

EVAPORATIVE CONDENSERS

PHC-E

PARALLEL HYBRID CONDENSER



Available with Optional



Available in Capacities from 500 to 8750 Ammonia kW!



IARW International Association of Refrigerated Warehouses

Member of
iilar
International Institute of Ammonia Refrigeration
www.iilar.org

AHRP Air-Conditioning, Heating, and Refrigeration Institute

PHC-E Design Features

Proven Performance and Design Flexibility



About EVAPCO

Evapco is the global innovator in heat transfer solutions. Our pledge is to make everyday life easier, more comfortable, more reliable, and more sustainable for people everywhere. With manufacturing facilities and sales offices in more than 50 countries and 48 active US patents —we are the team that engineers and contractors know they can count on for life.

Contact

your local Evapco Representative
or visit evapco.eu to learn more.

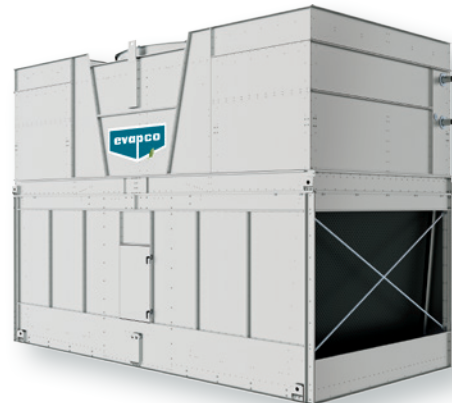
Proven Performance and Design Flexibility

The PHC-E Parallel Hybrid Condenser offers more system design and layout flexibility than ever before. This Induced Draft condenser design enhances EVAPCO's already extensive line of evaporative condensing technology. The PHC-E offers more selections for large industrial refrigeration projects: more capacity with a smaller plan area, fewer motors, less weight and lower refrigerant charge. More equipment choices and more design flexibility mean greater value for the End-User.

The PHC-E combines high efficiency PVC crossflow fill with EVAPCO's patented coil designs featuring the exclusive **CROSSCOOL™** tube enhancement for superior induced draft, parallel flow, hybrid condenser performance. The PHC-E evaporative condenser was designed in EVAPCO's state-of-the-art research and development center as part of the company's ongoing product development program. The PHC-E has undergone extensive thermal testing to ensure each condenser will perform as specified. As with all EVAPCO products, each PHC-E condenser is supplied with a written Thermal Performance Guarantee.



PHC-E - S Models

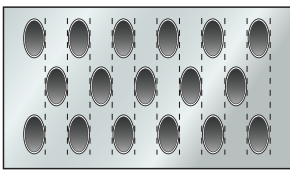


PHC-E - D Models

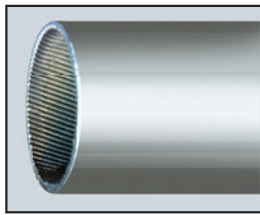
PHC-E Design Features

Coil Technology

The PHC-E incorporates EVAPCO's latest high efficiency heat transfer coils featuring EVAPCO'S exclusive **CROSSCOOL™** internal tube enhancement! All units utilize EVAPCO's patented **Sensi-Coil®** technology which features EVAPCO's elliptical tubes assembled in a high density coil tube arrangement. The combination of these coil technologies with **CROSSCOOL™** tube enhancement provides more internal and external heat transfer surface area as well as greater air and water loading over the coil versus other designs. The result is superior heat transfer performance in parallel-flow heat transfer!



Sensi-Coil®
(US Patent #7,296,620)



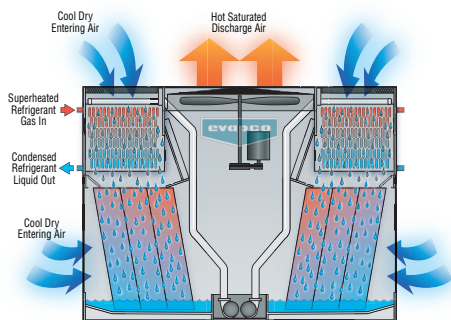
CROSSCOOL™

Principle of Operation

Hot gas discharged from the compressor enters the condenser coil inlet(s) at the top of the unit. Cooled water from the unit basin is pumped through spray distribution nozzles and floods over the condenser coil(s). Ambient air is simultaneously drawn into the unit at the top in parallel flow with the water over the coil. A portion of the recirculated water evaporates into the air stream. This evaporation process and the cooled water flowing over the tubes removes heat from the refrigerant causing it to condense. The saturated refrigerant liquid drains out of the sloped coil tubes into a receiver for return to the system.

The recirculated water that was not evaporated falls through a crossflow fill section located below the coil. Air is drawn through the side of the unit and fill section removing additional heat from the water through evaporation. The cooled water collects in the basin for recirculation over the coil.

The hot, saturated air from both the coil and fill sections pass through internal drift eliminators to strip water droplets entrained in the air stream. The unit fan(s) then discharge the saturated air out of the top of the unit at a high velocity, where it dissipates into the atmosphere.



Principle of Operation

Condensing Coil

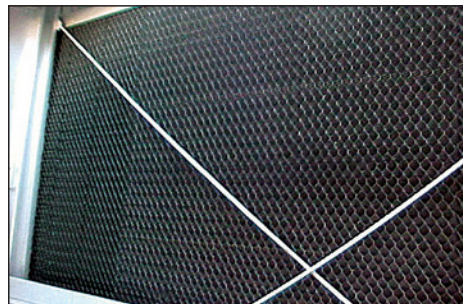
The coils are manufactured from high quality carbon steel tubing following the most stringent quality control procedures and in accordance with the Pressure Equipment Directive. Each circuit is inspected to assure the material quality and then tested before being assembled into a coil. The tubes are assembled into a complete coil with a design pressure of 24 bar. Finally the coil assembly is leak tested using air under water according to PED 2014/68/EU. To protect the coil against corrosion, it is placed in a heavy-duty steel frame and the entire assembly is dipped in molten zinc (hot dip galvanized) at a temperature of approximately 430°C.



Crossflow Fill

The PVC crossflow fill used in the PHC-E Evaporative Condenser is specially designed and manufactured by EVAPCO to induce highly turbulent mixing of the air and water for superior heat transfer. The fill is constructed of inert polyvinyl chloride. It will not rot or decay and is formulated to withstand water temperatures of 50°C.

The individual crossflow fill sheets are bonded together and supported at the bottom to enhance the structural integrity of the fill section. The assembled fill sheets form an integral inlet louver to prevent debris from entering the heat transfer fill. Each fill sheet has an integral multi-pass drift eliminator to strip the entrained water droplets from the discharge air. The fill material selected for the PHC-E Evaporative Condenser are self-extinguishing and have a flame spread of less than 25 under ASTM E84.



PHC-E Design and Construction Features – S Models

The PHC-E line of evaporative condensers reflect EVAPCO's commitment to product development. The advanced design provides owners with many operational and performance advantages. These parallel-flow hybrid condensers are designed for easy maintenance and long, trouble-free operation.

Sun-Blocker System (optional)

- Blocks sun light to minimize potential algae formation
- Prevents debris from entering the unit
- Eliminates water splash out



PVC Spray Distribution Header with ZM® II Nozzles

- Large orifice nozzles prevent clogging (no moving parts)
- Designed for superior water distribution
- Threaded nozzles eliminate troublesome grommets
- Fixed position nozzles require zero maintenance
- Guaranteed for life

CROSSCOOL™ Coil Design

- Internally enhanced coil for maximum heat transfer
- Low refrigerant charge
- Unique header design for free drainage
- PED 2014/68/EU compliant
- Design pressure of 24 bar

Unit Access

- Oversized access door for enhanced accessibility
- Internal walkway for safe and easy basin access (not available on 7' [2.1 m] box sizes)

Double-Brake Flange Joints

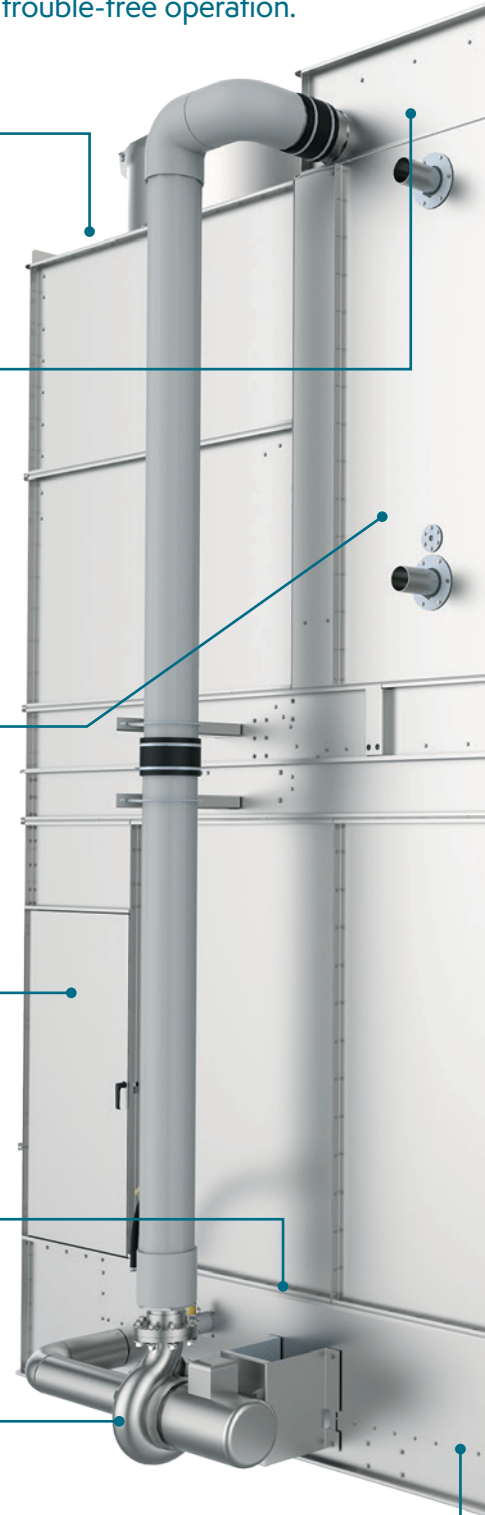
- Stronger than single brake designs
- Minimizes water leaks at field joints
- Greater structural rigidity

Totally Enclosed Pump Motors

- Help assure long, trouble-free operation

Stainless Steel Strainer

- Resists corrosion better than other materials



Z-725 Mill Hot-Dip Galvanized Steel Construction

(Stainless steel available as affordable option)

Drive System

- Totally enclosed fan motors assure long life
- Power-Band belts for better lateral rigidity
- Aluminum fan blades
- Non-corroding cast aluminum sheaves
- Heavy-Duty fan shaft bearings with L-10 life of 75,000 - 135,000 hrs.
- All other components are of corrosion resistant materials



Easy Rig Field Seam

- Self guiding channels improve the quality of the field seam to eliminate leaks
- Easy to install
- Lower installation cost

External Platform w/Ladder (optional)

- Safety cage
- Self supporting
- Modular design for easy field installation



Unique Fill Material

- Cross fluted PVC bonded block fill
- Superior heat transfer
- Impervious to rot and decay

Other PHC-S-E Options

- Internal ladder
- EVAPCO Water Systems
- Low Sound Fan
- Super Low Sound Fan



PHC-E Design and Construction Features – D Models



PVC Spray Distribution Header with ZM® II Nozzles

- Large orifice nozzles prevent clogging (no moving parts)
- Designed for superior water distribution
- Threaded nozzles eliminate troublesome grommets
- Fixed position nozzles require zero maintenance
- Guaranteed for life

Efficient Drift Eliminators

- Patented design reduces drift rate
- Made from corrosion resistant PVC for long life

U.S. Patent No. 6315804



CROSScool™ Coil Design

- Low refrigerant charge
- Unique header design for free drainage
- PED 2014/68/EU compliant
- Design pressure of 24 bar

Double-Brake Flange Joints

- Stronger than single brake design
- Minimizes water leaks at field joints
- Greater structural rigidity

Internal Walkway

- For safe easy access to entire basin

Pump House Access

- Easy access to pump and pump motor
- Oversized for easy addition of accessories, i.e. pan heaters

Large Access Door

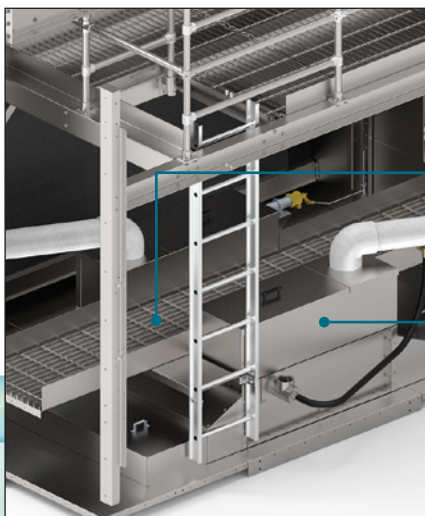
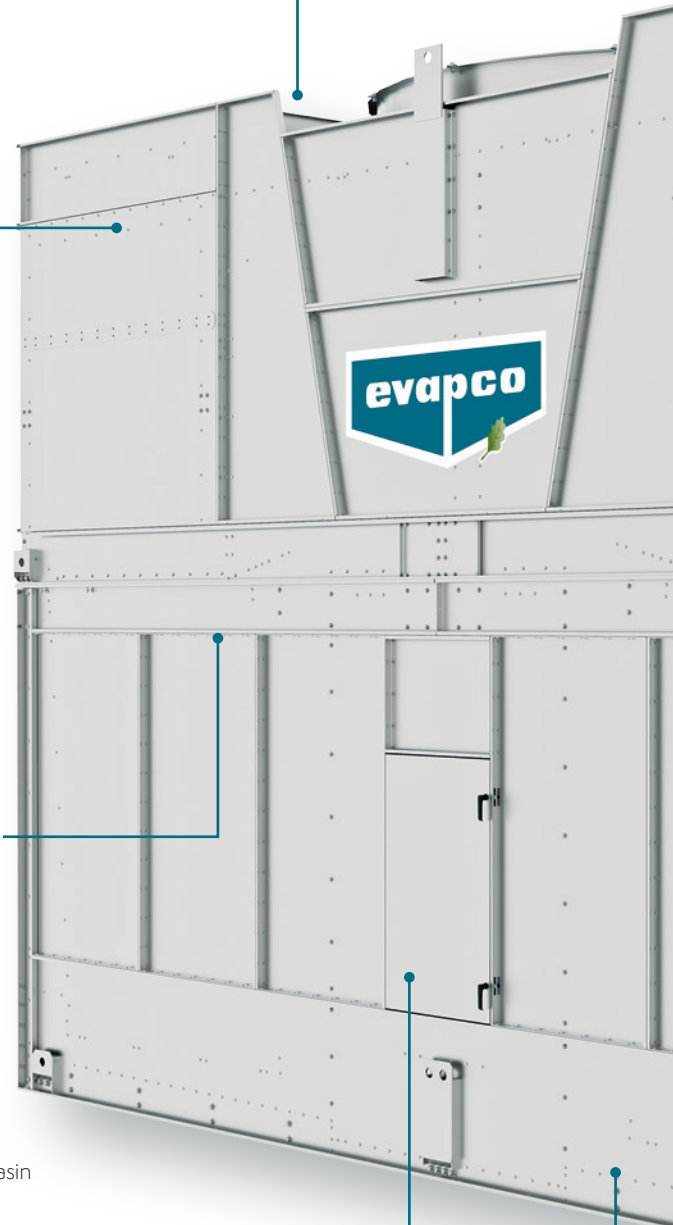
- Oversized access door for enhanced accessibility
- Standard on all models

Stainless Steel Strainer

- Resists corrosion better than other materials

Totally Enclosed Pump Motors

- Long, trouble-free operation



Z-725 Mill Hot-Dip Galvanized Steel Construction

(Stainless steel available as affordable option)

Advanced Design Smooth Flow Fan System

- Totally enclosed fan motors assures long life
- Power-Band belts for better lateral rigidity
- Advanced Design aluminum fan blades
- Non-corroding cast aluminum sheaves
- Heavy-Duty fan shaft bearings with L-10 life of 75,000 - 135,000 hrs.
- All other components are of corrosion resistant materials

Sun-Blocker System (optional)

- Blocks sun light to minimize potential algae formation
- Prevents debris from entering the unit
- Eliminates water splash out

Easy Rig Field Seam

- Self guiding channels improve the quality of the field seam to eliminate leaks
- Easy to install
- Lower installation cost

External Service Platform w/Ladder (optional)

- Safe access to coil
- Self supporting
- Modular design for easy field installation



Unique Fill Material

- Superior heat transfer
- Crossflow PVC bonded fill
- Greater structural integrity
- Impervious to rot and decay

Other PHC-D-E Options

- Internal motor davit
- Internal upper access ladder & platform
- Low Sound Fan
- Super Low Sound Fan



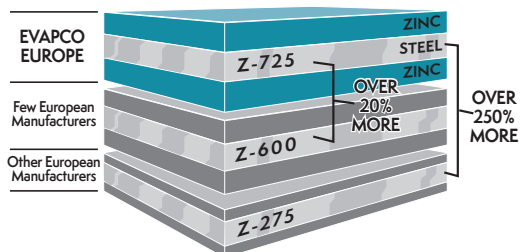
PHC-E Construction Features

PHC-E Construction Features

EVAPCO, known for superior product quality and the use of premium materials, has developed the ultimate system for corrosion protection in galvanized steel construction – the EVAPCOAT Corrosion Protection System. Marrying corrosion resistant materials with heavy gauge mill hot-dip galvanized steel construction to provide the longest life product with the best value.

Z-725 Mill Hot-Dip Galvanized Steel Construction

Mill hot-dip galvanized steel has been successfully used for over 40 years for the protection of evaporative condensers against corrosion. There are various grades of mill galvanized steel each with differing amounts of zinc protection. EVAPCO has been a leader in the industry in developing heavier galvanizing, and was the first to standardize on Z-600 mill hot-dip galvanized steel. Z-725 designation means there is a minimum of 725 g of zinc per m² of surface area present on the steel. Z-725 is the heaviest level of galvanizing available for manufacturing evaporative condensers and has over 2.5 times more zinc protection than competitive designs using Z-275 steel. With Z-725 mill hot-dip galvanized steel construction, EVAPCO provides galvanized steel panels with corrosion protection that approaches the level of the hot-dip galvanized heat exchanger coils.



During fabrication, all panel edges are coated with a 95% pure zinc-rich compound for extended corrosion resistance.



ZM® II Nozzle

ZM® II Spray Nozzle Water Distribution System

Uniform and constant water distribution are paramount for reliable, scale-free evaporative condensing. EVAPCO'S Zero Maintenance ZM® II Spray Nozzle remains clog-free under the toughest conditions.

The heavy-duty ABS ZM® II Spray Nozzles have a 1-1/4" (32 mm) diameter opening and a 1-1/4" (32 mm) splash plate clearance. The fixed position ZM® II Spray Nozzles are mounted in corrosion-free PVC waterdistribution pipes.

Together, these elements combine to provide enhanced water dispersion over the coil resulting in superior thermal performance and a virtually maintenance free water distribution system.

Fewer Fasteners Lower Installed Cost

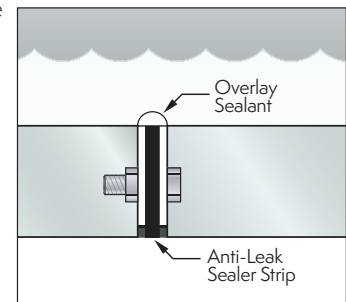
The PHC-E condensers feature a field seam design which ensures easier assembly and fewer field seam leaks. The field seam incorporates self-guiding channels which direct the coil casing section into position at the proper location on the bottom section of the condenser. In addition, the new design eliminates up to 85% of the fasteners typically used to join condenser sections in the field. This significantly reduces the amount of contractor labor cost to install the condenser.

Type 304 Stainless Steel Strainers

Subjected to excessive wear and corrosion, the sump strainer is critical to the successful operation of the condenser. EVAPCO uses only Type 304 Stainless Steel for this very important component.

Unique Seam Design—Eliminate Field Leaks

The PHC-E features EVAPCO's unique pan construction which includes a special butyl tape sealer. Each joint is then backed with a secondary caulking compound and encased in a double-brake flange for added strength and structural integrity. This unique sealing system has been proven effective in laboratory tests and years of field application.



Efficient Water Drift Eliminators

An efficient drift eliminator system removes entrained water droplets from the air stream to limit the drift loss from the condenser. With a low drift rate, EVAPCO condensers save valuable water and water treatment chemicals. The drift eliminators are constructed of an inert polyvinyl chloride (PVC) plastic material which effectively eliminates corrosion of these vital components. They are assembled in sections to facilitate easy removal for inspection of the coil.



PHC-E Construction Features/ Optional Equipment

Mechanical Drive System

Fan Motors – All PHC-E condensers utilize a Totally Enclosed Air Over (TEAO) fan motor designed specifically for evaporative cooling applications. Inverter duty fan motors are standard on all PHC-E condensers.

PHC-E S & D Fan Motor Mount – Units are equipped with TEAO motor mount assembly on each fan offering redundancy as compared to tandem arrangement. Routine maintenance is easily performed.

Power-Band Drive Belt: The Power-Band is a solid-back, multigroove belt system that has high lateral rigidity. The belt is constructed of neoprene with polyester cords. The drive belt is designed for minimum 150% of the motor nameplate horsepower for long life and durability.

Fan Shaft Bearings: The fan shaft bearings in PHC-E units are specially selected for long, trouble-free life. They are rated for an L-10 life of 75,000 to 135,000 hours and are the heaviest pillow block bearing available.

Aluminum Alloy Sheaves: Fan sheaves are constructed of corrosion resistant aluminum for long life, eliminating the corrosion that exists on cast steel sheaves, thereby extending belt life.

Maintenance Access

Large Access Door

For enhanced basin accessibility that enables maintenance personnel to quickly and easily enter the basin for float valve adjustment and unit inspection. This is provided standard on all PHC-E models.



Internal Walkway

Once inside the PHC-E condensers, maintenance personnel can safely move throughout the unit by way of a non-slip walkway. This walkway is standard on double coil units, and is standard on 12' (3.6 m) box size single coil units.

Optional Equipment

Self Supporting External Service Platforms

PHC-E Condensers are available with self-supporting service platforms that include access ladders which are designed for easy field installation. This option offers significant savings in comparison to field constructed, externally supported catwalks. The Evapco service platform option is for the air inlet end(s) of the unit.



PHC-S Model Shown

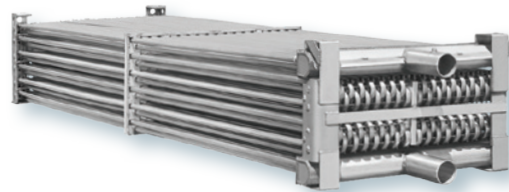
Stainless Steel Basin and Casing

In addition to the EVAPCOAT Corrosion Protection System, EVAPCO offers optional Type 304 or Type 316 stainless steel construction for superior corrosion resistance. EVAPCO induced draft condensers have a modular design which allows for specific areas to be enhanced for increased corrosion protection. The basin area of a condenser is often subjected to high concentrations of impurities and silt. EVAPCO's stainless steel basin option includes welded seam construction as standard. For particularly corrosive environments, stainless steel construction is also available for the coil casing / fan section.

PHC-S-E Dual Pump Option: On 12'x18' (3.6 m x 5.5 m) PHC-S-E models, an option for dual 50% spray water pumps is available. Using two smaller pumps as compared to one larger pump provides increased water loading on the coil and increased condensing capacity, while maintaining total installed pump power.

Evaporative Coils – Stainless Steel Construction

The heat exchanger coil is the heart of the evaporative condenser. For this critical component, EVAPCO offers the option of Type 304L and Type 316L stainless steel construction for the condensing coil. Highly efficient heat transfer coils with the ultimate corrosion protection.



Coil, Air Inlet & Sump Sun-Blocker System

EVAPCO's Sun-Blocker System is designed to prevent sunlight from entering the condenser at the coil inlet, at the fill/air intake, and through the fan cylinder. As standard, these areas are open and exposed to sunlight which may promote algae growth. The Sun-Blocker System will help minimize algae, water splash out, and may reduce water treatment chemistry costs.

Optional Equipment Water Treatment Solutions

Water Treatment Solutions

Pulse-Pure® Non-Chemical Water Treatment System



EVAPCO's Pulse-Pure® water treatment system utilizes pulsed electric field technology to provide an environmentally responsible alternative for the treatment of water in evaporative cooled equipment. The Pulse-Pure® system delivers short, high-frequency bursts of low energy electromagnetic fields to the recirculating water in the PHC-E.

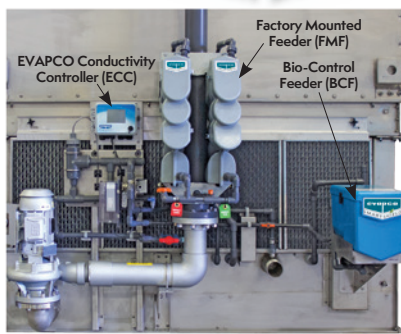


- EVAPCO guarantees that total bacterial counts will not exceed 10,000 CFU/ml in the cooling water
- Controls scale, corrosion, and microbiological growth with absolutely no chemicals required
- Compact design with no moving parts and low energy consumption

Smart Shield® Solid Chemical Water Treatment System



EVAPCO's Smart Shield® system utilizes proven solid chemistry delivered via our revolutionary feed system. Patented controlled a release scale and corrosion inhibitor is fed whenever your spray water pump is energized, keeping your system



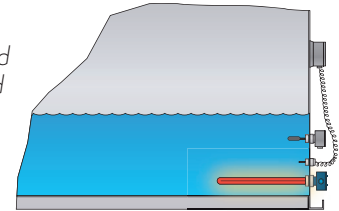
protected anytime the spray water pump is operating. Smart Shield® is a complete water treatment package that:

- Utilizes 'Bag in Bag' no touch chemical replenishments, making reloads easier and safer
- Creates reduced packaging, shipping and handling providing a reduced carbon footprint compared to liquid chemicals
- Eliminates the hazards associated with liquid chemicals, potential for liquid spills and the need for expensive feed pumps making it the easiest and safest chemical water treatment system available today

Basin Heater Package

Electric basin heater packages are available to help prevent freeze-up of the basin water. The packages include electric heater elements, thermostat and low water cutoff.

Note: External pumps should be heat traced and insulated in the field to prevent freezing.



	Heater Sizes (kW)			
	Box Size	-18°C	-28°C	-40°C
S Models	7x9	6	8	(2) 6
	7x12	8	(2) 6	(2) 8
	7x18	(2) 6	(2) 8	(3) 8
	12x12	(2) 5	(2) 8	(2) 10
	12x18	(2) 7	(2) 12	(3) 10
	12x24-2C	(4) 5	(4) 8	(4) 10
D Models	12x36-2C	(4) 7	(4) 12	(6) 10
	12x24	(2) 12	(4) 9	(4) 12
	14x26	(2) 15	(4) 10	(4) 15
	24x24	(4) 12	(8) 9	(8) 12
	28x26	(4) 15	(8) 10	(8) 15

Electric Water Level Control

EVAPCO evaporative condensers are available with an optional electric water level control system in place of the standard mechanical makeup valve and float assembly. This package provides very accurate control of the basin water level and does not require field adjustment, even under varying operating conditions.

Optional Equipment/ Steel Support

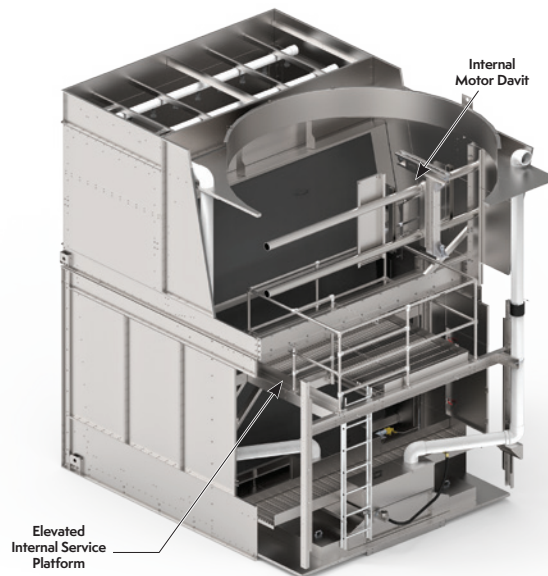
Optional Equipment (cont.)

Elevated Internal Service Platform

An elevated internal service platform option can be provided on the 12' (3.6 m) PHC-S-E models and the PHC-D-E models to provide easy access to the unit drive components. The elevated internal service platform system provides an aluminum ladder that extends from the walkway to the service platform located directly below the drive system. The service platform is constructed of galvanized steel and provides easy access to lubricate fan bearings and service the motor and drive components.

Internal Motor Davit

In order to provide for easy motor removal, the PHC-D-E models can be provided with an internal motor davit system. The internal motor davit is constructed of galvanized steel and provides an easy method to lower the fan motor to the basin of the unit for removal through the side access door.



Elevated Internal Service Platform & Internal Motor Davit

Steel Support

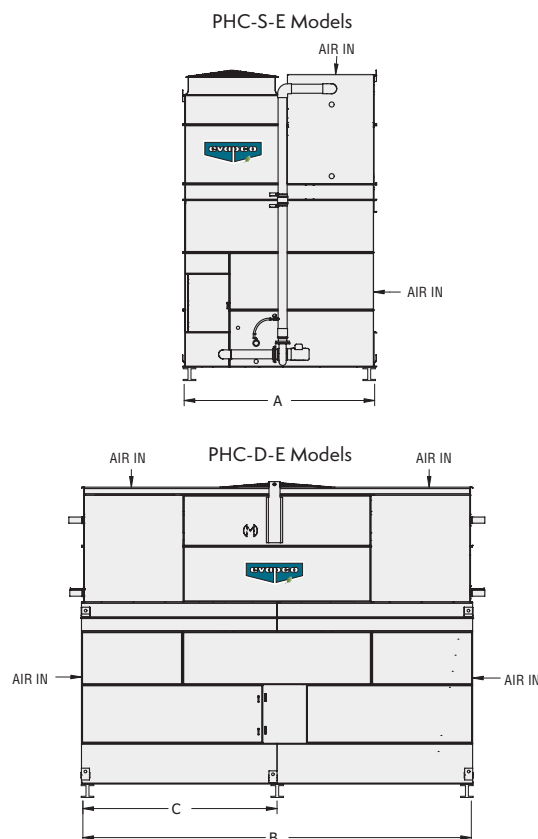
EVAPCO PHC-E condensers are designed to be supported with structural "I" beams located under the outer flanges and running the entire length of the unit. Mounting holes, 3/4" (19 mm) in diameter are located in the bottom channels of the pan section to provide for bolting to the structural steel. (Refer to certified drawings from the factory for bolt hole locations.)

Beams should be level to within 1/8" (3 mm) in 6' (1.8 m) before setting the unit in place. Do not level the unit by shimming between it and the "I" beams as this will not provide proper longitudinal support.

Consult IBC for required steel support layout and structural design

	PHC-E Pan Footprint Dimensions			
	Box Size	A	B	C
S Models	7x9	2184	-	-
	7x12	2184	-	-
	7x18	2184	-	-
	12x12	3607	-	-
	12x18	3607	-	-
	12x24	3607	-	-
D Models	12x24	-	7315	3658
	14x26	-	7925	3962
	24x24	-	7315	3658
	28x26	-	7925	3962

Note: Unit dimensions shown for reference only. Consult the PHC-E unit steel support drawings for specific beam dimensions and bolt locations.



Typical Steel Support

Engineering Dimensions & Data

Models *PHC-S79-107E to 161E*

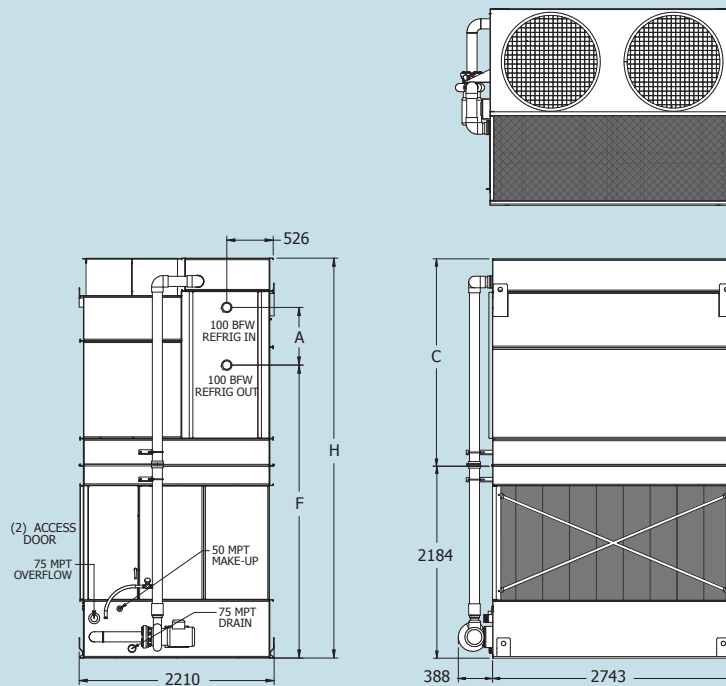


Table 1 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S79-107E	(2) 2.2	14.7	3955	5345	2715	55	454	2.2	19	1363	(1) 200	4850	1111	2861	2350	4575
PHC-S79-114E	(2) 2.2	15.1	4145	5545	2905	64	539	2.2	19	1363	(1) 200	5050	1340	2632	2350	4575
PHC-S79-119E	(2) 2.2	14.9	4245	5655	3005	73	623	2.2	19	1363	(1) 200	5155	1340	2632	2350	4575
PHC-S79-122E	(2) 4	17.4	3965	5360	2730	55	454	2.2	19	1363	(1) 200	4865	1111	2861	2350	4575
PHC-S79-130E	(2) 4	17.8	4155	5560	2920	64	539	2.2	19	1363	(1) 200	5060	1340	2632	2350	4575
PHC-S79-135E	(2) 4	17.7	4255	5670	3020	73	623	2.2	19	1363	(1) 200	5170	1340	2632	2350	4575
PHC-S79-137E	(2) 5.5	20.0	3955	5345	2715	55	454	2.2	19	1363	(1) 200	4850	1111	2861	2350	4575
PHC-S79-144E	(2) 5.5	20.4	4145	5545	2905	64	539	2.2	19	1363	(1) 200	5050	1340	2632	2350	4575
PHC-S79-150E	(2) 5.5	20.2	4245	5655	3005	73	623	2.2	19	1363	(1) 200	5155	1340	2632	2350	4575
PHC-S79-146E	(2) 7.5	22.2	3960	5350	2720	55	454	2.2	19	1363	(1) 200	4855	1111	2861	2350	4575
PHC-S79-154E	(2) 7.5	22.5	4150	5550	2910	64	539	2.2	19	1363	(1) 200	5055	1340	2632	2350	4575
PHC-S79-161E	(2) 7.5	22.2	4250	5660	3010	73	623	2.2	19	1363	(1) 200	5160	1340	2632	2350	4575

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-S712-151E to 210E

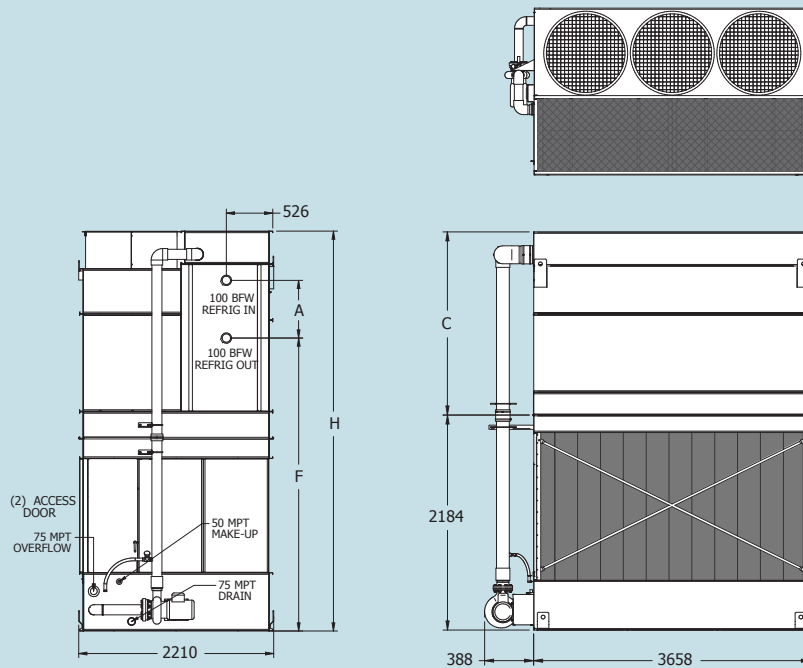


Table 2 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump		Dimensions (mm)				
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S712-151E	(3) 2.2	22.0	4985	6925	3465	69	595	4	36	1817	(1) 250	6245	1111	2861	2350	4575
PHC-S712-160E	(3) 2.2	22.6	5235	7185	3715	82	708	4	36	1817	(1) 250	6510	1340	2632	2350	4575
PHC-S712-167E	(3) 2.2	22.3	5400	7370	3875	100	850	4	36	1817	(1) 250	6690	1340	2632	2350	4575
PHC-S712-171E	(3) 4	26.1	5010	6945	3485	69	595	4	36	1817	(1) 250	6270	1111	2861	2350	4575
PHC-S712-182E	(3) 4	26.8	5260	7210	3735	82	708	4	36	1817	(1) 250	6530	1340	2632	2350	4575
PHC-S712-189E	(3) 4	26.5	5425	7390	3900	100	850	4	36	1817	(1) 250	6715	1340	2632	2350	4575
PHC-S712-188E	(3) 5.5	29.9	4985	6925	3465	69	595	4	36	1817	(1) 250	6245	1111	2861	2350	4575
PHC-S712-201E	(3) 5.5	30.6	5235	7185	3715	82	708	4	36	1817	(1) 250	6510	1340	2632	2350	4575
PHC-S712-210E	(3) 5.5	30.3	5400	7370	3875	100	850	4	36	1817	(1) 250	6690	1340	2632	2350	4575

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-S718-224E to 335E

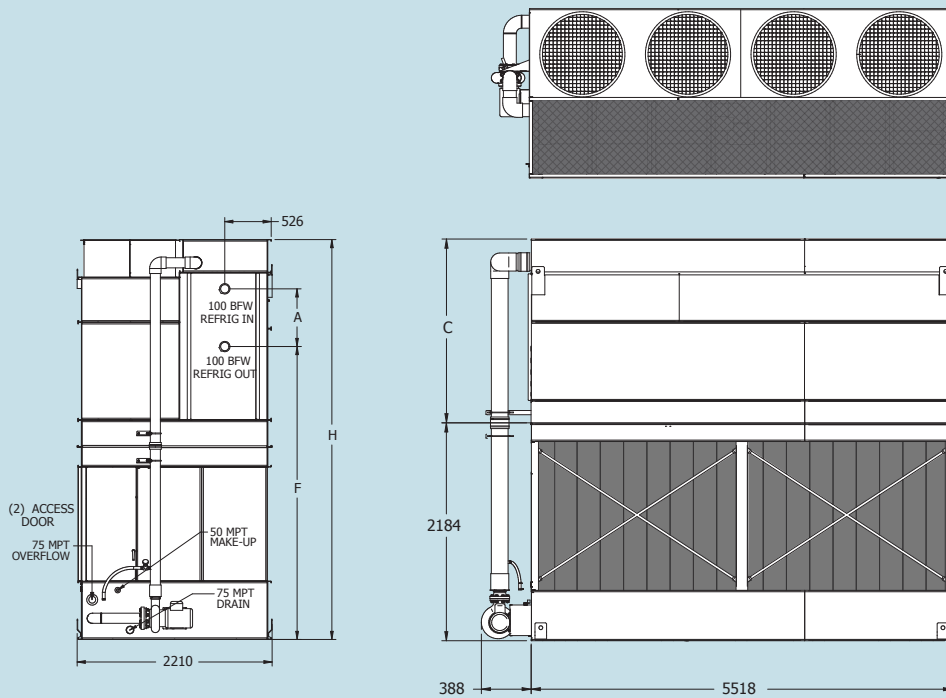


Table 3 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S718-224E	(4) 2.2	29.4	7180	10070	4995	109	907	5.5	47	2725	(1) 250	9085	1111	2861	2350	4575
PHC-S718-237E	(4) 2.2	30.1	7560	10465	5380	128	1077	5.5	47	2725	(1) 250	9485	1340	2632	2350	4575
PHC-S718-248E	(4) 2.2	29.8	7780	10710	5600	150	1275	5.5	47	2725	(1) 250	9730	1340	2632	2350	4575
PHC-S718-254E	(4) 4	34.9	7205	10095	5025	109	907	5.5	47	2725	(1) 250	9115	1111	2861	2350	4575
PHC-S718-270E	(4) 4	35.6	7585	10495	5405	128	1077	5.5	47	2725	(1) 250	9510	1340	2632	2350	4575
PHC-S718-282E	(4) 4	35.3	7810	10740	5625	150	1275	5.5	47	2725	(1) 250	9755	1340	2632	2350	4575
PHC-S718-281E	(4) 5.5	39.9	7180	10070	4995	109	907	5.5	47	2725	(1) 250	9085	1111	2861	2350	4575
PHC-S718-299E	(4) 5.5	40.8	7560	10465	5380	128	1077	5.5	47	2725	(1) 250	9485	1340	2632	2350	4575
PHC-S718-312E	(4) 5.5	40.4	7780	10710	5600	150	1275	5.5	47	2725	(1) 250	9730	1340	2632	2350	4575
PHC-S718-303E	(4) 7.5	44.5	7185	10075	5005	109	907	5.5	47	2725	(1) 250	9095	1111	2861	2350	4575
PHC-S718-321E	(4) 7.5	44.9	7570	10475	5385	128	1077	5.5	47	2725	(1) 250	9495	1340	2632	2350	4575
PHC-S718-335E	(4) 7.5	44.5	7790	10720	5610	150	1275	5.5	47	2725	(1) 250	9740	1340	2632	2350	4575

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-S1212-282E to 422E

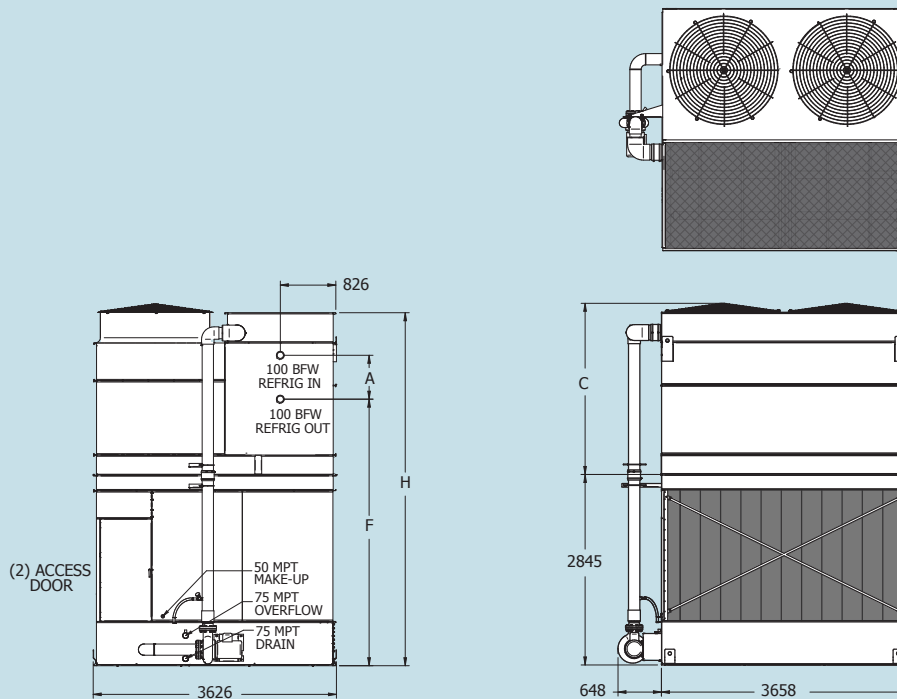


Table 4 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S1212-282E	(2) 4	30.8	6855	9320	4470	118	1020	5.5	51	2309	(1) 250	8405	1111	3518	2426	5391
PHC-S1212-300E	(2) 4	30.2	7285	9775	4895	146	1218	5.5	51	2309	(1) 250	8860	1340	3289	2426	5391
PHC-S1212-313E	(2) 4	29.6	7770	10280	5380	168	1416	5.5	51	2309	(1) 250	9365	1568	3518	2883	5848
PHC-S1212-319E	(2) 4	29.4	8285	10825	5900	196	1643	5.5	51	2309	(1) 250	9910	1797	3289	2883	5848
PHC-S1212-305E	(2) 5.5	35.3	6845	9305	4455	118	1020	5.5	51	2309	(1) 250	8390	1111	3518	2426	5391
PHC-S1212-326E	(2) 5.5	34.6	7270	9760	4885	146	1218	5.5	51	2309	(1) 250	8845	1340	3289	2426	5391
PHC-S1212-339E	(2) 5.5	33.9	7755	10265	5370	168	1416	5.5	51	2309	(1) 250	9355	1568	3518	2883	5848
PHC-S1212-347E	(2) 5.5	33.7	8270	10810	5885	196	1643	5.5	51	2309	(1) 250	9895	1797	3289	2883	5848
PHC-S1212-323E	(2) 7.5	38.8	6845	9310	4460	118	1020	5.5	51	2309	(1) 250	8395	1111	3518	2426	5391
PHC-S1212-345E	(2) 7.5	38.0	7275	9765	4890	146	1218	5.5	51	2309	(1) 250	8850	1340	3289	2426	5391
PHC-S1212-360E	(2) 7.5	37.3	7760	10270	5375	168	1416	5.5	51	2309	(1) 250	9360	1568	3518	2883	5848
PHC-S1212-367E	(2) 7.5	37.0	8275	10815	5890	196	1643	5.5	51	2309	(1) 250	9900	1797	3289	2883	5848
PHC-S1212-352E	(2) 11	44.5	6905	9370	4520	118	1020	5.5	51	2309	(1) 250	8455	1111	3518	2426	5391
PHC-S1212-373E	(2) 11	43.5	7335	9825	4945	146	1218	5.5	51	2309	(1) 250	8910	1340	3289	2426	5391
PHC-S1212-389E	(2) 11	42.6	7820	10330	5430	168	1416	5.5	51	2309	(1) 250	9415	1568	3518	2883	5848
PHC-S1212-398E	(2) 11	42.3	8335	10875	5950	196	1643	5.5	51	2309	(1) 250	9960	1797	3289	2883	5848
PHC-S1212-396E	(2) 15	47.9	7580	10070	5190	146	1218	5.5	51	2309	(1) 250	9260	1340	3289	2426	5391
PHC-S1212-413E	(2) 15	46.6	8065	10575	5675	168	1416	5.5	51	2309	(1) 250	9765	1568	3518	2883	5848
PHC-S1212-422E	(2) 15	46.2	8580	11120	6195	196	1643	5.5	51	2309	(1) 250	10310	1797	3289	2883	5848

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-S1218-414E to 616E

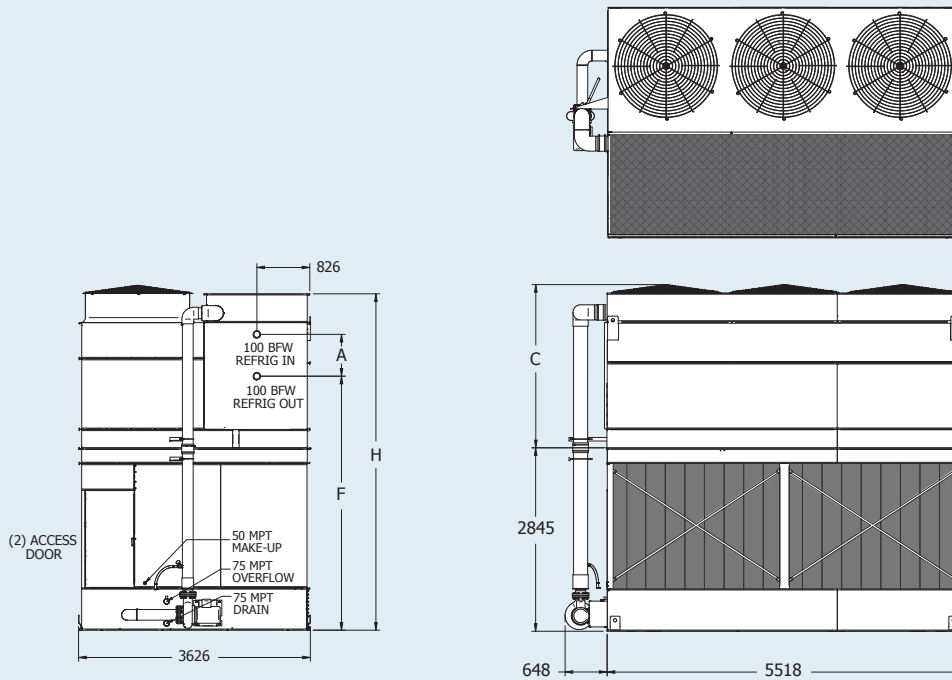


Table 5 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S1218-414E	(3) 4	46.7	10085	13800	6625	182	1530	5.5	65	3596	(1) 300	12415	1111	3518	2426	5391
PHC-S1218-438E	(3) 4	45.7	10725	14475	7265	218	1841	7.5	65	3596	(1) 300	13090	1340	3289	2426	5391
PHC-S1218-456E	(3) 4	44.9	11345	15135	7885	255	2153	7.5	65	3596	(1) 300	13750	1568	3518	2883	5848
PHC-S1218-467E	(3) 4	44.6	12075	15900	8615	291	2464	7.5	65	3596	(1) 300	14515	1797	3289	2883	5848
PHC-S1218-448E	(3) 5.5	53.5	10065	13780	6600	182	1530	7.5	65	3596	(1) 300	12390	1111	3518	2426	5391
PHC-S1218-476E	(3) 5.5	52.4	10705	14455	7240	218	1841	7.5	65	3596	(1) 300	13070	1340	3289	2426	5391
PHC-S1218-495E	(3) 5.5	51.3	11325	15110	7865	255	2153	7.5	65	3596	(1) 300	13725	1568	3518	2883	5848
PHC-S1218-506E	(3) 5.5	50.9	12055	15880	8595	291	2464	7.5	65	3596	(1) 300	14490	1797	3289	2883	5848
PHC-S1218-474E	(3) 7.5	58.8	10070	13785	6610	182	1530	7.5	65	3596	(1) 300	12400	1111	3518	2426	5391
PHC-S1218-503E	(3) 7.5	57.6	10710	14465	7250	218	1841	7.5	65	3596	(1) 300	13075	1340	3289	2426	5391
PHC-S1218-524E	(3) 7.5	56.5	11335	15120	7870	255	2153	7.5	65	3596	(1) 300	13735	1568	3518	2883	5848
PHC-S1218-536E	(3) 7.5	56.0	12065	15885	8605	291	2464	7.5	65	3596	(1) 300	14500	1797	3289	2883	5848
PHC-S1218-515E	(3) 11	67.2	10160	13875	6700	182	1530	7.5	65	3596	(1) 300	12485	1111	3518	2426	5391
PHC-S1218-546E	(3) 11	65.8	10800	14550	7335	218	1841	7.5	65	3596	(1) 300	13165	1340	3289	2426	5391
PHC-S1218-568E	(3) 11	64.6	11420	15205	7960	255	2153	7.5	65	3596	(1) 300	13820	1568	3518	2883	5848
PHC-S1218-582E	(3) 11	64.1	12150	15975	8690	291	2464	7.5	65	3596	(1) 300	14590	1797	3289	2883	5848
PHC-S1218-578E	(3) 15	72.5	11170	14920	7710	218	1841	7.5	65	3596	(1) 300	13695	1340	3289	2426	5391
PHC-S1218-603E	(3) 15	71.1	11790	15580	8330	255	2153	7.5	65	3596	(1) 300	14350	1568	3518	2883	5848
PHC-S1218-616E	(3) 15	70.6	12520	16345	9060	291	2464	7.5	65	3596	(1) 300	15120	1797	3289	2883	5848

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models *PHC-S1218-438E-2P* to *652E-2P*

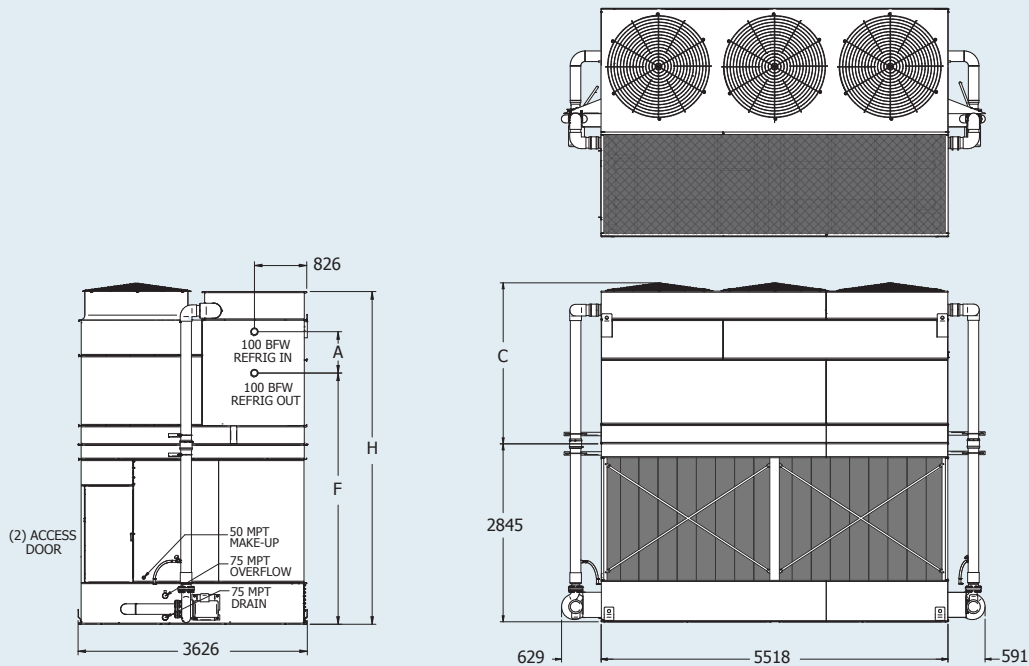


Table 6 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump		Dimensions (mm)				
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S1218-438E-2P	(3) 4	46.7	10170	13885	6625	182	1530	(2) 4	79	3899	(1) 300	12475	1111	3518	2426	5391
PHC-S1218-464E-2P	(3) 4	45.7	10810	14565	7265	218	1841	(2) 4	79	3899	(1) 300	13150	1340	3289	2426	5391
PHC-S1218-484E-2P	(3) 4	44.9	11435	15220	7885	255	2153	(2) 4	79	3899	(1) 300	13805	1568	3518	2883	5848
PHC-S1218-495E-2P	(3) 4	44.6	12165	15985	8615	291	2464	(2) 4	79	3899	(1) 300	14575	1797	3289	2883	5848
PHC-S1218-474E-2P	(3) 5.5	53.5	10150	13865	6600	182	1530	(2) 4	79	3899	(1) 300	12450	1111	3518	2426	5391
PHC-S1218-503E-2P	(3) 5.5	52.4	10790	14540	7240	218	1841	(2) 4	79	3899	(1) 300	13125	1340	3289	2426	5391
PHC-S1218-524E-2P	(3) 5.5	51.3	11410	15200	7865	255	2153	(2) 4	79	3899	(1) 300	13785	1568	3518	2883	5848
PHC-S1218-536E-2P	(3) 5.5	50.9	12140	15965	8595	291	2464	(2) 4	79	3899	(1) 300	14550	1797	3289	2883	5848
PHC-S1218-501E-2P	(3) 7.5	58.8	10160	13875	6610	182	1530	(2) 4	79	3899	(1) 300	12460	1111	3518	2426	5391
PHC-S1218-533E-2P	(3) 7.5	57.6	10800	14550	7250	218	1841	(2) 4	79	3899	(1) 300	13135	1340	3289	2426	5391
PHC-S1218-555E-2P	(3) 7.5	56.5	11420	15205	7870	255	2153	(2) 4	79	3899	(1) 300	13795	1568	3518	2883	5848
PHC-S1218-568E-2P	(3) 7.5	56.0	12150	15975	8605	291	2464	(2) 4	79	3899	(1) 300	14560	1797	3289	2883	5848
PHC-S1218-545E-2P	(3) 11	67.2	10245	13960	6700	182	1530	(2) 4	79	3899	(1) 300	12545	1111	3518	2426	5391
PHC-S1218-578E-2P	(3) 11	65.8	10885	14635	7335	218	1841	(2) 4	79	3899	(1) 300	13220	1340	3289	2426	5391
PHC-S1218-602E-2P	(3) 11	64.6	11505	15295	7960	255	2153	(2) 4	79	3899	(1) 300	13880	1568	3518	2883	5848
PHC-S1218-616E-2P	(3) 11	64.1	12235	16060	8690	291	2464	(2) 4	79	3899	(1) 300	14645	1797	3289	2883	5848
PHC-S1218-612E-2P	(3) 15	72.5	11255	15005	7710	218	1841	(2) 4	79	3899	(1) 300	13750	1340	3289	2426	5391
PHC-S1218-638E-2P	(3) 15	71.1	11880	15665	8330	255	2153	(2) 4	79	3899	(1) 300	14405	1568	3518	2883	5848
PHC-S1218-652E-2P	(3) 15	70.6	12610	16430	9060	291	2464	(2) 4	79	3899	(1) 300	15175	1797	3289	2883	5848

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-S1224-565E to 844E

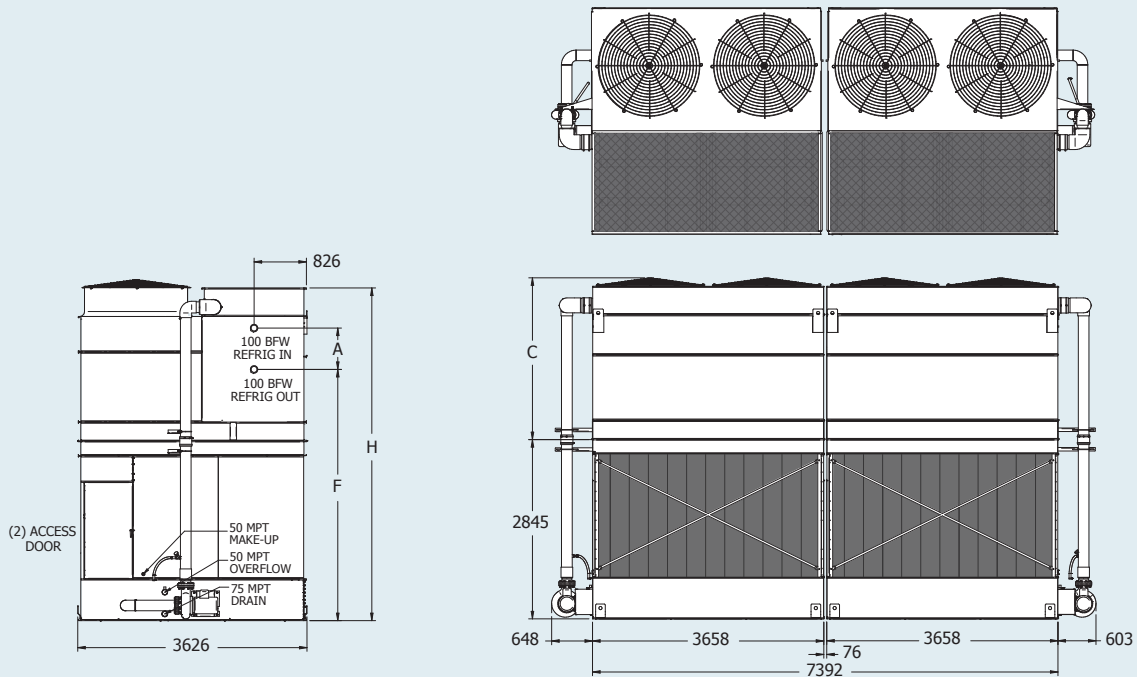


Table 7 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S1224-565E	(4) 4	61.5	13710	18635	4470	236	2039	(2) 5.5	101	4618	(2) 250	16810	1111	3518	2426	5391
PHC-S1224-600E	(4) 4	60.4	14565	19545	4895	291	2436	(2) 5.5	101	4618	(2) 250	17715	1340	3289	2426	5391
PHC-S1224-626E	(4) 4	59.3	15535	20560	5380	336	2832	(2) 5.5	101	4618	(2) 250	18735	1568	3518	2883	5848
PHC-S1224-638E	(4) 4	58.8	16570	21650	5900	391	3285	(2) 5.5	101	4618	(2) 250	19820	1797	3289	2883	5848
PHC-S1224-611E	(4) 5.5	70.5	13685	18610	4455	236	2039	(2) 5.5	101	4618	(2) 250	16785	1111	3518	2426	5391
PHC-S1224-651E	(4) 5.5	69.2	14535	19515	4885	291	2436	(2) 5.5	101	4618	(2) 250	17690	1340	3289	2426	5391
PHC-S1224-678E	(4) 5.5	67.8	15505	20530	5370	336	2832	(2) 5.5	101	4618	(2) 250	18705	1568	3518	2883	5848
PHC-S1224-694E	(4) 5.5	67.3	16540	21620	5885	391	3285	(2) 5.5	101	4618	(2) 250	19795	1797	3289	2883	5848
PHC-S1224-647E	(4) 7.5	77.6	13690	18620	4460	236	2039	(2) 5.5	101	4618	(2) 250	16790	1111	3518	2426	5391
PHC-S1224-690E	(4) 7.5	76.1	14545	19525	4890	291	2436	(2) 5.5	101	4618	(2) 250	17700	1340	3289	2426	5391
PHC-S1224-720E	(4) 7.5	74.6	15515	20540	5375	336	2832	(2) 5.5	101	4618	(2) 250	18715	1568	3518	2883	5848
PHC-S1224-734E	(4) 7.5	74.0	16550	21630	5890	391	3285	(2) 5.5	101	4618	(2) 250	19805	1797	3289	2883	5848
PHC-S1224-704E	(4) 11	88.9	13810	18735	4520	236	2039	(2) 7.5	101	4618	(2) 250	16910	1111	3518	2426	5391
PHC-S1224-746E	(4) 11	86.9	14665	19645	4945	291	2436	(2) 7.5	101	4618	(2) 250	17815	1340	3289	2426	5391
PHC-S1224-778E	(4) 11	85.2	15635	20660	5430	336	2832	(2) 7.5	101	4618	(2) 250	18835	1568	3518	2883	5848
PHC-S1224-796E	(4) 11	84.6	16670	21750	5950	391	3285	(2) 7.5	101	4618	(2) 250	19920	1797	3289	2883	5848
PHC-S1224-792E	(4) 15	95.7	15155	20135	5190	291	2436	(2) 7.5	101	4618	(2) 250	18515	1340	3289	2426	5391
PHC-S1224-826E	(4) 15	93.2	16125	21150	5675	336	2832	(2) 7.5	101	4618	(2) 250	19530	1568	3518	2883	5848
PHC-S1224-844E	(4) 15	92.4	17155	22240	6195	391	3285	(2) 7.5	101	4618	(2) 250	20620	1797	3289	2883	5848

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models *PHC-S1236-828E* to *1232E*

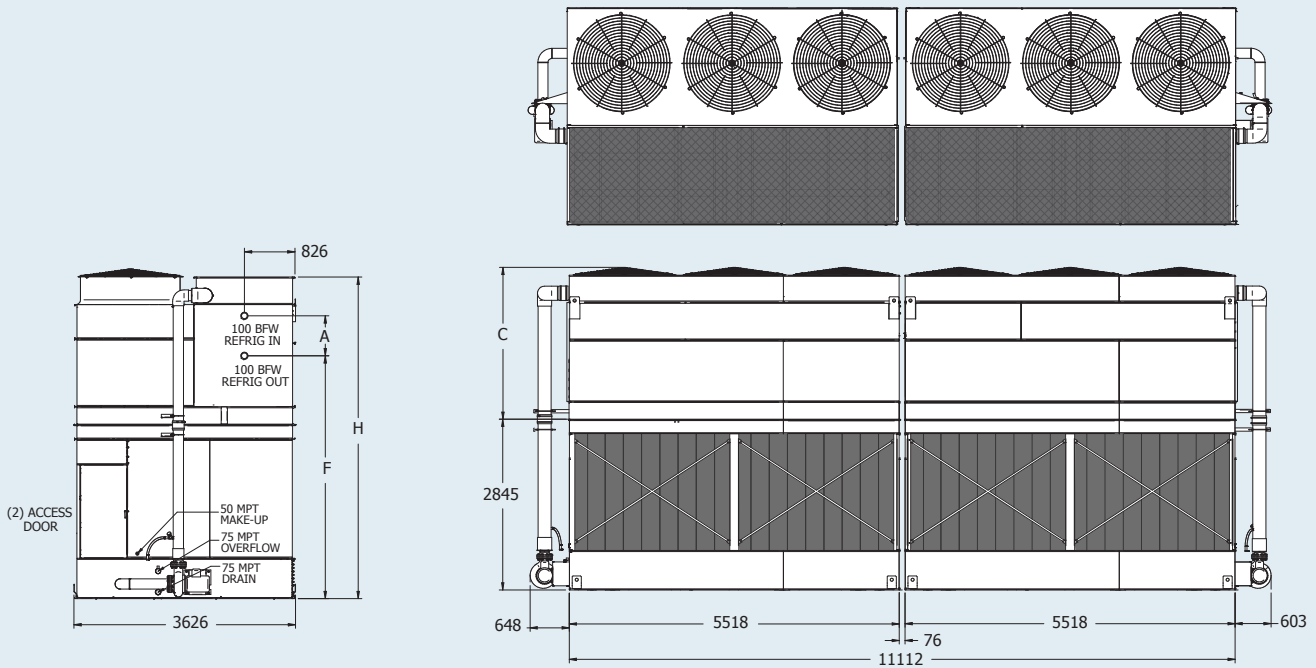


Table 8 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-S1236-828E	(6) 4	93.5	20170	27600	6625	363	3059	(2) 7.5	130	7192	(2) 300	24830	1111	3518	2426	5391
PHC-S1236-876E	(6) 4	91.5	21450	28950	7265	436	3682	(2) 7.5	130	7192	(2) 300	26180	1340	3289	2426	5391
PHC-S1236-912E	(6) 4	89.8	22690	30265	7885	509	4305	(2) 7.5	130	7192	(2) 300	27495	1568	3518	2883	5848
PHC-S1236-934E	(6) 4	89.1	24150	31800	8615	581	4928	(2) 7.5	130	7192	(2) 300	29030	1797	3289	2883	5848
PHC-S1236-896E	(6) 5.5	107.0	20125	27555	6600	363	3059	(2) 7.5	130	7192	(2) 300	24785	1111	3518	2426	5391
PHC-S1236-952E	(6) 5.5	104.8	21405	28905	7240	436	3682	(2) 7.5	130	7192	(2) 300	26135	1340	3289	2426	5391
PHC-S1236-992E	(6) 5.5	102.6	22645	30220	7865	509	4305	(2) 7.5	130	7192	(2) 300	27450	1568	3518	2883	5848
PHC-S1236-1012E	(6) 5.5	101.9	24105	31755	8595	581	4928	(2) 7.5	130	7192	(2) 300	28985	1797	3289	2883	5848
PHC-S1236-948E	(6) 7.5	117.6	20140	27570	6610	363	3059	(2) 7.5	130	7192	(2) 300	24800	1111	3518	2426	5391
PHC-S1236-1006E	(6) 7.5	115.2	21420	28925	7250	436	3682	(2) 7.5	130	7192	(2) 300	26155	1340	3289	2426	5391
PHC-S1236-1048E	(6) 7.5	112.9	22665	30240	7870	509	4305	(2) 7.5	130	7192	(2) 300	27470	1568	3518	2883	5848
PHC-S1236-1072E	(6) 7.5	112.0	24125	31770	8605	581	4928	(2) 7.5	130	7192	(2) 300	29005	1797	3289	2883	5848
PHC-S1236-1030E	(6) 11	134.4	20315	27745	6700	363	3059	(2) 7.5	130	7192	(2) 300	24975	1111	3518	2426	5391
PHC-S1236-1092E	(6) 11	131.7	21595	29095	7335	436	3682	(2) 7.5	130	7192	(2) 300	26325	1340	3289	2426	5391
PHC-S1236-1138E	(6) 11	129.2	22835	30410	7960	509	4305	(2) 7.5	130	7192	(2) 300	27640	1568	3518	2883	5848
PHC-S1236-1164E	(6) 11	128.2	24295	31945	8690	581	4928	(2) 7.5	130	7192	(2) 300	29175	1797	3289	2883	5848
PHC-S1236-1156E	(6) 15	144.9	22335	29840	7710	436	3682	(2) 7.5	130	7192	(2) 300	27390	1340	3289	2426	5391
PHC-S1236-1206E	(6) 15	142.2	23580	31155	8330	509	4305	(2) 7.5	130	7192	(2) 300	28705	1568	3518	2883	5848
PHC-S1236-1232E	(6) 15	141.1	25040	32690	9060	581	4928	(2) 7.5	130	7192	(2) 300	30235	1797	3289	2883	5848

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models *PHC-D1224-718E to 879E*

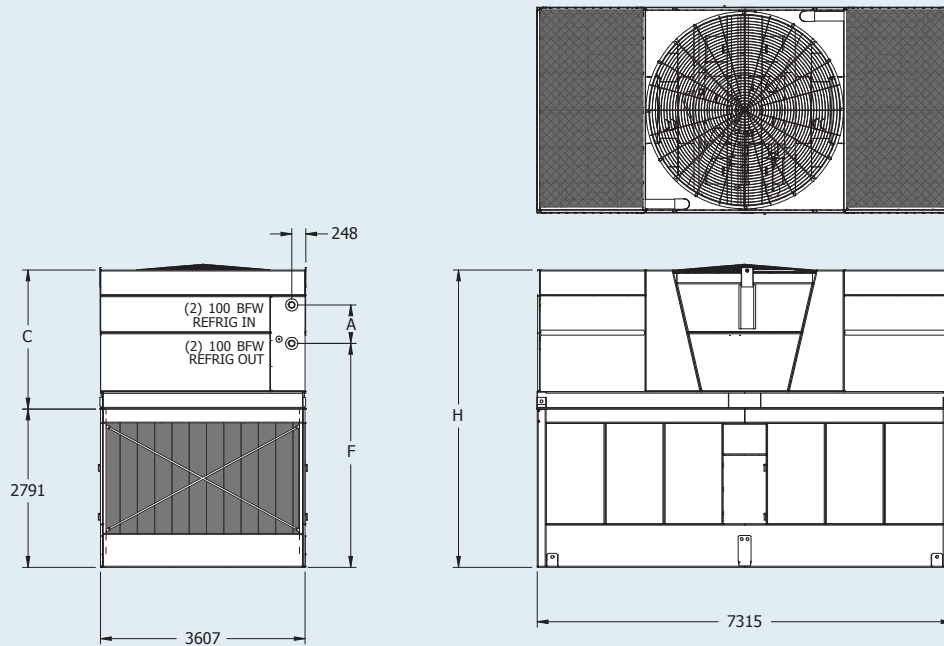


Table 9 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-D1224-718E	22	83.7	15435	19335	10855	327	2776	(2) 5.5	114	5980	(1) 360	18785	1365	3261	2534	5245
PHC-D1224-747E	22	83.8	16480	20435	11905	382	3229	(2) 5.5	114	5980	(1) 360	19885	1594	3489	2991	5702
PHC-D1224-766E	22	81.5	17580	21590	13000	436	3682	(2) 5.5	114	5980	(1) 360	21040	1822	3261	2991	5702
PHC-D1224-760E	30	92.1	15530	19430	10950	327	2776	(2) 5.5	114	5980	(1) 360	18880	1365	3261	2534	5245
PHC-D1224-792E	30	90.3	16575	20530	12000	382	3229	(2) 5.5	114	5980	(1) 360	19980	1594	3489	2991	5702
PHC-D1224-810E	30	89.6	17675	21685	13100	436	3682	(2) 5.5	114	5980	(1) 360	21135	1822	3261	2991	5702
PHC-D1224-794E	37	99.2	15535	19435	10955	327	2776	(2) 5.5	114	5980	(1) 360	18885	1365	3261	2534	5245
PHC-D1224-829E	37	97.2	16580	20535	12005	382	3229	(2) 5.5	114	5980	(1) 360	19985	1594	3489	2991	5702
PHC-D1224-848E	37	96.4	17680	21690	13100	436	3682	(2) 5.5	114	5980	(1) 360	21135	1822	3261	2991	5702
PHC-D1224-824E	45	105.4	15660	19560	11085	327	2776	(2) 5.5	114	5980	(1) 360	19010	1365	3261	2534	5245
PHC-D1224-859E	45	103.2	16710	20665	12130	382	3229	(2) 5.5	114	5980	(1) 360	20110	1594	3489	2991	5702
PHC-D1224-879E	45	102.4	17805	21815	13230	436	3682	(2) 5.5	114	5980	(1) 360	21265	1822	3261	2991	5702

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-D1426-828E to 1060E

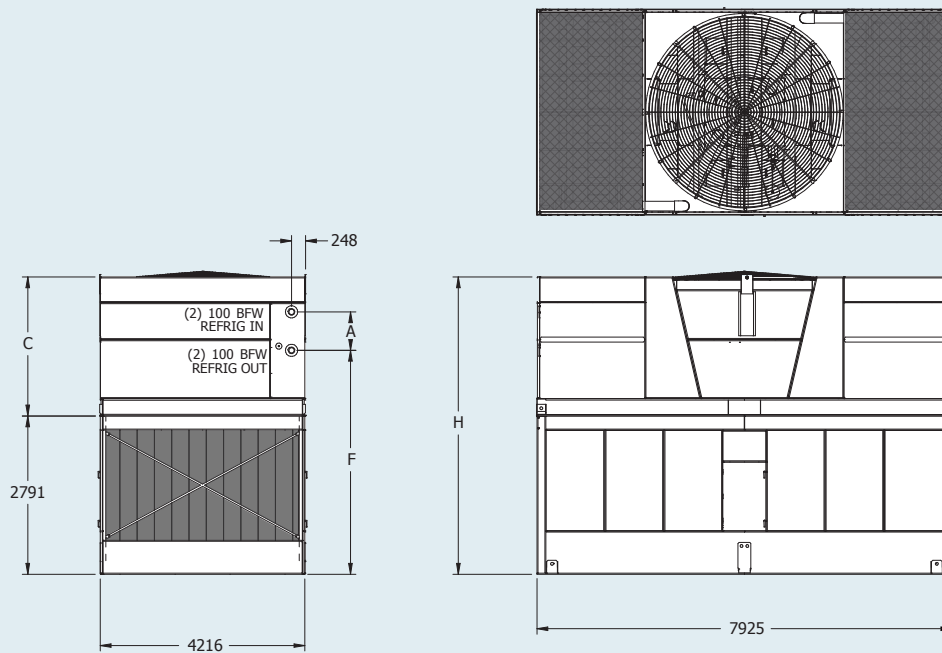


Table 10 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-D1426-828E	22	96.7	17465	22525	12355	382	3229	(2) 5.5	114	7986	(1) 360	21860	1365	3261	2534	5245
PHC-D1426-863E	22	94.8	18750	23870	13640	445	3795	(2) 5.5	114	7986	(1) 360	23205	1594	3489	2991	5702
PHC-D1426-882E	22	94.0	20000	25185	14890	509	4305	(2) 5.5	114	7986	(1) 360	24520	1822	3261	2991	5702
PHC-D1426-877E	30	106.3	17565	22625	12455	382	3229	(2) 5.5	114	7986	(1) 360	21960	1365	3261	2534	5245
PHC-D1426-914E	30	104.2	18850	23970	13735	445	3795	(2) 5.5	114	7986	(1) 360	23305	1594	3489	2991	5702
PHC-D1426-934E	30	103.4	20100	25285	14990	509	4305	(2) 5.5	114	7986	(1) 360	24620	1822	3261	2991	5702
PHC-D1426-917E	37	114.5	17565	22625	12455	382	3229	(2) 5.5	114	7986	(1) 360	21960	1365	3261	2534	5245
PHC-D1426-956E	37	112.2	18850	23970	13735	445	3795	(2) 5.5	114	7986	(1) 360	23305	1594	3489	2991	5702
PHC-D1426-978E	37	111.3	20100	25285	14990	509	4305	(2) 5.5	114	7986	(1) 360	24620	1822	3261	2991	5702
PHC-D1426-951E	45	121.6	17695	22755	12585	382	3229	(2) 5.5	114	7986	(1) 360	22090	1365	3261	2534	5245
PHC-D1426-991E	45	119.1	18980	24100	13870	445	3795	(2) 5.5	114	7986	(1) 360	23435	1594	3489	2991	5702
PHC-D1426-1013E	45	118.2	20235	25415	15120	509	4305	(2) 5.5	114	7986	(1) 360	24755	1822	3261	2991	5702
PHC-D1426-994E	56	130.8	17710	22770	12600	382	3229	(2) 5.5	114	7986	(1) 360	22105	1365	3261	2534	5245
PHC-D1426-1037E	56	128.2	18995	24115	13880	445	3795	(2) 5.5	114	7986	(1) 360	23450	1594	3489	2991	5702
PHC-D1426-1060E	56	127.2	20245	25430	15135	509	4305	(2) 5.5	114	7986	(1) 360	24765	1822	3261	2991	5702

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models *PHC-D2424-1436E* to *1758E*

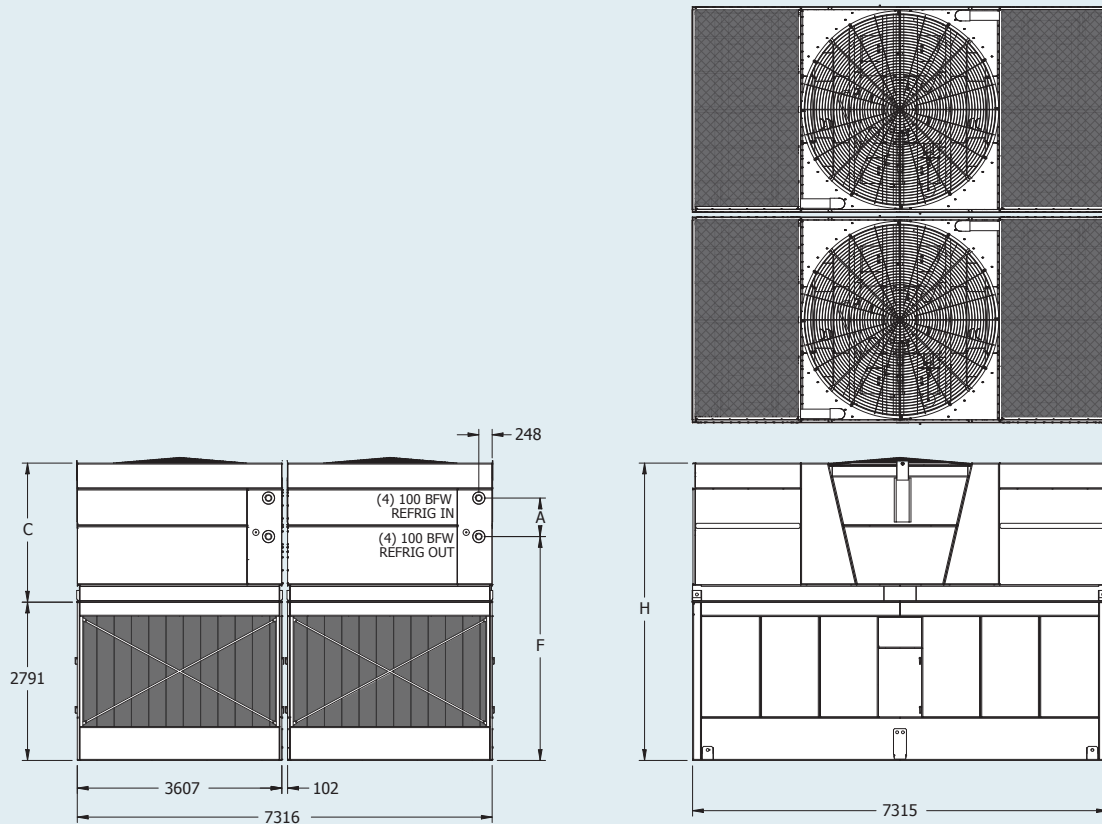


Table 11 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-D2424-1436E	(2) 22	167.5	30865	38665	10855	654	5551	(4) 5.5	228	11961	(2) 360	37565	1365	3261	2534	5245
PHC-D2424-1495E	(2) 22	167.7	32960	40870	11905	763	6457	(4) 5.5	228	11961	(2) 360	39770	1594	3489	2991	5702
PHC-D2424-1532E	(2) 22	162.9	35155	43175	13000	871	7363	(4) 5.5	228	11961	(2) 360	42075	1822	3261	2991	5702
PHC-D2424-1520E	(2) 30	184.3	31055	38855	10950	654	5551	(4) 5.5	228	11961	(2) 360	37755	1365	3261	2534	5245
PHC-D2424-1584E	(2) 30	180.6	33150	41060	12000	763	6457	(4) 5.5	228	11961	(2) 360	39960	1594	3489	2991	5702
PHC-D2424-1620E	(2) 30	179.2	35345	43365	13100	871	7363	(4) 5.5	228	11961	(2) 360	42265	1822	3261	2991	5702
PHC-D2424-1588E	(2) 37	198.4	31065	38865	10955	654	5551	(4) 5.5	228	11961	(2) 360	37765	1365	3261	2534	5245
PHC-D2424-1658E	(2) 37	194.5	33160	41070	12005	763	6457	(4) 5.5	228	11961	(2) 360	39970	1594	3489	2991	5702
PHC-D2424-1696E	(2) 37	192.9	35355	43375	13100	871	7363	(4) 5.5	228	11961	(2) 360	42275	1822	3261	2991	5702
PHC-D2424-1648E	(2) 45	210.7	31320	39120	11085	654	5551	(4) 5.5	228	11961	(2) 360	38020	1365	3261	2534	5245
PHC-D2424-1718E	(2) 45	206.5	33415	41325	12130	763	6457	(4) 5.5	228	11961	(2) 360	40225	1594	3489	2991	5702
PHC-D2424-1758E	(2) 45	204.8	35610	43630	13230	871	7363	(4) 5.5	228	11961	(2) 360	42530	1822	3261	2991	5702

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Engineering Dimensions & Data

Models PHC-D2826-1656E to 2120E

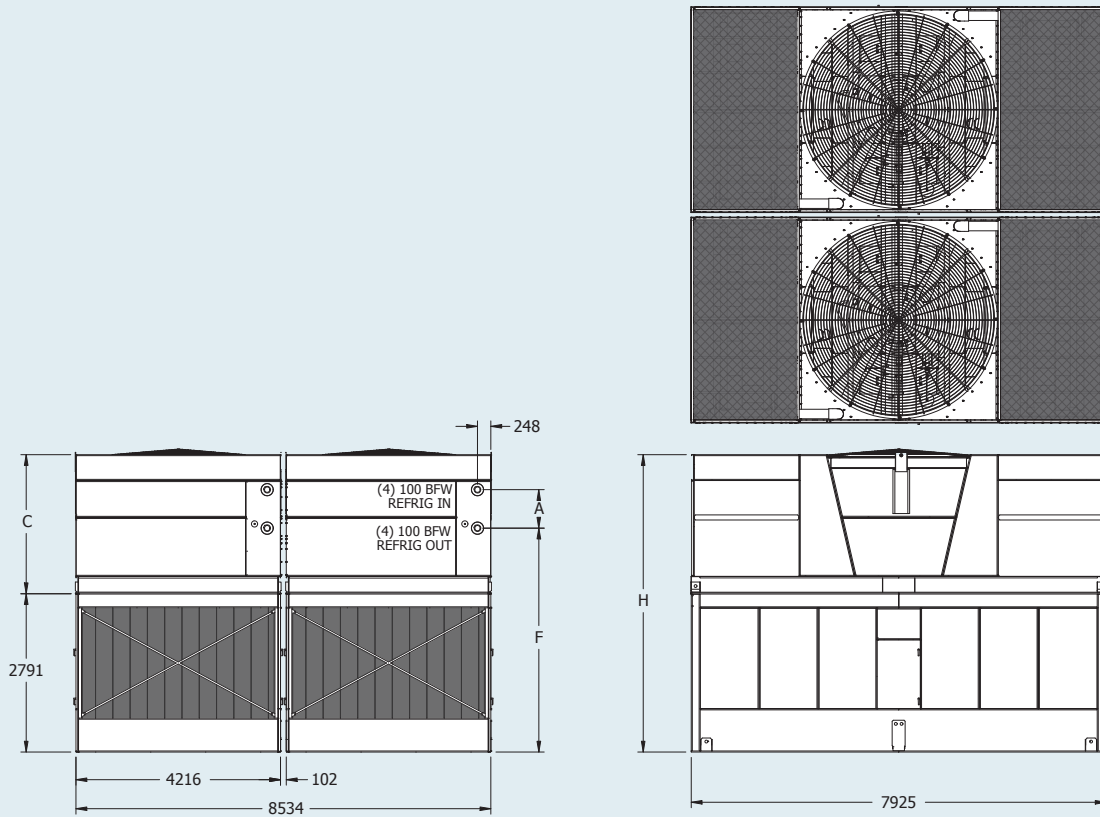


Table 12 Engineering Data

Model No.	Fans		Weights (kg)			NH3 Operating Charge (kg)	Coil Volume (Liters)	Spray Pump		Remote Sump			Dimensions (mm)			
	kW	m ³ /s	Shipping	Operating	Heaviest Section†			kW	l/s	Liters Req'd	Conn. Size (mm)	Operating Weight (kg)	A	F	C	H
PHC-D2826-1656E	(2) 22	193.4	34930	45045	12355	763	6457	(4) 5.5	228	15973	(2) 360	43715	1365	3261	2534	5245
PHC-D2826-1726E	(2) 22	189.6	37495	47740	13640	890	7589	(4) 5.5	228	15973	(2) 360	46410	1594	3489	2991	5702
PHC-D2826-1764E	(2) 22	188.0	40000	50370	14890	1017	8609	(4) 5.5	228	15973	(2) 360	49040	1822	3261	2991	5702
PHC-D2826-1754E	(2) 30	212.7	35130	45245	12455	763	6457	(4) 5.10	228	15973	(2) 360	43915	1365	3261	2534	5245
PHC-D2826-1828E	(2) 30	208.4	37695	47940	13735	890	7589	(4) 5.11	228	15973	(2) 360	46610	1594	3489	2991	5702
PHC-D2826-1868E	(2) 30	206.7	40200	50570	14990	1017	8609	(4) 5.12	228	15973	(2) 360	49240	1822	3261	2991	5702
PHC-D2826-1834E	(2) 37	228.9	35130	45245	12455	763	6457	(4) 5.17	228	15973	(2) 360	43915	1365	3261	2534	5245
PHC-D2826-1912E	(2) 37	224.4	37695	47940	13735	890	7589	(4) 5.18	228	15973	(2) 360	46610	1594	3489	2991	5702
PHC-D2826-1956E	(2) 37	222.6	40200	50570	14990	1017	8609	(4) 5.19	228	15973	(2) 360	49240	1822	3261	2991	5702
PHC-D2826-1902E	(2) 45	243.2	35390	45505	12585	763	6457	(4) 5.24	228	15973	(2) 360	44180	1365	3261	2534	5245
PHC-D2826-1982E	(2) 45	238.3	37960	48200	13870	890	7589	(4) 5.25	228	15973	(2) 360	46875	1594	3489	2991	5702
PHC-D2826-2026E	(2) 45	236.4	40465	50830	15120	1017	8609	(4) 5.26	228	15973	(2) 360	49505	1822	3261	2991	5702
PHC-D2826-1988E	(2) 56	261.7	35420	45535	12600	763	6457	(4) 5.30	228	15973	(2) 360	44205	1365	3261	2534	5245
PHC-D2826-2074E	(2) 56	256.5	37985	48230	13880	890	7589	(4) 5.31	228	15973	(2) 360	46900	1594	3489	2991	5702
PHC-D2826-2120E	(2) 56	254.4	40490	50860	15135	1017	8609	(4) 5.32	228	15973	(2) 360	49530	1822	3261	2991	5702

NOTE: Dimensions and weights are subject to change. The coil connection quantity and locations are subject to change due to refrigerant loading. Refer to project certified print drawings for specific weights, dimensions and all piping connections.

† Heaviest section is the casing/fan section.

Application

Design

EVAPCO units are heavy-duty construction and designed for long trouble-free operation. Proper equipment selection, installation and maintenance are, however, necessary to ensure good unit performance. Some of the major considerations in the application of a condenser are presented below. For additional information, contact the factory.

Air Circulation

In reviewing the system design and unit location, it is important that proper air circulation be provided. The best location is on an unobstructed roof top or on ground level away from walls and other barriers. Care must be taken when locating condensers in wells or enclosures or next to high walls. The potential for recirculation of hot, moist discharge air back into the fan intake exists. Recirculation raises the wet bulb temperature of the entering air causing the condensing pressure to rise above the design. For these cases, a discharge hood or ductwork should be provided to raise the overall unit height even with the adjacent wall, thereby reducing the chance of recirculation. Good engineering practice dictates that the evaporative condenser's discharge air not be directed or located close to, or in the vicinity of, building air intakes. Engineering assistance is available from the factory to identify potential recirculation problems and recommend solutions.

For additional information regarding layout of evaporative condensers, see EVAPCO Bulletin entitled *"Equipment Layout"*.

Piping

Condenser piping should be designed and installed in accordance with generally accepted engineering practice. All piping should be anchored by properly designed hangers and supports with allowance made for possible expansion and contraction. No external loads should be placed upon condenser connections, nor should any of the pipe supports be anchored to the unit framework. For additional information concerning refrigerant pipe sizing and layout, see EVAPCO Bulletin entitled *"Refrigerant Piping Manual"*.

Maintaining the Recirculated Water System

The heat rejection in a condenser is accomplished by the evaporation of a portion of the recirculated spray water. As this water evaporates, it leaves behind all of its mineral content and impurities. Therefore, it is important to bleed-off an amount of water equal to that which is evaporated to prevent the build-up of these impurities. If this is not done, the mineral or the acidic nature of the water will continue to increase. This will ultimately result in heavy scaling or a corrosive condition.

Bleed-off

Each unit supplied with a pump mounted on the side is furnished with a clear bleed line for visual inspection and a valve which, when fully open, will bleed-off the proper amount of water. If the make-up water supplying the unit is relatively free of impurities, it may be possible to cut back the bleed, but the unit must be checked frequently to make sure scale is not forming. Make-up water pressure should be maintained between 140 and 340 kPa.

Water Treatment

A proper water treatment program is an essential part of routine maintenance in order to help assure proper operation and longevity of the unit. To help prevent the formation of "white rust", the interior of the unit should be passivated during start-up and monitored periodically as part of the water treatment program. For more information about white rust, please request a copy of EVAPCO Engineering Bulletin 36. A qualified water treatment company should be contacted to design a water treatment protocol specifically based on applicable location, water quality and unit materials of construction.

If acid is used for treatment, it should be accurately metered and the concentration properly controlled. **The pH of the water should be maintained between 6.5 and 8.0. Units constructed of galvanized steel operating with circulating water having a pH of 8.3 or higher will require periodic passivation of the galvanized steel to prevent the formation of "white rust"**. Batch chemical feeding is not recommended because it does not afford the proper degree of control. If acid cleaning is required, extreme caution must be exercised and only inhibited acids recommended for use with galvanized construction should be used.

NOTE: Operating the condenser below 6.0 pH for any period of time may cause the removal of the protective zinc coating on the galvanized steel components.

For more information see EVAPCO Bulletin entitled *"Maintenance Instructions"*.

Control of Biological Contamination

Water quality should be checked regularly for biological contamination. If biological contamination is detected, a more aggressive water treatment and mechanical cleaning program should be undertaken. The water treatment program should be performed in conjunction with a qualified water treatment company. It is important that all internal surfaces be kept clean of accumulated dirt and sludge. In addition, the drift eliminators should be maintained in good operating condition.

Solutions for Sound Sensitive Applications

The PHC-E product line is available with two (2) equipment options to reduce the overall sound generated from the side or top of the unit. Each option provides various levels of sound reduction and can be used in combination to provide the lowest sound level. If a detailed analysis or full octave band data sheet is required for your application, please consult your EVAPCO Sales Representative.

NOTE: Not all PHC-E models are available with low sound options. These low sound option may impact performance, installed dimensions and weight of the unit.

Application

Remote Sump Installations

The PHC-E Evaporative Condenser utilizes a hybrid technology design that presents some unique features and application issues when applied on typical remote sump applications. The PHC-E Condenser design uses a combination of primary condenser coil surface with high efficiency PVC fill to achieve the design condenser capacity. (Refer to page 3 for "Principle of Operation.") The PHC-E models are most effective when supplied with an integral recirculating pump. When the PHC-E Condenser is installed with a remote sump system with multiple condensers, thermal efficiency may be reduced.

Performance

Due to its design, the PHC-E unit performance may require additional consideration when applied in a remote sump application. The inherent performance of the PHC-E Condenser utilizes PVC fill to cool the recirculating water in combination with the prime surface condenser coil. When the PHC is installed in an existing remote sump system with multiple evaporative condensers (such as PMC-E, ATC-E, or LRC models or other PHC-E's where the fans are shut down to control capacity), the return water to the condensers may be elevated during peak design conditions. The higher recirculating water temperatures will have an adverse effect on the PHC-E Condenser performance resulting in reduced operating efficiency. These applications should be limited to ensure maximum operating efficiency.

Piping

The traditional method of piping an evaporative condenser on a remote sump installation is to pipe the supply lines to the condenser water distribution system connection(s) located on the side of the coil casing. The remote sump drain connections are typically located in the bottom of the condenser basin to return the water to the sump tank.

The PHC-E design offers similar pipe arrangements on the PHC-S Models. However, the larger PHC-D Models offer alternate piping options for the remote sump systems.

Figure 1 – Top-End Mount Water Inlet

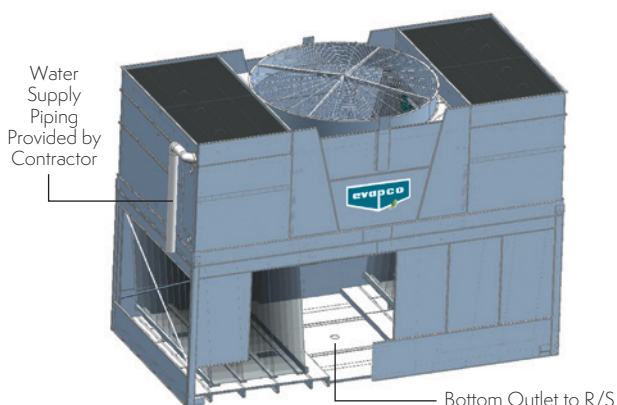
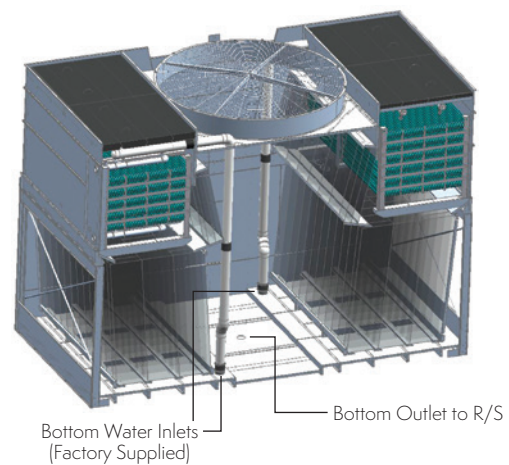


Figure 1, illustrates the water supply piping arrangement that connects to the condenser water distribution system on the top side of the casing. The PHC-D models will require two supply connections that be piped individually or piped to a manifold header.

The alternate method of piping the PHC-D Model is shown in Figure 2. Using this piping method, the water supply lines may be piped to the bottom of the condenser to connect to the water distribution system. For this piping design, two water supply lines are required to feed each cell of the PHC-D Models.

Figure 2 – Bottom Water Inlet



Note: When individual supply lines are piped to the PHC condenser balancing valves are recommended to ensure equal flow to each side of the condenser water distribution system.

The remote sump drain connections for the PHC-E Condenser design will typically be located on the bottom of the basin section of the condenser as standard. The PHC-S and D Models will require one connection per condenser cell.

EVAPCO will supply a detailed certified print drawing for each PHC Condenser to illustrate the unit dimensions, connection sizes, quantity and location of all water inlet and remote sump drain connections as specified on the order. Refer to the EVAPCO certified dimensional drawings to determine all piping requirements.

Water Treatment Systems

Remote sump systems typically present many different piping designs to supply water from the sump back to the condenser(s) and are therefore a challenge for factory supplied water treatment system designs. EVAPCO's water treatment systems, Pulse-Pure® PLUS and Smart Shield®, may be adapted to operate in conjunction with remote sumps. For factory supplied, remote sump water treatment recommendations and applications, consult your local EVAPCO Sales Representative or the factory for assistance.

PHC-E Mechanical Specifications

Furnish and install, as shown on the plans, an EVAPCO model _____ induced draft, parallel, hybrid evaporative condenser with a condensing capacity of _____ MBH (kW) total heat of rejection when operating with _____ refrigerant at _____ °F (°C) condensing temperature with a _____ °F (°C) design wet bulb temperature.

IBC Compliance

The condenser shall be designed and constructed to meet the International Building Code (IBC) specifications for installed components per ASCE.

Basin and Casing

The basin and casing shall be constructed of Z-725 hot-dip galvanized steel for long life and durability. Standard basin accessories shall include overflow, drain, type 304 stainless steel strainers, and brass make-up valve with plastic float.

Fan Motor

_____ kW totally enclosed air over ball bearing fan motor(s), with 1.15 service factor shall be furnished suitable for service on _____ volts, _____ hertz, and _____ phase.

Drive

The fan drive shall be a multigroove, solid back V-belt type with taper lock bushings designed for 150% of the motor nameplate horsepower. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative condenser service. Fan and motor sheaves shall be aluminum alloy construction. The fans and fan sheaves shall be mounted on the shaft with a specially coated bushing to provide maximum corrosion protection. Belt adjustment shall be accomplished from the interior of the unit.

Axial Propeller Fans

Fans shall be heavy duty axial propeller type statically balanced. The fans shall be constructed of aluminum alloy blades, installed in a closely fitted cowl with venturi air inlet. Fan screens shall be galvanized steel mesh and frame, bolted to the fan cowl.

Fan Shaft Bearings

Fan shaft bearings shall be heavy duty self-aligning ball type with grease fittings extended to the outside of the unit. Bearings shall be designed for a minimum L-10 life of 75,000 hours.

Water Recirculation Pump

The pump(s) shall be a close-coupled, centrifugal type with mechanical seal, installed at the factory. _____ kW totally enclosed motor(s) shall be furnished suitable for outdoor service on _____ volts, _____ hertz, and _____ phase.

Water Distribution System

The PVC distribution branches shall contain large diameter fixed position holes aligned by the manufacturer to eject a stream of water that efficiently collides with the opposing branch water flow. The intersecting streams of water shall create a broad scattering of water resulting in uniform water coverage of the heat transfer coil with no moving parts. The distribution branches shall be constructed of schedule 40 polyvinyl chloride pipe for corrosion resistance.

Heat Transfer Coil & Drift Eliminators

Condensing coil(s) shall be all prime surface steel, encased in a steel framework and hot-dip galvanized after fabrication as a complete assembly. The coil(s) shall be designed with sloping tubes for free drainage. Coils shall have a design pressure of 24 bar and shall be in compliance with the Pressure Equipment Directive. The coil shall be leak tested using air under water in accordance with PED 2014/68/EU.

The eliminators shall be constructed entirely of inert polyvinyl chloride (PVC) in easily handled sections. The eliminator design shall incorporate three changes in air direction to assure complete removal of all entrained moisture from the discharge air stream. Maximum drift rate shall be less than 0.001% of the circulating water rate.

Heat Transfer Fill & Drift Eliminators

The condenser shall be designed with a bank of heat transfer fill constructed of polyvinyl chloride (PVC) that is impervious to rot or decay. The fill sheets shall be bonded together and supported from the base to provide greater structural integrity. The support channels shall be designed to provide for easy cleaning below the fill bundles.

The fill bundle shall form an integral inlet louver to prevent debris from entering the heat transfer surface and a drift eliminator to remove water droplets from the air discharging the side of the fill.

Finish

All basin and casing materials shall be constructed of Z-725 heavy gauge mill hot-dip galvanized steel. During fabrication, all panel edges shall be coated with a 95% pure zinc-rich compound for superior protection against corrosion.



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