BALTIMORE AIRCOIL COMPANY

TrilliumSeries™
Condenser

TrilliumSeries™ Condenser

The TrilliumSeries™ Condenser uses a patented Dry-Coil Adiabatic Design that saves energy, reduces refrigerant change, and lowers operating costs. The TrilliumSeries™ Condenser enables the adoption of sustainable refrigeration systems that might otherwise be too cost and energy prohibitive. With the use of proprietary logic and EcoFlex controls, the unit uses water only on the hottest days to maintain condensing temperatures that typical air cooled technology cannot achieve. Combining the best of wet and dry cooling, the TrilliumSeries™ Condenser provides low process temperatures while optimizing energy and water efficiency.

- LOWEST SYSTEM ENERGY
- LOWEST TOTAL COST OF OWNERSHIP
- LOWEST WATER USE
- LOWEST REFRIGERANT CHARGE
- LOWEST INSTALLATION COSTS
- EASY MAINTENANCE

COMBINING THE BEST OF WET AND DRY COOLING, THE **TrilliumSeries™** CONDENSER PROVIDES LOW PROCESS TEMPERATURES WHILE OPTIMIZING ENERGY AND WATER EFFICIENCY

INDUSTRIES WE SERVE

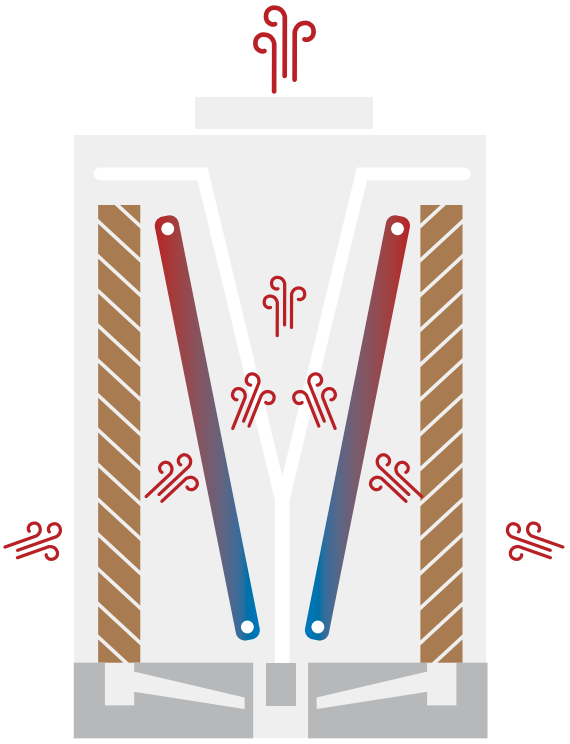
- SUPERMARKETS
- DISTRIBUTION CENTERS
- WINERIES
- DAIRIES
- ICE RINKS
- FOOD PROCESSING

TrilliumSeries™ Condenser
MODES OF OPERATION

DRY MODE

When the ambient air is below the set point, the unit runs as a dry cooler to save water and energy. The ambient air condenses the refrigerant in the coils which is then returned to the system.

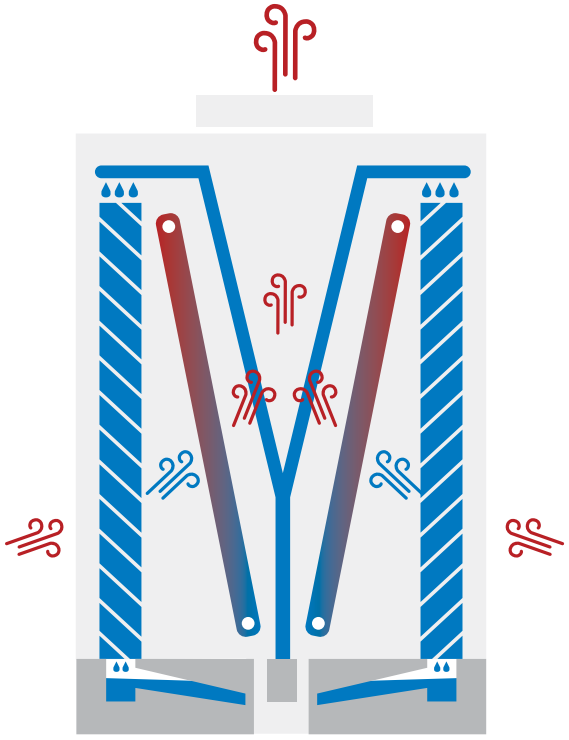
For transcritical CO_2 operation, the coil operates with vapor in and vapor out. For subcritical CO_2 operation, the coil operates with vapor in and liquid out.



PRE-COOLER MODE

When the unit is in Pre-Cooler mode and the ambient air reaches a pre-set temperature, water is evenly sprayed over the highly efficient Pre-Cooler Pads. The air is humidified as it passes through the media, cooling down to 2-3ºF above the wet-bulb temperature. Such substantial depression of the dry bulb temperature results in a major increase in dry cooling capacity.

The cooler air passes over the coil and condenses the refrigerant in the coil, which is then returned to the system. In the sump there is an industrial duty pump that supplies the water. Part of the distributed water is evaporated, while the excess water assists in rinsing the pads. The EcoFlex Controls determine when the water is purged from the sump.



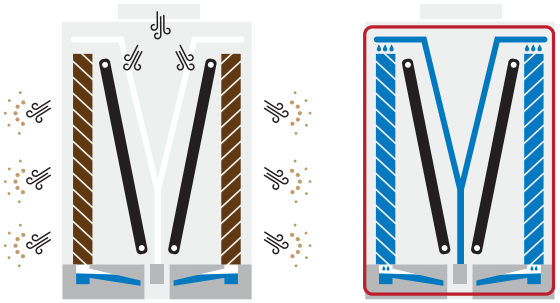
EXPERIENCE *THE* DIFFERENCE

EcoFlex Controls

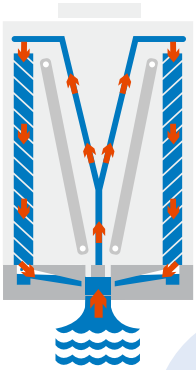
BAC's exclusive Ecoflex™ Controls allow for the TrilliumSeries™ Condenser to operate in the mode of operation specific for your job conditions, without you having to think about it. Each unit is shipped from the factory with your specific climate conditions and preferences in mind.

MODE	DEFINITION	TIME	BENEFITS
Forced Dry Mode	Automatically forces the unit into Dry Mode	Once a day, 2-4 hours	Promotes the best hygiene in humid climates Increased Pre-Cooler Pad life
Self-Clean Mode	Reverses the fans and blows dirt and debris off the coil and the Pre-Cooler Pads. Water rinses the pads, piping, and basin and is flushed from the unit.	Once a day, 3 minutes	Minimizes maintenance Maintains hygiene No water treatment required Maintains peak energy performance of coil
Cleansing Circulation	Part of the Pre-Cooler mode, water recirculates and flushes	6-12 times per day	No water treatment required Minimizes scale on Pre-Cooler Pads, extending their life
Water Monitoring Package (option)	Part of Cleansing Circulation, this package is available to further minimize and monitor water usage	1-6 times per day	Further minimize and monitor water usage
Auto-Discrete Mode	Provides a backup water system for the adiabatic cooling in case of component failure, triggering a back up water supply and alarm	1-6 times per day	Redundancy and backup, Automatic backup

SELF CLEAN MODE



CLEANSING CIRCULATION



THREE WAYS TO OPTIMIZE OPERATION

Standard Logic (Default)

The controller will start the Pre-Cooler Mode at a preset outside air temperature to increase the unit's capacity and efficiency.

Water Saver Logic

The controller will optimize the unit's dry efficiency and only use water when the conditions require the extra cooling capacity. Pre-Cooler Mode will be initiated only when the outside air temperature is above the switch point and the refrigeration load is high. This mode will recheck conditions every two hours.

Energy Saver Logic

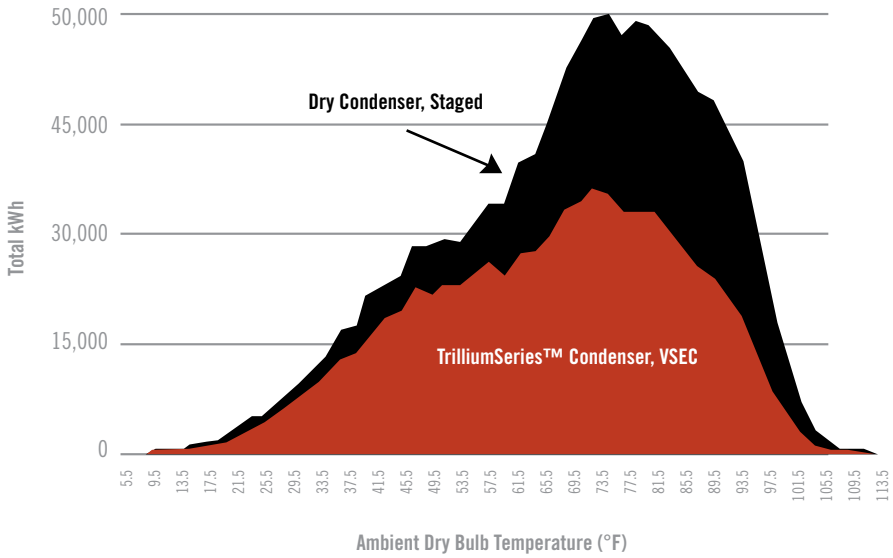
The controller will optimize its sequence so that the least amount of energy is consumed to meet the present load of the unit. Pre-Cooler Mode will be initiated at 10 degrees below the switch point and if the refrigeration load is moderate or high.

TrilliumSeries™ Condenser
LOWEST ENERGY AND WATER USAGE

LOWEST MONTHLY ENERGY USAGE

- Reduced condensing temperatures
- Less compressor work
- Direct drive VSEC motors minimize fan energy requirement
- Helps increase compressor life by lowering refrigeration temperatures (compared to AC)

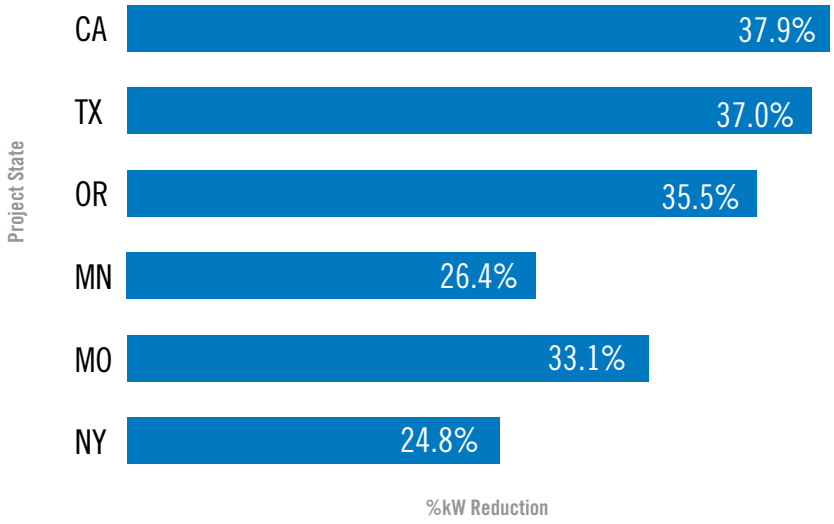
ANNUAL 37% ENERGY REDUCTION EL PASO, TX

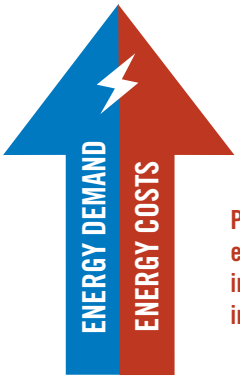


LOWEST PEAK ENERGY USAGE

- Up to 44% peak energy reduction compared to air cooled units by operating compressors at significantly lower condensing temperatures
- Peak energy is more expensive than off peak energy
- Potential for substantial state and local energy rebates

AVERAGE PEAK ENERGY REDUCTION IN %KW/STATE

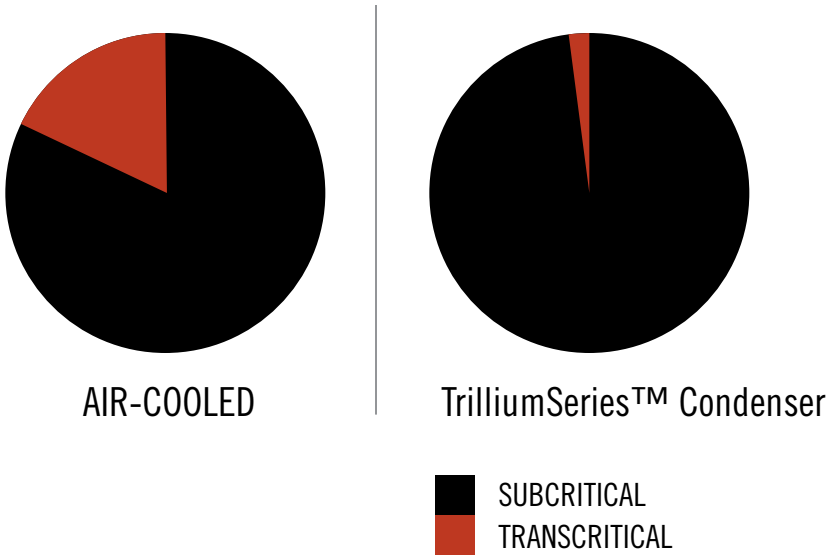




Peak energy is more expensive because costs increase as demand increases

SUBCRITICAL OPERATION WITH CO_2

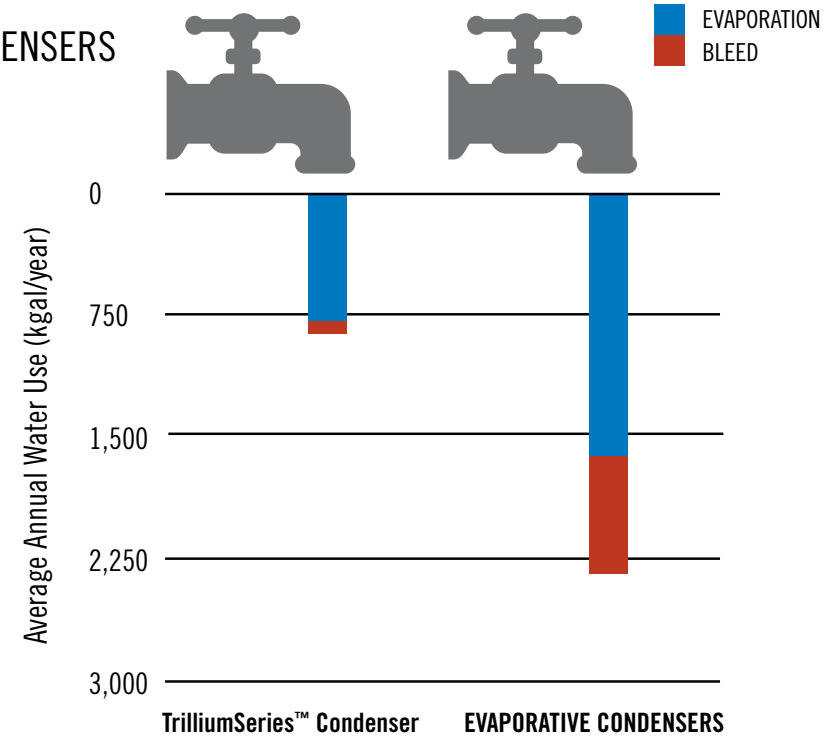
Minimize transcritical operation using the CO_2 TrilliumSeries™ Condenser. In many cases, transcritical operation can be reduced to less than 5 hours per year.



AVERAGE ANNUAL WATER USE

TrilliumSeries™ VS. EVAPORATIVE CONDENSERS

- Uses water on only the hottest days reduces consumption by more than half
- Cleansing circulating water management minimizes water usage while keeping the Pre-Cooler Pads and unit clean

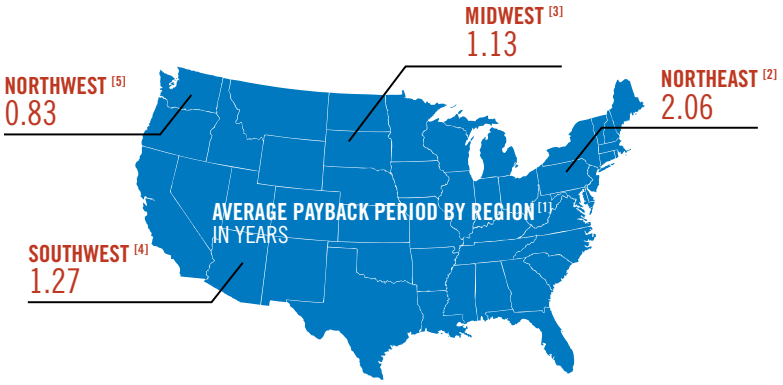


TrilliumSeries™ Condenser
OWNER BENEFITS

LOWEST TOTAL COST OF OWNERSHIP

> PAYBACK

1. Average payback periods based on current analyses performed. Specific payback periods vary. Utility prices (electricity, water, etc) vary by state & system details vary by job.
2. MA, MD, CT, DC, NJ, NY, PA, & RI
3. MN and MO
4. LA, TX, and Southern CA
5. Northern CA, OR, and UT



> REBATES

up to **50%** rebates available

- Most states offer utility incentives and rebates which further decrease initial investment.
- Visit www.dsireusa.com to see what rebates are available

LOWEST INSTALLATION COST

Compact design

Example 700 MBH Evaporator Load, Sacramento, CA, R404a

LOWEST REFRIGERANT CHARGE

- 90% less charge than comparable air cooled or evaporative condensers with the microchannel coils
- Reduced charge could help meet EPA's Greenchill commitments
- Lowers greenhouse gas emissions of the supermarket refrigeration system
- Fluid cooler models available to support propane, or other contained-charge systems
- Avoid PSM issues on ammonia installations

EASY MAINTENANCE

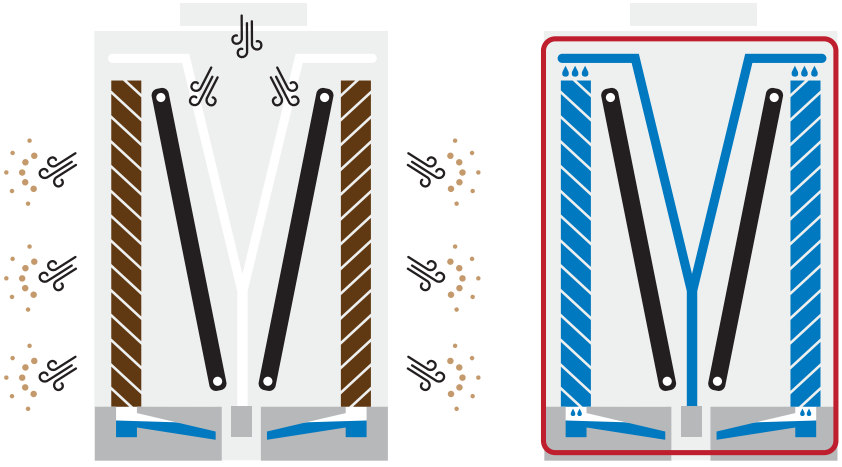
NO WATER TREATMENT

DAILY SELF CLEAN

NO TOOLS NEEDED

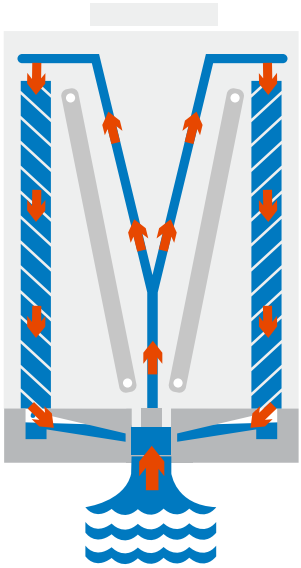
EASY ACCESS

SELF CLEAN MODE



Once daily, fans reverse cooling direction and blow dirt and debris off the coil and Pre-Cooler Pads,sweeping the unit. Water then rises the pads, piping and basin and is flushed from the unit to maintain peak performance.

CLEANSING CIRCULATION



Water enters the unit and is circulated throughout, never remaining still. Every 2 hours, the water is drained from the unit, requiring no water treatment.

BENEFITS OF CO_2 REFRIGERATION

NO REGULATORY LIABILITY OR RESTRICTIONS

NO EXPENSIVE FUTURE RETROFITS DUE TO REFRIGERANT PHASE OUT

REDUCED SYSTEM CARBON FOOTPRINT WITH GLOBAL WARMING POTENTIAL OF "1" AND OZONE DEPLETING POTENTIAL OF "0"

LOW INSTALLED COST DUE TO LOWER REFRIGERANT PRICES AND NO REFRIGERANT TAX

With an estimated 9,000+ European food retail stores using CO_2 transcritical refrigeration systems, their application is constantly expanding to other countries including Canada and the Northern part of the United States. Energy efficient, economical refrigeration systems have traditionally been limited to colder climates due to the limitations of air cooled gas coolers.

However, by using the TrilliumSeries™ Condenser's unique adiabatic design, restrictions due to warmer climates have been eliminated and additional energy is being saved in cooler ones.

Climate Limitation of
Air Cooled Condensers

TrilliumSeries Condenser
Expands CO_2 Applications

EXPERIENCE *THE* DIFFERENCE

ACCESS TO BEST-IN-CLASS TECHNOLOGY, THE STRENGTH OF OUR PEOPLE, AND THE RELIABILITY OF OUR PRODUCTS ARE REASONS ALONE TO PARTNER WITH BAC. BUT ULTIMATELY, CUSTOMERS RELY ON US FOR OUR COMMITMENT TO CREATE CUSTOM SOLUTIONS FOR THEIR UNIQUE APPLICATIONS.

WARRANTY

BAC SERVICE

EXPERIENCED REPS

ON-SITE STARTUP

PEACE OF MIND

CUSTOMIZED SELECTION

Made in USA

1 Coils
- Microchannel or tube/fin design condenses refrigerant from a gas to a liquid and returns it to building piping system
- Corrosion-resistant, easy to clean
- Minimizes refrigerant charge, allows thermal expansion

2 Whisper Quiet Fans
- Integrated electronically commutated motors (ECMs)
- Highly efficient with embedded speed control
- Modbus communication with EcoFlex™ Controls

3 Pre-Cooler Pads
- Pads precool the air to within 2-3° of the wet bulb, rejecting heat on hot days
- Keeps water off the coils
- Removable for inspection and cleaning

4 Refrigerant Connections
- Connects unit to the refrigeration piping system

5 Discrete Spray Connection
- Backup connection to reduce downtime
- Uses a garden hose for spray system backup
- Automatic valve backup (optional)

6 Access Hatch
- Safe access to internal components for inspection with no need to climb into the unit

7 Pump
- Industrial Grade delivers water when in Pre-Cooler Mode
- Continuous duty

8 Sump
- Stainless steel
- Collects water from drain pan & spray system
- Houses the pump

9 Strainer
- Surrounds the pump
- Protects spray system from debris

10 Float Switch
- Industrial grade stainless steel
- Detects water level in the sump, preventing overfow
- Provides secondary safety to pump

11 Makeup Valve
- Provides fresh water to replenish evaporating water
- Normally closed (NC)

12 Drain Valve
- Drains water during Dry Mode and cleaning cycles
- Slow opening, normally open (NO)

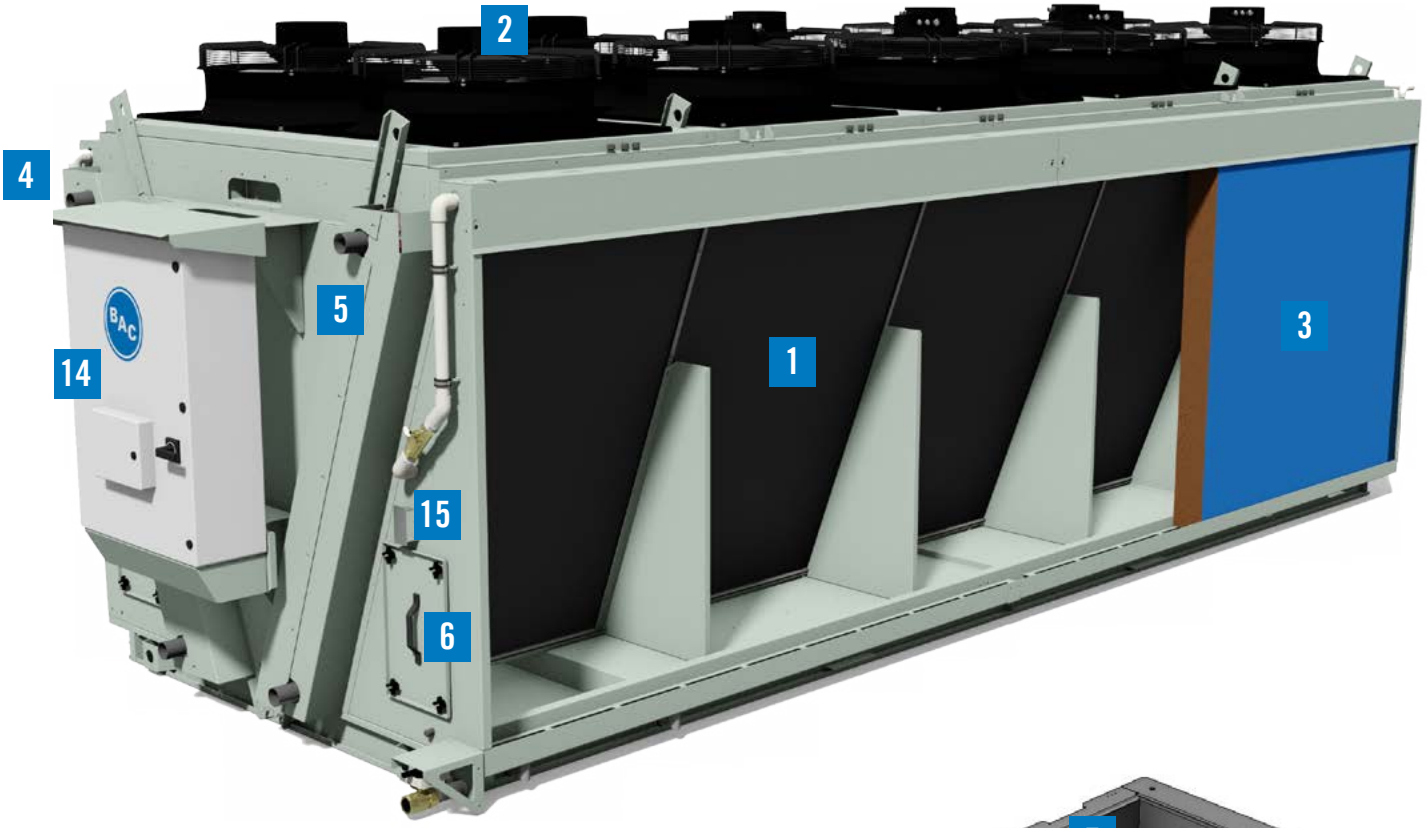
13 Outdoor Air Sensor
- Senses out door temperature to determine dry mode or On-Demand Adiabatic™ Pre-Cooler Mode

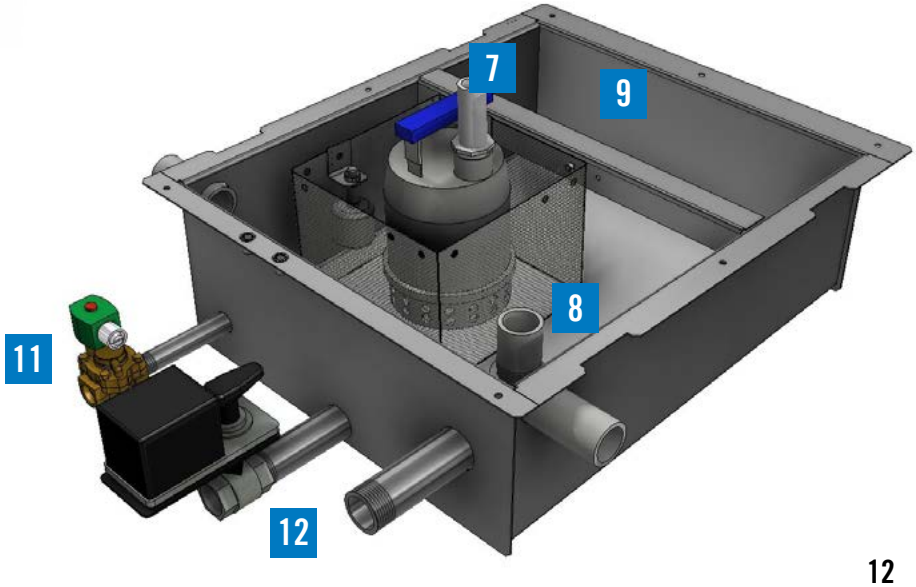
14 EcoFlex™ Controls
- Custom settings reduce energy consumption, optimizes water usage
- Programmed and ready from the factory

15 Pre-Cool Temperature Sensor (optional)
- Senses pre-cooled air temperature to support customer-supplied control system

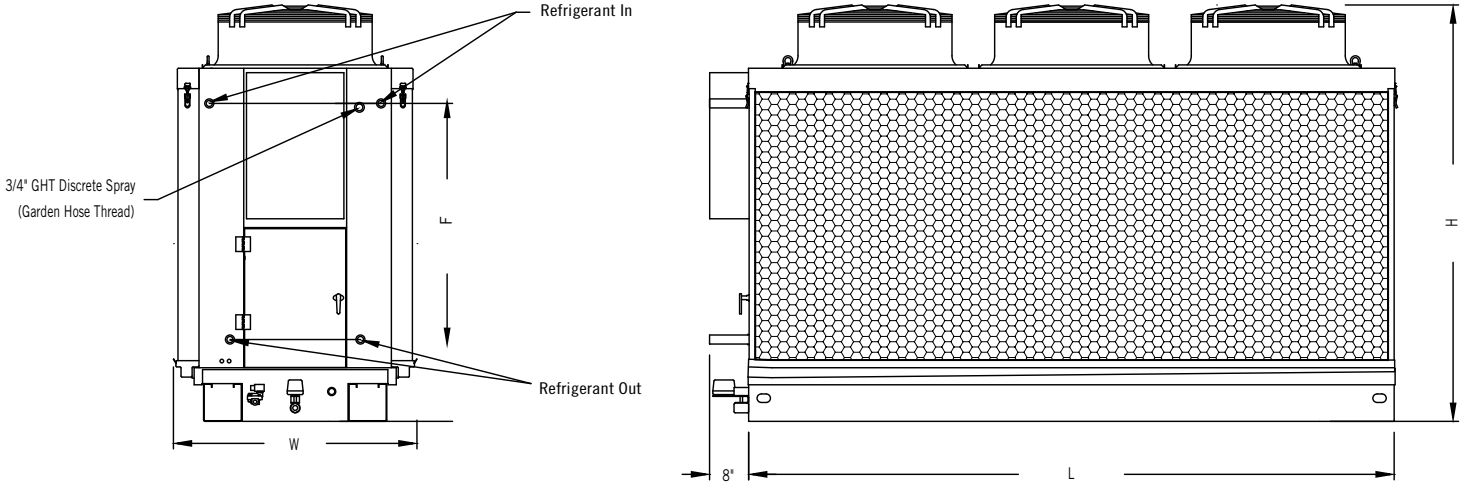
TrilliumSeries™ Condenser

CONSTRUCTION DETAILS





TrilliumSeries™ Condenser
ENGINEERING DATA



Model	Fan Qty	Base Heat Rejection (MBH)[1]	Base Tons	Motor HP	Airflow (CFM)	Total Unit FLA at 460V	Unit Length (L)	Unit Width (W)	Unit Height (H)	F	Shipping Weight (lbs)	Operating Weight (lbs)
TSDC-033-3	1	391[1]	33	3.0	14,890	4.7	5'-3"	4'-2"	7'-0"	4'-0"	1,280	1,500
TSDC-058-6.2	2	702[1]	59	6.2	28,000	8.7	7'-11"	4'-2"	7'-0"	4'-0"	1,740	2,000
TSDC-085-9.6	3	1,026[1]	86	9.6	41,400	12.6	11'-1"	4'-2"	7'-0"	4'-0"	2,300	2,600
TSDC-116-12.4	4	1,405[1]	117	12.4	56,000	16.6	15'-7"	4'-4"	7'-1/2"	4'-0"	3,200	3,570
TSDC-TF-033-3	1	391[1]	33	3.0	14,890	4.7	5'-3"	5'-7"	7'-1/2"	4'-0"	1,740	1,990
TSDC-TF-058-6.2	2	702[1]	59	6.2	28,000	8.7	7'-11"	5'-7"	7'-1/2"	4'-0"	2,400	2,690
TSDC-TF-085-9.6	3	1,026[1]	86	9.6	41,400	12.6	11'-1"	5'-7"	7'-1/2"	4'-0"	3,150	3,500
TSDC-TF-116-12.4	4	1,405[1]	117	12.4	56,000	16.6	15'-7"	5'-7"	7'-1/2"	4'-0"	4,140	4,560
TSDC-CO2-044-3	1	530[2]	44	3.0	15,200	4.7	5'-3"	5'-7"	7'-1/2"	4'-0"	1,650	1,890
TSDC-CO2-077-6.2	2	828[2]	77	6.0	28,800	8.7	7'-11"	5'-7"	7'-1/2"	4'-0"	2,300	2,580
TSDC-CO2-112-9.6	3	1,344[2]	112	9.6	42,600	12.6	11'-1"	5'-7"	7'-1/2"	4'-0"	2,970	3,300
TSDC-CO2-152-12.4	4	1,828[2]	152	12.0	57,500	16.6	15'-7"	5'-7"	7'-1/2"	4'-0"	3,940	4,340

NOTES:

1. Base Heat Rejection (MBH) is based on R-134a 90°F dry-bulb/76°F wet-bulb and 105°F condensing temperature.
2. The water make-up connection is 3/4". The water drain connection is 1 1/4". The water overflow connection is 1 1/2".
3. The Pump HP is .33

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

TrilliumSeries™ Condenser
OPTIONS

FEATURE	STANDARD	AVAILABLE OPTIONS			
MATERIALS OF CONSTRUCTION	**Thermosetting Hybrid Polymer Structure, Stainless Steel Wetted Parts**	**N/A**			
COIL & REFRIGERANT	**Coil:** Microchannel	**Coil:** Microchannel	**Coil:** Fin/Tube	**Coil:** Fin/Tube	**Coil:** Fin/Tube
	Refrigerant: Low charge Freon **Connections are copper.** Best for customers looking for extremely low charge.	**Refrigerant:** Low Charge Ammonia **Connections are steel.** Best for customers looking for extremely low charge.	**Refrigerant:** CO2 **Connections are steel (T1), copper (T2) or stainless steel (T2)** (options). Best for Natural Refrigerant applications.	**Refrigerant:** Freon **Connections are copper.** Best for traditional applications.	**Fluid:** Water/Glycol **Connections are red brass.** Best for systems designed around contained charge and remote-condensing
PIPING CONNECTIONS	**Front (by the controls)**	**Rear**			
FAN CONTROL / COMMUNICATIONS	**Rack-Controlled Fans**	**Self Contained - Head Pressure Controlled Fans**			
	Analog Signal Best for standard systems with controls that have been optimized for system energy minimization - 10-0V (Standard) - 0-10V - 4-20mA	Unit manages fans itself based on a pressure sensor, target setpoint, preset refrigerant. Best for tight unit control with low charge.			
	Digital communications Best for advanced systems that want diagnostic information. Communicates operational and fault information. - Modbus (RS485) - BACnet (RS485) - Ethernet				
ENERGY INTELLIGENCE	**N/A**	**Energy Monitoring** This option will record energy consumption. Can be reviewed on the controller, or via digital communications. Best for customers who want individual power information, by unit.			
ALARMS	**N/A**	Includes a 15A Relay output, and fault messages on controller describing specific problem, if problem occurs. This option is included when Digital communication is ordered. Best for customers looking for quick diagnostics			
WATER MANAGEMENT/ INTELLIGENCE	**Standard Low Water Use** See EcoFlex Controls on Page 5.	**Water Monitoring Package with Conductivity Sensor** Water consumption will be optimized based on local water quality, and consumption recorded and available in controls. Best for customers looking to minimize water consumption	**Water Monitoring Option with Auto-Discrete Spray** Unit will sense loss of water to pads due to mal-function of water supply or internal components, and enable backup water supply system to pads automatically. Best for critical systems.		
PRE-COOLER PAD TEMPERATURE SENSOR	**N/A**	**Temperature Sensor** - Thermistor for Emerson/CPC/Microthermal Rack controllers - RTD For Danfoss Rack Controllers Best for customers looking to allow their rack controller to leverage TD control on CO_2 systems			
EASY PAD™ REMOVAL	**YES**	**No**			
INLET STRAINER	**NO**	**Yes** To prevent debris from fouling unit			

FACTORY STARTUP & COMMISSIONING

GET THE MOST OUT OF YOUR TRILLIUMSERIES™ CONDENSER

BAC TECHNICIANS WORK ON-SITE TO:

- Adjust the unit, optimizing energy and water usage for your climate and conditions
- Work through any installation issues or challenges
- Ensure the unit is operating efficiently with the rest of your system

RECEIVE ADDITIONAL 12 MONTHS EXTENDED WARRANTY