



# VCA Evaporative Condenser

## TABLE OF CONTENTS

---

**F66 VCA EVAPORATIVE CONDENSERS**

---

**F68 BENEFITS**

---

**F70 CONSTRUCTION DETAILS**

---

**F72 CUSTOM FEATURES & OPTIONS**

---

**F120 ENGINEERING DATA**

---

**F135 STRUCTURAL SUPPORT**

**When your application calls for a workhorse, turn to the VCA.** From BAC's InterLok™ System to align the coil casing and basin to the pre-assembled platform packages and unrestricted access to the motors, bearings, and fan, the VCA incorporates features which benefit the installer, operator, end-user, and owner. A tonnage range of 87 - 1,433 R-717 tons and compliance with the wind and seismic requirements of the International Building Code gives added peace of mind and makes the VCA the industry leader in the forced draft, axial fan category.



IBC Compliant

# BAC's VCA: The Industry Workhorse

87 to 1,443 R-717 Tons in a Single Unit

▽  
Easiest  
Motor  
Access

▽  
Independent  
Fan Drives

▽  
Pre-Assembled  
Platforms

▽  
24' Long  
Coils for  
Reduced  
Piping

▽  
Shake Table  
Tested up to  
 $S_{DS}$  of 1.60g





# VCA Benefits

## > Peace of Mind – Flexibility

- ▶ Independent fan motors are standard
  - Provide redundancy and options for capacity control
  - For replacement opportunities where existing wiring must remain, the VCA can be supplied with a dual motor option
- ▶ Meets wind and seismic requirements of the International Building Code through shake table testing
- ▶ Bearings selected for a minimum  $L_{10}$  life of 94,000 hours
- ▶ Premium efficient motors are standard and ready for VFD's now or later

## > Installation Efficiency

- ▶ BAC's InterLok™ System aligns the coil casing and the basin to expedite rigging
- ▶ Pre-assembled platform package reduces installation time (option)
- ▶ Single point wiring simplifies field installation (option)

## > Industrial Grade Construction

- ▶ Enhanced longevity with a variety of durable materials of construction (see **page F72** for details)
- ▶ Fully welded, not bolted, stainless steel basins (option)
- ▶ All coils are fabricated to ASME B31.5 standards

## > Serviceability

- ▶ Two large access doors are standard with every side blow VCA, one included on end blow units
- ▶ A hinged, internal partition door is standard
- ▶ Entire drive system is located at the base of the unit for easy and unrestricted access to the motors, bearings, and fans
- ▶ Extended lubrication lines standard
- ▶ A water distribution system that makes service of the nozzles, spray branches and headers possible without the need for tools
- ▶ Multiple access options to meet your service and site requirements (all OSHA compliant)



Shake Table Tested VCA



BAC's InterLok™ System

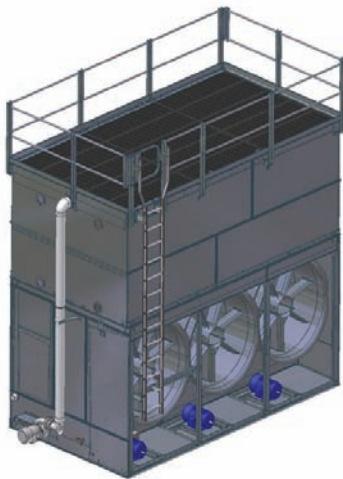


Large Access Door for Easy Maintenance

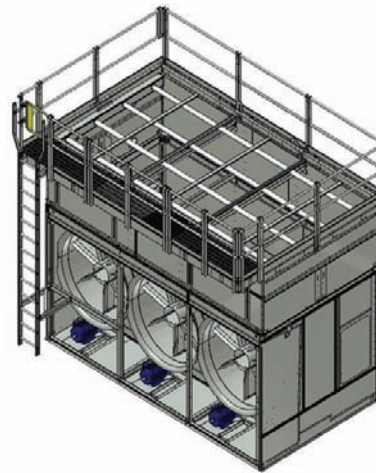


## > Variety of Access Options

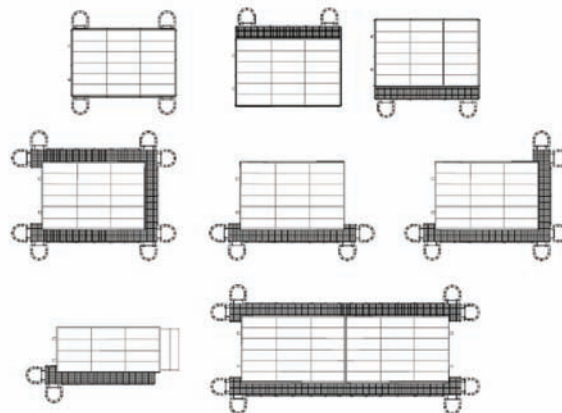
- ▶ The VCA has the most access options available in the industry
- ▶ Preassembled modular external access packages
- ▶ Widest variety of external access packages
  - Perimeter handrails only
  - Flush platform
  - Offset platform
- ▶ Assembled at the manufacturing plant to verify fit
- ▶ Eliminates potential for missing parts and reduces installation time
- ▶ All BAC platforms are available with safety gates and safety cages and are OSHA compliant



Perimeter Handrails Only

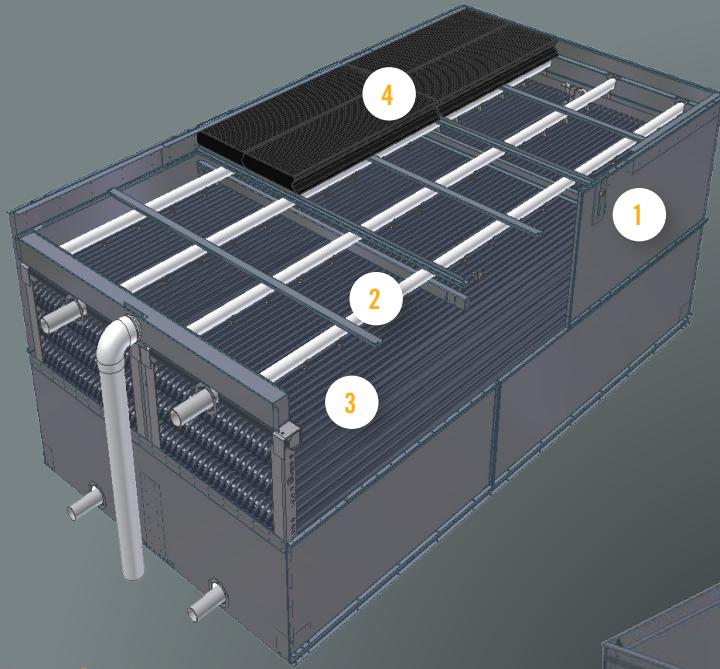


Flush Platform

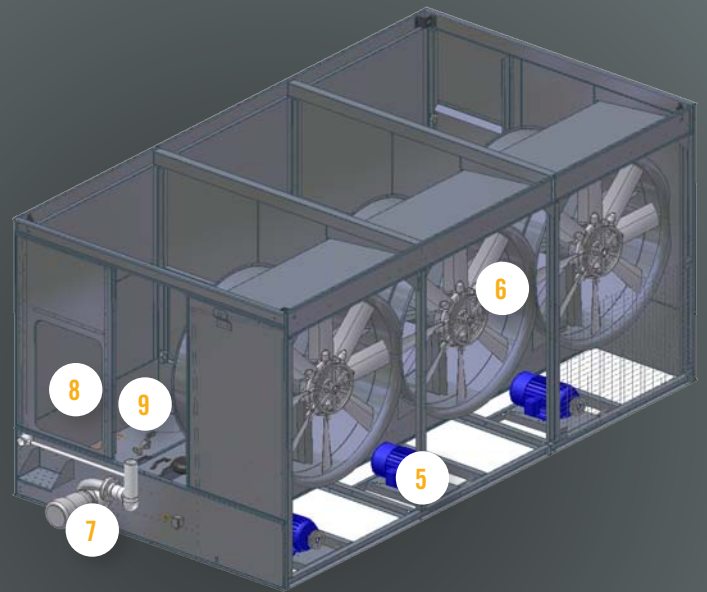


Access Ladder & Platform Options

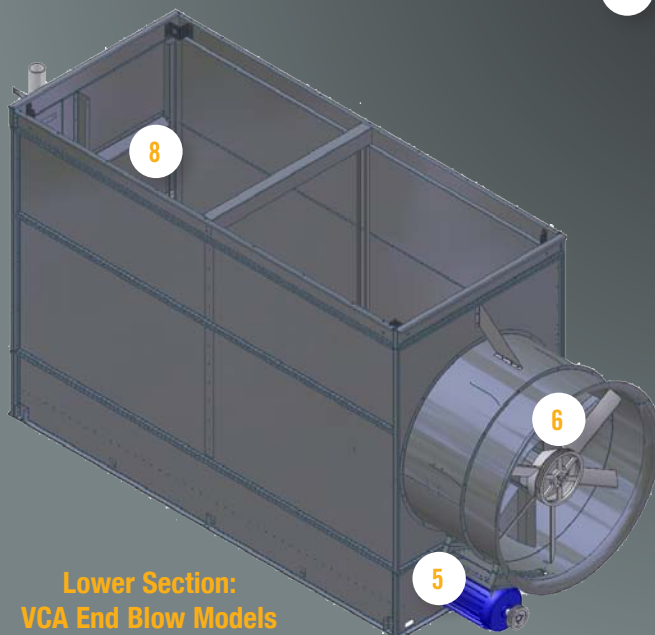
# VCA Construction Details



Upper Section



Lower Section:  
VCA Side Blow Models



Lower Section:  
VCA End Blow Models

## 1 Heavy-Duty Construction

- ▶ G-235 (Z700 metric) mill galvanized steel panels

## 2 Water Distribution System

- ▶ Schedule 40 PVC spray branches
- ▶ Large orifice, non-clog, 360™ Spray Nozzles
- ▶ Nozzle and spray branches grommited for easy maintenance

## 3 Coil

- ▶ Continuous serpentine, steel tubing
- ▶ Hot-dip galvanized after fabrication (HDGAF)
- ▶ Maximum allowable working pressure is 300 psig (2,068 kPa)
- ▶ Fabricated per ASME B31.5 standards
- ▶ Orders shipping into Canada are supplied with a CRN

## 4 Drift Eliminators

- ▶ Recyclable polyvinyl chloride (PVC)
- ▶ Impervious to rot, decay, and biological attack
- ▶ Flame spread rating of 5 per ASTM E84
- ▶ Assembled in easy to handle sections

## 5 Independent Fan Drive System

- ▶ Premium efficient/VFD duty fan motors are standard
- ▶ 5-year motor and drive warranty
- ▶ Heavy duty bearings, with minimum  $L_{10}$  94,000 hours
- ▶ Extended lubrication lines
- ▶ Premium quality, solid-backed, multi-groove belt

## 6 Low Horsepower Axial Fan(s)

- ▶ Corrosion resistant

## 7 Recirculating Spray Water 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 Doors

- ▶ Interior of unit is easily accessible
- ▶ Two 30" x 44" access doors are standard on side blow units
- ▶ One 30" x 44" access door is standard on end blow units

## 9 Strainer (NOT SHOWN)

- ▶ Anti-vortexing design to prevent air entrainment



# VCA

# Custom Features & Options

## ➤ Materials of Construction

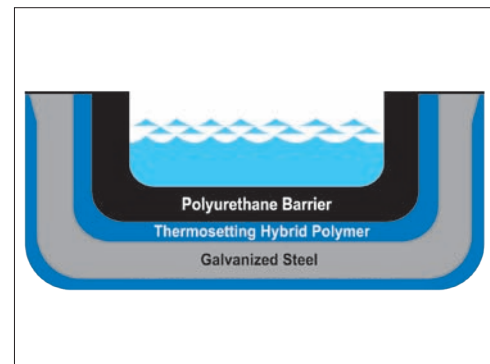
Determining the appropriate material of construction for a project depends on several factors, including water quality, climate and environmental conditions, availability of time and manpower for maintenance, unit lifetime requirements, and budget. BAC provides the widest variety of material of construction options in the industry and has the ability to provide a solution to meet all conditions and budgets.

### ▶ STANDARD CONSTRUCTION

G-235 mill galvanized steel is the heaviest commercially available galvanized steel, universally recognized for its strength and corrosion resistance. To assure long life, G-235 mill galvanized steel panels and structural members are used as the standard material of construction. The standard construction has been seismically verified by shake table testing in an independent laboratory up to an  $S_{DS}$  of 1.60g and can withstand wind loads of up to 90 psf, proving its construction is designed for extreme durability. With proper maintenance and water treatment, G-235 galvanized steel will provide an excellent service life under the operating conditions normally encountered in refrigeration and industrial applications.



Standard Construction Installation



TriArmor® Corrosion Protection System Triple Layer Protection of the Basin



### TRIARMOR® CORROSION PROTECTION SYSTEM (OPTION)

The TriArmor® Corrosion Protection System consists of heavy gauge G-235 galvanized steel panels fully encapsulated by a thermosetting hybrid polymer and further protected by a polyurethane barrier applied to all submerged surfaces of the cold water basin. The triple layers of protection form a completely seamless cold water basin for the most leak resistant and durable basin in the industry. Other components within the basin, such as the strainer and submerged structural supports, will be constructed of Type 304 Stainless Steel. The TriArmor® Corrosion Protection System was specifically designed for evaporative cooling applications and released in 2006 after a decade of extensive R&D and field testing. To date, there are over 1,000 successful installations in North America. Every basin is leak tested at the factory and warranted against leaks and corrosion for 5 years.



Application of TriArmor® Corrosion Protection System





▶ **EVERTOUGH™ CONSTRUCTION (OPTION)**

EVERTOUGH™ Construction combines the most corrosion resistant materials to provide the best value in corrosion protection for most water chemistries. EVERTOUGH™ Construction is backed by a comprehensive Louver-to-Louver<sup>SM</sup> 5-year warranty which covers ALL components from the fan to the basin, from louver to louver including the motor.

Specifically, the following materials are used in EVERTOUGH™ Construction:

- The basin is constructed with the TriArmor® Corrosion Protection System. The basin is leak tested at the factory and warranted against leaks and corrosion for 5 years.
- Designated steel components above the basin are constructed of heavy-gauge G-235 galvanized steel and further protected with a thermosetting hybrid polymer.
- The distribution system is non-corrosive Schedule 40 PVC.
- Other components within the basin, such as the strainer and submerged structural supports, will be constructed of Type 304 stainless steel.



EVERTOUGH™ Construction Installation

▶ **THERMOSETTING HYBRID POLYMER (OPTION)**

A thermosetting hybrid polymer, used to extend equipment life, is applied to select G-235 mill galvanized steel components of the unit. The polymerized coating is baked onto the G-235 mill galvanized steel and creates a barrier to the already corrosion resistant galvanized steel. The thermosetting hybrid polymer has been tested to withstand 6,000 hours in a 5% salt spray without blistering, chipping, or losing adhesion.

▶ **STAINLESS STEEL (OPTION)**

Several Type 304 stainless steel material of construction options are available.

• **WELDED TYPE 304 STAINLESS STEEL BASIN**

All steel panels and structural members of the basin are constructed from Type 304 stainless steel. Seams between panels inside the basin are welded, providing an advantage over bolted stainless steel basins for minimizing susceptibility to leaks at basin seams. The basin is leak tested at the factory and welded seams are provided with a 5-year, leak-proof warranty.

• **ALL TYPE 304 STAINLESS STEEL CONSTRUCTION**

Steel panels and structural elements are constructed of Type 304 stainless steel. Seams between panels inside the basin are welded. The basin is leak tested at the factory and welded seams are provided with a 5-year leak-proof warranty.



Welded Type 304 Stainless Steel Basin

## > Coil Configurations

BAC offers a large selection of coil configuration options to fulfill any thermal and pressure drop requirements.

### ▶ STANDARD SERPENTINE COIL

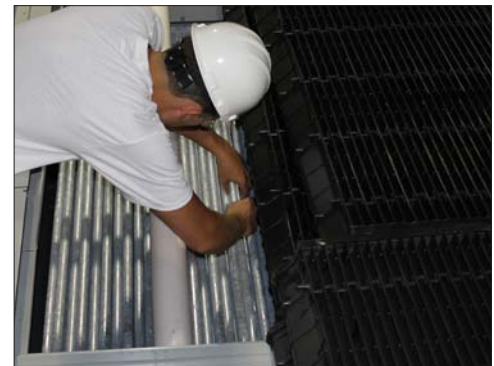
The standard cooling coil is constructed of continuous lengths of all prime surface steel. The coil is hot-dip galvanized after fabrication (HDGAF) to apply a thick, zinc corrosion barrier over the entire exterior surface of the coil. The coil is designed for low pressure drop with sloping tubes for free drainage of fluid. Each coil has a maximum allowable working pressure of 300 psig (2,068 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.

### ▶ STAINLESS STEEL COIL (OPTION)

Coils are available in Type 304 stainless steel for specialized applications. The coil is designed for low pressure drop with sloping tubes for free drainage of fluid. Each coil has a maximum allowable working pressure of 300 psig (2,068 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.

### ▶ ASME "U" STAMP COIL (OPTION)

The ASME coils are often requested for heavy industrial or process applications. This serpentine coil is manufactured and tested in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 and bears the ASME "U" stamp. ASME coils are hot-dip galvanized (outside surface) after fabrication (HDGAF). Each coil has a maximum allowable working pressure of 300 psig (2,068 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.



Standard Serpentine Coil



Standard Serpentine Coil

 **NOTE:** A Canadian Registration number (CRN) is required for all pressure vessels over 15 psig entering Canada. The CRN identifies that the design of a boiler, or fitting has been accepted and registered for use in Canada. CRN is available for all standard coil configurations shipping into Canada.



▶ **EXTENDED SURFACE COIL (OPTION)**

Coils are available with up to all rows finned at 5 fins per inch for seasonal wet/dry operation. The fins increase the surface area of the coil, therefore increasing the condensing capability. The coil is hot-dip galvanized after fabrication (HDGAF) to apply a thick, zinc corrosion barrier over the entire exterior surface of the coil and fins. BAC coils are designed for low pressure drops and to be completely drainable with sloping tubes for free drainage of fluid. Each coil has a maximum allowable working pressure of 300 psig (2,068 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.



Extended Surface Coil

▶ **MULTIPLE CIRCUIT COILS/AUXILIARY COOLING CIRCUIT (OPTION)**

Split coil configurations are available to allow separate process fluid or refrigerant loops through the same unit. Separate loops may be needed for multiple applications requiring different temperature processes or multiple types of process fluids or refrigerants. Multiple refrigerant circuit coils are generally required on halocarbon refrigerant systems, where it is common practice to maintain individual compressor systems. The quantity of circuits, capacity per circuit, and desired connection size and type should be specified when requesting this option.



Multiple Circuit Coil

▶ **SUBCOOLING COILS (OPTION)**

Subcooling coils are available for those halocarbon refrigerant installations where subcooled refrigerant is specified, or where the pressure drop or a vertical rise in the liquid line is great enough to cause excessive flashing. Standard subcooling coil sections provide approximately 10°F (5.6°C) of subcooling at standard conditions. Subcooling sections are approximately 7" high and are mounted between the coil and basin sections. Coils are hot-dip galvanized after fabrication and have a maximum allowable working pressure of 300 psig (2,068 kPa).

▶ **COPPER SWEAT FITTINGS (OPTION)**

Factory installed copper sweat fittings are available to simplify field piping.



Copper Sweat Fitting

# VCA

## Custom Features & Options

### > Drive System Options

The fan drive system provides the cooling air necessary to reject unwanted heat from the system to the atmosphere. All BAC drive systems use premium efficient cooling tower duty motors and include BAC's comprehensive 5-year motor and drive warranty. Cooling tower duty motors are specially designed for use in evaporative condenser applications and have permanently lubricated bearings, drastically decreasing the maintenance requirement of the motor. BAC belt drive systems are the most durable and maintenance friendly drive systems on the market, including single nut adjustment for belt tensioning to make belt tensioning simple.



#### ▶ INDEPENDENT FAN DRIVES

Independent fan motors are standard on every VCA model providing redundancy and options for capacity control. The fans, motors, and drive system of the VCA are located outside the discharge air stream of the unit, protecting them from moisture, condensation, and icing while facilitating maintenance. The fan drive system consists of a specially designed belts, taper lock sheaves, minimum L<sub>10</sub> bearing life of 94,000 hours and dedicated premium efficient cooling tower duty motor to provide maximum performance. Extended lubrication lines are standard for lubrication of the fan shaft bearings.

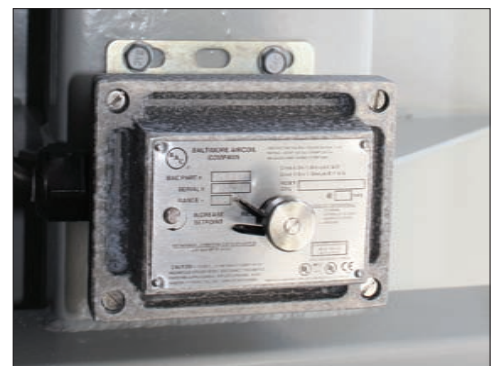


Independent Fan Drives



#### VIBRATION CUTOUT SWITCH (OPTION)

A factory mounted vibration cutout switch is available to effectively protect against rotating equipment failure. BAC can provide either a mechanical or solid-state electronic vibration cutout switch in a NEMA 4 enclosure to ensure reliable protection. Additional contacts can be provided on either switch type to activate an alarm. Remote reset capability is also available on either switch type.



Vibration Cutout Switch





## > Basin

The spray water collects in the basin which is pumped back over the condensing coil. The hygienic basin is sloped toward the pump suction. During operation, this design eliminates any stagnant water zones, which are susceptible to biological growth.

### ▶ STANDARD MECHANICAL WATER LEVEL CONTROL

Mechanical make-up valves must operate continuously in the moist and turbulent environment existing within evaporative cooling equipment. Due to this environment, the operation of the valve must be simple, and the valve must be durable. BAC's high quality mechanical water level control assembly is standard with all units, and has been specially designed to provide the most reliable operation while being easy to maintain. This accessory is omitted for remote sump applications.



Mechanical Water Level Control

### ▶ ELECTRIC WATER LEVEL CONTROL (OPTION)

BAC's Electric Water Level Control (EWLC) is a state-of-the-art, conductivity actuated, probe type liquid level control. The hermetically sealed EWLC is engineered and manufactured specifically for use in evaporative cooling systems and is equipped with an error code LED to indicate status, including when the water and/or probes are dirty. The EWLC option replaces the standard mechanical make-up valve, and includes a slow closing, solenoid activated valve in the make-up water line to minimize water hammer. EWLC is recommended when more precise water level control is required and in areas that experience sub-freezing conditions.



Electric Water Level Control



### BASIN SWEEPER PIPING (OPTION)

Basin sweeper piping is an effective method of reducing sediment that may collect in the basin of the unit. A complete piping system, including nozzles, is provided in the basin to connect to side stream filtration equipment (provided by others). For more information on filtration systems, consult "Filtration Guide" found on **page J233**.

# VCA

## Custom Features & Options

### ► BASIN HEATERS (OPTION)

Evaporative cooling equipment exposed to below freezing ambient temperatures require protection to prevent freezing of the water in the basin when the unit is idle. Factory-installed electric immersion heaters, which maintain 40°F (4.4°C) water temperature, are a simple and inexpensive way of providing such protection.

### HEATER kW DATA

Model Number	0°F (-17.8°C) Ambient Heaters		-20°F (-28.9°C) Ambient Heaters	
	Number of Heaters	kW per Heater	Number of Heaters	kW per Heater
VCA-122A to VCA-191A	1	6	1	8
VCA-174A to VCA-259A	1	8	1	10
VCA-261A to VCA-322A	1	8	1	12
VCA-323A to VCA-466A	1	12	1	18
VCA-300A to VCA-512A	1	8	1	10
VCA-460A to VCA-779A	1	12	1	15
VCA-662A to VCA-1024A	2	8	2	10
VCA-S700 to VCA-S884A	2	8	2	10
VCA-920A to VCA-1558A	2	12	2	15
VCA-302A to VCA-661A	1	10	1	15
VCA-526A to VCA-1010A	1	15	1	18
VCA-605A to VCA-1321A	2	10	4	20
VCA-S870A to VCA-S1204A	2	10	2	15
VCA-930A to VCA-2019AA	2	15	2	18



Basin Heater



**NOTE:** This table is based on 460V/3 phase/60 Hz power.

### ► LOW AND HIGH LEVEL ALARMS (OPTION)

Low and high level alarm float switches are available to provide added control to your equipment operation. Level alarms can alert operators to an abnormal operating condition to ensure the highest system efficiency with minimal water usage.



## > Water Distribution System

### ▶ STANDARD SPRAY WATER PUMP

The VCA water distribution system comes standard with an integral spray water pump sized to distribute the recirculating water over the coil, maximizing capacity. The patented BAC 360™ Spray Nozzles are non-clog, ensure even flow over the coil area, and are simple to remove for maintenance.

### ▶ REDUNDANT PUMPS (OPTION)

An optional secondary spray pump is available. This pump can be switched easily and maintained while the unit remains in operation.



Spray Water Distribution System

## > Shipping and Rigging

BAC units are factory-assembled to ensure uniform quality with minimum field assembly. Each unit has been designed with rigging and assembly in mind and includes features to minimize the number of tools required and installation time.



### INTERLOK™ SYSTEM

The coil section self-aligns with the basin section. This feature significantly reduces the time required to rig the VCA.

### ▶ KNOCKDOWN UNITS (OPTION)

Knockdown units are available for jobs where access to the evaporative condenser location is limited by elevators, doorways, or similar obstacles, where lifting methods impose very strict weight limits, or where the shipping cost of a fully assembled condenser is excessive. All materials of construction and design features are the same as those of a factory assembled unit. Welded Type 304 stainless steel basins and TriArmor® Corrosion Protection System basins are excluded due to the need for in-plant assembly.



InterLok™ System

# VCA

## Custom Features & Options

### > Air Intake Options

In an evaporative condenser, airborne debris can be trapped in the water through the unit's air intake. The VCA has several options for air intake accessories that prevent debris from entering the system and maintain even unobstructed flow through the unit. Reducing the amount of debris that enters the unit lowers maintenance requirements and helps to maintain thermal efficiency.

#### ▶ AIR INTAKE SCREENS

Standard 1" x 1" wire mesh screen is factory-installed over the air intake to prevent debris from entering the unit

#### ▶ SOLID BOTTOM PANELS (OPTION)

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



Air Intake Screen

### > Access Options

BAC's evaporative equipment is designed to be easily maintained for sustaining capacity over a longer life. All access options meet OSHA requirements to ensure personnel safety and code compliance.

#### ▶ OVERSIZED ACCESS DOOR(S)

Oversized access door(s) are standard on the VCA. Each measures 30" x 44" and a step for easier access is provided for each door.



Oversized Access Door



#### ▶ PRE-ASSEMBLED EXTERNAL PLATFORM, LADDER, AND SAFETY CAGE (OPTION)

Every external platform module is pre-assembled at the factory to ensure that every component will fit and function exactly as described. The platform will attach quickly in the field with minimal fasteners. Platforms can be added at the time of order or as an aftermarket item. All components are designed to meet OSHA requirements. Platforms, ladders, and safety cages can be added at the time of order or as an aftermarket item.



Pre-Assembled External Platform