6	12.6	1.82		26.7	5.8	4.2	1.7	3.3
	0.378	12.9	23.9/17.2	10.0	7.4	11.5	1.66		15.6	6.9	5.4	1.6	4.2
			26.7/19.4	10.8	7.7	12.3	1.65		21.1	6.6	5.0	1.7	3.8
			29.4/21.7	11.6	7.9	13.1	1.64		26.7	6.2	4.6	1.8	3.5
	0.567	26.6	23.9/17.2	10.3	7.5	11.7	1.59		15.6	7.2	5.7	1.7	4.3
			26.7/19.4	11.1	7.8	12.5	1.57		21.1	6.9	5.3	1.8	3.9
			29.4/21.7	11.9	8.0	13.4	1.54		26.7	6.5	4.8	1.9	3.5
21.1	0.221	4.8	23.9/17.2	9.0	6.9	10.7	1.94	10.0	15.6	7.4	5.9	1.7	4.4
			26.7/19.4	9.7	7.1	11.4	1.97		21.1	7.2	5.5	1.8	4.0
			29.4/21.7	10.3	7.4	12.1	1.99		26.7	6.8	5.1	1.9	3.6
	0.378	12.6	23.9/17.2	9.4	7.1	11.1	1.82		15.6	8.1	6.5	1.8	4.6
			26.7/19.4	10.2	7.4	11.8	1.82		21.1	7.8	6.1	1.9	4.2
			29.4/21.7	11.0	7.6	12.6	1.82		26.7	7.4	5.6	2.0	3.8
	0.567	25.7	23.9/17.2	9.7	7.2	11.3	1.75		15.6	8.5	6.9	1.8	4.7
			26.7/19.4	10.5	7.5	12.0	1.75		21.1	8.1	6.4	1.9	4.3
			29.4/21.7	11.3	7.8	12.9	1.73		26.7	7.8	5.9	2.0	3.9
26.7	0.221	4.5	23.9/17.2	8.4	6.7	10.3	2.09	15.6	15.6	8.7	6.9	1.8	4.8
			26.7/19.4	9.1	6.9	11.0	2.12		21.1	8.3	6.5	1.9	4.3
			29.4/21.7	9.7	7.1	11.7	2.15		26.7	8.0	6.1	2.0	3.9
	0.378	12.0	23.9/17.2	8.8	6.8	10.6	1.98		15.6	9.4	7.7	1.9	5.0
			26.7/19.4	9.6	7.1	11.4	1.99		21.1	9.0	7.2	2.0	4.5
			29.4/21.7	10.3	7.4	12.1	2.00		26.7	8.7	6.7	2.1	4.1
	0.567	25.1	23.9/17.2	9.1	6.9	10.8	1.92		15.6	9.8	8.1	1.9	5.2
			26.7/19.4	9.8	7.3	11.5	1.93		21.1	9.5	7.6	2.0	4.7
			29.4/21.7	10.5	7.5	12.3	1.93		26.7	9.0	7.0	2.2	4.2
29.4	0.221	4.5	23.9/17.2	8.1	6.6	10.0	2.15	21.1	15.6	9.9	8.0	1.9	5.2
			26.7/19.4	8.7	6.8	10.7	2.20		21.1	9.4	7.6	2.0	4.7
			29.4/21.7	9.4	7.1	11.4	2.23		26.7	9.1	7.1	2.2	4.2
	0.378	12.0	23.9/17.2	8.6	6.7	10.4	2.05		15.6	10.7	8.9	2.0	5.5
			26.7/19.4	9.2	7.0	11.1	2.08		21.1	10.3	8.4	2.1	4.9
			29.4/21.7	9.9	7.3	11.8	2.09		26.7	9.9	7.8	2.2	4.4
	0.567	24.5	23.9/17.2	8.7	6.9	10.5	2.00		15.6	11.2	9.4	2.0	5.6
			26.7/19.4	9.5	7.1	11.3	2.02		21.1	10.8	8.8	2.1	5.0
			29.4/21.7	10.2	7.4	12.0	2.02		26.7	10.3	8.2	2.3	4.5
32.2	0.221	4.5	23.9/17.2	7.8	6.4	9.8	2.22	26.7	15.6	11.1	9.1	2.0	5.6
			26.7/19.4	8.4	6.7	10.4	2.27		21.1	10.6	8.7	2.1	5.0
			29.4/21.7	9.1	6.9	11.1	2.31		26.7	10.3	8.1	2.3	4.5
	0.378	11.7	23.9/17.2	8.2	6.6	10.1	2.13		15.6	12.0	10.2	2.0	5.9
			26.7/19.4	8.9	6.9	10.8	2.16		21.1	11.6	9.6	2.2	5.3
			29.4/21.7	9.6	7.1	11.5	2.18		26.7	11.1	8.9	2.4	4.7
	0.567	24.2	23.9/17.2	8.4	6.7	10.2	2.08		15.6	12.6	10.8	2.1	6.1
			26.7/19.4	9.1	7.0	11.0	2.11		21.1	12.1	10.0	2.2	5.4
			29.4/21.7	9.8	7.2	11.7	2.12		26.7	11.6	9.4	2.4	4.8
37.8	0.221	4.2	23.9/17.2	7.2	6.2	9.3	2.36	Operation Not Recommended					
			26.7/19.4	7.8	6.4	9.9	2.42						
			29.4/21.7	8.4	6.7	10.5	2.47						
	0.378	11.4	23.9/17.2	7.6	6.3	9.6	2.28						
			26.7/19.4	8.2	6.6	10.2	2.32						
			29.4/21.7	8.8	6.9	11.0	2.36						
	0.567	23.6	23.9/17.2	7.7	6.4	9.7	2.24						
			26.7/19.4	8.4	6.7	10.4	2.28						
			29.4/21.7	9.1	7.0	11.1	2.30						
43.3	0.221	4.2	23.9/17.2	6.6	5.8	8.8	2.48						
			26.7/19.4	7.1	6.2	9.3	2.55						
			29.4/21.7	7.6	6.4	10.0	2.62						
	0.378	11.1	23.9/17.2	6.9	6.0	9.0	2.42						
			26.7/19.4	7.5	6.3	9.7	2.48						
			29.4/21.7	8.1	6.6	10.3	2.53						
	0.567	22.7	23.9/17.2	7.0	6.0	9.1	2.39						
			26.7/19.4	7.6	6.4	9.8	2.44						
			29.4/21.7	8.3	6.6	10.5	2.49						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

50PC036 — 566 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.252	3.9	23.9/17.2	12.0	8.8	14.0	2.16	-1.1	15.6	6.9	5.0	2.0	3.5
			26.7/19.4	12.8	9.1	14.9	2.17		21.1	6.6	4.6	2.1	3.2
			29.4/21.7	13.7	9.3	15.7	2.18		26.7	6.1	4.0	2.2	2.9
	0.473	12.6	23.9/17.2	12.7	9.1	14.6	1.96		15.6	7.4	5.5	2.1	3.6
			26.7/19.4	13.7	9.4	15.5	1.95		21.1	7.0	5.1	2.2	3.2
			29.4/21.7	14.7	9.6	16.5	1.93		26.7	6.7	4.6	2.3	3.0
	0.693	24.8	23.9/17.2	13.0	9.2	14.8	1.88		15.6	7.8	5.7	2.1	3.7
			26.7/19.4	14.0	9.5	15.8	1.86		21.1	7.3	5.3	2.2	3.3
			29.4/21.7	15.0	9.8	16.8	1.83		26.7	6.9	4.8	2.3	3.0
15.6	0.252	3.9	23.9/17.2	11.3	8.5	13.5	2.33	4.4	15.6	8.0	6.0	2.2	3.7
			26.7/19.4	12.2	8.8	14.4	2.35		21.1	7.7	5.5	2.3	3.4
			29.4/21.7	13.0	9.0	15.2	2.37		26.7	7.5	4.9	2.4	3.2
	0.473	12.0	23.9/17.2	12.1	8.8	14.0	2.14		15.6	8.8	6.7	2.2	3.9
			26.7/19.4	13.0	9.1	15.0	2.13		21.1	8.4	6.2	2.4	3.6
			29.4/21.7	13.9	9.4	15.9	2.12		26.7	8.0	5.6	2.5	3.3
	0.693	23.9	23.9/17.2	12.3	8.9	14.3	2.06		15.6	9.1	6.9	2.3	4.0
			26.7/19.4	13.3	9.2	15.2	2.05		21.1	8.7	6.4	2.4	3.6
			29.4/21.7	14.3	9.5	16.2	2.02		26.7	8.3	5.9	2.5	3.3
21.1	0.252	3.9	23.9/17.2	10.7	8.2	13.0	2.51	10.0	15.6	9.3	7.1	2.3	4.1
			26.7/19.4	11.5	8.5	13.8	2.54		21.1	9.0	6.6	2.4	3.7
			29.4/21.7	12.3	8.7	14.7	2.56		26.7	8.6	6.2	2.5	3.4
	0.473	11.7	23.9/17.2	11.4	8.5	13.5	2.33		15.6	10.3	8.0	2.4	4.3
			26.7/19.4	12.3	8.8	14.4	2.33		21.1	9.9	7.4	2.5	3.9
			29.4/21.7	13.2	9.1	15.4	2.32		26.7	9.4	6.7	2.6	3.6
	0.693	23.3	23.9/17.2	11.7	8.6	13.7	2.25		15.6	10.8	8.3	2.4	4.5
			26.7/19.4	12.6	8.9	14.7	2.25		21.1	10.4	7.6	2.6	4.1
			29.4/21.7	13.5	9.2	15.6	2.23		26.7	9.7	7.3	2.7	3.6
26.7	0.252	3.6	23.9/17.2	10.0	7.9	12.5	2.69	15.6	15.6	10.7	8.3	2.4	4.4
			26.7/19.4	10.8	8.2	13.3	2.73		21.1	10.4	7.8	2.6	4.0
			29.4/21.7	11.5	8.5	14.1	2.76		26.7	9.9	7.3	2.7	3.7
	0.473	11.4	23.9/17.2	10.7	8.2	13.0	2.52		15.6	11.8	9.4	2.5	4.7
			26.7/19.4	11.5	8.5	13.9	2.53		21.1	11.0	8.5	2.7	4.1
			29.4/21.7	12.4	8.8	14.7	2.54		26.7	10.8	8.2	2.8	3.8
	0.693	22.4	23.9/17.2	10.9	8.3	13.2	2.45		15.6	12.3	9.9	2.6	4.8
			26.7/19.4	11.8	8.6	14.1	2.46		21.1	11.9	9.1	2.7	4.4
			29.4/21.7	12.7	8.9	15.0	2.45		26.7	11.2	8.6	2.9	3.9
29.4	0.252	3.6	23.9/17.2	9.7	7.8	12.2	2.77	21.1	15.6	12.1	9.6	2.5	4.8
			26.7/19.4	10.4	8.1	13.0	2.82		21.1	11.7	9.1	2.7	4.3
			29.4/21.7	11.2	8.3	13.8	2.86		26.7	11.3	8.5	2.9	3.9
	0.473	11.1	23.9/17.2	10.3	8.1	12.7	2.61		15.6	13.5	10.8	2.6	5.1
			26.7/19.4	11.1	8.3	13.6	2.64		21.1	13.0	10.1	2.8	4.6
			29.4/21.7	12.0	8.6	14.4	2.65		26.7	12.6	9.4	3.0	4.2
	0.693	22.1	23.9/17.2	10.5	8.1	12.9	2.55		15.6	14.1	11.3	2.7	5.3
			26.7/19.4	11.4	8.4	13.8	2.56		21.1	13.7	10.5	2.9	4.8
			29.4/21.7	12.3	8.8	14.7	2.56		26.7	13.1	9.7	3.0	4.3
32.2	0.252	3.6	23.9/17.2	9.3	7.6	11.9	2.86	26.7	15.6	13.6	10.9	2.6	5.1
			26.7/19.4	10.0	8.0	12.7	2.91		21.1	13.1	10.3	2.8	4.6
			29.4/21.7	10.8	8.3	13.5	2.95		26.7	12.7	9.7	3.0	4.2
	0.473	10.8	23.9/17.2	10.0	7.9	12.4	2.71		15.6	15.1	12.3	2.7	5.5
			26.7/19.4	10.7	8.2	13.2	2.74		21.1	14.4	11.6	2.9	4.9
			29.4/21.7	11.6	8.5	14.1	2.76		26.7	13.8	10.8	3.1	4.4
	0.693	21.8	23.9/17.2	10.2	8.0	12.6	2.65		15.6	15.8	13.0	2.8	5.7
			26.7/19.4	11.0	8.3	13.4	2.67		21.1	15.3	12.0	3.0	5.2
			29.4/21.7	11.9	8.6	14.3	2.68		26.7	14.4	11.4	3.2	4.5
37.8	0.252	3.3	23.9/17.2	8.6	7.3	11.3	3.03	Operation Not Recommended					
			26.7/19.4	9.3	7.7	12.1	3.09						
			29.4/21.7	10.0	8.0	12.9	3.15						
	0.473	10.5	23.9/17.2	9.2	7.6	11.8	2.90						
			26.7/19.4	10.0	7.9	12.6	2.94						
			29.4/21.7	10.7	8.2	13.4	2.97						
	0.693	21.2	23.9/17.2	9.4	7.6	12.0	2.85						
			26.7/19.4	10.2	8.0	12.8	2.88						
			29.4/21.7	11.0	8.3	13.7	2.90						
43.3	0.252	3.3	23.9/17.2	7.9	7.1	10.8	3.18						
			26.7/19.4	8.5	7.4	11.5	3.26						
			29.4/21.7	9.2	7.6	12.2	3.34						
	0.473	10.2	23.9/17.2	8.4	7.2	11.2	3.08						
			26.7/19.4	9.1	7.6	12.0	3.14						
			29.4/21.7	9.8	7.9	12.7	3.18						
	0.693	20.6	23.9/17.2	8.6	7.3	11.3	3.04						
			26.7/19.4	9.3	7.6	12.1	3.09						
			29.4/21.7	10.1	8.0	12.9	3.12						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

Performance data (cont)

50PC042 — 708 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.315	6.3	23.9/17.2	13.2	9.7	15.8	2.72	-1.1	15.6	8.1	5.6	2.6	3.1
			26.7/19.4	14.2	10.0	16.8	2.73		21.1	7.7	5.2	2.7	2.8
			29.4/21.7	15.2	10.3	17.8	2.73		26.7	7.4	4.7	2.8	2.6
	0.630	22.1	23.9/17.2	14.1	10.0	16.5	2.49		15.6	8.7	6.2	2.7	3.2
			26.7/19.4	15.1	10.4	17.6	2.48		21.1	8.3	5.7	2.8	3.0
			29.4/21.7	16.3	10.6	18.7	2.45		26.7	7.9	5.1	2.9	2.7
	0.819	35.3	23.9/17.2	14.3	10.1	16.6	2.44		15.6	8.9	6.4	2.7	3.3
			26.7/19.4	15.4	10.5	17.8	2.41		21.1	8.5	5.8	2.8	3.0
			29.4/21.7	16.6	10.7	18.9	2.38		26.7	8.1	5.2	2.9	2.8
15.6	0.315	6.0	23.9/17.2	12.6	9.4	15.2	2.91	4.4	15.6	9.3	6.7	2.8	3.4
			26.7/19.4	13.5	9.7	16.2	2.93		21.1	9.0	6.3	2.9	3.1
			29.4/21.7	14.5	10.0	17.2	2.94		26.7	8.6	5.8	3.0	2.9
	0.630	21.2	23.9/17.2	13.4	9.7	15.9	2.69		15.6	10.2	7.5	2.9	3.6
			26.7/19.4	14.4	10.0	16.9	2.68		21.1	9.9	6.9	3.0	3.3
			29.4/21.7	15.5	10.3	18.0	2.67		26.7	9.4	6.4	3.1	3.0
	0.819	34.1	23.9/17.2	13.5	9.8	16.0	2.64		15.6	10.5	7.7	2.9	3.6
			26.7/19.4	14.6	10.1	17.1	2.62		21.1	10.1	7.0	3.0	3.4
			29.4/21.7	15.7	10.4	18.3	2.60		26.7	9.6	6.5	3.2	3.0
21.1	0.315	6.0	23.9/17.2	11.8	9.1	14.6	3.10	10	15.6	10.8	8.0	2.9	3.7
			26.7/19.4	12.7	9.3	15.6	3.13		21.1	10.4	7.5	3.1	3.4
			29.4/21.7	13.7	9.6	16.6	3.16		26.7	10.0	6.9	3.2	3.1
	0.630	20.6	23.9/17.2	12.6	9.3	15.2	2.90		15.6	11.8	9.0	3.0	3.9
			26.7/19.4	13.6	9.7	16.3	2.90		21.1	11.5	8.3	3.2	3.6
			29.4/21.7	14.7	10.0	17.3	2.90		26.7	10.9	7.6	3.3	3.3
	0.819	33.2	23.9/17.2	12.8	9.4	15.4	2.85		15.6	12.2	9.1	3.0	4.0
			26.7/19.4	13.8	9.8	16.4	2.85		21.1	11.8	8.5	3.2	3.7
			29.4/21.7	14.9	10.1	17.6	2.83		26.7	11.1	7.8	3.4	3.3
26.7	0.315	5.7	23.9/17.2	11.1	8.7	14.0	3.30	15.6	15.6	12.2	9.4	3.1	4.0
			26.7/19.4	12.0	9.0	14.9	3.35		21.1	11.9	8.8	3.2	3.7
			29.4/21.7	12.8	9.4	15.9	3.38		26.7	11.6	8.2	3.4	3.4
	0.630	20.0	23.9/17.2	11.8	9.0	14.6	3.12		15.6	13.5	10.6	3.2	4.3
			26.7/19.4	12.8	9.3	15.6	3.13		21.1	13.2	9.7	3.3	4.0
			29.4/21.7	13.8	9.7	16.6	3.14		26.7	12.7	9.1	3.5	3.6
	0.819	32.0	23.9/17.2	12.0	9.1	14.7	3.07		15.6	14.0	10.7	3.2	4.4
			26.7/19.4	13.0	9.4	15.8	3.08		21.1	13.5	10.0	3.4	4.0
			29.4/21.7	14.0	9.8	16.8	3.07		26.7	13.2	9.0	3.5	3.7
29.4	0.315	5.7	23.9/17.2	10.7	8.5	13.7	3.40	21.1	15.6	13.8	10.8	3.2	4.4
			26.7/19.4	11.5	8.9	14.6	3.45		21.1	13.4	10.2	3.4	4.0
			29.4/21.7	12.4	9.2	15.5	3.49		26.7	13.2	9.5	3.6	3.7
	0.630	19.7	23.9/17.2	11.4	8.8	14.2	3.23		15.6	15.4	12.0	3.3	4.7
			26.7/19.4	12.3	9.2	15.2	3.25		21.1	14.9	11.3	3.5	4.3
			29.4/21.7	13.3	9.6	16.2	3.26		26.7	14.3	10.5	3.7	3.9
	0.819	31.4	23.9/17.2	11.6	8.9	14.4	3.18		15.6	15.8	12.4	3.3	4.8
			26.7/19.4	12.5	9.3	15.4	3.20		21.1	15.2	11.6	3.5	4.4
			29.4/21.7	13.5	9.6	16.4	3.20		26.7	15.0	10.4	3.7	4.0
32.2	0.315	5.7	23.9/17.2	10.3	8.4	13.3	3.50	26.7	15.6	15.4	12.3	3.3	4.7
			26.7/19.4	11.1	8.8	14.2	3.55		21.1	14.9	11.7	3.5	4.3
			29.4/21.7	12.0	9.0	15.2	3.60		26.7	14.4	10.9	3.7	3.9
	0.630	19.4	23.9/17.2	11.0	8.6	13.9	3.34		15.6	17.1	13.7	3.3	5.2
			26.7/19.4	11.9	9.0	14.9	3.36		21.1	16.6	12.9	3.6	4.6
			29.4/21.7	12.8	9.3	15.9	3.38		26.7	16.0	12.0	3.8	4.2
	0.819	31.1	23.9/17.2	11.1	8.7	14.0	3.30		15.6	17.4	14.3	3.3	5.2
			26.7/19.4	12.1	9.1	15.0	3.32		21.1	17.0	13.2	3.6	4.7
			29.4/21.7	13.0	9.4	16.1	3.33		26.7	16.7	11.9	3.8	4.4
37.8	0.315	5.4	23.9/17.2	9.5	8.1	12.6	3.69	Operation Not Recommended					
			26.7/19.4	10.3	8.4	13.5	3.76						
			29.4/21.7	11.1	8.7	14.4	3.82						
	0.630	18.8	23.9/17.2	10.1	8.3	13.2	3.55						
			26.7/19.4	11.0	8.7	14.1	3.59						
			29.4/21.7	11.9	9.0	15.1	3.63						
	0.819	30.2	23.9/17.2	10.3	8.4	13.3	3.51						
			26.7/19.4	11.1	8.8	14.2	3.55						
			29.4/21.7	12.1	9.1	15.2	3.58						
43.3	0.315	5.4	23.9/17.2	8.7	7.7	11.9	3.88						
			26.7/19.4	9.4	8.0	12.8	3.96						
			29.4/21.7	10.2	8.4	13.7	4.03						
	0.630	18.2	23.9/17.2	9.2	8.0	12.4	3.76						
			26.7/19.4	10.0	8.4	13.3	3.82						
			29.4/21.7	10.9	8.7	14.2	3.86						
	0.819	29.3	23.9/17.2	9.4	8.0	12.5	3.73						
			26.7/19.4	10.2	8.4	13.4	3.78						
			29.4/21.7	11.1	8.7	14.4	3.82						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

50PC048 — 755 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.378	2.7	23.9/17.2	15.5	11.1	18.3	2.95	-1.1	15.6	10.0	7.4	2.7	3.7
			26.7/19.4	16.5	11.5	19.3	2.97		21.1	9.4	6.6	2.8	3.4
			29.4/21.7	17.6	11.7	20.5	2.99		26.7	8.7	5.7	2.9	3.0
	0.756	9.0	23.9/17.2	16.6	11.6	19.1	2.63		15.6	10.8	8.1	2.8	3.8
			26.7/19.4	17.7	11.9	20.2	2.61		21.1	10.1	7.3	2.9	3.4
			29.4/21.7	18.8	12.2	21.4	2.58		26.7	9.4	6.4	3.0	3.1
	1.008	15.2	23.9/17.2	16.8	11.7	19.3	2.54		15.6	11.0	8.3	2.9	3.9
			26.7/19.4	18.0	12.0	20.5	2.51		21.1	10.3	7.5	3.0	3.5
			29.4/21.7	19.2	12.3	21.6	2.46		26.7	9.6	6.6	3.1	3.1
15.6	0.378	2.4	23.9/17.2	14.6	10.8	17.7	3.19	4.4	15.6	11.3	8.5	2.9	3.9
			26.7/19.4	15.6	11.1	18.7	3.23		21.1	10.7	7.8	3.0	3.5
			29.4/21.7	16.7	11.4	19.8	3.26		26.7	10.1	6.9	3.1	3.2
	0.756	8.7	23.9/17.2	15.6	11.2	18.4	2.91		15.6	12.2	9.3	3.0	4.1
			26.7/19.4	16.7	11.5	19.5	2.90		21.1	11.6	8.6	3.2	3.7
			29.4/21.7	17.9	11.8	20.7	2.89		26.7	10.9	7.8	3.3	3.3
	1.008	14.6	23.9/17.2	15.9	11.3	18.6	2.83		15.6	12.6	9.6	3.1	4.1
			26.7/19.4	17.0	11.6	19.7	2.81		21.1	11.9	8.8	3.2	3.7
			29.4/21.7	18.2	12.0	20.9	2.79		26.7	11.2	8.0	3.3	3.4
21.1	0.378	2.4	23.9/17.2	13.7	10.4	17.0	3.43	10.0	15.6	12.7	9.8	3.1	4.1
			26.7/19.4	14.7	10.7	18.0	3.48		21.1	12.2	9.0	3.2	3.8
			29.4/21.7	15.8	11.0	19.1	3.52		26.7	11.5	8.3	3.4	3.4
	0.756	8.4	23.9/17.2	14.7	10.8	17.7	3.18		15.6	13.9	10.7	3.2	4.3
			26.7/19.4	15.8	11.1	18.8	3.19		21.1	13.3	9.9	3.4	3.9
			29.4/21.7	16.9	11.5	20.0	3.19		26.7	12.7	9.1	3.5	3.6
	1.008	14.0	23.9/17.2	14.9	10.9	17.9	3.11		15.6	14.3	11.0	3.2	4.4
			26.7/19.4	16.0	11.2	19.0	3.11		21.1	13.7	10.4	3.4	4.0
			29.4/21.7	17.2	11.6	20.2	3.10		26.7	13.0	9.5	3.6	3.6
26.7	0.378	2.4	23.9/17.2	12.9	10.0	16.3	3.67	15.6	15.6	14.3	11.1	3.3	4.4
			26.7/19.4	13.8	10.3	17.3	3.73		21.1	13.8	10.3	3.4	4.0
			29.4/21.7	14.8	10.8	18.4	3.78		26.7	13.3	9.6	3.6	3.7
	0.756	8.1	23.9/17.2	13.7	10.3	17.0	3.44		15.6	15.7	12.4	3.4	4.6
			26.7/19.4	14.8	10.7	18.1	3.47		21.1	15.1	11.5	3.6	4.2
			29.4/21.7	15.9	11.0	19.2	3.49		26.7	14.5	10.8	3.8	3.8
	1.008	13.7	23.9/17.2	13.9	10.4	17.1	3.38		15.6	16.2	12.9	3.4	4.7
			26.7/19.4	15.0	10.8	18.3	3.40		21.1	15.5	12.0	3.6	4.3
			29.4/21.7	16.1	11.1	19.4	3.41		26.7	14.9	11.2	3.8	3.9
29.4	0.378	2.4	23.9/17.2	12.4	9.8	15.9	3.78	21.1	15.6	16.0	12.7	3.4	4.7
			26.7/19.4	13.3	10.2	16.9	3.85		21.1	15.5	11.9	3.6	4.3
			29.4/21.7	14.3	10.5	18.0	3.92		26.7	14.9	11.2	3.8	3.9
	0.756	8.1	23.9/17.2	13.2	10.1	16.6	3.57		15.6	17.7	14.2	3.6	5.0
			26.7/19.4	14.3	10.5	17.7	3.61		21.1	17.1	13.2	3.8	4.5
			29.4/21.7	15.3	10.9	18.8	3.64		26.7	16.4	12.5	4.0	4.1
	1.008	13.5	23.9/17.2	13.4	10.2	16.8	3.51		15.6	18.2	14.8	3.6	5.1
			26.7/19.4	14.5	10.6	17.9	3.54		21.1	17.5	13.9	3.8	4.6
			29.4/21.7	15.6	11.0	19.0	3.56		26.7	16.8	13.0	4.1	4.1
32.2	0.378	2.4	23.9/17.2	11.9	9.6	15.6	3.90	26.7	15.6	17.8	14.3	3.6	5.0
			26.7/19.4	12.9	9.9	16.6	3.98		21.1	17.3	13.5	3.8	4.5
			29.4/21.7	13.9	10.3	17.7	4.05		26.7	16.7	12.7	4.1	4.1
	0.756	7.8	23.9/17.2	12.7	9.9	16.2	3.70		15.6	19.7	16.0	3.7	5.3
			26.7/19.4	13.7	10.3	17.3	3.75		21.1	19.0	15.1	4.0	4.8
			29.4/21.7	14.8	10.6	18.4	3.79		26.7	18.4	14.1	4.2	4.4
	1.008	13.2	23.9/17.2	13.0	10.0	16.4	3.65		15.6	20.5	16.6	3.7	5.5
			26.7/19.4	14.0	10.4	17.5	3.68		21.1	19.6	15.8	4.0	4.9
			29.4/21.7	15.1	10.8	18.6	3.72		26.7	18.8	14.8	4.3	4.4
37.8	0.378	2.1	23.9/17.2	11.0	9.2	14.8	4.12	Operation Not Recommended					
			26.7/19.4	11.9	9.6	15.9	4.22						
			29.4/21.7	12.8	10.0	16.9	4.31						
	0.756	7.8	23.9/17.2	11.7	9.5	15.4	3.95						
			26.7/19.4	12.7	9.9	16.5	4.02						
			29.4/21.7	13.7	10.3	17.6	4.08						
	1.008	12.9	23.9/17.2	11.9	9.6	15.6	3.91						
			26.7/19.4	12.9	10.0	16.6	3.96						
			29.4/21.7	14.0	10.3	17.8	4.02						
43.3	0.378	2.1	23.9/17.2	10.1	8.8	14.1	4.35						
			26.7/19.4	10.9	9.3	15.1	4.46						
			29.4/21.7	11.8	9.7	16.1	4.57						
	0.756	7.5	23.9/17.2	10.7	9.1	14.6	4.20						
			26.7/19.4	11.6	9.5	15.6	4.29						
			29.4/21.7	12.6	10.0	16.7	4.36						
	1.008	12.6	23.9/17.2	10.8	9.1	14.7	4.17						
			26.7/19.4	11.8	9.5	15.8	4.25						
			29.4/21.7	12.8	10.0	16.8	4.31						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

Performance data (cont)

50PC0060 — 944 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.504	5.1	23.9/17.2	19.2	13.8	22.6	3.52	-1.1	15.6	13.2	9.0	4.0	3.3
			26.7/19.4	20.5	14.2	24.0	3.56		21.1	13.4	8.2	4.4	3.1
			29.4/21.7	21.8	14.5	25.4	3.62		26.7	13.0	7.9	4.8	2.7
	0.819	12.0	23.9/17.2	19.8	14.0	23.0	3.28		15.6	13.9	9.6	4.0	3.4
			26.7/19.4	21.2	14.4	24.4	3.31		21.1	13.9	8.8	4.4	3.2
			29.4/21.7	22.6	14.8	25.9	3.35		26.7	13.7	8.2	4.8	2.9
	1.260	25.7	23.9/17.2	20.1	14.2	23.2	3.14		15.6	14.3	9.9	4.1	3.5
			26.7/19.4	21.5	14.6	24.6	3.16		21.1	14.1	9.2	4.4	3.2
			29.4/21.7	23.0	15.0	26.2	3.19		26.7	13.7	8.8	4.8	2.8
15.6	0.504	4.8	23.9/17.2	18.5	13.4	22.2	3.83	4.4	15.6	14.6	10.5	4.1	3.6
			26.7/19.4	19.7	13.8	23.5	3.88		21.1	15.1	9.7	4.5	3.4
			29.4/21.7	21.0	14.2	24.8	3.93		26.7	14.6	9.4	4.9	3.0
	0.819	11.4	23.9/17.2	19.0	13.7	22.5	3.59		15.6	15.7	11.2	4.2	3.8
			26.7/19.4	20.3	14.1	23.9	3.62		21.1	15.5	10.6	4.5	3.4
			29.4/21.7	21.7	14.4	25.3	3.66		26.7	15.5	9.8	5.0	3.1
	1.260	24.8	23.9/17.2	19.3	13.8	22.7	3.46		15.6	16.1	12.0	4.2	3.8
			26.7/19.4	20.7	14.2	24.1	3.48		21.1	16.0	11.0	4.6	3.5
			29.4/21.7	22.2	14.6	25.6	3.51		26.7	15.8	10.3	5.0	3.2
21.1	0.504	4.5	23.9/17.2	17.6	13.1	21.7	4.17	10.0	15.6	16.8	12.2	4.2	4.0
			26.7/19.4	18.9	13.5	22.9	4.22		21.1	16.3	11.7	4.6	3.5
			29.4/21.7	20.1	13.8	24.3	4.28		26.7	16.1	11.1	5.1	3.2
	0.819	11.1	23.9/17.2	18.2	13.3	22.0	3.93		15.6	17.8	13.1	4.3	4.1
			26.7/19.4	19.5	13.7	23.4	3.96		21.1	17.5	12.4	4.7	3.7
			29.4/21.7	20.8	14.1	24.7	4.00		26.7	17.3	11.7	5.1	3.4
	1.260	24.2	23.9/17.2	18.5	13.5	22.2	3.80		15.6	18.4	13.7	4.3	4.2
			26.7/19.4	19.8	13.9	23.6	3.82		21.1	18.1	12.9	4.7	3.8
			29.4/21.7	21.2	14.2	25.0	3.85		26.7	17.8	12.1	5.2	3.4
26.7	0.504	4.5	23.9/17.2	16.8	12.7	21.2	4.56	15.6	15.6	18.8	14.1	4.4	4.3
			26.7/19.4	18.0	13.1	22.4	4.61		21.1	18.6	13.4	4.8	3.9
			29.4/21.7	19.2	13.4	23.7	4.66		26.7	18.0	12.8	5.2	3.5
	0.819	10.8	23.9/17.2	17.4	13.0	21.5	4.31		15.6	20.0	15.1	4.5	4.5
			26.7/19.4	18.6	13.4	22.8	4.34		21.1	19.7	14.4	4.9	4.0
			29.4/21.7	19.9	13.7	24.1	4.38		26.7	19.4	13.6	5.3	3.6
	1.260	23.3	23.9/17.2	17.6	13.1	21.7	4.17		15.6	20.6	16.1	4.5	4.5
			26.7/19.4	18.9	13.5	23.0	4.20		21.1	20.1	15.1	4.9	4.1
			29.4/21.7	20.3	13.9	24.4	4.22		26.7	20.0	14.1	5.4	3.7
29.4	0.504	4.5	23.9/17.2	16.4	12.5	21.0	4.77	21.1	15.6	21.3	15.9	4.5	4.7
			26.7/19.4	17.6	12.9	22.2	4.82		21.1	21.0	15.1	5.0	4.2
			29.4/21.7	18.8	13.3	23.4	4.87		26.7	20.4	14.5	5.4	3.8
	0.819	10.5	23.9/17.2	16.9	12.7	21.3	4.51		15.6	22.3	17.3	4.7	4.8
			26.7/19.4	18.2	13.2	22.5	4.55		21.1	21.9	16.4	5.1	4.3
			29.4/21.7	19.4	13.5	23.9	4.58		26.7	21.5	15.5	5.5	3.9
	1.260	23.0	23.9/17.2	17.2	12.9	21.4	4.38		15.6	23.2	18.0	4.7	4.9
			26.7/19.4	18.5	13.3	22.7	4.40		21.1	22.4	17.2	5.2	4.4
			29.4/21.7	19.8	13.7	24.1	4.43		26.7	22.0	16.2	5.6	3.9
32.2	0.504	4.5	23.9/17.2	16.0	12.3	20.8	4.99	26.7	15.6	23.2	18.1	4.7	4.9
			26.7/19.4	17.1	12.7	22.0	5.04		21.1	23.2	17.1	5.2	4.5
			29.4/21.7	18.3	13.1	23.2	5.10		26.7	22.5	16.4	5.6	4.0
	0.819	10.5	23.9/17.2	16.5	12.5	21.0	4.73		15.6	24.8	19.5	4.9	5.1
			26.7/19.4	17.7	13.0	22.3	4.76		21.1	24.3	18.5	5.3	4.6
			29.4/21.7	18.9	13.4	23.5	4.80		26.7	23.8	17.6	5.8	4.1
	1.260	22.7	23.9/17.2	16.8	12.7	21.2	4.60		15.6	25.8	20.4	5.0	5.2
			26.7/19.4	18.0	13.1	22.4	4.62		21.1	24.9	19.5	5.4	4.6
			29.4/21.7	19.3	13.5	23.8	4.64		26.7	24.3	18.3	5.9	4.1
37.8	0.504	4.2	23.9/17.2	15.1	11.9	20.4	5.49	Operation Not Recommended					
			26.7/19.4	16.2	12.4	21.5	5.54						
			29.4/21.7	17.3	12.7	22.7	5.59						
	0.819	10.2	23.9/17.2	15.6	12.1	20.6	5.22						
			26.7/19.4	16.7	12.6	21.8	5.25						
			29.4/21.7	17.9	13.0	23.0	5.28						
	1.260	21.8	23.9/17.2	15.9	12.2	20.7	5.08						
			26.7/19.4	17.0	12.7	21.9	5.10						
			29.4/21.7	18.2	13.2	23.1	5.12						
43.3	0.504	4.2	23.9/17.2	14.2	11.5	20.0	6.08						
			26.7/19.4	15.2	12.0	21.1	6.12						
			29.4/21.7	16.3	12.4	22.2	6.17						
	0.819	9.9	23.9/17.2	14.7	11.7	20.2	5.79						
			26.7/19.4	15.7	12.2	21.3	5.81						
			29.4/21.7	16.8	12.7	22.4	5.84						
	1.260	21.2	23.9/17.2	14.9	11.9	20.2	5.65						
			26.7/19.4	16.0	12.4	21.4	5.65						
			29.4/21.7	17.1	12.8	22.6	5.67						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

50PC0070 — 1038 L/S NOMINAL AIRFLOW

COOLING								HEATING					
EWT (C)	Water Flow (L/s)	WPD (kPa)	Entering Air Temp (C) (db/wb)	TC (kW)	SC (kW)	HR (kW)	Power Input (kW)	EWT (C)	EAT (C)	TC (kW)	Heat of Absorption (kW)	Power Input (kW)	COP
10.0	0.630	7.8	23.9/17.2	21.2	15.8	25.0	3.96	-1.1	15.6	14.5	10.3	4.2	3.5
			26.7/19.4	22.6	16.3	26.5	4.01		21.1	14.5	9.6	4.6	3.2
			29.4/21.7	24.1	16.7	28.1	4.06		26.7	14.3	8.9	5.0	2.9
	0.945	16.1	23.9/17.2	21.7	16.0	25.4	3.76		15.6	15.0	10.8	4.2	3.6
			26.7/19.4	23.2	16.5	26.9	3.80		21.1	14.7	10.1	4.6	3.2
			29.4/21.7	24.8	17.0	28.5	3.84		26.7	14.5	9.5	5.0	2.9
	1.260	27.2	23.9/17.2	21.9	16.1	25.5	3.66		15.6	15.3	11.0	4.2	3.6
			26.7/19.4	23.5	16.6	27.1	3.69		21.1	15.0	10.4	4.6	3.3
			29.4/21.7	25.1	17.1	28.8	3.72		26.7	14.7	9.6	5.0	2.9
15.6	0.630	7.5	23.9/17.2	20.3	15.4	24.5	4.29	4.4	15.6	16.3	12.0	4.3	3.8
			26.7/19.4	21.7	15.9	25.9	4.34		21.1	16.3	11.2	4.7	3.5
			29.4/21.7	23.1	16.3	27.4	4.39		26.7	16.1	10.6	5.1	3.2
	0.945	15.5	23.9/17.2	20.8	15.6	24.8	4.09		15.6	17.0	12.7	4.3	3.9
			26.7/19.4	22.2	16.1	26.3	4.13		21.1	16.6	12.0	4.7	3.5
			29.4/21.7	23.7	16.7	27.8	4.17		26.7	16.4	11.3	5.1	3.2
	1.260	26.0	23.9/17.2	21.0	15.7	25.0	4.00		15.6	17.3	13.0	4.4	4.0
			26.7/19.4	22.5	16.2	26.5	4.03		21.1	17.0	12.3	4.7	3.6
			29.4/21.7	24.1	16.8	28.0	4.06		26.7	16.7	11.5	5.1	3.2
21.1	0.630	7.2	23.9/17.2	19.4	15.0	23.9	4.65	10.0	15.6	18.3	14.0	4.4	4.2
			26.7/19.4	20.7	15.5	25.3	4.70		21.1	18.0	13.4	4.8	3.8
			29.4/21.7	22.1	16.0	26.7	4.76		26.7	17.8	12.6	5.2	3.4
	0.945	14.9	23.9/17.2	19.8	15.2	24.2	4.45		15.6	19.2	14.8	4.5	4.3
			26.7/19.4	21.2	15.8	25.6	4.49		21.1	18.8	14.0	4.8	3.9
			29.4/21.7	22.7	16.2	27.2	4.53		26.7	18.5	13.2	5.3	3.5
	1.260	25.4	23.9/17.2	20.1	15.4	24.3	4.35		15.6	19.7	15.2	4.5	4.4
			26.7/19.4	21.5	15.9	25.8	4.38		21.1	19.3	14.4	4.9	4.0
			29.4/21.7	23.0	16.4	27.3	4.42		26.7	18.9	13.6	5.3	3.6
26.7	0.630	7.2	23.9/17.2	18.4	14.6	23.3	5.05	15.6	15.6	20.8	16.0	4.5	4.6
			26.7/19.4	19.7	15.1	24.6	5.10		21.1	20.2	15.4	4.9	4.1
			29.4/21.7	21.0	15.7	26.0	5.15		26.7	19.8	14.5	5.4	3.7
	0.945	14.6	23.9/17.2	18.8	14.9	23.5	4.85		15.6	21.6	17.1	4.6	4.7
			26.7/19.4	20.2	15.4	24.9	4.88		21.1	21.2	16.2	5.0	4.2
			29.4/21.7	21.6	15.9	26.4	4.92		26.7	20.7	15.4	5.4	3.8
	1.260	24.5	23.9/17.2	19.1	15.0	23.7	4.75		15.6	22.2	17.6	4.6	4.8
			26.7/19.4	20.5	15.5	25.1	4.78		21.1	21.6	16.7	5.0	4.3
			29.4/21.7	21.9	16.0	26.6	4.81		26.7	21.2	15.8	5.5	3.9
29.4	0.630	6.9	23.9/17.2	17.9	14.5	23.0	5.27	21.1	15.6	23.2	18.2	4.7	5.0
			26.7/19.4	19.1	15.0	24.3	5.32		21.1	22.5	17.4	5.1	4.4
			29.4/21.7	20.4	15.5	25.6	5.37		26.7	22.1	16.5	5.5	4.0
	0.945	14.3	23.9/17.2	18.4	14.6	23.3	5.07		15.6	24.2	19.5	4.8	5.1
			26.7/19.4	19.7	15.1	24.6	5.10		21.1	23.6	18.6	5.2	4.6
			29.4/21.7	21.0	15.7	26.0	5.14		26.7	23.4	17.3	5.6	4.2
	1.260	24.2	23.9/17.2	18.6	14.7	23.4	4.97		15.6	24.8	20.1	4.8	5.2
			26.7/19.4	20.0	15.2	24.8	5.00		21.1	24.3	18.9	5.2	4.7
			29.4/21.7	21.3	15.8	26.2	5.02		26.7	23.6	18.1	5.6	4.2
32.2	0.630	6.9	23.9/17.2	17.4	14.2	22.7	5.51	26.7	15.6	25.8	20.6	4.8	5.3
			26.7/19.4	18.6	14.8	24.0	5.55		21.1	24.9	19.7	5.3	4.7
			29.4/21.7	19.9	15.2	25.4	5.61		26.7	24.6	18.8	5.7	4.3
	0.945	14.0	23.9/17.2	17.8	14.4	22.9	5.29		15.6	27.0	22.0	4.9	5.5
			26.7/19.4	19.2	14.9	24.3	5.33		21.1	26.1	21.0	5.4	4.9
			29.4/21.7	20.5	15.5	25.7	5.37		26.7	25.9	19.6	5.8	4.5
	1.260	23.6	23.9/17.2	18.0	14.5	23.1	5.19		15.6	27.6	22.7	5.0	5.5
			26.7/19.4	19.4	15.1	24.4	5.22		21.1	26.9	21.7	5.4	5.0
			29.4/21.7	20.8	15.5	25.9	5.26		26.7	26.1	20.5	5.9	4.5
37.8	0.630	6.6	23.9/17.2	16.4	13.9	22.2	6.02	Operation Not Recommended					
			26.7/19.4	17.6	14.4	23.4	6.07						
			29.4/21.7	18.8	14.8	24.7	6.13						
	0.945	13.7	23.9/17.2	16.8	14.0	22.4	5.81						
			26.7/19.4	18.0	14.6	23.6	5.84						
			29.4/21.7	19.3	15.1	25.0	5.87						
	1.260	23.0	23.9/17.2	17.0	14.1	22.5	5.71						
			26.7/19.4	18.2	14.7	23.8	5.72						
			29.4/21.7	19.6	15.1	25.2	5.76						
43.3	0.630	6.3	23.9/17.2	15.3	13.4	21.7	6.64						
			26.7/19.4	16.4	14.0	22.9	6.68						
			29.4/21.7	17.6	14.5	24.1	6.73						
	0.945	13.5	23.9/17.2	15.7	13.5	21.9	6.41						
			26.7/19.4	16.9	14.1	23.1	6.43						
			29.4/21.7	18.0	14.7	24.3	6.46						
	1.260	22.4	23.9/17.2	15.9	13.7	21.9	6.30						
			26.7/19.4	17.1	14.2	23.2	6.32						
			29.4/21.7	18.3	14.7	24.4	6.34						

LEGEND

db/wb — Dry Bulb/Wet Bulb
EAT — Entering Air Temperature
EWT — Entering Water Temperature
HR — Heat of Rejection
ISO — International Organization for Standardization
SC — Sensible Cooling
TC — Total Cooling
WPD — Waterside Pressure Drop

NOTES:

1. Performance tables are estimates only. For exact performance, consult the latest version of the WSHP Builder selection software.
2. Interpolation is permissible; extrapolation is not.
3. Table does not reflect fan or pump power corrections for ISO conditions.
4. Operation below 4.4 C EWT is based on a 15% antifreeze solution.

Performance data (cont)

ANTIFREEZE CORRECTION TABLE

ANTIFREEZE TYPE	ANTIFREEZE%	COOLING			HEATING		WPD CORRECTION FACTOR
		EWT 32.2 C			EWT –1.1 C		
		Total Capacity	Sensible Capacity	kW	Heating Capacity	kW	EWT –1.1 C
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	5	0.997	0.997	1.004	0.989	0.997	1.060
	10	0.994	0.994	1.006	0.986	0.995	1.125
	15	0.990	0.990	1.009	0.978	0.988	1.190
	25	0.983	0.983	1.016	0.960	0.979	1.300
	30	0.979	0.979	1.020	0.950	0.974	1.736
	35	0.975	0.974	1.024	0.940	0.969	1.834
Methanol	5	0.997	0.997	1.003	0.990	0.997	1.060
	10	0.996	0.996	1.005	0.979	0.993	1.100
	15	0.994	0.994	1.008	0.970	0.990	1.140
	20	0.992	0.992	1.011	0.961	0.987	1.248
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.160
	10	0.996	0.996	1.004	0.960	0.988	1.230
	15	0.992	0.992	1.006	0.944	0.983	1.280
	25	0.986	0.986	1.009	0.917	0.974	1.400
Ethylene Glycol	5	0.997	0.997	1.003	0.993	0.998	1.060
	10	0.995	0.995	1.004	0.986	0.996	1.120
	15	0.992	0.992	1.005	0.980	0.993	1.190
	25	0.988	0.988	1.009	0.970	0.990	1.330
	30	0.985	0.985	1.012	0.965	0.987	1.400

LEGEND

EWT — Entering Water Temperature
WPD — Water Pressure Differential

50PCH,PCV009-070 BLOWER PERFORMANCE — STANDARD PSC UNIT

50PCH,PCV UNIT SIZE	FAN SPEED	RATED AIRFLOW	EXTERNAL STATIC PRESSURE (Pa)											
			25	50	75	100	125	150	175	200	225	250	275	300
009	Low	141	118	114	113	110	—	—	—	—	—	—	—	—
	Med		149	149	142	130	114	—	—	—	—	—	—	—
	High		165	157	149	142	134	126	—	—	—	—	—	—
012	Low	144	118	114	113	110	—	—	—	—	—	—	—	—
	Med		149	149	142	130	114	—	—	—	—	—	—	—
	High		165	157	149	142	134	126	—	—	—	—	—	—
015	Low	197	197	177	157	—	—	—	—	—	—	—	—	—
	Med		220	205	189	169	157	—	—	—	—	—	—	—
	High		—	230	220	216	197	177	157	—	—	—	—	—
018	Low	280	248	232	220	—	—	—	—	—	—	—	—	—
	Med		319	311	299	287	267	232	—	—	—	—	—	—
	High		—	380	362	342	315	267	208	—	—	—	—	—
024	Low	334	256	240	224	212	201	—	—	—	—	—	—	—
	Med		326	322	315	303	283	244	—	—	—	—	—	—
	High		413	393	374	358	330	279	224	—	—	—	—	—
030	Low	374	291	287	275	260	240	—	—	—	—	—	—	—
	Med		326	319	303	287	267	244	—	—	—	—	—	—
	High		393	374	354	326	295	271	248	—	—	—	—	—
036	Low	472	507	492	472	452	425	393	—	—	—	—	—	—
	Med		555	531	507	480	452	417	354	—	—	—	—	—
	High		570	566	539	507	476	441	393	354	—	—	—	—
042	Low	551	476	476	468	456	441	425	—	—	—	—	—	—
	Med		574	570	562	547	523	492	456	—	—	—	—	—
	High		680	673	657	637	614	574	523	476	425	—	—	—
048	Low	629	570	566	559	551	535	519	—	—	—	—	—	—
	Med		669	657	641	621	602	578	551	—	—	—	—	—
	High		759	736	712	684	657	629	598	562	527	—	—	—
060	Low	787	614	610	606	602	592	580	566	551	—	—	—	—
	Med		743	739	736	732	718	704	680	657	625	590	—	—
	High		873	865	846	826	806	787	763	736	708	669	625	—
070	Low	826	618	614	610	606	602	592	580	566	551	—	—	—
	Med		747	743	739	736	732	718	704	680	657	625	590	—
	High		881	873	865	846	826	806	787	763	736	708	669	625

50PCH,PCV015-070 BLOWER PERFORMANCE — ECM UNIT

50PCH,PCV UNIT SIZE	FAN SPEED	RATED AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)											
			25	50	75	100	125	150	175	200	225	250	275	300
015	Low	141	170	170	170	170	170	170	170	170	170	170	—	—
	Med		200	200	200	200	200	200	200	200	200	200	—	—
	High		230	230	230	230	230	230	230	230	230	230	—	—
018	Low	144	201	201	201	201	201	201	201	201	201	201	—	—
	Med		236	236	236	236	236	236	236	236	236	236	—	—
	High		271	271	271	271	271	271	271	271	271	271	—	—
024	Low	197	281	281	281	281	281	281	281	281	281	281	—	—
	Med		330	330	330	330	330	330	330	330	330	330	—	—
	High		380	380	380	380	380	380	380	380	380	380	—	—
030	Low	280	341	341	341	341	341	341	341	341	341	341	—	—
	Med		401	401	401	401	401	401	401	401	401	401	—	—
	High		461	461	461	461	461	461	461	461	461	461	—	—
036	Low	334	401	401	401	401	401	401	401	401	401	401	—	—
	Med		472	472	472	472	472	472	472	472	472	472	—	—
	High		543	543	543	543	543	543	543	543	543	543	—	—
042	Low	374	481	481	481	481	481	481	481	481	481	481	481	—
	Med		566	566	566	566	566	566	566	566	566	566	566	—
	High		651	651	651	651	651	651	651	651	651	651	651	—
048	Low	472	562	562	562	562	562	562	562	562	562	562	562	—
	Med		661	661	661	661	661	661	661	661	661	661	661	—
	High		760	760	760	760	760	760	760	760	760	760	760	—
060	Low	551	682	682	682	682	682	682	682	682	682	682	682	682
	Med		802	802	802	802	802	802	802	802	802	802	802	802
	High		880	880	880	880	880	880	880	880	880	880	880	880
070	Low	629	763	763	763	763	763	763	763	763	763	763	763	763
	Med		897	897	897	897	897	897	897	897	897	897	897	897
	High		1032	1032	1032	1032	1032	1032	1032	1032	1032	1032	1032	1032

Electrical data

50PCH,PCV009-070 UNIT WITH ECM MOTOR ELECTRICAL DATA

UNIT SIZE	RATED VOLTAGE V-Ph/Hz	VOLTAGE MIN/MAX	COMPRESSOR			FAN MOTOR FLA	FAN MOTOR HP	TOTAL UNIT FLA	MIN CIRCUIT AMP	MAX FUSE/ HACR
			QTY	RLA	LRA					
015	220-240/1/50	198/264	1	5.48	24.5	2.80	0.333	8.28	9.7	15
018	220-240/1/50	198/264	1	6.20	48.0	2.80	0.333	9.00	10.6	15
024	380-420/3/50	342/462	1	3.00	30.0	2.80	0.333	5.80	6.6	15
030	220-240/1/50	198/264	1	9.40	48.0	2.80	0.333	12.20	14.6	20
	380-420/3/50	342/462	1	3.60	30.0	2.80	0.333	6.40	7.3	15
036	220-240/1/50	198/264	1	11.40	64.0	4.30	0.5	15.70	18.6	25
	380-420/3/50	342/462	1	4.00	35.0	4.30	0.5	8.30	9.3	15
042	380-420/3/50	342/462	1	4.50	35.0	4.30	0.5	8.80	9.9	15
048	380-420/3/50	342/462	1	5.40	43.0	6.80	0.75	12.20	13.6	15
060	380-420/3/50	342/462	1	7.80	51.5	6.80	0.75	14.60	16.6	20
070	380-420/3/50	342/462	1	8.50	67.1	6.80	0.75	15.30	17.4	25

LEGEND

FLA — Full Load Amps
HACR — Heating, Air-Conditioning and Refrigeration
HP — Horsepower
LRA — Locked Rotor Amps
RLA — Rated Load Amps

50PCH,PCV009-070 UNIT WITH PSC MOTOR ELECTRICAL DATA

UNIT SIZE	RATED VOLTAGE	VOLTAGE MIN/MAX	COMPRESSOR			FAN MOTOR FLA	FAN MOTOR HP	TOTAL UNIT FLA	MIN CIRCUIT AMP	MAX FUSE/ HACR
			QTY	RLA	LRA					
009	220/240	198/264	1	2.77	18.8	0.85	0.10	3.62	4.3	15
012	220/240	198/253	1	4.35	21.0	0.85	0.10	5.20	6.3	15
015	220/240	198/253	1	5.48	24.5	0.90	0.17	6.40	7.8	15
018	220/240	198/264	1	6.20	48.0	1.60	0.25	7.80	9.4	20
024	380/420	342/462	1	3.00	30.0	0.90	0.25	3.9	4.7	15
030	220/240	198/264	1	9.40	48.0	1.60	0.25	11.0	13.4	25
	380/420	342/462	1	3.60	30.0	0.90	0.25	4.5	5.4	15
036	380/420	342/462	1	4.00	35.0	1.80	0.50	5.8	6.8	15
	220/240	198/264	1	11.20	64.0	3.30	0.50	14.5	17.3	30
042	220/240	198/264	1	12.80	64.0	1.80	0.50	14.6	17.8	35
	380/420	342/462	1	4.50	35.0	3.30	0.50	7.8	8.9	15
048	380/420	342/462	1	5.40	43.0	2.80	0.75	8.2	9.6	15
060	380/420	342/462	1	7.80	51.5	2.80	0.75	10.6	12.6	25
070	380/420	342/462	1	8.50	67.1	2.80	0.75	11.3	13.4	25

LEGEND

FLA — Full Load Amps
HACR — Heating, Air-Conditioning and Refrigeration
HP — Horsepower
LRA — Locked Rotor Amps
RLA — Rated Load Amps

Application data

Aquazone™ water source heat pumps are available in a flexible, efficient array of models, which can be used in all types of water loop, ground water, and ground loop type systems. Aquazone products provide optimal energy efficient solutions and adapt to the most challenging design requirements.

Water loop system

Water loop (or boiler/tower) system applications typically include a number of units plumbed to a common piping system. For optimal performance, this system should be designed between 0.142 and 0.189 L/s per ton of cooling capacity. The system is comprised of highly efficient packaged reverse cycle heat pump units interconnected by a water loop. The water circuit serves as both a sink and source for heat absorption and rejection and is designed for entering water temperatures between 10 and 26.6 C. Within this temperature range units can heat or cool as required from the same water source. Transferring heat from warm to cold spaces in the building, whenever they coexist, conserves energy rather than creating new heat.

Refer to the **Carrier Water Source Heat Pump System Design Guide** for assistance designing water loop systems. The guide includes a practical approach for the most current design recommendations including:

- Product application including horizontal, vertical, console, rooftop and water-to-water applications.
- Ventilation methods and system design including energy recovery.
- Acoustical considerations for different product types.
- Addressing indoor air quality (IAQ) issues such as condensate removal, humidity control.
- Air distribution design including diffuser selection/layout and ductwork design.
- Hydronic system design including pipe sizing/layout and boiler/tower sizing.
- Control configurations such as stand alone, DDC, DCV (demand controlled ventilation), and VVT® (variable volume and temperature) controls.
- Water Source Heat Pump Efficiency/Operational Cost Comparison chart.
- System variations such as a system without a boiler, variable pumping, and VAV for interior use.

Condensate drainage

Venting — Properly vent condensate lines to prevent fan pressure from causing water to hang up in the piping. Condensate lines should be pitched to assure full drainage of condensate under all load conditions. Use chemical treatment to remove algae in the condensate pans and drains in geographical areas that are conducive to algae growth.

Trapping — Condensate trapping is a necessity on every water source heat pump unit. A trap is provided to prevent the backflow of moisture from the condensate pan and into the fan intake or downstream into the mechanical system. The water seal or the length of the trap depends on the positive or negative pressure on the drain pan. As a rule of thumb, size the water seal 25.4 mm for every 25.4 mm of negative pressure on the unit. The water seal is the distance from the bottom of the unit condensate piping connection to the bottom of the condensate drain line run-out piping. Therefore, the trap size should be double the water seal dimension.

Horizontal units — Horizontal units should be sloped toward the drain at a 6.35 mm per foot pitch. If it is not possible to meet the pitch requirement, a condensate pump should be designed and installed at the unit to pump condensate to a building drain. Horizontal units are not internally trapped; therefore an external trap is necessary. Each unit must be installed with its own individual trap and means to flush or blow out the condensate drain. It is not acceptable to use a common trap or vent for multiple units. The condensate piping system should not be designed with a pipe size smaller than the drain connection pipe size.

Vertical units — Vertical units are not internally trapped and require their own external trap. Each unit must be installed with its own individual trap and means to flush or blow out the condensate drain. It is not acceptable to use a common trap or vent for multiple units. The condensate piping system should not be designed with a pipe size smaller than the drain connection pipe size.

Water conditioning

In some applications, maintaining proper water quality may require higher corrosion protection for the water-to-refrigerant heat exchanger. Water quality varies from location to location and is unique for each job. Water characteristics such as pH value, alkalinity, hardness, and specific conductance are important when considering any WSHP application. Water typically includes impurities and hardness that must be removed. The required treatment will depend on the water quality as well as type of system. Water problems fall into three main categories:

1. Scale formation caused by hard water reduces the heat transfer rate and increases the water pressure drop through the heat exchanger. As water is heated, minerals and salts are precipitated from a solution and deposited on the inside surface of the pipe or tube.
2. Corrosion is caused by absorption of gases from the air coupled with water on exposed metal. Corrosion is also common in salt-water areas.
3. Organic growths such as algae can reduce the heat transfer rate by forming an insulating coating on the inside tube surface. Algae can also promote corrosion by pitting.

NOTE: In most commercial water loop applications, Aquazone WSHP units use copper water-to-refrigerant heat exchanger. Units can also be equipped with a cupronickel heat exchanger for applications where water is outside the standard contaminant limits for a copper heat exchanger.

Application data (cont)

WATER QUALITY GUIDELINES

CONDITION	HX MATERIAL*	CLOSED RECIRCULATING†	OPEN LOOP AND RECIRCULATING WELL**
Scaling Potential — Primary Measurement			
Above the given limits, scaling is likely to occur. Scaling indexes should be calculated using the limits below.			
pH/Calcium Hardness Method	All	N/A	**pH < 7.5 and Ca Hardness, <100 ppm**
Index Limits for Probable Scaling Situations (Operation outside these limits is not recommended.)			
Scaling indexes should be calculated at 150 F for direct use and at 90 F for indirect HX use. A monitoring plan should be implemented.			
Ryznar Stability Index	All	N/A	**6.0 to 7.5** If >7.5 minimize steel pipe use.
Langelier Saturation Index	All	N/A	**–0.5 to +0.5** If <=0.5 minimize steel pipe use. Based upon 150 F direct well, 85 F indirect well HX.
Iron Fouling			
Iron Fe^{2+} (Ferrous) (Bacterial Iron Potential)	All	N/A	**<0.2 ppm (Ferrous)** If Fe^{2+} (ferrous) >0.2 ppm with pH 6 to 8, O_2<5 ppm, check for iron bacteria.
Iron Fouling	All	N/A	**<0.5 ppm of Oxygen** Above this level deposition will occur.
Corrosion Prevention††			
pH	All	6 - 8.5 Monitor/treat as needed.	**6 to 8.5** Minimize steel pipe below 7 and no open tanks with pH <8.
Hydrogen Sulfide (H_2S)	All	N/A	**<0.5 ppm** At H_2S>0.2 ppm, avoid use of copper and cupronickel piping or HXs. Rotten egg smell appears at 0.5 ppm level. Copper alloy (bronze or brass) cast components are acceptable to <0.5 ppm.
Ammonia Ion as Hydroxide, Chloride, Nitrate and Sulfate Compounds	All	N/A	**<0.5 ppm**
Maximum Chloride Levels			Maximum allowable at maximum water temperature.
			50 F (10 C) / 75 F (24 C) / 100 F (38 C)
	Copper	N/A	<20 ppm / NR / NR
	Cupronickel	N/A	<150 ppm / NR / NR
	304 SS	N/A	<400 ppm / <250 ppm / <150 ppm
	316 SS	N/A	<1000 ppm / <550 ppm / <375 ppm
	Titanium	N/A	>1000 ppm / >550 ppm / >375 ppm
Erosion and Clogging			
Particulate Size and Erosion	All	<10 ppm of particles and a maximum velocity of 6 fps. Filtered for maximum 800 micron size.	<10 ppm (<1 ppm “sandfree” for reinjection) of particles and a maximum velocity of 6 fps. Filtered for maximum 800 micron size. Any particulate that is not removed can potentially clog components.
Brackish	All	N/A	Use cupronickel heat exchanger when concentrations of calcium or sodium chloride are greater than 125 ppm are present. (Seawater is approximately 25,000 ppm.)

LEGEND

HX — Heat Exchanger
N/A — Design Limits Not Applicable Considering Recirculating Potable Water
NR — Application Not Recommended
SS — Stainless Steel

*Heat exchanger materials considered are copper, cupronickel, 304 SS (stainless steel), 316 SS, titanium.

†Closed recirculating system is identified by a closed pressurized piping system.

**Recirculating open wells should observe the open recirculating design considerations.

††If the concentration of these corrosives exceeds the maximum allowable level, then the potential for serious corrosion problems exists.

Sulfides in the water quickly oxidize when exposed to air, requiring that no agitation occur as the sample is taken. Unless tested immediately at the site, the sample will require stabilization with a few drops of one Molar zinc acetate solution, allowing accurate sulfide determination up to 24 hours after sampling. A low pH and high alkalinity cause system problems, even when both values are within ranges shown. The term pH refers to the acidity, basicity, or neutrality of the water supply. Below 7.0, the water is considered to be acidic. Above 7.0, water is considered to be basic. Neutral water registers a pH of 7.0.

To convert ppm to grains per gallon, divide by 17. Hardness in mg/l is equivalent to ppm.

COMPLETE C BOARD CAPABILITIES

CAPABILITY	COMPLETE C BOARD
High and Low Refrigerant Pressure Switches	X
Fluid Temperature (Freeze) Protection	X
Condensate Overflow Protection Sensor	X
Air Temperature (Freeze) Protection	X
Anti-short Cycle Timer	X
Random Start Relay	X
Low Pressure Bypass Timer	X
Surge Protection	X
Intelligent Reset	X
Lockout Reset	X
Malfunction (Alarm) Output	X
Test Service Mode with LED Fault Indication	X
Transformer	50 va*

Packaged Water Source Heat Pumps

HVAC Guide Specifications (Water Loop)

Size Range: **1.8 to 21.1 kW**
Carrier Unit: **50PCH,PCV Series 50 Hz**

Part 1 — General

1.01 SYSTEM DESCRIPTION

A. Install water source heat pumps, as indicated on the plans with capacities and characteristics as listed in the schedule and the specifications that follow. Units shall be horizontal or vertical configurations. All equipment shall be rated and certified in accordance with AHRI/ISO (Air-Conditioning, Heating, and Refrigeration Institute/International Organization for Standardization) 13256-1. All equipment shall be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the United States and CAN/CSA-C22.2 NO.236 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI/ISO, ETL-US-C labels and CE community mark.

B. Units shall be supplied completely factory built and capable of operation with an entering water temperature range from 6.7 to 43.3 C. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuation and accurately charging of system, detailed heating and cooling mode tests, and quality cross checking all operational and test conditions to pass/fail criteria.

C. Units shall be individually packaged on wooden skid with protective corner posts and plastic stretch wrapping for maximum protection.

1.02 QUALITY ASSURANCE

A. All equipment listed in this section must be rated in accordance with AHRI/ASHRAE/ISO 13256-1 performance standard, latest edition. The applicable units shall have a AHRI/ISO label. Standard cabinet panel insulation shall meet NFPA (National Fire Protection Association, U.S.A Standard) 90A requirements, air erosion and mold growth limits of UL-181, stringent fungal resistance test per ASTM-C1071 (American Society for Testing and Materials) and ASTM G21, and shall meet zero level bacteria growth per ASTM G22.

B. All units shall be factory tested in all operating modes and safety switch operation shall be verified.

C. Serial numbers will be recorded by factory and furnished to contractor for ease of unit warranty status.

Part 2 — Product

2.01 EQUIPMENT

A. General: Units shall be prewired and precharged in factory.

B. Basic Construction:

1. Units shall have the air flow arrangement as shown on the plans. If units with these arrangements are not used, the contractor supplying the water source heat pumps is responsible for any extra costs incurred by other trades and must submit detailed mechanical drawings showing ductwork requirements and changes or relocation of any other mechanical or electrical system. If other arrangements make servicing difficult, the contractor must provide access panels and clear routes to ease service. The architect must approve all changes 10 days prior to bid.
2. All units shall have stainless steel drain pans to comply with this project's IAQ (indoor air quality) requirements. Painted steel or plastic is not acceptable.
3. → The cabinet shall be fabricated from heavy gage galvanized steel for superior corrosion protection. All interior surfaces shall be lined with 1/2-in. thick, multi-density, coated, fiberglass insulation. Insulation must be non-combustible, non-hydroscopic and anti-fungal. Insulation must meet NFPA 90A and 90B for fire protection as well as Fire Hazard classification 25/50 (per ASTM E84 and UL 723 and CAN/ULC S102-M88), ASTM C1071, erosion requirements of UL181 and be certified to meet GREENGUARD indoor air quality standards for low emitting products. One blower access panel and two compressor compartment access panels shall be removable with supply and return air ductwork in place.
4. Unit shall have a floating compressor or pan consisting of a $^1/_2$-in. (12 mm) thick high density elastomeric pad between the compressor base plate and the unit base pan to prevent transmission of vibration to the structure.
5. Units shall have a 2.54 cm filter rack and 2.54 cm thick throwaway type glass fiber filter as standard. The filter rack shall incorporate a 2.54 cm duct flange. The units shall have an insulated divider panel between the air-handling section and the compressor section to minimize the transmission of compressor noise, and to permit service testing without air bypass.
6. Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be brass female pipe thread fittings and mounted flush to cabinet exterior. Connections that require a backup wrench or that extrude past the unit corner post are not acceptable. Condensate connection will be stainless steel female pipe thread fittings. Plastic is not acceptable.
7. Hanging brackets shall be provided as standard for horizontal units.

C. Fan and Motor Assembly:

1. The fan shall be direct-drive centrifugal forward curved type with a dynamically balanced wheel. The housing and wheel shall be designed for quiet low velocity operation. The blower housing shall feature a removable inlet ring to facilitate removal and servicing of the fan motor.

The fan motor shall be 3-speed, permanently lubricated, PSC (permanent split capacitor) type with thermal overload protection.

2. Units rated 4.4 to 21.1 kW shall have an optional electronically commutated motor (ECM) to comply with necessary CE requirements.
3. Blower shall have inlet rings to allow removal of wheel and motor from one side without removing housing.
4. Units supplied without permanently lubricated motors must provide external oilers for easy service.
5. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule.
6. The airflow/static pressure rating of the unit shall be based on a wet coil and a clean filter in place.

D. Refrigerant Components:

1. Units shall use R-410A refrigerant. All units shall have a factory sealed and fully charged refrigerant circuit.
2. Hermetic Compressor:

   Hermetic reciprocating, rotary, or scroll compressors shall be specifically designed for R-410A refrigerant and shall be internally sprung (if reciprocating), externally isolated and with thermal overload protection.
3. Refrigerant metering thermostatic expansion valves or capillary tubes.
4. The finned tube heat exchanger shall be constructed of lanced aluminum fins not exceeding 6.3 fins per cm bonded to rifled copper tubes in a staggered pattern and will have a 600 psig (4140 kPa) working pressure. The heat exchanger shall have aluminum end sheets.
5. Reversing Valve:

   Reversing valves shall be four-way solenoid activated refrigerant valves that shall fail to the heating operation should the solenoid fail to function. Reversing valves that fail to the cooling operation shall not be allowed.
6. Coaxial (tube in tube) refrigerant to water heat exchanger. Refrigerant to water heat exchangers shall be of copper inner water tube and steel outer refrigerant tube design rated to withstand 600 psig (4140 kPa) working refrigerant pressure and 400 psig (2758 kPa) working water pressure. Shell and tube style refrigerant to water heat exchangers shall be treated as pressure vessels and shall require refrigerant pressure relief valves piped to the exterior of the building. The contractor supplying the water source heat pumps with shell and tube heat exchangers shall be responsible for any additional installation costs. Brazed plate water to refrigerant heat exchangers shall require additional centrifugal separators added to the supply water piping at each unit. Each separator shall have an automated clean out valve piped to a waste line. The contractor supplying water source heat pumps with brazed plate heat exchangers shall be responsible for any additional costs.
7. Safety controls include both a high pressure and low pressure switch. Temperature sensors shall not replace these safety switches. See the unit controls section.
8. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service.
9. Activation of any safety device shall prevent compressor operation via a lockout circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset at the disconnect switch only shall not be acceptable.

E. Controls and Safeties:

1. Electrical:

   Controls and safety devices will be factory wired and mounted within the unit. Controls shall include fan relay, compressor contactor, 24-v transformer, reversing valve coil, solid-state lockout controller and unit protection module (UPM). The standard transformer shall be rated for a minimum 50 va. All units shall be nameplated for use with time-delay fuses or HACR (Heating, Air Conditioning and Refrigeration) circuit breakers. Unit controls shall be 24-v and provide heating or cooling as required by the remote thermostat/sensor.
2. Piping:
   a. Supply and return water connections shall be copper FPT fittings and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a backup wrench.
   b. All water connections and electrical knockouts must be in the compressor compartment corner post to not interfere with the serviceability of unit. Contractor shall be responsible for any extra costs involved in the installation of units that do not have this feature.
3. Unit Controls:
   a. Solid-State Safety Circuit:

      All units shall have a Complete C board safety control circuit with the following features:

      1) Anti-short cycle time delay (5-minute delay on break).
      2) Random start time delay on initial power.
      3) Brown out/surge/power interruption protection.
      4) 120-second low pressure switch bypass timer.
      5) High refrigerant pressure shutdown.

6) Low refrigerant pressure shutdown.
7) Low water temperature shutdown (adjustable for closed loop systems).
8) Air coil freeze protection shutdown.
9) High condensate level shutdown.
10) 24 vac alarm output for remote fault indication.

b. The Complete C board shall automatically reset after a safety shutdown. Restart the unit if the cause of the shutdown no longer exists (except for low temperature and high condensate level shutdowns). Should a fault re-occur within 60 minutes after reset, then a "hard" lockout will occur. A light-emitting diode (LED) shall annunciate the following alarms: brown out, high refrigerant pressure, low refrigerant pressure, low water temperature and a high level of condensate in the drain pan. The LED will display each fault condition as soon as the fault occurs. If a hard lockout occurs, then the fault LED will display the type of fault until the unit is reset.

c. The Complete C board shall feature the following field configurable adjustments:
1) Lock out reset on thermostat interruption or power reset.
2) Two or four restart attempts before a hard lockout.
3) Test mode (reduces all time delays to 5 seconds for diagnostic work).
4) Antifreeze setting for low water temperature sensor.

d. Safety devices include:
1) Low pressure cutout set a 40 psig (280 kPa) for loss of charge protection (freezestat and/or high discharge gas temperature sensor is not acceptable).
2) High pressure cutout control set at 600 psig (4125 kPa).
3) Low supply water temperature sensor that detects drops in refrigerant temperature that could result in water coax heat exchanger freezing.
4) Low air coil temperature sensor that detects drops in refrigerant temperature that could result in air heat exchanger freezing.
5) High level condensate sensor that shuts off the compressor if the condensate drain pan fills with water.
6) On board voltage detection that disables the compressor control circuit if there are extreme variations in supply voltage.

F. Special Features:
1. Cupronickel coaxial water-to-refrigerant heat exchangers shall be provided.
2. Carrier commercial thermostat controls are available as follows:

   Edge® Pro 7-day programmable thermostat offers 2-stage heat, 2-stage cool, remote contact input, remote sensor capability, pre-occupancy purge, soft start, manual/auto changeover, 4 settings per day, 24 vac, backlit LCD, keypad lockout, no batteries required, 5-minute compressor protection, never lost memory, 3 security levels, and temperature display in degrees F or C.
3. Aquazone system control panel as specified in the 50RLP Product Data is available.
4. Sound attenuation (mute) package shall consist of high technology compressor blanket on sizes 018 and above.

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