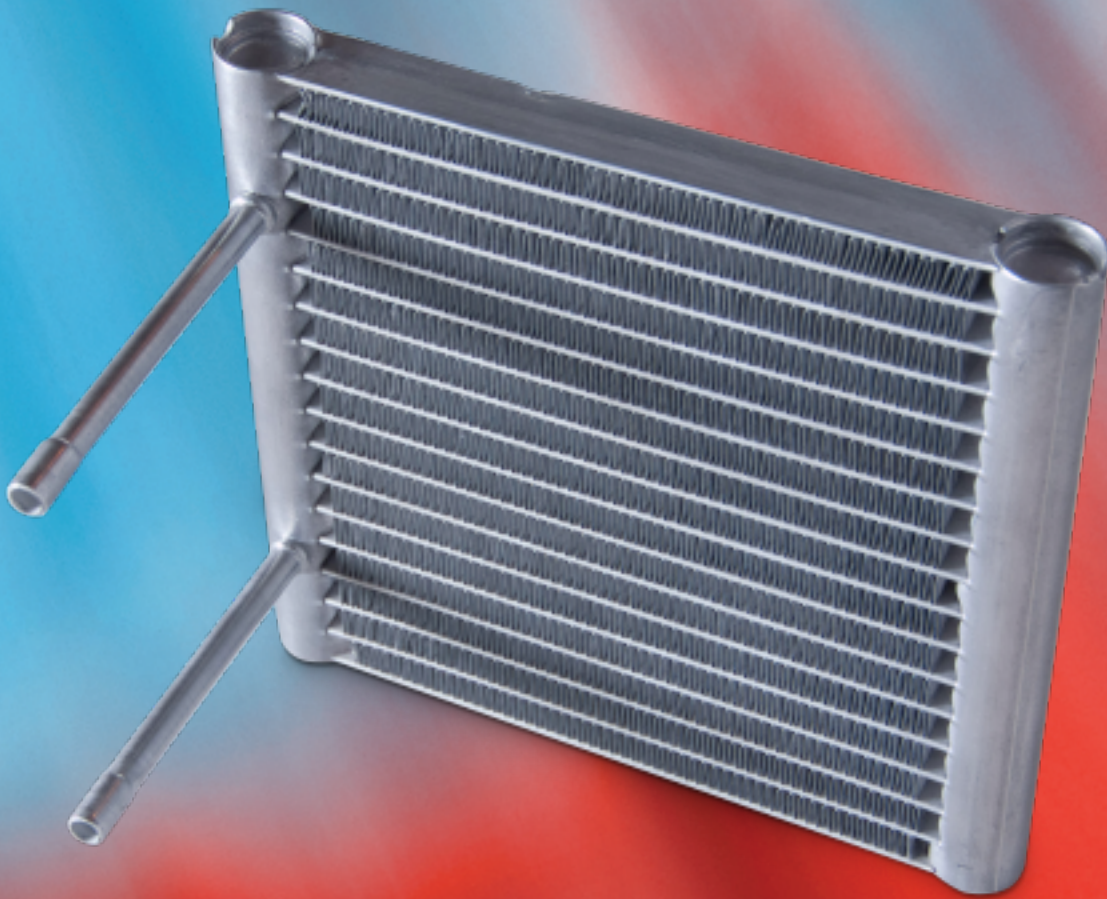


Brazed Aluminum Technology for the Heat Transfer Industry



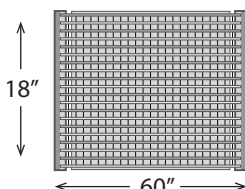
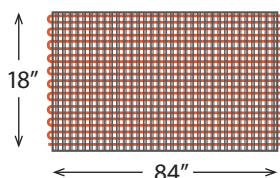
BRAZED ALUMINUM COILS DEMONSTRATE SUPERIOR PERFORMANCE WHEN COMPARED TO EXISTING COIL TECHNOLOGY

1-Row Condenser Coil Comparison

Current Coil Technology

VS.

Brazed Aluminum Technology



Unit size:
18" x 84" x 7/8"

Unit size:
18" x 60" x 18mm

Frontal Area:
10.5 sq. ft

Frontal Area:
7.5 sq. ft (29% decrease)

Weight:
16.75 lbs.

Weight:
15.31 lbs. (9% decrease)

Fins per inch:
18

Fins per inch:
18

Tubes:
Copper-3/8" Round

Tubes:
Aluminum-18mm Multi-Port Extrusion

Fins:
Aluminum-Plate-Louvered

Fins:
Aluminum-Serpentine-Louvered

Construction:
Fins mechanically bonded to tubes

Construction:
All aluminum CAB brazed construction

Circuitry:
3 circuits / 2 pass

Circuitry:
1 circuit / 2 pass

Distribution:
1 to 3 split

Distribution:
(2) 30mm manifolds

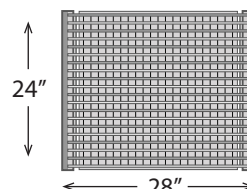
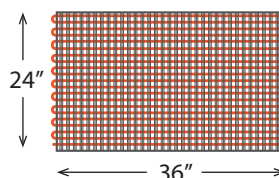
**29% SMALLER
9% LIGHTER
EQUAL PERFORMANCE!**

2-Row Condenser Coil Comparison

Current Coil Technology

VS.

Brazed Aluminum Technology



Unit size:
24" x 36" x 1-3/4"

Unit size:
24" x 28" x 2"

Frontal Area:
6.0 sq. ft

Frontal Area:
4.67 sq. ft

Weight:
22 lbs.

Weight:
13.57 lbs.

Fins per inch:
15

Fins per inch:
21

Tubes:
Copper-3/8" Round

Tubes:
Aluminum-1" Multi-Port Extrusion

Fins:
Aluminum-Serpentine-Louvered

Fins:
Aluminum-Serpentine-Louvered

Construction:
Fins mechanically bonded to tubes

Construction:
All aluminum CAB brazed construction

Circuitry:
3 circuits/2 pass

Circuitry:
1 circuit / 4 pass

Distribution:
1 to 3 split

Distribution:
v(2) 30 mm manifolds

**22% SMALLER
38% LIGHTER
EQUAL PERFORMANCE!**

BENEFITS OF NEW "BRAZED ALUMINUM" COILS

- The answer to DOE's next round of efficiency increases.
- Lighter weight—easier to handle.
- Less refrigerant usage by up to 40 – 45% of original charge.
- Same capacity and performance in significantly smaller cabinetry.

- Higher capacity and efficiency in same cabinetry.
- Equal or lower overall system cost.
- Aluminum to copper transition joint systems are available.
- New aluminum brazing technology allows for repair of the coils in the field.

Test run in the API Heat Transfer Center in Montgomery, Alabama, provide the above comparison data. (All tests were run according to the industry standards.)

INTRODUCTION OF NEW TECHNOLOGY

Technology Shift

The development and implementation of a new technology into any industry can be difficult. API Heat Transfer has positioned itself to offer a variety of unique services to support the Heat Transfer Industry in general in this effort. We have the capability of developing and supplying heat exchangers to address the specifications of a variety of applications. These include products to serve the HVAC, the refrigeration and the electronics cooling market segments to name just a few.



We've been there before! We are a key player in the automotive industry's transition to brazed aluminum heat exchangers and the associated componentry. API stands at the cutting edge of Brazed Aluminum technology. Today, we supply heat exchanger technology to the world's most demanding industries.

Technical Support

A world class tech center has been established to help the API manufacturing facilities, their customers and potential customers develop products utilizing this technology in new industry segments. The full-time staff is comprised of specialized design and test engineers and metallurgists. In addition to the technical staff, the Tech Center is equipped with a full complement of sophisticated laboratory test and analysis equipment including a fully functioning certified "Calorimeter."

Technical Center Capabilities

A climate control system calorimeter for testing:

- Residential HVAC systems including heat pumps, split systems and window air conditioners.
- Heating and air conditioning systems and components including condensers, evaporators and compressors.
- Engine cooling systems including radiators, heater cores, charge air coolers and oil coolers.
- A state-of-the-art materials lab featuring Scanning Electron Microscope (SEM) and Fourier Transform Infrared (FTIR) Analysis.
- Advanced engineering capabilities include heat exchanger performance modeling, Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), Computer Aided Design (CAD) coupled with prototype heat exchanger services and controlled atmosphere brazing (CAB).
- A variety of durability tests including corrosion, pressure cycle, burst, and thermal cycle are available.

The Approach

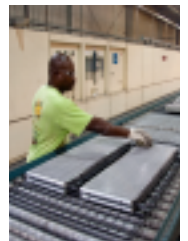
- Projects covered by Confidentiality agreements to protect all parties are assigned to the Tech Center Project Team.
- Detailed computer simulation analysis is completed by comparing the performance of the customers existing technology with the performance of the brazed aluminum coil surfaces.
- Once the simulation is complete, prototype brazed aluminum coils are manufactured in our model shop.
- The units are then tested based on industry standards in our state-of-the-art "Calorimeter."
- A technical report is prepared and submitted to the customer as a baseline for follow-up tests in the customer's facilities.
- Once it has been determined that the brazed aluminum heat exchanger is suitable to the application, a specific development project is established aimed at implementing the new coil surface into the appropriate segment of the customer's product line.




Manufacturing

Once the heat exchangers have been fully developed and are ready for production, API is prepared to support the customer in a variety of ways.

- We have the capacity to supply the customer with superior quality coils at competitive prices for as long as is required.
- If the customer decides to vertically integrate their coil manufacturing operation, API is positioned to assist the customer with this integration. Through API Products (coil manifolds) and our joint venture "Thermalex" (multi-port tubing), API Heat Transfer will supply the major components required.





API Heat Transfer, a family of high-performance brands 

High-performance heat transfer.

It's who we are and what we do. It's part of our 140-year heritage designing and delivering world-class heat transfer products for nearly every industry. It's bolstered by our worldwide network of manufacturing facilities that provide sales, service, and support. And it's ingrained in a process that has helped customers around the world for nearly a century and a half.

When you work with us, you'll find the performance of our technologies sets the bar for heat transfer products, and our relentless drive to find and create custom heat transfer solutions to meet any industry challenge sets us apart.

See how our performance can improve yours.

Contact your API Heat Transfer sales rep or visit apiheattransfer.com today.

USA

Buffalo Facility

2777 Walden Avenue
Buffalo, NY 14225, USA
+1.716.684.6700

Iron Ridge Facility

1025 Industrial Road
Iron Ridge, WI 53035, USA
+1.920.387.4200

Franklin Facility

4700 Ironwood Drive
Franklin, WI 53132, USA
+1.414.761.4500

Racine Facility

5215 21st Street
Racine, WI 53406, USA
+1.262.554.8330

GERMANY

Bretten Facility

Langenmorgen 4
75015 Bretten, Germany
+49.7252.53.0

Dortmund Facility

Breienbachstrasse 87
44357 Dortmund, Germany
+49.231.9920.119

CHINA

Suzhou Facilities Building 1

156 Qingqiu Street, 3rd District
Suzhou Industrial Park
Suzhou, Jiangsu 215126, China
+86.512.8816.8000

Building 2

126 Qingqiu Street, 3rd District
Suzhou Industrial Park
Suzhou, Jiangsu 215126, China
+86.512.8816.8000

Shanghai

Gubei 1699 Commercial Plaza
Room 905-1
1699 Gubei Road
Minhang District
Shanghai 201103, China

