



Series V Closed Circuit Cooling Towers

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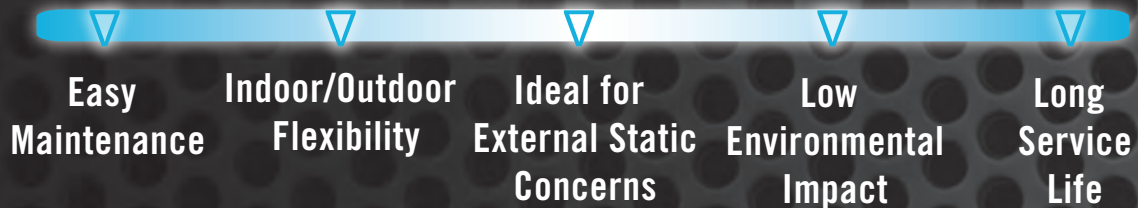
C134 STRUCTURAL SUPPORT

The VF1 and VFL Closed Circuit Cooling Towers provide answers to some of the most challenging applications. These units are equipped to handle external static pressure, making them ideal for indoor installations and are available in a low profile version to accommodate limited ceiling or enclosure heights. Offering low installed costs, year-round operating reliability, and long service life, the VF1 and VFL Closed Circuit Cooling Towers provide an excellent solution for a large variety of fluids and processes.



BAC's Series V Closed Circuit Cooling Towers: Solutions for Challenging Applications

Wide Range of CTI Certified Capacities
3.9 to 614 Nominal Tons in a Single Cell
Up to 4,470 USGPM for Process Applications



Series V Benefits

> Low Environmental Impact

▶ ENERGY EFFICIENT

- Capacity is certified by the Cooling Technology Institute using water, ethylene glycol, and propylene glycol
- All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements
- Closed loop cooling further minimizes process fouling, maintaining process efficiency
- Premium efficient/inverter duty fan motors
- BALTIGUARD™ Fan System provides redundancy and energy savings by providing a pony motor (optional)

▶ SOUND REDUCTION OPTIONS

- Centrifugal fans have inherently low sound characteristics
- Factory designed sound attenuation is available for both the air intake and discharge (option)
- Sound sensitive installations can be accommodated by facing the quiet blankoff panel to the sound sensitive direction

> Durable Construction

- ▶ Panels are constructed of rugged G-235 mill galvanized steel
- ▶ Forced draft design protects moving parts
- ▶ Various materials of construction are available to enhance longevity of the unit (see **page C115** for details)
- ▶ PVC drift eliminators are impervious to rot, decay, and biological attack
- ▶ Standard patented serpentine coils are HDGAF minimizing scaling and fouling potential



Durable Construction



Intake Sound Attenuation



BALTIDRIVE® Power Train Fan System



> Reliable Year-Round Operation

- ▶ Well suited for operation during low ambient temperature conditions and can operate dry
- ▶ Motors, drives, and bearings are located in the dry airstream, protecting them from moisture, condensation, and icing

> Flexible Installation

- ▶ Centrifugal fans can overcome the static pressure imposed by external ductwork, allowing the Series V to be installed indoors
- ▶ Low profile VFL has the fan located adjacent to the basin and casing for use in height sensitive installations

> Low Installed Cost

- ▶ All models mount directly on two parallel I-beams
- ▶ Modular design reduces assembly time (VFL models ship in one piece)
- ▶ All models ship with motors and drives factory installed and aligned

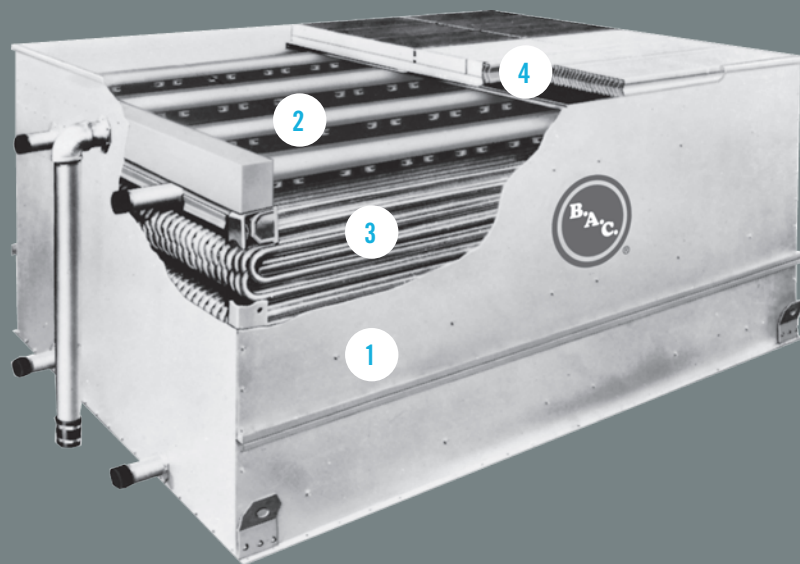


VF1 Closed Circuit Cooling Tower with Discharge Hood



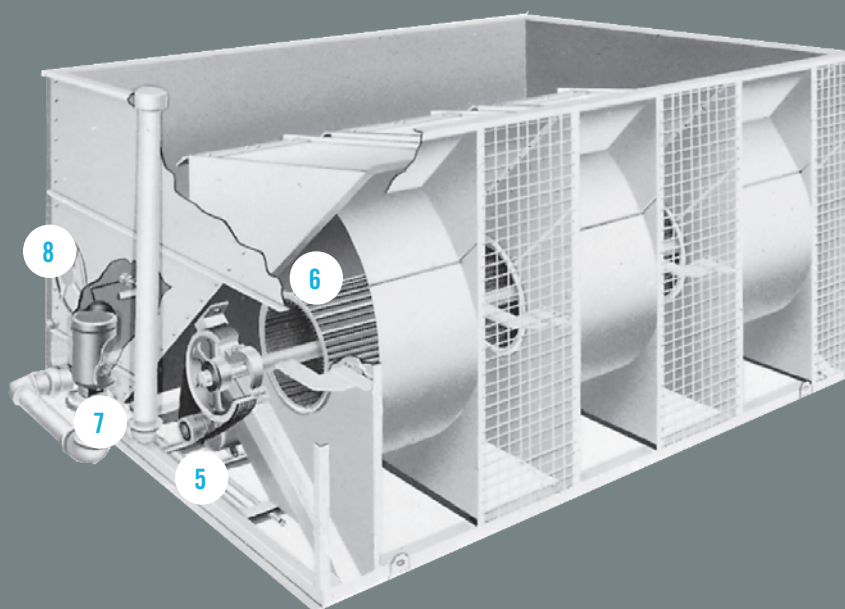
Single Piece Lift of a VFL

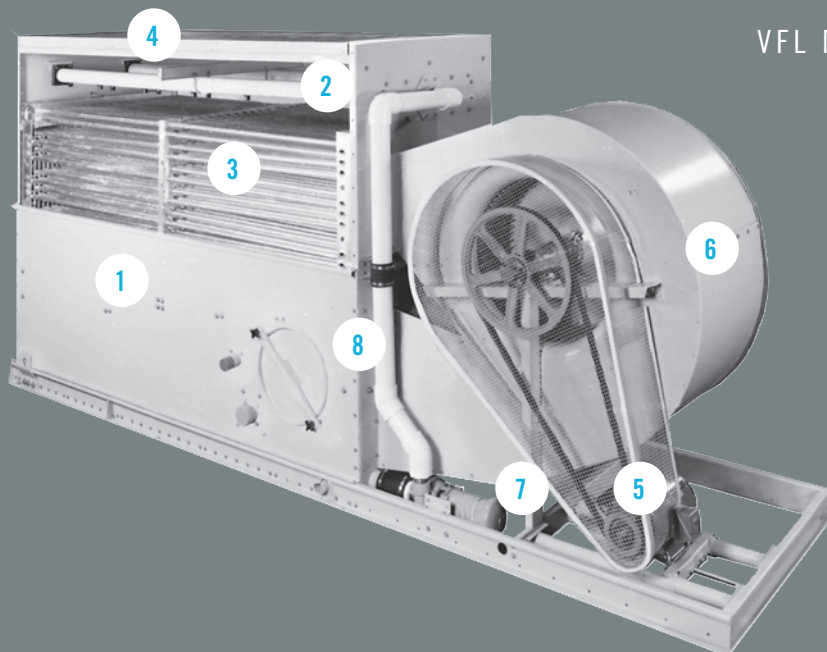
Series V Construction Details



VF1 COIL SECTION

VF1 COLD
WATER BASIN





1 Heavy-Duty Construction

- ▶ Heavy-gauge G-235 (Z700 Metric) mill galvanized steel frame

2 Water Distribution System

- ▶ Schedule 40 PVC spray header and branches
- ▶ Large orifice, 360™ non-clog nozzles
- ▶ Grommets for easy removal

3 Coil

- ▶ Continuous serpentine, steel tubing
- ▶ Hot-dip galvanized after fabrication (HDGAF)
- ▶ Pneumatically tested at 375 psig
- ▶ Sloped tubes for free drainage of fluid
- ▶ ASME B31.5 compliant
- ▶ When required, orders shipping into Canada are supplied with a CRN

4 Drift Eliminators

- ▶ Polyvinyl chloride (PVC)
- ▶ Impervious to rot, decay, and biological attack
- ▶ Assembled in easy to handle sections

5 Fan Drive System

- ▶ V-belt drive
- ▶ Heavy-duty bearings with a minimum of L_{10} 40,000 hour life
- ▶ Premium efficient, cooling tower duty motors fit for VFD applications
- ▶ 5-year motor and drive warranty

6 Low Sound 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

- ▶ Interior of unit is easily accessible

9 Strainer (NOT SHOWN)

- ▶ Anti-vortexing design to prevent air entrainment

Series V 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 is used as the standard material of construction for all units. All exposed cut edges are protected with a thick zinc coating after fabrication to ensure the zinc rich corrosion barrier is maintained for all over protection. With proper maintenance and water treatment, G-235 galvanized steel products will provide an excellent service life under the operating conditions normally encountered in comfort cooling and industrial applications.

▶ 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)

For applications where severe corrosive conditions exist or where exceptionally long equipment life is required, several material of construction options utilizing stainless steel are available.

- **WATER CONTACT STAINLESS STEEL COLD WATER BASIN**

The cold water basin components below the overflow level are constructed of stainless steel. All principal components in the casing section (minus the coil) will be constructed of galvanized steel or thermosetting hybrid polymer.



Standard Construction Installation



Thermosetting Hybrid Polymer Installation



Stainless Steel Cold Water Basin on VFL



- **WATER CONTACT STAINLESS STEEL UNIT**

The cold water basin and water-contacted components in the coil section (minus the coil) are constructed of stainless steel. All components that are not in direct contact with the water will be constructed of galvanized steel or thermosetting hybrid polymer.

> 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 is pneumatically tested at 375 psig (2,586 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.

▶ **CLEANABLE HEADER COIL (OPTION)**

The cleanable header tube bundle provides removable cover plates on the intake and outlet header boxes to permit access to each serpentine tube circuit for solvent or air-pressure cleaning. Coil material options include carbon steel coils (hot-dip galvanized outside surface). Each coil is pneumatically tested at 125 psig (860 kPa).

▶ **STAINLESS STEEL COIL (OPTION)**

Coils are available in stainless steel for specialized applications. The coil is designed for low pressure drop with sloping tubes for free drainage of fluid. Each coil is pneumatically tested at 375 psig (2,586 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.



Standard Coil



Cleanable Header Coil

Series V Custom Features & Options

▶ **STRAIGHT-THROUGH CLEANABLE COIL (OPTION)**

A header box with a removable cover plate at each end of the coil allows access to every tube end for mechanical cleaning or plugging. It is available in carbon steel (hot-dip galvanized inside and out). Each coil is pneumatically tested at 125 psig (860 kPa).

▶ **ASME U DESIGNATOR COIL (OPTION)**

BAC offers coils that are certified in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Division I. ASME U designated coils are available for projects requiring ASME certified pressure vessels and involve 3rd party inspection and certification. Standard ASME U designated coils are rated at 340 psig (2,344 kPa) maximum allowable working pressure, and they are pneumatically tested at 375 psig (2,586 kPa).

▶ **EXTENDED (FINNED) SURFACE COIL (OPTION)**

Coils are available with half or 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 heat transfer 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 is pneumatically tested at 375 psig (2,586 kPa) and is fabricated per ASME B31.5 standards to ensure the highest quality and integrity.

▶ **MULTIPLE CIRCUIT COILS (OPTION)**

Split coil configurations are available to allow separate process fluid loops through the same unit. Separate loops may be needed for multiple applications requiring different temperature processes or multiple types of process fluids.



Straight-Through Cleanable Coil



Multiple Circuit Coils



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



➤ 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 the harsh environment of a cooling tower 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.



EXTERNAL V-BELT DRIVE

This BAC engineered external drive consists of centrifugal fan(s), motor(s), and drive system(s) located outside of the discharge airstream, protecting them from moisture, condensation, and icing. The drive system consists of a specially designed belts, taper lock sheaves, and premium efficient cooling tower duty motor to provide maximum performance.



External V-belt Drive



BALTIGUARD™ FAN SYSTEM (OPTION)

The BALTIGUARD™ Fan System consists of two standard single-speed fan motor and drive assemblies. One drive assembly is sized for full speed and load, and the other is sized approximately 2/3 speed and consumes only 1/3 the design horsepower. This configuration allows the reserve capacity of a standby motor in the event of failure. As a minimum, approximately 70% capacity will be available from the low horsepower motor, even on a design wet-bulb day. Controls and wiring are the same as those required for a two-speed, two-winding motor. Redundant motors are available by increasing the size of the standby fan motor of the BALTIGUARD™ Fan System to the size of the main motor, providing 100% motor redundancy. Applicability dependant on motor size and model, contact your local BAC Representative for more information.



BALTIGUARD™ Fan System

Series V Custom Features & Options

▶ **BALTIGUARD PLUS™ FAN SYSTEM (OPTION)**

The BALTIGUARD PLUS™ Fan System builds on the advantages of the BALTIGUARD™ Fan System by adding a VFD to either the pony or the main motor, depending on system requirements. This offers the benefits of additional capacity control and energy savings, along with the redundancy offered by the BALTIGUARD™ Fan System. Alternatively, a VFD can be added to BOTH the pony and main motor for complete capacity control and redundancy under any load.

▶ **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.

▶ **EXTENDED LUBRICATION LINES (OPTION)**

Extended lubrication lines are available for lubrication of the fan shaft bearings. Fittings are located on the exterior casing panel near the fan housing



Variable Frequency Drive

➤ **Cold Water Basin**

The spray water collects in the cold water basin which is pumped back over the heat transfer coil. The Series V cold water basin includes the "V" sloped cold water basin design. During operation, this design helps eliminate 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 Inspection



► 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 which illuminates 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.



BASIN HEATERS (OPTION)

Evaporative cooling equipment exposed to below freezing ambient temperatures require protection to prevent freezing of the water in the cold water 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.



Electric Water Level Control

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
VFL-012	1	2	1	2
VFL-024	1	3	1	4
VFL-036	1	4	1	5
VFL-048	1	5	1	7
VFL-072	1	7	1	9
VFL-096	1	9	1	12
VF1-009	1	2	1	2
VF1-018	1	2	1	2
VF1-027	1	2	1	3
VF1-036	1	3	1	5
VF1-048	1	3	1	5
VF1-072	1	5	1	7.5
VF1-096	1	5	1	7.5
VF1-144N	1	7	1	10
VF1-144	1	8	1	10
VF1-192	2	5	2	7.5
VF1-216	1	12	1	16
VF1-288N	2	7	2	10
VF1-1012	1	8	1	10
VF1-1018	1	12	1	16
VF1-1024	2	8	2	10
VF1-1036	2	12	2	16
VF1-288	2	8	2	10
VF1-432	2	12	2	16



Basin Heater



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

Series V Custom Features & Options

► BASIN SWEEPER PIPING (OPTION)

Basin sweeper piping is an effective method of reducing sediment that may collect in the cold water basin of the unit. A complete piping system, including nozzles, is provided in the cold water basin to connect to side stream filtration equipment (provided by others). For more information on filtration systems, consult “Filtration Guide” found on **page J241**. VF1-009 through 048 are provided with filter connection only since the turbulence in the cold water basin keeps particles in suspension.

► LOW AND HIGH LEVEL ALARM FLOAT SWITCHES (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

The Series V water distribution system is provided with BAC 360™ Spray Nozzles. These nozzles are large orifice and non-clogging.

► STANDARD SPRAY WATER PUMP

The Series V is provided with an integral spray water pump sized to distribute the recirculating water over the coil maximizing capacity. The patented BAC 360™ non-clog nozzles ensure even flow over the coil area and are simple to remove for maintenance.

► REDUNDANT PUMPS (OPTION)

An optional secondary spray pump is available for critical applications.

> 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. All Low Profile units ship completely assembled, minimizing installation time and cost. There are no motors to mount, no sheaves to align, no belts to install, and no make-up system to assemble.



Standard Spray Water Pump



Single Piece Lift of a VFL



► **KNOCKDOWN UNITS (OPTION)**

Knockdown units are available for jobs where access to the cooling tower 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 tower is excessive. All materials of construction and design features are the same as those of a factory assembled unit.

> **Sound Options**

The low sound levels generated by Series V Closed Circuit Cooling Towers make them suitable for most installations. The panel opposite the air intake, called the blankoff panel, is inherently quiet. Positioning the blankoff panel towards the sound sensitive direction insulates sensitive areas from higher sound levels.



► **STANDARD FAN**

The standard centrifugal fan provided on Series V Closed Circuit Cooling Towers is inherently quiet and is selected to optimize low sound levels.



Standard Centrifugal Fan

► **SOUND ATTENUATION (OPTION)**

For extremely sound sensitive installations, factory designed, tested, and rated sound attenuation options are available for both the air intake and discharge. Consult your local BAC Representative regarding available options.

► **SINGLE-SIDE AIR INTAKE**

Single-side air intake units can be placed close to solid walls, reducing the size of enclosures and allowing for more profitable use of premium space. Also, the panel opposite the air intake, called the blankoff panel, is inherently quiet. Positioning the blankoff panel towards the sound sensitive direction insulates sensitive areas from higher sound levels.



Intake and Discharge Sound Attenuation

Series V Custom Features & Options

> Air Intake Options

In a closed circuit cooling tower, airborne debris can be entrained in the water through the unit's air intake. The Series V 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 tower lowers maintenance requirements and helps to maintain thermal efficiency.

▶ **AIR INTAKE SCREENS**

The standard 1" x 1" wire screen is factory-installed over the air intake to prevent debris from entering the tower.

▶ **BOTTOM INTAKE SCREENS (OPTION)**

Series V Closed Circuit Cooling Towers are available with factory-installed wire mesh screens over the bottom openings to prevent unauthorized access.

▶ **SOLID BOTTOM PANELS (OPTION)**

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

> Air Discharge Options

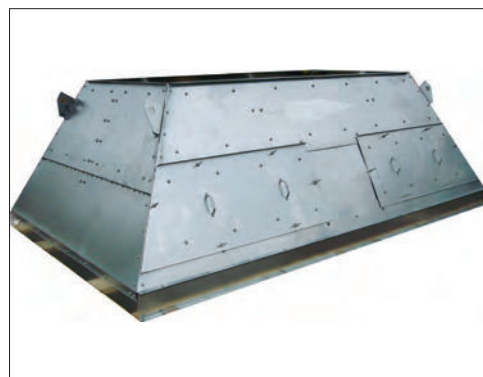
BAC offers a full line of discharge hoods that are built, tested, and rated specifically for all Series V Closed Circuit Cooling Towers.

▶ **PCD HOODS AND INSULATION (OPTION)**

The innovative design of BAC Closed Circuit Cooling Tower's results in a low heat loss when the unit is idle. When additional heat loss prevention is desired, factory mounted PCDs with stainless steel linkages and damper actuators can be provided. The motor actuators are easily accessible. The addition of factory mounted insulation to the hood and/or casing further reduces the heat loss by minimizing losses due to conduction. Per ASHRAE 90.1-2010 either an automatic 3 way valve or PCDs are required on Closed Circuit Cooling Towers used on heat pump applications when used in heating mode.



Multiple Cell Layout



Tapered Hood



► **DISCHARGE HOODS (OPTION)**

BAC offers a full line of discharge hoods with and without positive closure dampers that are built, tested, and rated specifically for all Series V Closed Circuit Cooling Towers. The tapered hoods are designed to increase the discharge air velocity to avoid recirculation in extremely tight enclosures. Straight or tapered hoods can be used to elevate the unit discharge above adjacent walls. A larger fan motor may be necessary when this option is provided.

> **Access Options**

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



NOTE: Platforms, ladders, handrails, safety gates, and safety cages can be added at the time of order or as an aftermarket item.

► **HANDRAIL PACKAGES AND LADDERS (OPTION)**

Handrail packages and ladders are available to provide safe access to the top of the unit for maintenance to the distribution system. Galvanized steel eliminators provide a safe walking surface on top of the unit.



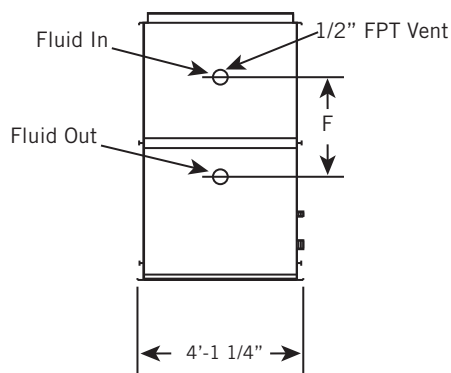
Discharge Hood



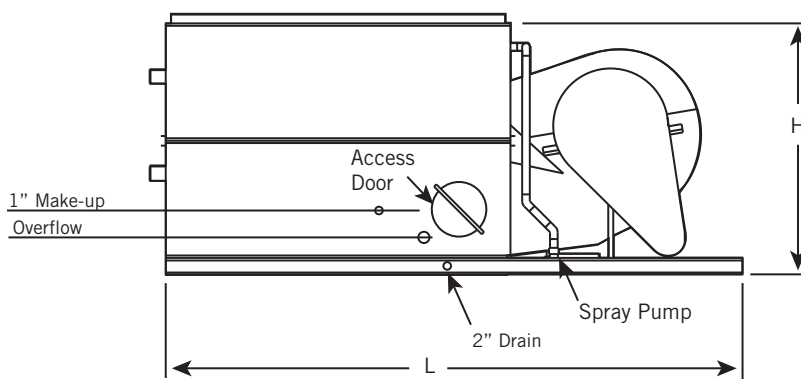
Ladder and Handrail Package

Series V Engineering Data

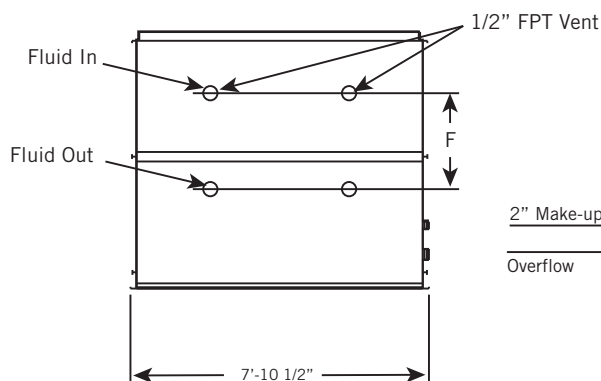
VFL MODELS



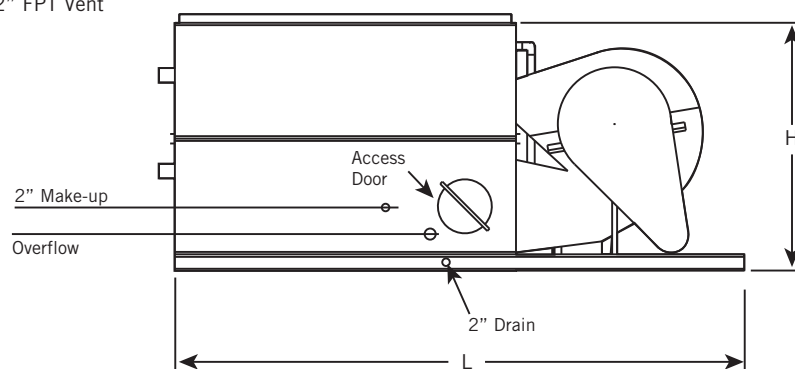
End Elevation: Models VFL-012 to 048



Side Elevation: Models VFL-012 to 048



End Elevation: Models VFL-072 to 096



Side Elevation: Models VFL-072 to 096



NOTES:

1. Nominal tons of cooling represents the capability to cool 3 USGPM of water from a 95°F entering water temperature to an 85°F leaving water temperature at a 78°F entering wet-bulb temperature.
2. Fan horsepower is at 0" external static pressure.
3. Operating weight is for the unit with the water level in the cold water basin at the overflow and a full coil.
4. Standard coil connections are beveled for welding.
5. The number and location of coil connections will vary with design flow and coil arrangement.
6. If discharge hoods with positive closure damper are furnished, see **page C135** for added weight and height. Fan motor horsepower may increase; consult selection software for verification.
7. All units ship in one piece.
8. VFL-012 to 048, the riser pipe diameter is 3". For VFL-072 to 096, the riser pipe diameter is 4".

Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase.



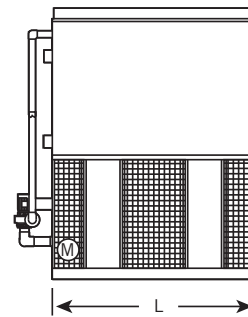
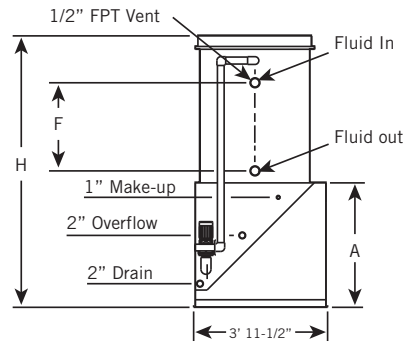
NOTE: Up-to-date engineering data, free product selection software, and more can be found at www.BaltimoreAircoil.com.

Model Number	Nominal Tons ⁽¹⁾	Motor HP		Airflow (CFM)	Weights (lbs)		Dimensions			Connections		Spray Pump (USGPM)	Internal Coil Volume (gal)
		Fan ⁽²⁾	Pump		Operating ⁽³⁾	Shipping	L	H	F	Coil ^(4,5)	Overflow		
VFL-012-02F	4	2	1/3	8,050	2,560	1,880	7'-1"	5'-5"	1'-3"	3"	2"	45	18
VFL-012-02G	5	3	1/3	9,220	2,560	1,880	7'-1"	5'-5"	1'-3"	3"	2"	45	18
VFL-012-12F	7	2	1/3	7,870	2,810	2,090	7'-1"	6'-4"	1'-11"	3"	2"	45	25
VFL-012-12H	9	5	1/3	10,680	2,810	2,090	7'-1"	6'-4"	1'-11"	3"	2"	45	25
VFL-012-22F	8	2	1/3	7,750	3,140	2,330	7'-1"	6'-10"	2'-8"	3"	2"	45	32
VFL-012-22H	11	5	1/3	10,510	3,140	2,330	7'-1"	6'-10"	2'-8"	3"	2"	45	32
VFL-012-32G	12	3	1/3	8,760	3,140	2,555	7'-1"	7'-7"	3'-4"	3"	2"	45	39
VFL-012-32H	14	5	1/3	10,380	3,140	2,555	7'-1"	7'-7"	3'-4"	3"	2"	45	39
VFL-024-12H	17	5	1/2	15,430	4,610	3,120	11'-0"	6'-4"	1'-10"	4"	2"	94	47
VFL-024-22H	21	5	1/2	15,180	4,610	3,120	11'-0"	6'-8"	2'-7"	4"	2"	94	61
VFL-024-22J	24	7.5	1/2	17,380	5,130	3,150	11'-0"	6'-10"	2'-7"	4"	2"	94	61
VFL-024-32H	26	5	1/2	14,990	5,750	3,960	11'-0"	7'-4"	3'-3"	4"	2"	94	75
VFL-024-32J	30	7.5	1/2	17,160	5,750	3,960	11'-0"	7'-4"	3'-3"	4"	2"	94	75
VFL-036-22K	35	10	1	23,580	7,070	4,690	15'-0"	6'-11"	2'-10"	4"	2"	142	90
VFL-036-22L	40	15	1	26,990	7,070	4,690	15'-0"	7'-0"	2'-10"	4"	2"	142	90
VFL-036-22M	46	20	1	29,710	7,070	4,690	15'-0"	7'-0"	2'-10"	4"	2"	142	90
VFL-036-31M	49	20	1	29,340	7,950	5,330	15'-0"	8'-0"	3'-7"	4"	2"	142	111
VFL-036-32K	43	10	1	23,290	7,950	5,330	15'-0"	7'-9"	3'-7"	4"	2"	142	111
VFL-036-32L	50	15	1	26,660	7,950	5,330	15'-0"	8'-0"	3'-7"	4"	2"	142	111
VFL-036-32M	56	20	1	29,340	7,950	5,330	15'-0"	8'-0"	3'-7"	4"	2"	142	111
VFL-048-22L	43	15	1 1/2	29,150	8,905	5,616	18'-0"	6'-11"	2'-10"	4"	3"	192	119
VFL-048-31L	46	15	1 1/2	28,790	9,320	6,480	18'-0"	7'-9"	3'-7"	4"	3"	192	148
VFL-048-31M	52	20	1 1/2	31,680	9,320	6,480	18'-0"	7'-9"	3'-7"	4"	3"	192	148
VFL-048-41L	49	15	1 1/2	28,490	10,350	7,230	18'-0"	8'-5"	4'-4"	4"	3"	192	177
VFL-072-22N	69	25	1 1/2	45,390	12,835	8,755	15'-0"	7'-1"	2'-10"	4"	3"	284	180
VFL-072-22O	75	30	1 1/2	48,240	12,835	8,755	15'-0"	7'-1"	2'-10"	4"	3"	284	180
VFL-072-31N	75	25	1 1/2	44,830	14,470	9,920	15'-0"	7'-9"	3'-7"	4"	3"	284	223
VFL-072-31O	81	30	1 1/2	47,640	14,470	9,920	15'-0"	8'-0"	3'-7"	4"	3"	284	223
VFL-072-31P	92	40	1 1/2	52,430	14,470	9,920	15'-0"	8'-0"	3'-7"	4"	3"	284	223
VFL-072-41N	79	25	1 1/2	44,370	15,870	10,950	15'-0"	8'-5"	4'-4"	4"	3"	284	265
VFL-072-41O	86	30	1 1/2	47,150	15,870	10,950	15'-0"	8'-8"	4'-4"	4"	3"	284	265
VFL-072-41P	97	40	1 1/2	51,900	15,870	10,950	15'-0"	8'-9"	4'-4"	4"	3"	284	265
VFL-096-41N	86	25	2	50,920	18,940	12,960	18'-0"	8'-5"	4'-4"	4"	3"	384	347
VFL-096-41O	94	30	2	54,110	18,940	12,960	18'-0"	8'-5"	4'-4"	4"	3"	384	347
VFL-096-41P	108	40	2	59,560	18,940	12,960	18'-0"	8'-5"	4'-4"	4"	3"	384	347

Series V Engineering Data

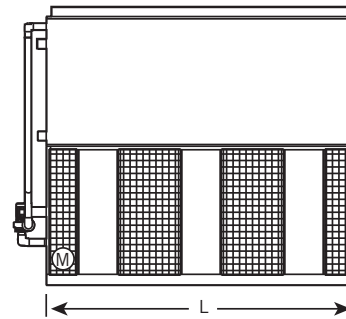
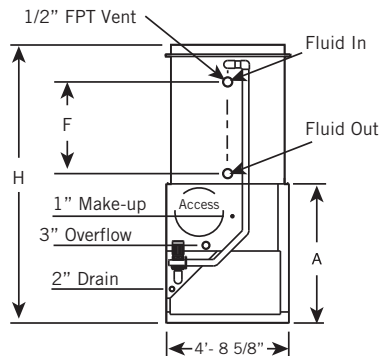
VF1 MODELS

End Elevation: Models VF1-009 to 036



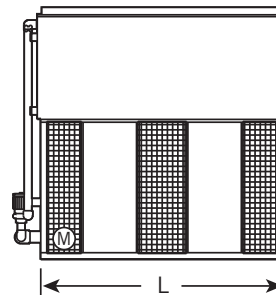
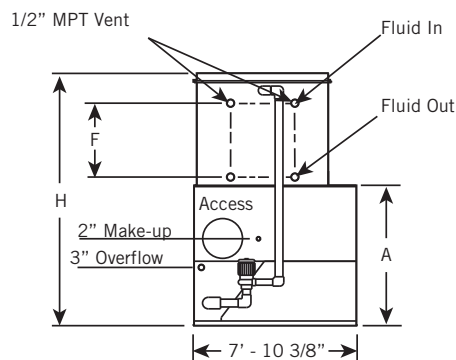
Side Elevation: Models VF1-009 to 036

End Elevation: Models VF1-048



Side Elevation: Models VF1-048

End Elevation: Models VF1-072



Side Elevation: Models VF1-072

NOTES FOR OPPOSITE TABLE:

1. Nominal tons of cooling represents the capability to cool 3 USGPM of water from a 95°F entering water temperature to an 85°F leaving water temperature at a 78°F entering wet-bulb temperature.
2. Fan horsepower is at 0" external static pressure.
3. Operating weight is for the unit with the water level in the cold water basin at the overflow and a full coil.
4. Units marked with an asterisk ship in one piece. The coil section is the heaviest section.
5. Standard coil connections are beveled for welding.
6. The number and location of coil connections will vary with design flow and coil arrangement.
7. If discharge hoods with positive closure damper are furnished, see **page C135** for added weight and height. Fan motor horsepower may increase; consult selection software for verification.
8. For VF1-009 to 048, the riser pipe diameter is 3". For VF1-072 the riser pipe diameter is 4".

Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase.



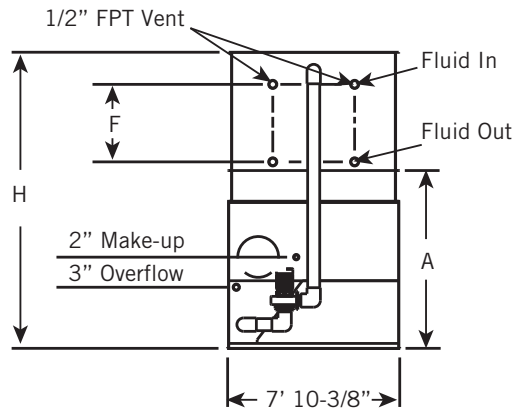
Model Number	Nominal Tons ^[1]	Motor HP		Airflow (CFM)	Weights (lbs)			Dimensions				Connections		Spray Pump (USGPM)	Internal Coil Volume (gal)
		Fan ^[2]	Pump		Operating ^[3]	Shipping	Heaviest Section ^[4]	L	H	F	A	Coil ^[5,6]	Overflow		
VF1-009-12E	4	1.5	1/3	4,510	1,875	1,625	1,460*	3'-0"	7'-4"	1'-11"	3'-9"	3"	2"	35	20
VF1-009-12F	5	2		4,970	1,875	1,625	1,460*		7'-4"	1'-11"					20
VF1-009-12G	5	3		5,690	1,875	1,625	1,460*		7'-4"	1'-11"					20
VF1-009-22F	6	2		4,890	2,075	1,785	1,000		8'-1"	2'-8"					26
VF1-009-22G	7	3		5,590	2,075	1,785	1,000		8'-1"	2'-8"					26
VF1-009-32G	8	3		5,520	2,295	1,965	1,180		8'-9"	3'-4"					31
VF1-009-42G	9	3		5,470	2,495	2,125	1,340		9'-6"	4'-1"					36
VF1-018-12F	9	2	1/2	8,050	2,955	2,415	2,415*	6'-0"	7'-4"	1'-11"	3'-9"	4"	2"	75	38
VF1-018-12G	11	3		9,220	2,955	2,415	2,415*		7'-4"	1'-11"					38
VF1-018-12H	14	5		10,930	2,955	2,415	2,415*		7'-4"	1'-11"					38
VF1-018-22H	17	5		10,750	3,260	2,640	1,720		8'-1"	2'-8"					49
VF1-018-22J	20	7.5		12,310	3,260	2,640	1,720		8'-1"	2'-8"					49
VF1-018-32G	16	3		8,960	3,660	2,940	2,010		8'-9"	3'-3"					60
VF1-018-32H	19	5		10,620	3,660	2,940	2,010		8'-9"	3'-3"					60
VF1-018-32J	22	7.5		12,150	3,660	2,940	2,010		8'-9"	3'-3"					60
VF1-018-42H	21	5		10,510	4,010	3,190	2,260		9'-6"	4'-0"					71
VF1-018-42J	24	7.5		12,030	4,010	3,190	2,260		9'-6"	4'-0"					71
VF1-027-22H	24	5	3/4	14,060	4,860	3,750	2,470	9'-0"	8'-4"	2'-10"	3'-9"	4"	2"	115	72
VF1-027-22J	28	7.5		16,090	4,860	3,750	2,470		8'-4"	2'-10"					72
VF1-027-22K	32	10		17,710	4,860	3,750	2,470		8'-4"	2'-10"					72
VF1-027-32H	26	5		13,880	5,440	4,180	2,850		9'-1"	3'-7"					89
VF1-027-32J	31	7.5		15,890	5,440	4,180	2,850		9'-1"	3'-7"					89
VF1-027-32K	35	10		17,490	5,440	4,180	2,850		9'-1"	3'-7"					89
VF1-027-42H	28	5		13,740	5,970	4,570	3,240		9'-10"	4'-4"					106
VF1-027-42J	33	7.5		15,730	5,970	4,570	3,240		9'-10"	4'-4"					106
VF1-027-42K	37	10		17,310	5,970	4,570	3,240		9'-10"	4'-4"					106
VF1-036-21L	41	15	1	24,870	6,280	4,760	3,200	12'-0"	8'-4"	2'-10"	3'-9"	4"	2"	150	95
VF1-036-22J	35	7.5		19,740	6,280	4,760	3,200		8'-4"	2'-10"					95
VF1-036-22K	39	10		21,730	6,280	4,760	3,200		8'-4"	2'-10"					95
VF1-036-22L	47	15		24,870	6,280	4,760	3,200		8'-4"	2'-10"					95
VF1-036-31L	44	15		24,560	7,020	5,310	3,720		9'-1"	3'-7"					118
VF1-036-32J	37	7.5		19,490	7,020	5,310	3,720		9'-1"	3'-7"					118
VF1-036-41L	47	15		24,310	7,710	5,810	4,220		9'-10"	4'-4"					140
VF1-036-51L	49	15		24,100	8,390	6,310	4,720		10'-7"	4'-4"					163
VF1-048-21L	48	15	1 1/2	32,520	10,230	7,870	4,920	12'-0"	10'-0"	2'-10"	5'-5"	4"	3"	220	137
VF1-048-21M	55	20		35,790	10,230	7,870	4,920		10'-0"	2'-10"					137
VF1-048-31M	59	20		35,340	11,390	8,460	5,930		10'-9"	3'-7"					170
VF1-048-31N	65	25		38,070	11,390	8,460	5,930		10'-9"	3'-7"					170
VF1-048-41M	63	20		34,980	12,690	9,320	6,600		11'-7"	4'-4"					203
VF1-048-41N	70	25		37,690	12,690	9,320	6,600		11'-7"	4'-4"					203
VF1-072-21M	62	20	2	45,990	15,670	10,720	6,580	11'-8"	11'-4"	2'-10"	6'-9"	4"	3"	305	190
VF1-072-21N	69	25		49,540	15,670	10,720	6,580		11'-4"	2'-10"					190
VF1-072-21O	75	30		52,650	15,670	10,720	6,580		11'-4"	2'-10"					190
VF1-072-31M	67	20		45,420	17,380	12,050	7,950		12'-2"	3'-7"					235
VF1-072-31N	74	25		48,930	17,380	12,050	7,950		12'-2"	3'-7"					235
VF1-072-31O	81	30		51,990	17,380	12,050	7,950		12'-2"	3'-7"					235
VF1-072-41M	72	20		44,960	18,000	12,480	9,320		12'-11"	4'-4"					281
VF1-072-41N	80	25		48,430	18,000	12,480	9,320		12'-11"	4'-4"					281
VF1-072-41O	86	30		51,460	18,000	12,480	9,320		12'-11"	4'-4"					281



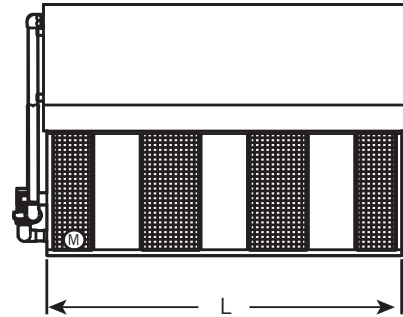
NOTE: Up-to-date engineering data, free product selection software, and more can be found at www.BaltimoreAircoil.com.

Series V Engineering Data

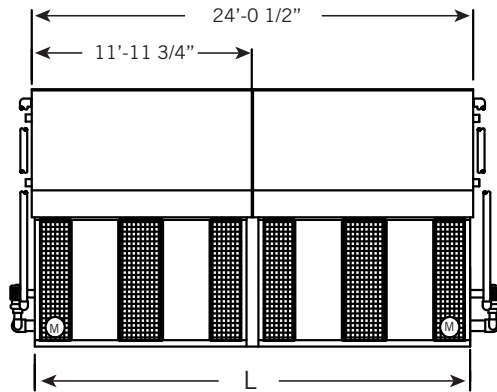
VF1 MODELS



End Elevation: Models VF1-096 to 144N, & VF1-192 to 288N



Side Elevation: Models VF1-096 & 144N



Side Elevation: Models VF1-192N & 288N



NOTE: Up-to-date engineering data, free product selection software, and more can be found at www.BaltimoreAircoil.com.



Model Number	Nominal Tons ^[1]	Motor HP		Airflow (CFM)	Weights (lbs)			Dimensions				Connections		Spray Pump (USGPM)	Internal Coil Volume (gal)
		Fan ^[2]	Pump		Operating ^[3]	Shipping	Heaviest Section ^[4]	L	H	F	A	Coil ^[5,6]	Overflow		
VF1-096-310	81	30	3	53,540	19,385	12,795	8,460	11'-8"	13'-7"	3'-7"	8'-2"	4"	3"	400	296
VF1-096-31P	93	40		58,930	19,385	12,795	8,460		13'-7"	3'-7"					296
VF1-096-31Q	102	50		63,480	19,385	12,795	8,460		13'-7"	3'-7"					296
VF1-096-410	87	30		52,990	21,345	14,215	9,880		14'-4"	4'-4"					353
VF1-096-41P	99	40		58,320	21,345	14,215	9,880		14'-4"	4'-4"					353
VF1-096-41Q	109	50		62,830	21,345	14,215	9,880		14'-4"	4'-4"					353
VF1-096-51P	104	40		57,820	23,305	14,855	10,520		15'-1"	5'-1"					411
VF1-096-51Q	114	50		62,290	23,305	14,855	10,520		15'-1"	5'-1"					411
VF1-144N-21P	113	40	5	67,490	25,610	16,430	10,390	17'-9"	12'-10"	2'-10"	8'-2"	4"	3"	610	356
VF1-144N-21Q	127	50		72,700	25,610	16,430	10,390		12'-10"	2'-10"					356
VF1-144N-21R	139	60		77,250	25,610	16,430	10,390		12'-10"	2'-10"					356
VF1-144N-31P	122	40		66,640	28,480	18,490	12,570		13'-7"	3'-7"					443
VF1-144N-31Q	136	50		71,790	28,480	18,490	12,570		13'-7"	3'-7"					443
VF1-144N-31R	148	60		76,290	28,480	18,490	12,570		13'-7"	3'-7"					443
VF1-144N-41P	130	40		65,960	31,560	20,750	14,750		14'-4"	4'-4"					594
VF1-144N-41Q	144	50		71,060	31,560	20,750	14,750		14'-4"	4'-4"					594
VF1-144N-41R	157	60		75,510	31,560	20,750	14,750		14'-4"	4'-4"					594
VF1-192-310	163	60	6	106,150	38,900	25,570	8,460	23'-9"	13'-7"	3'-7"	8'-2"	4"	3"	800	592
VF1-192-31P	185	80		116,830	38,900	25,570	8,460		13'-7"	3'-7"					592
VF1-192-31Q	205	100		125,850	38,900	25,570	8,460		13'-7"	3'-7"					592
VF1-192-410	174	60		105,060	42,780	28,360	9,880		14'-4"	4'-4"					706
VF1-192-41P	198	80		115,640	42,780	28,360	9,880		14'-4"	4'-4"					706
VF1-192-41Q	219	100		124,570	42,780	28,360	9,880		14'-4"	4'-4"					706
VF1-192-51P	207	80		114,640	46,660	29,780	10,520		15'-1"	5'-1"					822
VF1-192-51Q	228	100		123,490	46,660	29,780	10,520		15'-1"	5'-1"					822
VF1-288N-21P	226	80	10	135,080	51,260	32,750	11,970**	35'-10"	12'-10"	2'-10"	8'-2"	4"	3"	1,220	712
VF1-288N-21Q	253	100		145,510	51,260	32,750	11,970**		12'-10"	2'-10"					712
VF1-288N-21R	277	120		154,630	51,260	32,750	11,970**		12'-10"	2'-10"					712
VF1-288N-31P	244	80		133,400	57,080	36,950	12,570		13'-7"	3'-7"					886
VF1-288N-31Q	271	100		143,700	57,080	36,950	12,570		13'-7"	3'-7"					886
VF1-288N-31R	295	120		152,700	57,080	36,950	12,570		13'-7"	3'-7"					886
VF1-288N-41P	260	80		132,030	63,220	40,520	14,750		14'-4"	4'-4"					1,058
VF1-288N-41Q	288	100		142,230	63,220	40,520	14,750		14'-4"	4'-4"					1,058
VF1-288N-41R	313	120		151,140	63,220	40,520	14,750		14'-4"	4'-4"					1,058

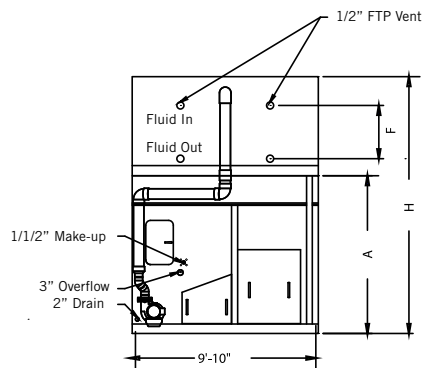
NOTES:

- Nominal tons of cooling represents the capability to cool 3 USGPM of water from a 95°F entering water temperature to an 85°F leaving water temperature at a 78°F entering wet-bulb temperature.
- Fan horsepower is at 0" external static pressure.
- Operating weight is for the unit with the water level in the cold water basin at the overflow and a full coil.
- Unless marked with a double asterisk (**), the coil section is the heaviest section.
- Standard coil connections are beveled for welding.
- The number and location of coil connections will vary with design flow and coil arrangement.
- If discharge hoods with positive closure damper are furnished, see **page C135** for added weight and height. Fan motor horsepower may increase; consult selection software for verification.
- For VF1-096 and 192, the riser pipe diameter is 4". For VF1-144N and 288N the riser pipe diameter is 6".

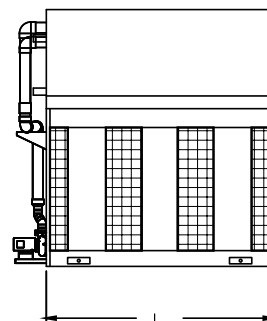
Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase.

Series V Engineering Data

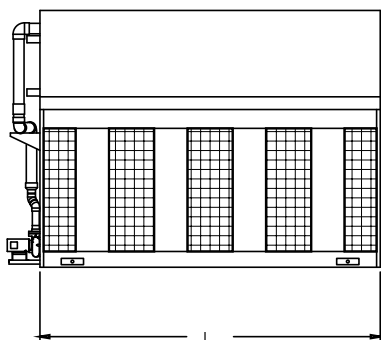
VF1 MODELS



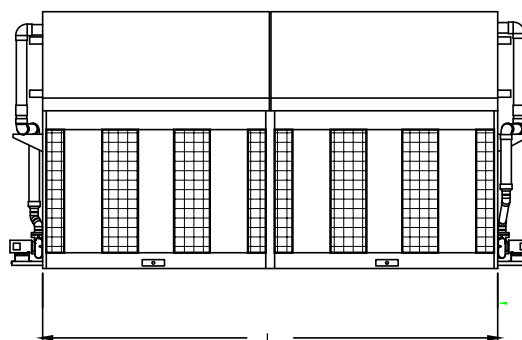
End Elevation: Models Models VF1-1012, 1018, 1024, 1036



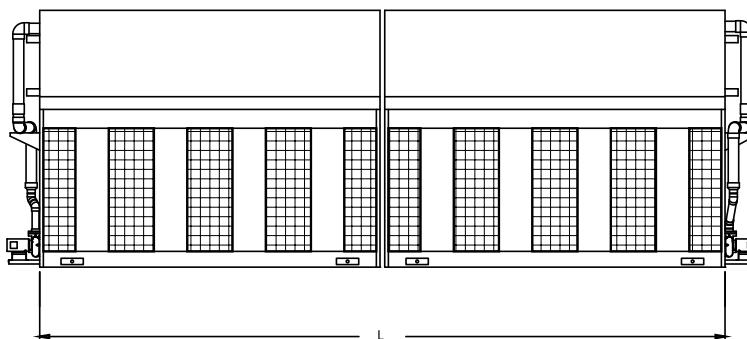
Side Elevation: Models VF1-1012



Side Elevation: Models VF1-1018



Side Elevation: Models VF1-1024



Side Elevation: Models VF1-1036



Model Number	Nominal Tons ^[1]	Motor HP		Airflow (CFM)	Weights (lbs)			Dimensions				Connections		Spray Pump (USGPM)	Internal Coil Volume (gal)
		Fan ^[2]	Pump		Operating ^[3]	Shipping	Heaviest Section ^[4]	L	H	F	A	Coil ^[5,6]	Overflow		
VF1-1012N-4D	127	(1) 60	(1) 3	84,580	20,500	14,150	8,660	12'-0"	14'-1"	2'-10"	8'-4"	4"	3"	350	303
VF1-1012N-5D	145	(1) 60		83,610	22,740	15,790	10,300		14'-10"	3'-7"					375
VF1-1012N-6D	177	(1) 75		88,740	24,830	17,280	11,700		14'-11"	3'-8"					447
VF1-1012N-7D	192	(1) 75		88,020	27,010	18,860	13,280		15'-6"	4'-3"					520
VF1-1012N-8D	201	(1) 75		87,380	29,180	20,430	14,850		16'-2"	4'-11"					592
VF1-1018N-4D	220	(2) 50	(2) 5	132,460	29,610	20,060	12,420	18'-0"	14'-1"	2'-10"	8'-4"	4"	3"	520	450
VF1-1018N-5D	249			130,920	32,820	22,370	14,730		14'-10"	3'-7"					559
VF1-1018N-6D	273			129,670	35,920	24,560	16,920		14'-11"	3'-8"					668
VF1-1018N-7D	294			128,630	39,180	26,910	19,270		15'-6"	4'-3"					777
VF1-1018N-8D	307			127,760	42,370	29,190	21,550		16'-2"	4'-11"					886
VF1-1024N-4D	255	(2) 60	(2) 3	169,160	40,800	27,950	10,630	24'-3"	14'-1"	2'-10"	8'-4"	4"	3"	700	303
VF1-1024N-5D	290	(2) 60		167,220	45,280	31,230	10,300		14'-10"	3'-7"					375
VF1-1024N-6D	355	(2) 75		177,480	49,460	34,210	11,700		14'-11"	3'-8"					447
VF1-1024N-7D	385	(2) 75		176,040	53,820	37,370	13,280		15'-6"	4'-3"					520
VF1-1024N-8D	402	(2) 75		174,760	58,160	40,510	14,850		16'-2"	4'-11"					592
VF1-1036N-4D	441	(4) 50	(2) 5	264,920	59,220	40,120	12,420	36'-3"	14'-1"	2'-10"	8'-4"	4"	3"	1,040	450
VF1-1036N-5D	498			261,840	65,640	44,740	14,730		14'-10"	3'-7"					559
VF1-1036N-6D	546			259,340	71,840	49,120	16,920		14'-11"	3'-8"					668
VF1-1036N-7D	589			257,260	78,360	53,820	19,270		15'-6"	4'-3"					777
VF1-1036N-8D	614			255,520	84,740	58,380	21,550		16'-2"	4'-11"					886



NOTE: Up-to-date engineering data, free product selection software, and more can be found at www.BaltimoreAircoil.com. Additional models are available in BAC selection software, including lower fan motor HP models for higher efficiency, and 2-pass models for higher thermal performance.

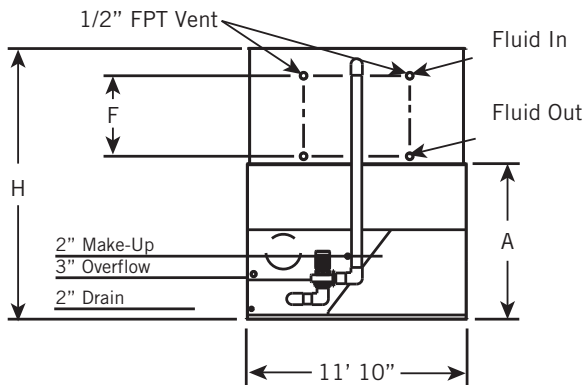


NOTES:

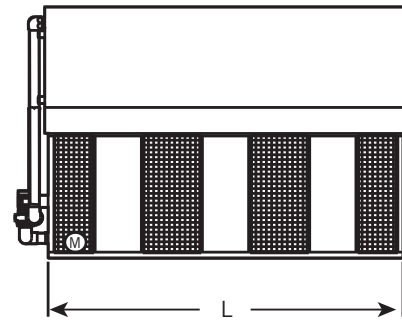
- Nominal tons of cooling represents the capability to cool 3 USGPM of water from a 95°F entering water temperature to an 85°F leaving water temperature at a 78°F entering wet-bulb temperature.
- Fan horsepower is at 0" external static pressure.
- Operating weight is for the unit with the water level in the cold water basin at the overflow and a full coil.
- Unless marked with a double asterisk (**), the coil section is the heaviest section.
- Standard coil connections are beveled for welding.
- The number and location of coil connections will vary with design flow and coil arrangement.
- If discharge hoods with positive closure damper are furnished, see **page C135** for added weight and height. Fan motor horsepower may increase; consult selection software for verification.
- The riser pipe diameter is 6".

Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase.

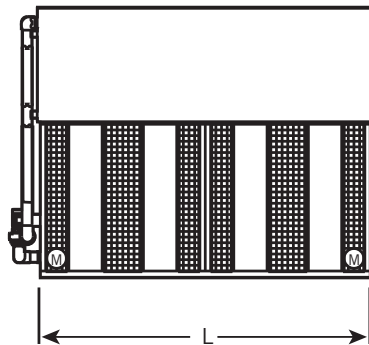
Series V Engineering Data



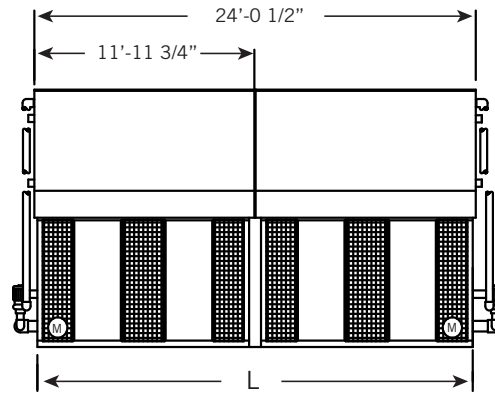
End Elevation: Models VF1-144, 216, & VF1-288 to 432



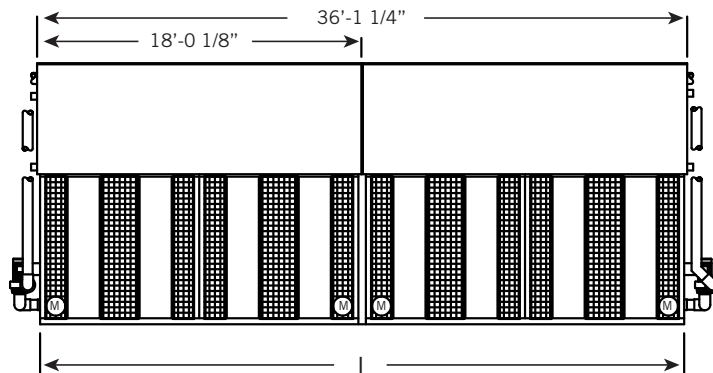
Side Elevation: Models VF1-144



Side Elevation: Models VF1-216



Side Elevation: Models VF1-288



Side Elevation: Models VF1-432



VF1 MODELS

Model Number	Nominal Tons ⁽¹⁾	Motor HP		Airflow (CFM)	Weights (lbs)			Dimensions				Connections		Spray Pump (USGPM)	Internal Coil Volume (gal)
		Fan ⁽²⁾	Pump		Operating ⁽³⁾	Shipping	Heaviest Section ⁽⁴⁾	L	H	F	A	Coil ^(5,6)	Overflow		
VF1-144-21P	116	40	5	81,320	27,090	16,530	10,300	11'-8"	13'-0"	2'-10"	8'-4"	4"	3"	610	365
VF1-144-21Q	129	50		87,600	27,090	16,530	10,300		13'-0"	2'-10"					365
VF1-144-21R	141	60		93,080	27,090	16,530	10,300		13'-0"	2'-10"					365
VF1-144-31P	127	40		80,300	29,980	18,610	12,370		13'-9"	3'-7"					453
VF1-144-31Q	140	50		86,500	29,980	18,610	12,370		13'-9"	3'-7"					453
VF1-144-31R	153	60		91,920	29,980	18,610	12,370		13'-9"	3'-7"					453
VF1-144-41P	137	40		79,480	32,840	20,640	14,440		14'-6"	4'-4"					541
VF1-144-41Q	151	50		85,620	32,840	20,640	14,440		14'-6"	4'-4"					541
VF1-144-41R	164	60	7.5	90,990	32,840	20,640	14,440	17'-9"	14'-6"	4'-4"	8'-4"	4"	3"	900	541
VF1-216-21N	172	50		117,660	40,190	24,200	15,170		13'-0"	2'-10"					545
VF1-216-21Q	188	60		125,030	40,190	24,200	15,170		13'-0"	2'-10"					545
VF1-216-21P	217	80		137,610	40,190	24,200	15,170		13'-0"	2'-10"					545
VF1-216-31N	185	50		116,190	44,370	27,140	18,290		13'-9"	3'-7"					677
VF1-216-31Q	202	60		123,470	44,370	27,140	18,290		13'-9"	3'-7"					677
VF1-216-31P	231	80		135,890	44,370	27,140	18,290		13'-9"	3'-7"					677
VF1-216-41Q	215	60		122,210	48,570	30,090	21,410	23'-9"	14'-6"	4'-4"	8'-4"	4"	3"	1,240	809
VF1-216-41P	245	80	10	134,510	48,570	30,090	21,410		14'-6"	4'-4"					809
VF1-216-41Q	271	100		144,900	48,570	30,090	21,410		14'-6"	4'-4"					809
VF1-288-21P	232	80		162,630	54,300	32,930	12,330**		13'-0"	2'-10"					730
VF1-288-21Q	259	100		175,190	54,300	32,930	12,330**		13'-0"	2'-10"					730
VF1-288-21R	282	120		186,170	54,300	32,930	12,330**		13'-0"	2'-10"					730
VF1-288-31P	254	80		160,600	60,100	37,020	12,370		13'-9"	3'-7"					906
VF1-288-31Q	281	100		173,010	60,100	37,020	12,370		13'-9"	3'-7"					906
VF1-288-31R	305	120	15	183,850	60,100	37,020	12,370	35'-10"	13'-9"	3'-7"	8'-4"	4"	3"	1,800	906
VF1-288-41Q	299	100		158,970	65,720	41,050	14,440		14'-6"	4'-4"					1,082
VF1-288-41R	325	120		171,240	65,720	41,050	14,440		14'-6"	4'-4"					1,082
VF1-432-21N	343	100		235,310	79,600	45,960	18,000**		13'-0"	2'-10"					1,090
VF1-432-21Q	376	120		250,060	79,600	45,960	18,000**		13'-0"	2'-10"					1,090
VF1-432-21P	434	160		275,220	79,600	45,960	18,000**		13'-0"	2'-10"					1,090
VF1-432-31N	371	100		232,380	88,320	52,400	18,290		13'-9"	3'-7"					1,354
VF1-432-31Q	404	120		246,940	88,320	52,400	18,290		13'-9"	3'-7"					1,354
VF1-432-31P	462	160	200	271,790	88,320	52,400	18,290		13'-9"	3'-7"					1,354
VF1-432-41Q	430	120		244,420	97,320	59,200	21,410		14'-6"	4'-4"					1,618
VF1-432-41P	490	160		269,010	97,320	59,200	21,410		14'-6"	4'-4"					1,618
VF1-432-41Q	543	200		289,790	97,320	59,200	21,410		14'-6"	4'-4"					1,618



NOTES:

- Nominal tons of cooling represents the capability to cool 3 USGPM of water from a 95°F entering water temperature to an 85°F leaving water temperature at a 78°F entering wet-bulb temperature.
- Fan horsepower is at 0" external static pressure.
- Operating weight is for the unit with the water level in the cold water basin at the overflow and a full coil.
- Unless marked with a double asterisk (**), the coil section is the heaviest section.
- Standard coil connections are beveled for welding.
- The number and location of coil connections will vary with design flow and coil arrangement.
- If discharge hoods with positive closure damper are furnished, see **page C135** for added weight and height. Fan motor horsepower may increase; consult selection software for verification.
- The riser pipe diameter is 6".

Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase.

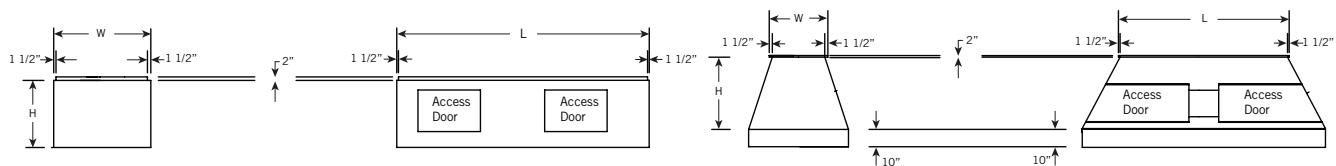
Series V Engineering Data

Discharge Hoods with Positive Closure Dampers

Both tapered and straight discharge hoods with factory mounted positive closure dampers and damper actuators are available for all Series V Closed Circuit Cooling Towers. Hoods are designed to minimize heat loss from convective air flow through an idle unit. The addition of factory installed insulation to the hood and casing further reduces the heat loss by minimizing losses due to conduction. Heat loss data is presented on **page C136** for units without hood, with hood, and with insulated casing and hood. Damper actuators and linkage are factory mounted on the hood.

All wiring and actuator controls must be furnished by others. 115 volt single phase power supply is required. Damper actuators should be interlocked with the temperature control system so that the dampers are open when the pumps are running and closed when the pumps are off.

The additional external static pressure of the tapered discharge hood with dampers may require the use of a larger fan motor; consult selection software for verification. Consult your local BAC Representative for a unit drawing with a hood and positive closure dampers.



Model Number	Number of Hoods Required	Tapered			Total Shipping Weight (lbs)	Straight			Total Shipping Weight (lbs)
		L	W	H		L	W	H	
VFL-012	1	2'-12"	2'-4"	2'-10" ⁽¹⁾	220 ⁽⁴⁾	3'	3'-1"	3'-1" ⁽¹⁾	260 ⁽⁴⁾
VFL-024	1	3'-11"	2'-4"	2'-10" ⁽¹⁾	330 ⁽⁴⁾	5'-3"	3'-1"	3'-1" ⁽¹⁾	410 ⁽⁴⁾
VFL-036	1	6'-11"	2'-4"	2'-10" ⁽¹⁾	470 ⁽⁴⁾	8'-3"	3'-1"	3'-1" ⁽¹⁾	540 ⁽⁴⁾
VFL-048	1	9'-10"	2'-4"	2'-10" ⁽¹⁾	590 ⁽⁴⁾	11'-2"	3'-1"	3'-1" ⁽¹⁾	760 ⁽⁴⁾
VFL-072	1	6'-11"	4'-1"	4'-3" ⁽¹⁾	910 ⁽⁴⁾	8'-3"	6'-4"	3'-1" ⁽¹⁾	960 ⁽⁴⁾
VFL-096	1	8'-3"	4'-1"	4'-3" ⁽¹⁾	1,100 ⁽⁴⁾	11'-2"	6'-4"	3'-1" ⁽¹⁾	1,200 ⁽⁴⁾
VF1-009	1	2'-11"	1'-5"	3'-2" ⁽¹⁾	280 ⁽³⁾	3'	3'-1"	3'-1" ⁽¹⁾	300 ⁽³⁾
VF1-018	1	3'-11"	1'-5"	3'-2" ⁽¹⁾	470 ⁽³⁾	5'-1"	3'-1"	3'-1" ⁽¹⁾	490 ⁽³⁾
VF1-027	1	6'-11"	1'-5"	3'-2" ⁽¹⁾	640 ⁽³⁾	8'-3"	3'-1"	3'-1" ⁽¹⁾	680 ⁽³⁾
VF1-036	1	9'-10"	1'-5"	3'-2" ⁽¹⁾	760 ⁽³⁾	11'-2"	3'-1"	3'-1" ⁽¹⁾	840 ⁽³⁾
VF1-048	1	8'-3"	2'-4"	4'-9" ⁽¹⁾	1,240 ⁽³⁾	11'-2"	4'-1"	3'-10" ⁽¹⁾	1,220 ⁽³⁾
VF1-072	1	8'-3"	3'-1"	4'-9" ⁽¹⁾	1,540 ⁽³⁾	10'-6"	5'-10"	3'-10" ⁽¹⁾	1,620 ⁽³⁾
VF1-096	1	8'-3"	4'-1"	4'-5" ⁽¹⁾	1,200 ⁽⁴⁾	11'-2"	6'-4"	3'-10" ⁽¹⁾	1,320 ⁽⁴⁾
VF1-144N	1	14'-2"	3'-8"	4'-5" ⁽¹⁾	1,750 ⁽⁴⁾	16'-8"	6'-4"	3'-10" ⁽¹⁾	1,820 ⁽⁴⁾
VF1-144	1	8'-3"	6'-4"	4'-5" ⁽¹⁾	1,550 ⁽⁴⁾	11'-2"	10'-4"	3'-10" ⁽¹⁾	1,750 ⁽⁴⁾
VF1-192	2	8'-3"	4'-1"	4'-5" ⁽¹⁾	2,400 ⁽⁴⁾	11'-2"	6'-7"	3'-10" ⁽¹⁾	2,640 ⁽⁴⁾
VF1-216	1	14'-2"	5'-11"	4'-5" ⁽¹⁾	2,150 ⁽⁴⁾	16'-8"	10'-4"	3'-10" ⁽¹⁾	2,400 ⁽⁴⁾
VF1-288N	2	14'-2"	3'-8"	4'-5" ⁽¹⁾	3,500 ⁽⁴⁾	16'-8"	6'-4"	3'-10" ⁽¹⁾	3,640 ⁽⁴⁾
VF1-1012N	1	12'-0"	5'-3"	4'-10" ⁽¹⁾	1,180 ⁽⁴⁾	12'-0"	10'-10"	4'-11" ⁽¹⁾	1,510 ⁽⁴⁾
VF1-1018N	1	18'-0"	5'-3"	4'-10" ⁽¹⁾	1,580 ⁽⁴⁾	18'-0"	10'-10"	4'-11" ⁽¹⁾	2,110 ⁽⁴⁾
VF1-1024N	2	12'-0"	5'-3"	4'-10" ⁽¹⁾	2,360 ⁽⁴⁾	12'-0"	10'-10"	4'-11" ⁽¹⁾	3,020 ⁽⁴⁾
VF1-1036N	2	18'-0"	5'-3"	4'-10" ⁽¹⁾	3,160 ⁽⁴⁾	18'-0"	10'-10"	4'-11" ⁽¹⁾	4,220 ⁽⁴⁾
VF1-288	2	8'-3"	6'-4"	4'-5" ⁽¹⁾	3,100 ⁽⁴⁾	11'-2"	10'-4"	3'-10" ⁽¹⁾	3,500 ⁽⁴⁾
VF1-432	2	14'-2"	5'-11"	4'-5" ⁽¹⁾	4,300 ⁽⁴⁾	16'-8"	10'-4"	3'-10" ⁽¹⁾	4,800 ⁽⁴⁾

NOTES (APPLICABLE TO SPECIFIC MODELS ONLY):

1. On these models, the discharge hood surrounds the drift eliminators and is recessed into the drift eliminator frame; therefore, the overall height of the unit with hood equals H (of unit) plus H (of hood) minus 4".

2. On these units, the hood sits directly on top of the casing.

3. Includes drift eliminators and skid.

4. Includes skid only. Drift eliminators are included in unit weight.



VFL HEAT LOSS DATA (BTUH)^[1]

Model Number (VFL Models Only)	Standard Unit Heat Loss (BTU/HR)	Unit w/ Hood & Positive Closure Dampers	Unit w/ Hood, Positive Closure Dampers & Insulation ^[2]
VFL-012-02	19,200	16,500	11,000
VFL-012-12	25,000	17,800	11,900
VFL-012-22	29,900	19,200	12,800
VFL-012-32	33,800	20,500	13,700
VFL-024-12	48,200	28,500	19,000
VFL-024-22	57,700	30,400	20,300
VFL-024-32	65,400	32,300	21,500
VFL-036-22	87,000	47,100	30,700
VFL-036-33	98,400	49,800	32,500
VFL-048-22	126,400	66,000	42,600
VFL-048-31	138,800	69,300	44,800
VFL-048-41	151,200	72,600	47,000
VFL-072-22	210,900	84,400	56,200
VFL-072-31	234,100	87,900	58,600
VFL-072-41	252,900	91,400	60,900
VFL-096-41	311,700	103,600	69,000



NOTES:

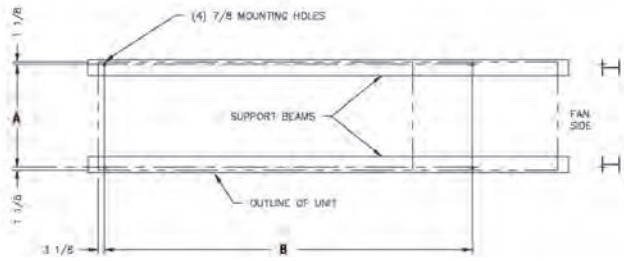
- Heat loss is based on 50°F (10°C) coil water and -10°F (-23°C) ambient with a 45 MPH wind. Fan(s) and pump(s) are off.
- One inch thick PVC nitrile rubber blend thermal insulation with protective paint.

VF1 HEAT LOSS DATA (BTUH)^[1]

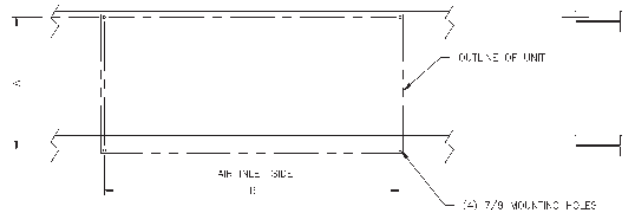
Model Number (VF1 Models Only)	Standard Unit Heat Loss (BTU/hr)	Unit w/ Hood & Positive Closure Dampers	Unit w/ Hood, Positive Closure Dampers & Insulation ^[2]
VF1-009-12	24,300	17,100	10,300
VF1-009-22	29,400	18,800	12,000
VF1-009-32	32,900	20,500	12,000
VF1-009-42	34,800	22,200	13,700
VF1-018-02	34,700	25,600	15,400
VF1-018-12	46,200	27,300	15,400
VF1-018-22	56,000	29,100	17,100
VF1-018-32	64,300	30,800	17,100
VF1-018-42	70,950	32,550	18,800
VF1-027-22	86,100	46,100	27,300
VF1-027-32	97,700	49,500	29,100
VF1-027-42	106,300	52,900	29,100
VF1-036-21	112,600	63,200	39,300
VF1-036-31	128,900	66,600	39,300
VF1-036-41	145,200	70,000	43,600
VF1-036-51	161,500	73,400	43,600
VF1-048-21	154,900	80,200	52,900
VF1-048-31	177,200	83,700	52,900
VF1-048-41	197,000	85,600	54,600
VF1-072-21	212,400	83,700	51,200
VF1-072-31	241,100	87,100	51,200
VF1-072-41	269,800	90,500	56,800
VF1-096-31	286,700	97,600	60,000
VF1-096-41	312,100	102,600	60,900
VF1-096-51	329,800	107,900	61,700
VF1-144N-21	381,400	128,300	81,300
VF1-144N-31	429,900	134,700	82,800
VF1-144N-41	464,800	141,400	84,400
VF1-144-21	385,000	139,900	88,600
VF1-144-31	435,500	146,900	90,200
VF1-144-41	474,600	154,200	91,900
VF1-192-31	576,300	228,400	153,600
VF1-192-41	627,300	240,100	156,700
VF1-192-51	662,800	252,500	160,100
VF1-216-21	579,900	194,000	122,900
VF1-216-31	653,500	203,700	125,100
VF1-216-41	707,300	213,800	127,300
VF1-288N-21	762,800	256,600	162,600
VF1-288N-31	859,800	269,400	165,600
VF1288N-41	929,600	282,800	168,800
VF1-1012N	355,500	144,900	91,700
VF1-1018N	528,600	185,800	123,300
VF1-1024N	711,000	289,700	183,400
VF1-1036N	1,884,100	399,800	250,000
VF1-288-21	750,800	260,300	171,900
VF1-288-31	849,300	273,300	175,000
VF1-288-41	925,600	286,800	178,300
VF1-432-21	1,142,500	390,000	259,400
VF1-432-31	1,287,400	409,500	264,000
VF1-432-41	1,393,500	429,800	268,500

Series V Structural Support

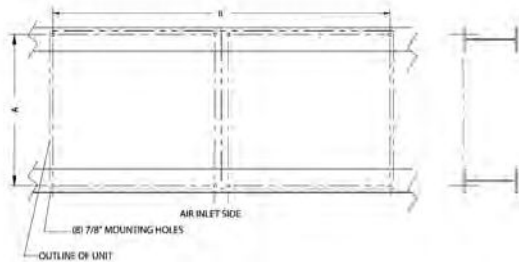
The recommended support arrangement for the Series V Closed Circuit Cooling Tower consists of parallel structural members running the full length of the unit, spaced as shown in the following drawing. In addition to providing adequate support, the members also serve to raise the unit above any solid foundation to ensure access to the bottom of the tower. To support a Series V Closed Circuit Cooling Tower in an alternate support arrangement, consult your local BAC Representative.



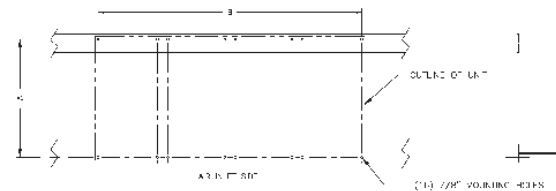
VFL Models



VF1-009 thru -048, -072, -096, -144, & -1012N



VF1-144N, -192, -216, -288, -1018N, & -1024



VF1-288N, -432, & -1036N

Model Number	A	B
VFL-012	3' -11"	4' -6"
VFL-024	3' -11"	8'
VFL-036	3' -11"	11'
VFL-048	3' -11"	14'
VFL-072	7' -9"	11'
VFL-096	7' -9"	14'
VF1-009	3' -10"	2' -6"
VF1-018	3' -10"	5' -6"
VF1-027	3' -10"	8' -6"
VF1-036	3' -10"	11' -6"
VF1-048	4' -7"	11' -6"
VF1-072, 096	7' -8"	10' -8"
VF1-144N	7' -8"	16' -8"
VF1-192	7' -8"	22' -9"
VF1-288N	7' -8"	34' -9"
VF1-1012	9' -8"	10' -8"
VF1-1018	9' -8"	10' -8"
VF1-1024	9' -8"	16' -8"
VF1-1036	9' -8"	22' -11"
VF1-144	11' -8"	33' -7"
VF1-216	11' -8"	16' -8"
VF1-288	11' -8"	22' -9"
VF1-432	11' -8"	34' -9"



NOTES:

1. Support members and anchor bolts shall be designed, furnished, and installed by others.
2. Design of support members and anchor bolts shall be in accordance with the strength and serviceability requirements of the applicable building code and project specifications.
3. Support members shall be level at the top.
4. Refer to the certified unit support drawing for loading and additional support requirements.
5. If vibration isolation (provided by others) is used, the isolators should be located under a structural base that complies with one of the recommended support arrangements. Contact your local BAC Representative for all other isolator configurations.