



**Alcoil**   
A Wholly Owned Subsidiary of EVAPCO

# Condensers

1/2 to 40 tons



## Advanced MicroChannel Condensers

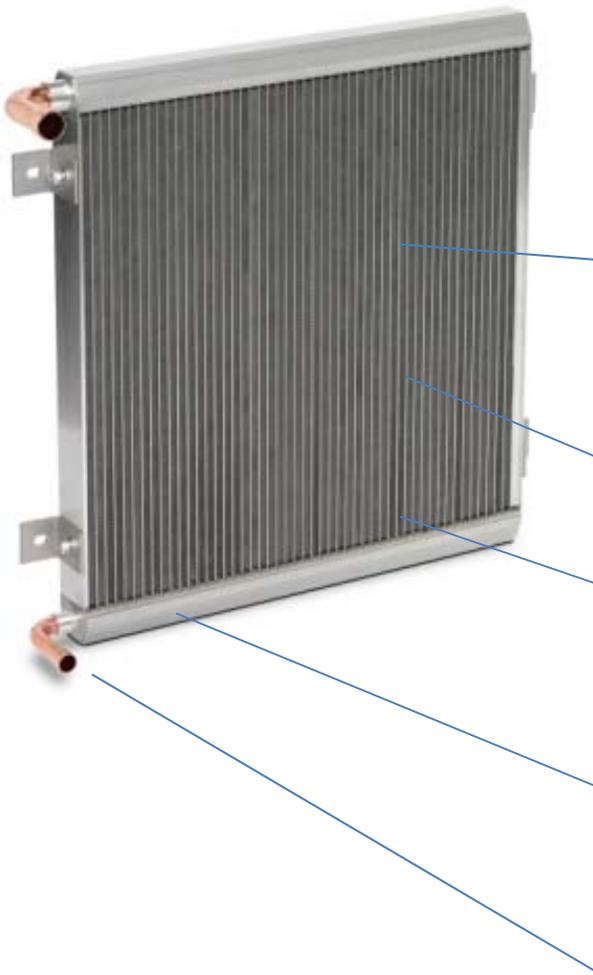
High Efficiency  
Field Proven  
Robust  
Reliable  
Easy to Use



**Product Guide**

# C Series - Condenser

## MicroChannel Features



### Custom & Standard Sizes

Flexibility and variable dimensions are tailored to our OEM customer needs using MicroChannelSELECT Software. Custom and QuickShip sizes are available from as small as 4"x4" to over 80"x144". Capacities range from ¼ tons to over 40 tons.

### Easy OEM Mounting

The coil itself is a robust frame that provides air tight flush mounting, thereby eliminating unnecessary components and air bypass. Optional "L" brackets, ¼"-20 studs or ¼"-20 flush nuts are available for easy mounting.

### High Performance Fins

A state of the art louvered fin design provides low airside pressure drop and high heat transfer.

### Vertical MicroChannel Tubes

EVAPCO Alcoil's patented innovation incorporates vertical tubes enhance condenser operation and ensure predictable performance. Tube wall thickness are 40% above automotive and import MicroChannel designs to assure long life operation.

### Built-in Mini-Receiver

Unlike any HVAC/R coil, the lower header serves as a mini-receiver to reduce any "critical refrigerant charge" issues and provide easier system charging. An integral "P trap" baffle assures proper coil operation and liquid refrigerant return.

### Connections and More

EVAPCO Alcoil condensers are available with copper sweat connections and custom orientations.



EVAPCO Alcoil's MicroChannel Condensers are based on a "Next Generation" design that combines high performance flat tubes and state of the art airside fins. MicroChannel tubes have numerous mini-ports that enhance refrigerant side performance, while the Airside achieves closer approach temperatures and lower airside pressure drops. The end result is higher overall heat transfer performance,



## C Series - Condenser

### The MicroChannel Advantage

All aluminum coils are the future and rapidly becoming the norm. EVAPCO Alcoi's MicroChannel Technology sets the industry standard with wide reaching advantages for HVAC/R equipment.

Equipment designs incorporating EVAPCO Alcoi condensers span a wide range of systems designs. These include HVAC Chillers, Process Chillers, Data Center systems, Rooftop Systems, Airside equip-ment, Heat Pumps, Environmental Chambers, Food and Beverage, Industrial Process Equipment and Mission Critical Military equipment.

The common themes are five major reasons and advantages:

#### **Higher Efficiency & Performance**

Up to 40% higher efficiency, compared to old style fin/tube designs. Advanced Micro-Channel technology combines integrally brazed airside fins to achieve higher heat transfer rates, closer approach temperatures and lower airside pressure drops.

#### **Smaller Size**

Up to 20% smaller coil face depending upon the design conditions. And almost always, EVAPCO Alcoi heat exchangers are thinner and take up less space.

#### **Less Weight**

Up to 50% less weight. This reduces shipping costs, minimizes equipment structural support, reduces labor to install, and cuts shipping costs.

#### **Less Refrigerant Charge**

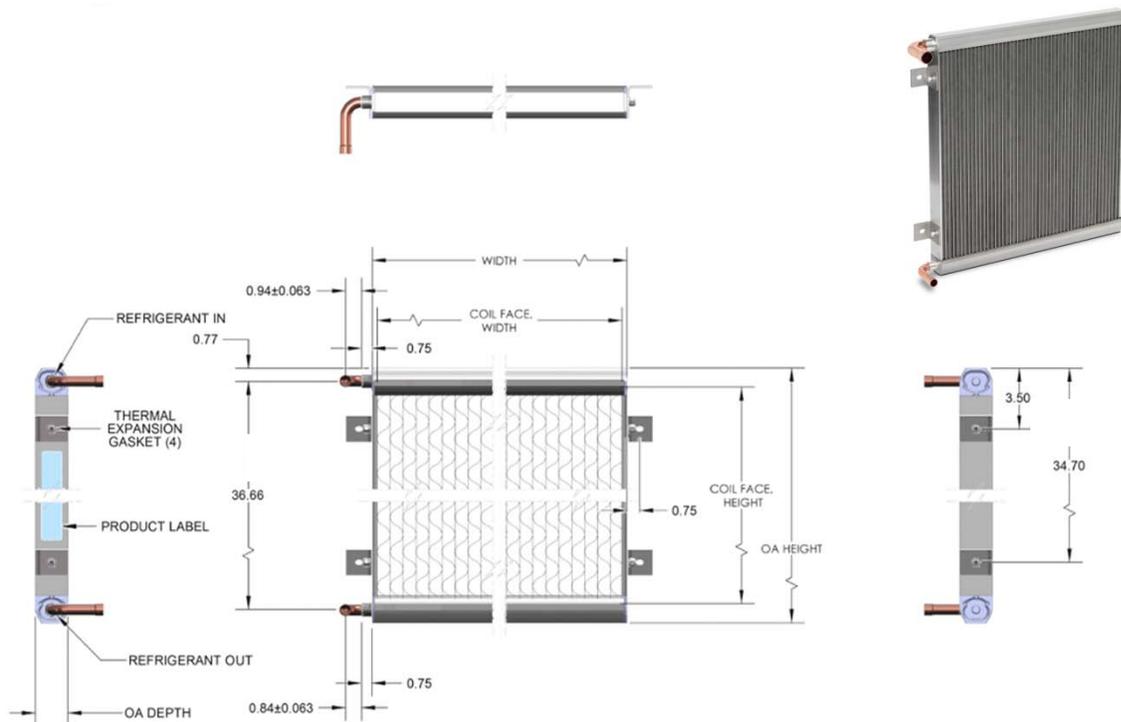
Typically 40% to 60% less refrigerant charge is required.

#### **Lower Cost**

All aluminum, high performance, and less weight translate to 5% to 30% lower cost, depending upon design conditions.

Compared to "traditional fin/tube" and "automotive type" aluminum coils, EVAPCO Alcoi's Condensers are a robust design with major technical and financial advantages. With proven field experience, EVAPCO Alcoi offers a competitive advantage for OEM equipment and new applications.

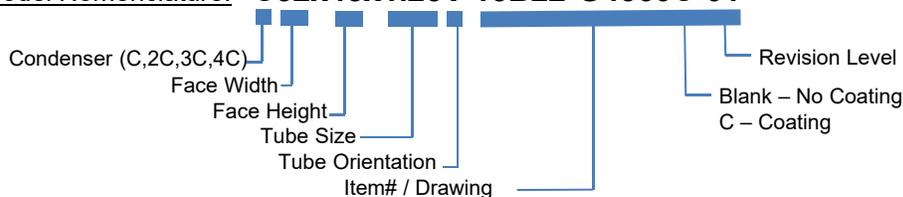
# C Series - Condenser



SSU

Capacity Range:	½ to 40 tons	
Refrigerants	R410a, R407C, R134a, R404a, R508B, R290, & others (R717 as special model)	
Design Working Pressure	650psig, 450psig & 300psig models	
Design Working Temperature	250F	
Maximum Face Width (C model)	46.4"	
Maximum Face Width (2C,3C, 4C models)	144" (up to 188")	
Maximum Face Height	77" (up to 96" upon request)	
Tube Sizes	1.25" (High Performance) .83" (Economy)	1.9" O.A. Depth 1.5" O.A. Depth
Fins	24 fpi, high performance, louvered	
Connection Sizes	3/8", 1/2", 5/8", 7/8", 1-1/8" IDS	
Connection Locations	EndCap (shown) & Header Face (optional)	
Mounting Options	LBrackets, ¼"-20 Threaded, Flush Nut Inserts ¼"-20 x ½" Studs	
Testing	Per UL 207 at full pressure, Helium Leak tested	
Code Approvals	Underwriters Laboratories (U.L. Listed, U.S. & Canada)	

**Model Nomenclature: C32x48x1.25V-15B22-G4560C-01**



# Typical Configurations

## C Models

Typical C Series Single “Module” models are typical for ½ ton to 15 ton capacity coils, depending on actual design conditions, air flow rate and target performance.



**C Model**  
w/ Elbow Connections at 3 o'clock  
w/ LBrackets



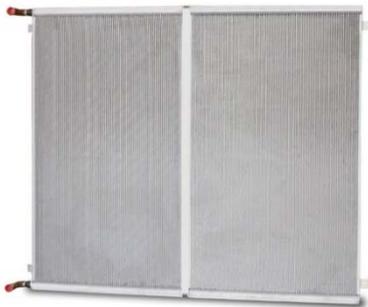
w/ Straight Connections  
w/ LBrackets



w/ Face Connections  
w/ ¼-20 Threaded Flush  
Inserts

## 2C, 3C & 4C Models

“Multi-Module” versions are designatd as 2C, 3C and 4C models. These models are typical for 15 ton to 40 ton capacity coils, depending on actual design conditions, type refrigerant, air flow rate and target performance.



**2C Model**  
w/ Elbow Connections  
w/ LBrackets



**3C Model**  
w/ Elbow Connections  
w/ LBrackets

# Connection Options

All Condensers have options for EndCap or Face Connections for easy packaging, piping and fit-up. A full range of copper connection sizes and connection locations are shown below. All connections options are available using MicroChannelSELECT™ software, except for custom angles.



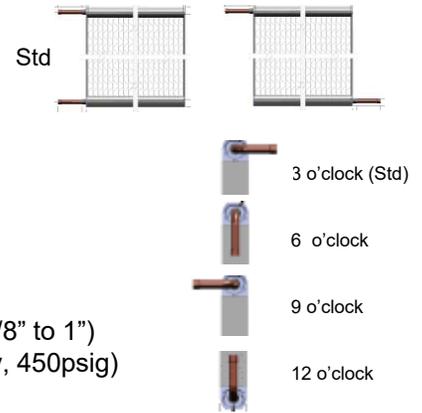
## ▶ EndCap Connections

1.25V Models                      3/8", 1/2", 5/8", 7/8", & 1-1/8" ID Solder  
 .83V Models                        3/8", 1/2", 5/8", 7/8" & 1-1/8" ID Solder

**Location**                              Same Side Connections (std)  
     Opposite Side Connections

**Straight (Std #1)**                      Same Side Connections (std)  
**Elbow (Std #2)**                        Same Side Connections (std)  
     3 o'clock, 6 o'clock, 9 o'clock, 12 o'clock  
     Opposite Side Connections  
     Custom angles (w/ volume production)

**Specials**                                Aluminum IDS to Copper OD  
     Stainless Steel or Carbon Steel Pipe, Butt Weld (3/8" to 1")  
     SS & Carbon Steel Pipe, Butt Weld (LV model only, 450psig)  
     Copper 1-5/8" OD (LV model only, 450psig)



## ▶ Face Connections

Face Connections are ideal for compact packaging where dimensions and space are critical. Standard location is Left side on the headers. Optional locations are header center or right side of headers. Straight and elbow connections, up to 7/8" IDS are available.

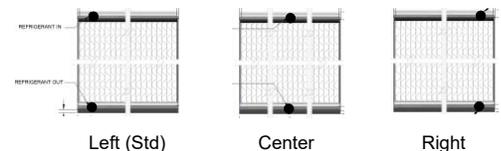


1.25V Models                      3/8", 1/2", 5/8", 7/8" ID Solder  
 .83V Models                        3/8", 1/2", 5/8", 7/8" ID Solder

**Location**                                Left, Same Side (std),  
     Center  
     Right  
     Opposite Sides, Left/Right, Right/Left

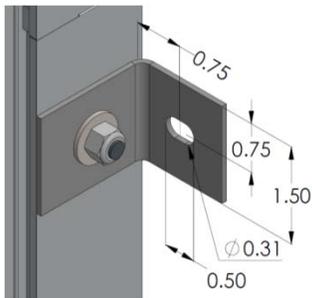
**Straight (Std)**                        Same side (Std)  
**Elbow**                                    3 o'clock, 6 o'clock, 9 o'clock, 12 o'clock  
     Opposite Side Connections  
     Custom angles (w/ volume production)

**Specials**                                None.



# Mounting Options

Models have four practical options for easy mounting and fit into OEM systems.



## Mounting Bracket

**1-1/2 x 1-1/2"** with 3/4" L Stud & Nut  
 2 Brackets, each side up to 53" models  
 3 Brackets, each side & center for 54" and taller models  
 Thermal expansion gaskets included, under bracket



1/4"-20 Threaded Flush Nut Insert

## 1/4"-20 Threaded Flush Nut Insert

Located 3.5" from either end for compact mounting from side wall or strut, or use with customer supplied Bracket.  
 2 inserts, each side up to 53" models  
 3 inserts, each side & center for 54" and taller models  
 5/16" maximum thread depth



1/4"-20x1/2" Stud

## 1/4"-20 Studs

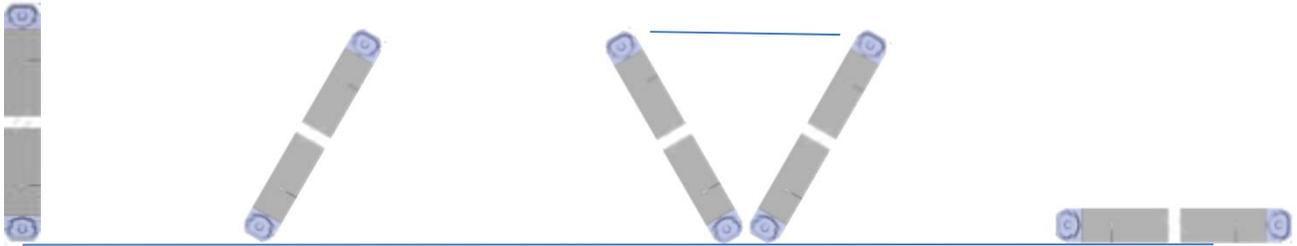
Located 3/4"L, 3.5" from either end. For use with customer supplied Brackets or through-the-wall mounting.  
 2 Studs, each side up to 53" models  
 3 Studs, each side & center for 54" and taller models

## None

# Application Tips

## Typical Configurations

There are several popular OEM configurations and orientations for the C Series condenser, depending upon equipment packaging requirements.



Vertical

Angled  
Min: 15 Degrees

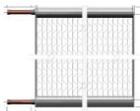
"V" Bank

"Flat" – Contact the Factory  
for Alternate Models

## Coil Orientation

**EVAPCO** Alcoil models are based on a vertical tube design for high heat transfer efficiency and use of a built-in mini-receiver. Proper orientation of the condenser should be vertical, or angled from vertical, and no less than 15 degrees from horizontal for downward refrigerant flow. Horizontal operation will cause loss of capacity. For Horizontal or "Flat" orientation, contact the factory for custom horizontal models.

## Typical Connection Options



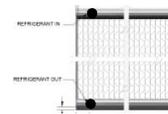
Vertical, Angled  
and "V" Bank



Vertical, Angled  
and "V" Bank



Vertical or  
Angled



Tight Fit, Vertical  
and Angled

Single coil applications are typical from 1/2 to 20 tons, and for some systems, up to 40 tons.

Two coil applications are typical up to 20 and to 80 tons, including two refrigerant circuit systems.

Two coil "V" Bank applications are typical of 20 to 60 ton "V" configurations. "V" banks are typical used in systems up to 400 tons, with 48" to 77" tall coils.

## Connections

All models have copper IDS solder connections, optional elbow or straight connections for refrigerant piping. All connections have a Viton protective sleeve for long-term corrosion protection.

When soldering or brazing to copper connections, a wet rag should be used at the base of the copper connection (at the black protective sleeve) to minimize heat at the copper to aluminum transition joint.

For models ordered with Aluminum solder connections, copper piping can be easily soldered into the aluminum connections using the appropriate Zn/Al brazing rods and flux. Contact the factory for information on soldering Al to Cu joints.

# Application Tips

## Refrigerant Charge

When using an EVAPCO Alcoil microchannel condenser, the refrigerant system charge will typically use 40% to 60% less refrigerant than a traditional fin/tube condenser (excluding a receiver, if used). Overcharging the system will result in higher head pressure and loss of system capacity. The following procedure is recommended: 1) At full load or near full load operating conditions and by weight of refrigerant, put approximately 1/3<sup>rd</sup> the calculated charge in the refrigeration system. Let the system stabilize and check for gas bubbles in the liquid line sight glass. 2) Incrementally, add small amounts (.1oz) of refrigerant and wait for the system to stabilize. 3) When there are few or no gas bubbles entering the expansion valve, then the charge is most likely correct. 4) If the system is operating with higher head pressure than design, extract refrigerant charge from the system. As a second check, typical refrigerant subcooling is 5F to 7F. Above 10F subcooling typically indicates an over-charged system.

## Built-in Mini-Receiver

Our built-in Mini-Receiver is based on a patented method of using the lower header (manifold) to accumulate and hold liquid refrigerant. The lower header has an internal outlet baffle with a slot on the bottom to allow only liquid refrigerant to leave the heat exchanger, and to hold back any potential refrigerant gas. Thus, excess refrigerant charge is allowed to backup into the lower header, and help optimize the system charge and operation. This feature also improves part-load operation, and helps reduce “critical charging” of the system.



Proper coil orientation and Refrigerant INLET and OUTLET is required. Orienting the coil upside down will result in loss of capacity and high condensing temperatures.

## Refrigerants

EVAPCO Alcoil's Microchannel condensers are manufactured as 650psig or 450psig models can be used with R410a (650psig model), R407C, R134a, R404A, R508B, and number out other refrigerants. For other refrigerants such as Ammonia and Propane, please contact the factory for custom models.

Because all EVAPCO Alcoil condensers use vertical tubes with downward flow, oil return is not an issue, regardless of type oil or refrigerant.

## System Operation & Control

- a) Low Ambient Operation (below 20F) can be achieved with variable speed fan operation and sequencing fans off. Lower ambient operation (below -10F) can also be implemented by a combination of small receiver and modulating control valve after the condenser, to control back-flooding of the condenser.
- b) High Ambient Operation is possible with EVAPCO Alcoil's 1.25 model, using proper head pressure control, high air flow rate and appropriate system design point.
- c) Fan Control – Recommended fan control is fan staging, and preferably variable speed fan(s) to 5-10% fan speed.
- d) Air Flow Distribution can effect coil overall performance. Fan placement, obstructions, change of air flow, and other factors can effect overall coil performance. On new or complex designs, air anometer checks are recommended.
- e) TXV, EV, & Hot Gas operation – In special systems, an over-reacting TXV or EV, or oversized TXV can cause system head pressure oscillation or high head pressure conditions which might activate the system high pressure cutout./safety. Slower response EV control will typically remedy this situation. Where hot gas bypass is used on a evaporator, a slower response modulating valve is recommended to prevent high pressure cutout due to rapid refrigerant transfer to the condenser.

# Application Tips

## Thermal Expansion

Models can be ordered with brackets. Expansion gaskets are included under the bracket.

For models using Threaded, Insert Flush Nuts, Stud Bolts or other mounting methods, equipment design consideration must be made for thermal expansion. Because aluminum has a high coefficient of thermal expansion, the equipment frame and mounting method of the coil MUST accommodate thermal expansion of the coil in both Height and Width Dimensions.

The table herein shows the Minimum Recommended Allowance for Thermal Expansion based on the Coil Height and Width assuming a 150F (83C) temperature differential. If high ambient or low ambient operation is expected, thermal expansion allowance should be increased based on the Refrigeration system Maximum Condensing Discharge (Superheat) Temperature at the High Pressure safety cutout, minus the lowest expected ambient operating temperature.

Reference: Thermal Expansion based on 150F (83C) rise or differential of coil inlet header temp vs steel frame.

Coil Width: Maximum Refrig Discharge Temp minus Lowest Ambient Operating Temperature (150F typical difference)

Coil Height: Maximum Condensing Temp (Ct at HP cutout) minus Lowest Ambient Operating Temperature (70-100F typical difference)

Coil Dimensions (Width & Height)			
		Minimum Allowance for Thermal Expansion	
inches	mm	inches	mm
10	250	0.011	0.27
15	375	0.016	0.40
20	500	0.021	0.53
25	625	0.026	0.67
30	750	0.032	0.80
40	1000	0.042	1.07
50	1250	0.053	1.33
60	1500	0.063	1.60
70	1750	0.074	1.87
80	2000	0.084	2.13
90	2250	0.095	2.40
100	2500	0.105	2.67
110	2750	0.116	2.93
120	3000	0.126	3.20

## Galvanic/Electrical

For most equipment applications, galvanic or stray current considerations are not necessary. Painted sheet metal parts, plastic parts and stainless steel interfaces with the aluminum coil(s) are normally accepted practice. With galvanized sheet metal, rubber can be used to prevent localized loss of galvanized zinc or interaction with the coil. For mobile, shipboard, or applications where equipment grounding may be an issue, coil electrical isolation from the equipment frame may be necessary, except for refrigerant connections.

## Corrosion

Due to the all aluminum construction, brazed aluminum heat exchangers are subject to significantly less galvanic corrosion than traditional fin/tube coils, in that there are no dissimilar metals. Normal installations should not require coatings, except in environments corrosive to aluminum.

For applications with pollution, chemical emissions, exposure to moist air, or corrosive environments, coil coatings must be used. See Coatings Option Section.

## Coil Cleaning

Routine cleaning of particulates from the coil can be performed with high pressure air. Routine cleaning of dirt and grime may be performed with high pressure water, including general detergents. Avoid chemical cleaning. In any cases, water pressure must be controlled to prevent damage to the fins. A coil filter or protective mesh cloth can also be used in the equipment design, if cotton wood trees, large bugs or other debris is known or present.

# Coating Options

## Epoxy Electrocoat

While all-aluminum Microchannel coils are not subject to the same galvanic corrosion issues as traditional copper/aluminum coils, there are situations or installations that may require the highest level of protection with Epoxy Electrocoat.

Recommended use of Epoxy Electrocoat  
 Industrial Pollution & Sulfurs  
 Petrochemical Installation  
 Adiabatic Assisted Systems  
 Sea Shore Installations

### Specifications:

Material: Epoxy Electrocoat, PPG Powercron series  
 Thickness: 0.001-inch, nominal  
 Appearance: Black, semi-gloss  
 Process: Dip bath with Electrodes, Oven Cured



### Chemical Resistance Guide:

Epoxy Electrocoat is resistant to the following at 70°F:

Acetates (ALL)	Diethanolamine	Lactose	Propyl Alcohol
Acetic Acid	Distilled Water	Lauryl Acid	Propylene Glycol
Alcohols	Esters	Magnesium	Salicylic Acid
Amines (ALL)	Ethyl Acetate	Maleic Acid	Salt Water
Ammonia	Ethyl Alcohol	Menthol	Sodium Bisulfite
Ammonium Hydroxide	Ethyl Ether	Methanol	Sodium Chloride
Amino Acids	Fatty Acid	Methyl Ethyl Ketone	Sodium Hypochlorite 5%
Benzene	Fluorine Gas	Methyl Isobutyl Ketone	Sodium Hydroxide<10%
Borax	Formaldehyde 27%	Mineral Oil	Sodium Sulfate
Boric Acid	Fructose	Motor Oil	Stearic Acid
Butyl Alcohol	Gasoline	Mustard Gas	Sucrose
Butyl Cellosolve	Glucose	Naphthol	Sulfuric Acid 25-28%
Butyric Acid	Glycol	Nitrates	Sulfates (ALL)
Calcium Chloride	Glycol Ether	Nitrides	Sulfides (ALL)
Calcium Hypochlorite	Hydraulic / Brake Fluid	Oleic Acid	Sulfites (ALL)
Carbolic Acid	Hydrazine	Oxalic Acid	Starch
Carbonates	Hydrochloric Acid<10%	Oxygen	Tannic Acids
Carbon Dioxide	Hydrogen Peroxide 5%	Ozone	Toluene
Carbon Monoxide	Hydrogen Sulfide	Perchloric Acid	Transmission Fluid
Cetyl Alcohol	Hydroxylamine	Phenol 85%	Triethanolamine
Chlorides (ALL)	Iodine	Phosgene	Urea
Chlorine Gas	Isobutyl Alcohol	Phenolphthalein	Vinegar
Citric Acid	Isopropyl Alcohol	Phosphoric Acid	Water
Creosol	Kerosene	Potassium Chloride	Windshield Solvent
Diesel Fuel	Lactic Acid	Potassium Hydroxide	Xylene

The following substances are **not recommended** for use with Epoxy Electrocoat:

Chromic Acid	Hydrofluoric Acid	Nitric Acid	Sodium Hydroxide>10%
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### NOTES:

- 1) Epoxy Electrocoat is not intended for liquid immersion applications.
- 2) Elevated temperatures can have an adverse effect on the coating.
- 3) This guide is provided for **GENERAL REFERENCE ONLY** and is not a guarantee of performance in a specific situation.
- 4) Effect on heat transfer rate is typically 1% to 2% and up to 10% on airside PD.

# MicroChannel Coil Family

EVAPCO Alcoil has a full line of MicroChannel coil models for cooling and heat rejection for HVAC/R systems for R410a, R134a, R404a, R717, and other refrigerants. Water and Glycol fluid models are available as both cooling coils and heating coils. Model sizes as small as 3" x 3" to 80" x 144" size.

## Condensers

**½ to 40 tons**

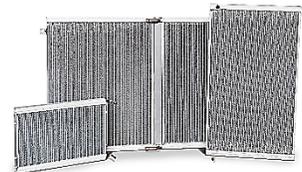
EVAPCO Alcoil manufactures a full range of refrigerant condensers from ½ ton to 40 tons for the HVAC/R industry, rated for 450 psig and 650 psig applications. The C Series Condenser is a robust design with built-in mini-receiver and numerous design options.



## Evaporator/Heat Pump

**½ to 30 tons**

E Series Evaporator and HP Series Heat Pump represent leading edge technology as a direct expansion (DX) cooling coil and/or reverse cycle heat pump coil. With a built-in refrigerant distributor and integrally high water condensate shedding, the E and HP Series provide high performance with all the advantages of MicroChannel technology.



## Fluid Coils

**up to 50 gpm**

For water and glycol systems, free cooling, heat recovery and other applications, EVAPCO Alcoil manufactures a high performance MicroChannel specifically for fluid to air featuring advanced water shedding as a cooling coil or high performance as a heating or cooling coil. Rated for 300psig.



## Specialty Coils

**up to 40 tons**

EVAPCO Alcoil can configure microchannel coils for other required HVAC/R applications, including:

- Reheat & Desuperheater Coils
- Flooded & Pumped Loop Evaporators.
- Subcoolers

## MicroCoils™

**up to ¾ ton**

For electronics, medical, computer and small appliance products, EVAPCO Alcoil has a family of MicroCoils™ as condensers, evaporators and fluid coils. The MicroCoil™ is lightweight and ultra small for specialty products from 20 to 2000 watts.





## Sales Support

EVAPCO Alcoil serves the U.S., Canada and Mexico with regional Sales Engineers, Applications Engineers and HDQ personnel to assist OEM customers with product selection, applications, and production delivery.

Shipping is via Freight Carriers or UPS. Freight Pre-paid or Freight Collect.

All Prices are FOB, York, Pennsylvania, USA

**General Inquiries** Email: [Info@evapco-alcoil.com](mailto:Info@evapco-alcoil.com)

**Production Lead-times** 4 weeks typical;  
up to 6 weeks (seasonal)  
up to 6 weeks (large qty)

**Purchase Orders** Email to: [Orders@evapco-alcoil.com](mailto:Orders@evapco-alcoil.com)

**Expedited Orders** Contact your regional Sales Engineer or the Factory



EVAPCO Alcoil is leading manufacturer of Airside Microchannel Coils for the HVAC/R and process industries. Located in York, Pennsylvania, EVAPCO Alcoil employees take Pride in Workmanship, Quality and Customer Service. We sincerely appreciate the opportunity to be of service.

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