

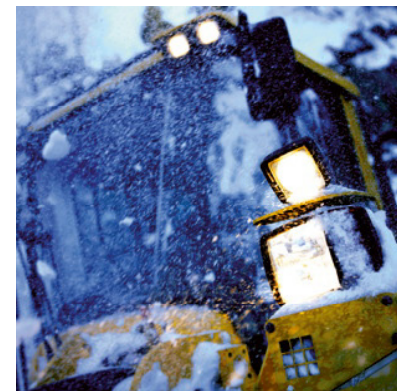
MCC's Microchannel Aluminum Heat Exchangers

Every vehicle needs the best possible thermal solution with MCC products

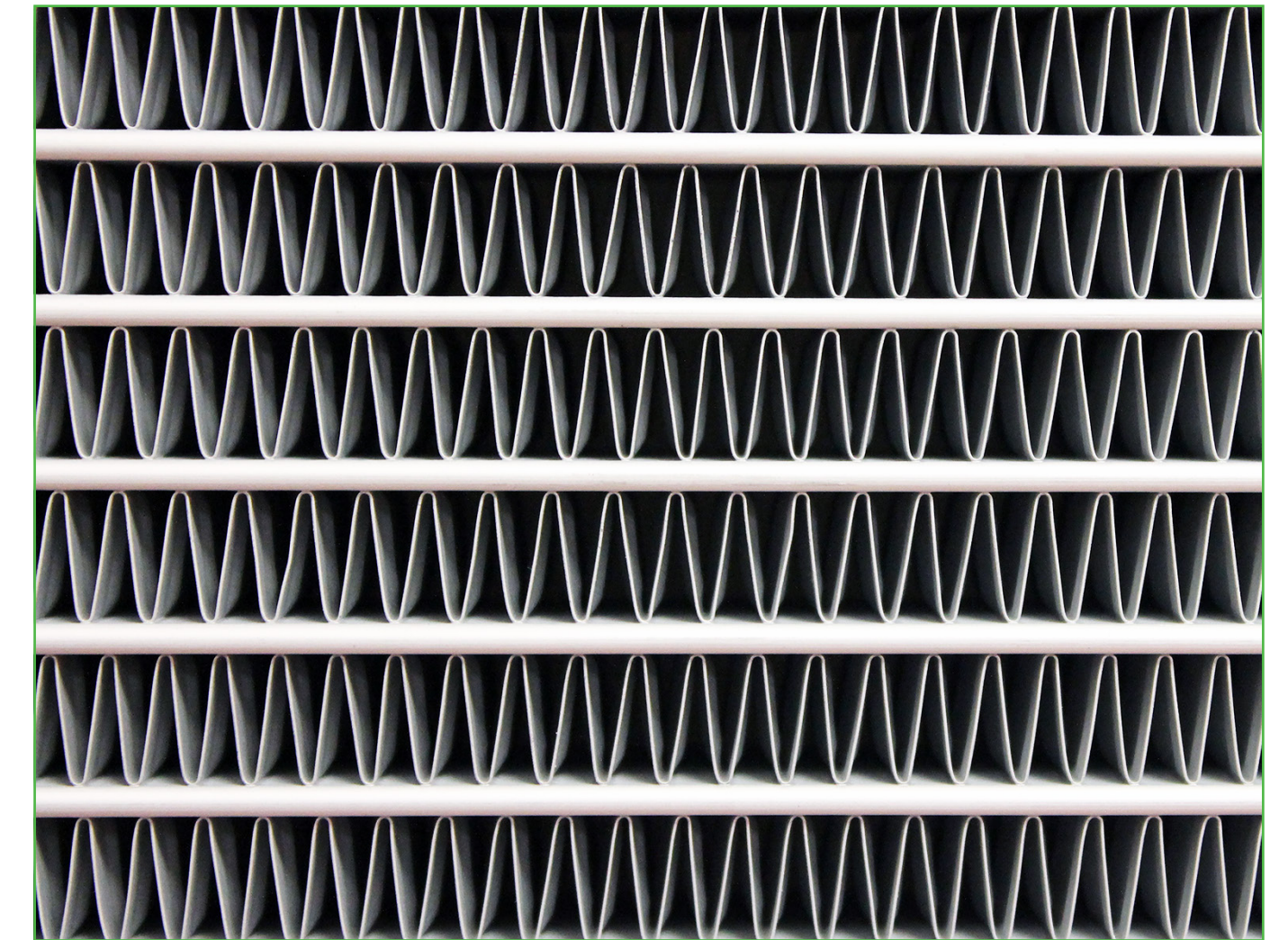
MCC provides exceptional performance in mobile thermal solutions



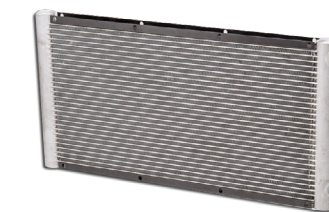
MCC's Microchannel Coil Plant - Mississauga, Ontario



Applications



Microchannel Aluminum Heat Exchangers



Exceptional Performance



www.mcc-hvac.com

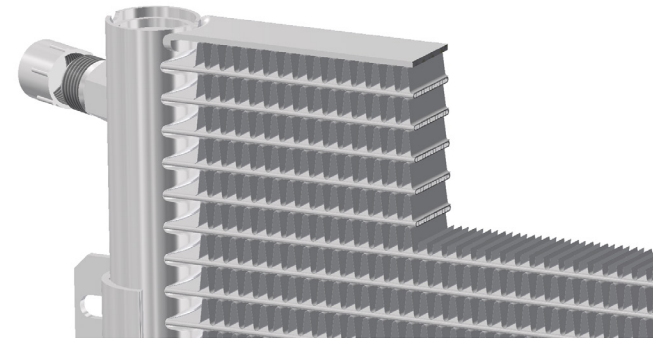
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Technology

Microchannel Aluminum Coils are all aluminum heat exchangers built out of multiple flat tubes containing microchannels through which refrigerant flows. Heat transfer is maximized by the insertion of angled or louvered aluminum fins inbetween the flat aluminum tubes. The components are joined together into a single heat exchanger using a controlled atmosphere brazing furnace. Product quality and integrity are maximized since only one braze is required compared to 50 plus manually brazed connections in traditional fin and tube heat exchangers.

- A microchannel aluminum coil is an alternative to traditional tube and fin based coils as

- Condensers
- Evaporators
- Heater coils



Performance



On Road Condenser Fin

The “on-road” condenser fin consists of standard gauge fin stock formed with higher density fins and louvers for maximum heat transfer capabilities. This allows for excellent performance and a taller effective fin height, requiring less material and therefore decreasing the mass of the condenser.



Off Road Condenser Fins

The “off-road” condenser fin consists of slightly heavier gauge fin stock with a sinusoidal shaped surface to increase heat transfer and have better anti-fouling properties necessary for off-road environments.



In addition to the sinusoidal (waved) fin there is a bump fin option for applications where the air side resistance needs to be minimized

Process

1. Fin production

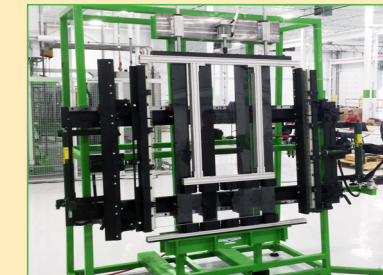
- Roll form and gathering technology
- Multiple fin styles gauges and densities



Fin mill

2. Core building

- Flexible coil assembly
- Sizes from 300 to 2000mm
- Rapid change over with minimal tooling
- Can accept a wide variety of manifold configurations



Core building cell

3. Brazing

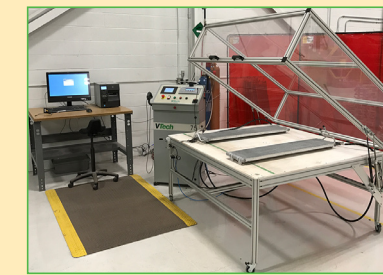
- The furnace is a flexible batch type:
 - Vacuum purged and pre-heated
 - Controlled atmosphere brazing chamber
 - Final air blast and cooling chamber



Brazing furnace

4. Leak testing

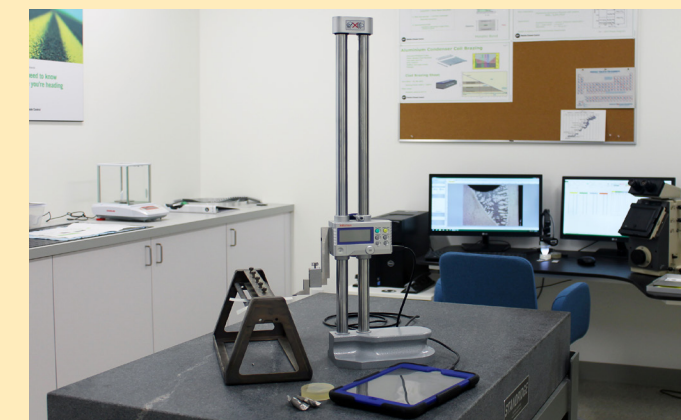
- Coils are 100% leak tested using high pressure decay and sensitive hydrogen sniffing methods



Hydrogen sniffer

Quality

In addition to standard quality practices to ensure the strict dimensional and surface requirements necessary for brazing, MCC's micro-channel production facility consists of a laboratory fully capable of metallographic analysis. The ability to perform inhouse metallographic analysis not only provides fast turnaround for microscopic information critical to ensuring quality and robustness of the brazed heat exchangers, it also serves as a company-wide resource to support a broad scope of failure analysis exercises and problem-solving in a timely manner.



Applications



Microchannel aluminium coils can be used instead of traditional fin and tube coils in almost all HVAC applications

ON ROAD:

1. Transit bus
2. School bus
3. Coach bus
4. Shuttle bus
5. Utility vehicles
6. Delivery vehicles
7. Fire trucks
8. Ambulances
9. And many more...

OFF ROAD:

1. Agriculture machines
2. Construction machines
3. Forestry machines
4. Material handling vehicles
5. Side by side ATV's
6. And many more ...

- Microchannel aluminum coils are already on the market replacing tube and fin coils
 - Are sold separately as single units or integrated into MCC's HVAC products
 - Available in a multitude of sizes and dimensions to fit diverse applications
 - Specifically suitable for all vehicles where compact sizes are needed, e.g. vehicles with electrical drivetrain

Features

- Louvered fin option
- Waved fin option
- Bump fin option
- Optimized tube spacing
- Optimized alloy combination
- Option for integrated receiver drier
- E-coat option

Benefits

- Maximized capacity for the coil size
- Withstands heavy duty off road service environments
- Lower air side pressure drop
- Reduced pressure drop and weight
- Corrosion protection
- System compactness
- Additional corrosion protection