

VXC

Evaporative Condensers



Evaporative Condensers

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VXC Evaporative Condensers

Capacity

Single Model Capacity:

VXC : 60 kW - 6930 kW

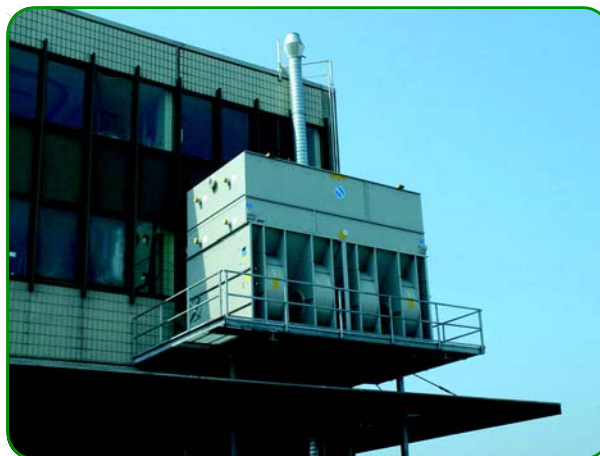
VXC-C : 950 kW - 1840 kW

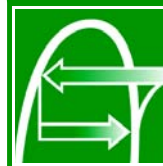
General Description

VXC Evaporative Condensers deliver fully rated thermal performance over a wide range of heat rejection and temperature requirements for various refrigerants. VXC and VXC-C models can be installed indoors and minimize sound levels. VXC-C models are designed to fit in standard dry van containers to minimize ocean freight costs. The Series VX occupies minimum floor space, provides year-round operating reliability and is ideal for sound sensitive applications.

Key Features

- Suitable for indoor and outdoor installations
- Low sound
- Low ocean freight costs (VXC-C)
- Single side air inlet
- Low energy consumption
- Low installed cost
- Easy maintenance
- Reliable year-round operation
- Long service life
- Wide capacity range
- PED 97/23/EC coil design





Low Energy Consumption

- **Evaporative Cooling Equipment** minimizes the energy consumption of the entire system because it provides lower operating temperatures. The owner saves money while conserving natural resources and reducing environmental impact.
- **Evaporative Condensers** provide lower condensing temperatures and can offer significant kW savings over conventional air-cooled and water-cooled condensing systems.

Low Installed Cost

- **Support** – All models mount directly on two parallel I-beams (supplied by others) and ship complete with motors and drives factory-installed and aligned.
- **Modular Design** – Large models ship in multiple sections to minimize the size and weight of the heaviest lift, allowing for the use of smaller, less costly cranes.

Easy Maintenance

- **Internal Access** - The interior of the unit is easily accessible for adjusting the float valve, cleaning the strainer or flushing the basin.

Reliable Year-Round Operation

- **V-Belt Drive** – The fans, motor, and drive system are located outside of the moist discharge airstream, protecting them from moisture, condensation and icing hence allowing a safe year-round operation.

Long Service Life

- **Materials of Construction** – Various materials are available to meet the corrosion resistance, unit operating life, and budgetary requirements of any project (See section "Technical Resources, Materials of Construction" for more details)



The water level control is easily reached from the access door.

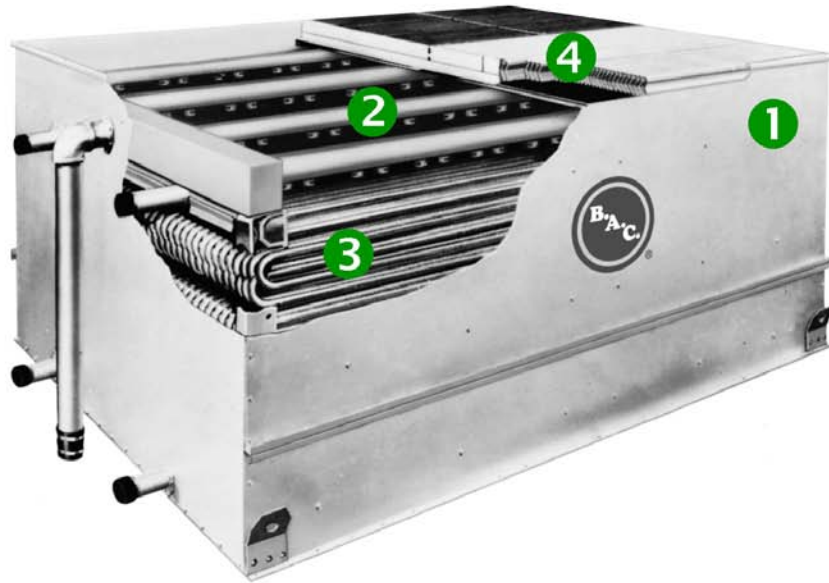


External V-belt drive system (shown here with panel removed)

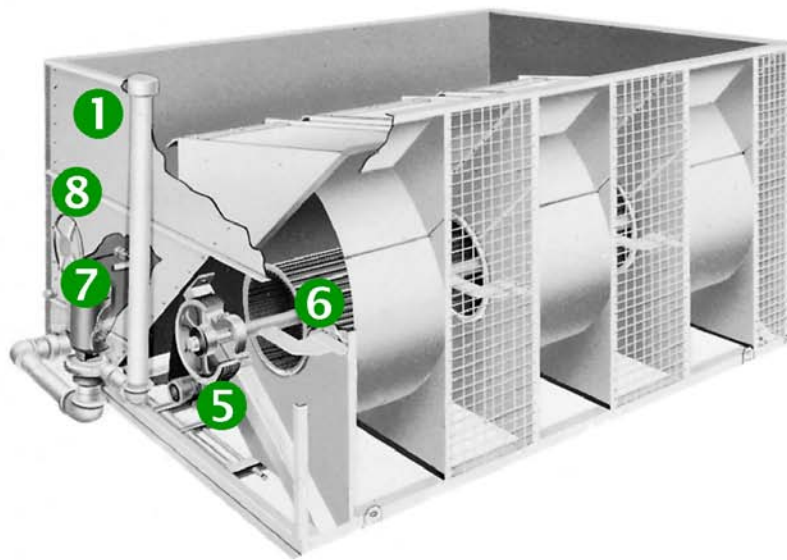
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Construction Details

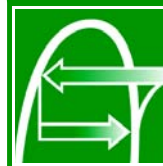


Upper Section



Lower Section





1. Heavy Duty Construction

- Z600 hot-dip galvanized steel panels

2. Water Distribution System

- Plastic spray header and branches
- Large orifice, non-clog nozzles
- Grommetted for easy maintenance

3. Coil

- Coil according to European Pressure Equipment Directive 97/23/EC
- Continuous serpentine, steel tubing
- Hot-dip galvanized after fabrication (HDGAF)
- Pneumatically tested at 34 bar standard coil
- Sloped tubes for free drainage of fluid

4. Drift Eliminators

- UV resistant non-corrosive material, impervious to rot, decay and biological attack
- Three distinct changes in air direction to reduce drift loss significantly
- Assembled in easy to handle sections, which can be removed for access to the equipment interior

5. Fan Drive System

- V-belt drive
- Heavy-duty bearings and fan motor

6. Centrifugal Fan(s)

- Quiet Operation

7. Recirculating Spray Pump

- Close coupled, bronze fitted centrifugal pump
- Totally enclosed fan cooled (TEFC) motor
- Bleed line with metering valve installed from pump discharge to overflow

8. Access Door

- Circular access door

9. Strainer (not shown)

- Anti-vortexing design to prevent air entrainment

Custom Features and Options

Construction Options

- **Standard Construction:**

Steel panels and structural elements are constructed of Z600 heavy-gauge hot-dip galvanized steel protected with the Baltiplus Corrosion Protection on the outside of the unit.

- **Optional BALTIBOND® Corrosion Protection System:**

The BALTIBOND® Corrosion Protection System, a hybrid polymer coating used to extend equipment life, is applied before assembly to all hot-dip galvanized steel components of the unit.

- **Optional Stainless Steel Construction:**

Steel panels and structural elements are constructed of stainless steel either type 304 or 316.

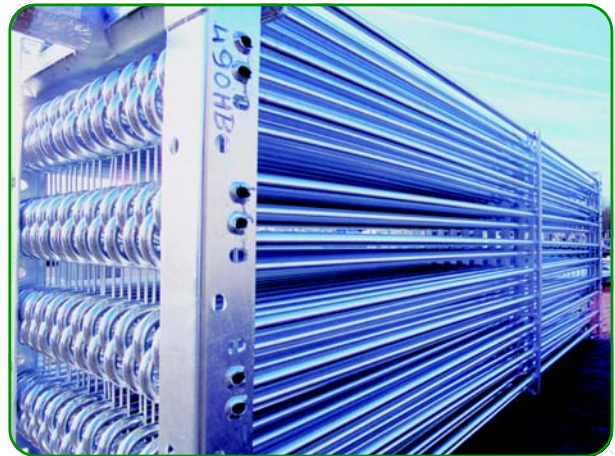
- **Optional Water-Contact Stainless Steel Cold Water Basin:**

A cost-effective alternative to an all stainless steel unit. The critical components in the cold water basin and the cold water basin itself are provided in stainless steel. The remaining components are protected with the BALTIBOND® Corrosion Protection System.

Note: See section Technical Resources, Material Options for more details on the materials described above.

Coil Configurations

Each coil is manufactured according to the European Pressure Equipment Directive (PED) 97/23/EC (For more details, refer to the Evaporative Condenser "Overview" section) BAC condenser coils are standard available at a design pressure of 23 bar, and are pneumatically tested at 34 bar.



Hot Dip Galvanized Coil

- **Standard Serpentine Coil:**

The standard condensing coil is constructed of continuous lengths of all prime surface steel, hot-dip galvanized after fabrication (HDGAF).

- **Multiple Circuit Coils (Split Coils):**

In general, multiple circuit coils are required primarily on halocarbon refrigerant systems where it is common practice to maintain individual compressor systems. Also, a circuit can be isolated to provide cooling of a water or glycol loop for compressor jacket cooling. A wide range of multiple circuit arrangements are available.

- **Optional Extended Surface Coil:**

Coils are available with selected rows finned at 3 to 5 fins per inch for wet/dry applications. The coil is hot-dip galvanized after fabrication (HDGAF).

- **Optional Stainless Steel Coil:**

Coils are available in Type 304L or 316L stainless steel for specialised applications.

- **Optional High Pressure Coil:**

Coils are available with a design pressure of 28 bar and pneumatically tested at 40 bar. The Coil is hot-dip galvanized after fabrication (HDGAF).

All coils are designed for low pressure drop with sloping tubes for free drainage of fluid.





Fan Drive System

The fan drive system provides the cooling air necessary to reject heat from the system to the atmosphere. Centrifugal fans, forwardly curved, are driven by matched V-belts with taper lock sheaves.

The Baltiguard Drive System

The BALTIGUARD[®] Drive System consists of two standard single-speed fan motors and drive assemblies. One drive assembly is sized for full speed and load, and the other is sized for approximately 2/3 speed and consumes only 1/3 of the design kilowatt power. This configuration allows the system to be operated like a two-speed motor, but with the reserve capacity of a standby motor in the event of failure. As a minimum, approximately 70% capacity will be available from the low kilowatt motor, even on a design wet-bulb day. Controls and wiring are the same, as those required for a two-speed, two-winding motor. Significant energy savings are achieved when operating at low speed during periods of reduced load and/or low wet-bulb temperatures.

Low Sound Operation

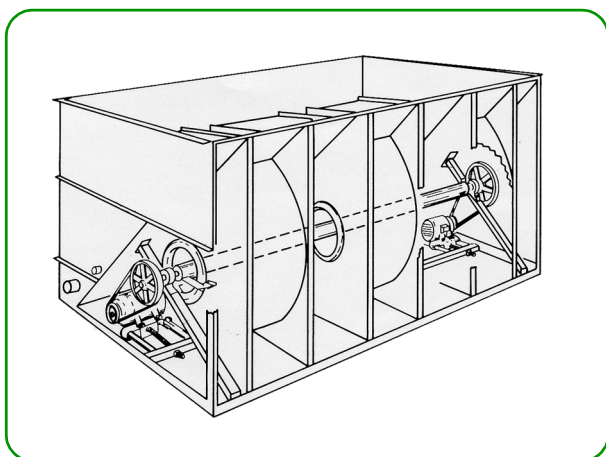
The low sound levels generated by BAC Products with centrifugal fans make them suitable for most installations. For situations when one direction is particularly sound sensitive, the unit can be oriented so that the side opposite the air inlet faces the sound-sensitive direction. Units with centrifugal fans are also available with factory designed, tested and rated sound attenuation for both the air inlet and discharge.



Remote Sump Execution

The use of an auxiliary sump within a heated space is the most satisfactory way to protect sump water from freezing. When the circulating pump is shut off, all the water in the water distribution, in suspension and in the sump will drain freely to the auxiliary sump.

Note: For detailed information on the calculation of the remote sump tank, please refer to the section "Technical Resources, Selection of Remote Sump Tank".



Baltiguard[®] Drive System



Unit with Intake and Discharge Sound Attenuation

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Model No. VXC	Heater -18°C (kW)
S806-S1010	4 x 4
C220 - C287	1 x 6
C325 - C426	2 x 4

Capacity Control Dampers

Modulating capacity control dampers are available to provide better leaving water temperature control than can be obtained from fan cycling alone. Fan discharge dampers consist of a single airfoil type damper blade located in the discharge of each fan housing. A standard electrical control package for dampers is available from BAC.

Solid Bottom Panels

Factory-installed bottom panels are required when intake air is ducted to the unit.

Discharge Hoods

Discharge hoods reduce the risk of re-circulation in tight enclosures by increasing discharge air velocity, and can be used to elevate the unit discharge above adjacent walls to comply with layout guidelines.

Desuperheater

Desuperheaters can be used in R-717 systems with reciprocating compressors. They increase the capacity of the standard model and extend the dry operation capacity. They are also effective in reducing the occurrence of visible plumes.

Steel Eliminators

Steel eliminators with Baltibond® Corrosion Protection System are available for specific applications.

N2 Filling of the Coil

For prolonged shipment periods (ocean freight) or extended storage on site it is recommended to charge the coil(s) with nitrogen.

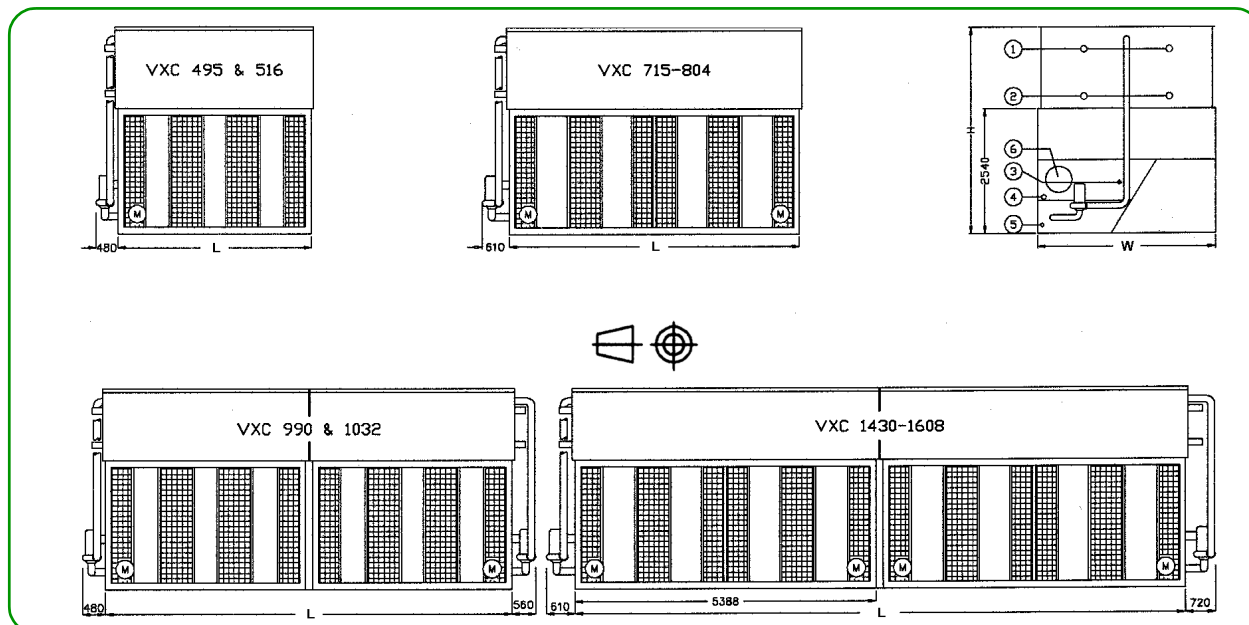
Basin Sweeper Piping

Basin sweeper piping provides an effective method of preventing sediment from collecting in the cold water basin of the unit. A complete piping system, including nozzles, is provided in the unit basin for connection to side stream filtration equipment (Refer to section "Technical Resources, Filtration").



Basin Sweeper Piping

VXC 495 - VXC 1608



1. Refrigerant in ND 100; 2. Refrigerant out ND 100; 3. Make-up; 4. Overflow ND 80; 5. Drain ND 50; 6. Access. For VXC 495 through VXC 1032 : Make-up ND50; For VXC 1430 through VXC 1608: Make-up ND 80.

Model	Heat Rejection (kW)	Operating Weight (kg)	Shipping Weight (kg)	Heaviest Section (coil) (kg)	Air Flow (m ³ /s)	Fan Motor (kW)	Water Flow (l/s)	Pump Motor (kW)	R717 Charge (kg)	L (mm)	W (mm)	H (mm)
VXC 495	2133	12040	8210	5610	40,0	(1x) 37,0	39,1	(1x) 4	250	3550	3607	4310
VXC 516	2223	13030	9170	6550	39,4	(1x) 37,0	39,1	(1x) 4	297	3550	3607	4545
VXC 715	3081	17555	11855	8300	56,1	(2x) 22,0	56,8	(1x) 4	374	5388	3607	4310
VXC 772	3326	17735	12035	8300	62,3	(2x) 30,0	56,8	(1x) 4	374	5388	3607	4310
VXC 804	3464	19290	13435	9710	60,4	(2x) 30,0	56,8	(1x) 4	449	5388	3607	4545
VXC 990	4265	24185	16520	5610	80,0	(2x) 37,0	78,2	(2x) 4	499	7226	3607	4310
VXC 1032	4446	26095	18280	6550	78,8	(2x) 37,0	78,2	(2x) 4	594	7226	3607	4545
VXC 1430	6161	35200	23680	8300	112,2	(4x) 22,0	113,6	(2x) 4	748	10903	3607	4310
VXC 1544	6652	35560	23770	8300	124,6	(4x) 30,0	113,6	(2x) 4	748	10903	3607	4310
VXC 1608	6928	38665	26845	9710	120,8	(4x) 30,0	113,6	(2x) 4	898	10903	3607	4545

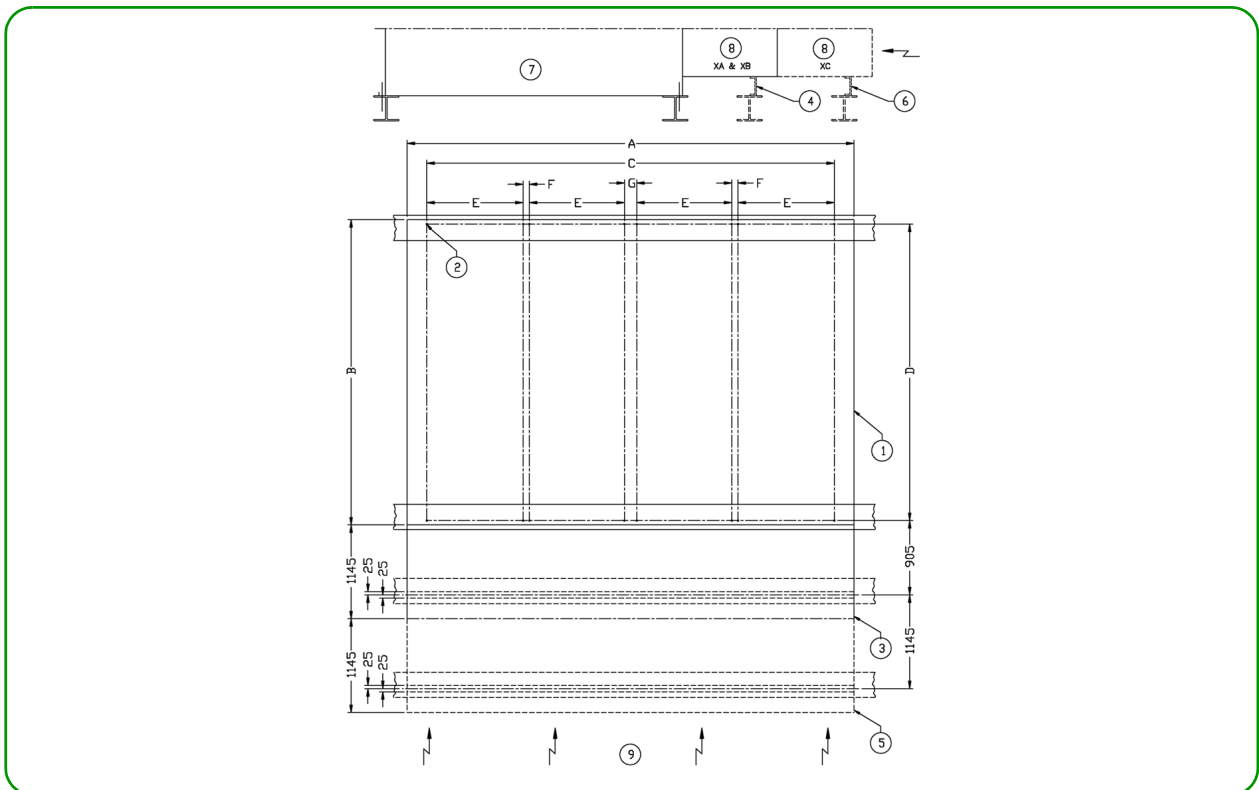
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Model	A Unit Length (mm)	B Unit width (mm)	C Center dis. Length (mm)	D Center dis. Width (mm)	E (mm)	F (mm)	G (mm)	X Max. Deflection (mm)	Mounting holes
VXC S806-S1010	10903	2397	10586	2327	2486	102	438	13	16
VXC 357-454	3550	3000	3238	2934	-	-	-	10	4
VXC 562-680	5388	3000	5074	2934	2486	102	-	13	8
VXC 714-908	7226	3000	6914	2934	3238	438	-	13	8
VXC 1124-1360	10903	3000	10586	2934	2486	102	438	13	16
VXC 495-516	3550	3607	3238	3537	-	-	-	10	4
VXC 715-804	5388	3607	5074	3537	2486	102	-	13	8
VXC 990-1032	7226	3607	6914	3537	3238	438	-	13	8
VXC 1430-1608	10903	3607	10586	3537	2486	102	438	13	16
VXC C220-C287	3550	2245	3238	2175	-	-	-	10	4
VXC C325-C426	5385	2245	5074	2175	2486	102	-	13	8

Units with Sound Attenuation



1. Outline of Unit; 2. Mounting Holes Ø 22 mm; 3. Outline of attenuator (optional XA or XB); 4. Support Channel attached to optional XA or XB attenuator; 5.+3. Outline of Attenuator (optional XC); 6.+4. Support Channels attached to optional XC attenuator; 7. Unit; 8. Sound Attenuator; 9. Air Intake.

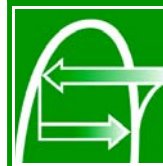
Notes:

- The recommended support arrangement for VX units consists of parallel I-beams extending the full length of the unit. Supports and anchor bolts are to be designed and furnished by others.
- All supporting beams are to be flush and level at top and must be oriented relative to gage line as shown.
- Recommended design loads for each unit support beam should be 70% of the total unit operating weight applied as a uniform load to each of the unit beams. The support beam(s) for the optional intake attenuator(s) needs to carry attenuator only, uniform load of 250 kg/m. Beams should be designed in accordance with

standard structural practice. For the maximum allowable deflection of beams under the unit refer to above table.

- All mounting holes have a diameter of 22 mm at the locations shown.
- If vibration isolators are used, a rail or channel must be provided between the unit (and optional attenuator) and the isolators to provide continuous unit support. Additionally the support beams must be designed to accommodate the overall length and mounting hole location of the isolators that may differ from those of the unit. Refer to vibration isolator drawings for these data.

Engineering Specifications



General

A. General: Furnish and install, _____ factory assembled evaporative condenser(s) of counterflow blow-through design, with single side entry, conforming in all aspects to the specifications and schedule as shown on the plans.

B. Capacity: The evaporative condenser(s) shall be warranted by the manufacturer to have condensing capacity of _____ kW heat rejection, operating with _____ refrigerant and _____°C condensing temperature and _____°C entering wet-bulb temperature.

C. Warranty: The manufacturer's standard equipment warranty shall be for a period of one year from the date of startup or eighteen months from the date of shipment, whichever ends first.

D. Quality Assurance: The manufacture shall have Management System certified by an accredited registrar as complying with the requirements of ISO-9001:2000 to ensure consistent quality of products and services.

Products

1.0 Evaporative Condenser Materials and Components

General: All steel panels and structural elements shall be constructed from heavy-gauge, Z600 hot-dip galvanized steel, with

cut edges given a protective coating of zinc-rich compound.

2.0 Coil Casing Assembly

The evaporative condenser shall include a coil casing section consisting of a refrigerant condensing coil, a spray water distribution system, and drift eliminators as indicated by the manufacturer.

1. The refrigerant condensing coil shall be fabricated of all prime surface steel at the manufacturer's own facility, and hot-dip galvanized after fabrication.

a. The refrigerant condensing coil shall be tested at 34 bar air pressure under water.

b. The refrigerant condensing coil shall be designed for low pressure drop with sloping tubes for free drainage of liquid refrigerant.

c. The refrigerant condensing coil shall be according to European Pressure Equipment Directive 97/23/EC.

2. Water shall be distributed evenly over the coil at a minimum flow rate of 14 kPa to ensure complete wetting of the coil at all times by large-diameter, non-clog, 360° plastic distribution nozzles spaced across the coil face area in plastic material spray branches. Nozzles shall utilize a two-stage diffusion pattern to provide overlapping, umbrella spray patterns that create multiple intersection points with adjacent nozzles.

Spray branches and nozzles shall be held in place by snap-in rubber grommets, allowing quick removal of individual nozzles or complete branches for cleaning or flushing.

3. Removable plastic material drift eliminators shall be positioned to prevent moisture from leaving the evaporative condenser and incorporate a minimum of three (3) changes in air direction.

3.0 Pan Assembly

The evaporative condenser shall include a pan assembly consisting of cold water basin with pump assembly and fan assemblies with single side air inlet and integral air plenum.

1. The cold water basin shall include: a drain/clean-out connection; a steel strainer; a brass make-up valve; overflow connection; and a water recirculation pump assembly.

a. Drain/clean-out connection shall be located in the cold water basin to allow removal of recirculating water.

b. Lift-out steel strainer shall be supplied with perforated openings sized smaller than the water distribution nozzle orifices and an integral anti-vortexing hood to prevent air entrainment.

c. Brass make-up valve shall be supplied with a large-diameter plastic float arranged for easy adjustment.

d. Overflow connection shall be provided in the cold water basin to protect against recirculating water spillage.

e. Water recirculation pump shall be a close-coupled, bronze-fitted centrifugal pump equipped with a mechanical seal, mounted on the basin and piped from the suction strainer to the water distribution system.

i. The pump shall be installed so that it may drain freely when the basin is drained.

ii. The pump assembly shall include an integral metering valve and bleed line to control the bleed rate from the pump discharge to the overflow connection.

iii. The pump motor shall be totally enclosed fan cooled (TEFC) type suitable for _____ V, _____ phase _____ Hz electrical service.

f. On installations requiring a remote sump, the evaporative condenser shall be modified to accommodate the use of an independent sump and pump for recirculating water (by others)

i. The recirculating water pump, steel strainer, make-up valve, and integral bleed line assemblies shall be omitted from the evaporative condenser scope of supply.

ii. The evaporative condenser shall be supplied with a cold water basin outlet sized and located as indicated on the drawings for gravity drain to the remote sump.

iii. The water distribution system shall have an operating pressure of 14 kPa at the evaporative condenser spray water inlet connection.

2. Air shall enter the evaporative condenser through the centrifugal fan assemblies and integral air plenum.

a. Fans and motors shall be located in the dry entering airstream to provide greater reliability and ease of maintenance.

b. Fan housings shall have curved inlet rings for efficient air entry and rectangular discharge cowls that extend into the pan to increase fan efficiency and prevent water from entering the fans.

c. Fan(s) shall be heavy-duty, centrifugal flow type mounted on a steel shaft with heavy-duty, self-aligning, relubricatable bearings with cast iron housings, designed for a minimum L10 life of 40 000 hours.

d. Fan motor(s) shall be totally enclosed fan cooled (TEFC) type, suitable for _____ V, _____ phase, _____ Hz electrical service and shall be mounted on an easily adjusted, heavy-duty motor base. Special moisture protection shall be furnished on the windings, shafts, and bearings.

4.0 Optional Equipment Specifications

A. Evaporative condenser shall be provided with basin heaters to prevent freezing of the water in the cold water basin when the evaporative condenser is idle.

1. The basin heaters shall be selected to maintain +4°C basin water temperature at -18°C ambient temperature.
2. Basin heaters shall be electric immersion type controlled by a remote thermostat with the sensing bulb located in the basin water.
3. Basin heaters shall be provided with a factory-installed low water level cutout switch to prevent heater operation unless the heater elements are fully submerged.

B. Evaporative condenser shall be provided with a factory assembled, field-installed access ladder and handrails to provide access to the top of the evaporative condenser.

C. Evaporative condenser shall be supplied with the Baltiguard Drive System to improve part load efficiency and provide system redundancy in case of a motor failure.

1. The Baltiguard® Drive System shall include the main fan motor as listed in the manufacturer's published literature and a pony motor sized for approximately 1/3 of design kW and 2/3 of design fan speed to optimize energy savings during non-design load conditions.

