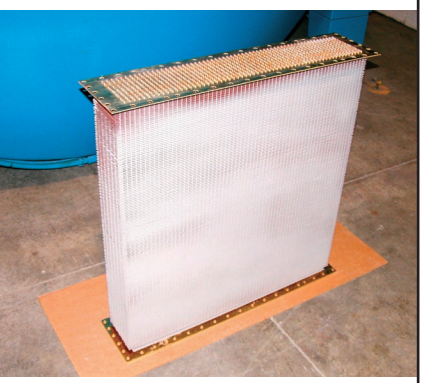
EXECUTIVE Report

RADAC Focuses on Aftermarket Demand for Brazed Copper-Brass Products

Company Offers Large Line of Superior Heat Exchangers for Commercial and Industrial Applications



RADAC is the first company to make plate-fin radiators using the *Cu*proBraze process

Known for its speedy service and high-quality products, RADAC is in the business of making heat exchangers for the commercial and industrial aftermarket. Commercial products include heat exchangers for heavy-duty highway trucks of all makes and models. Industrial products include rugged heat exchangers for construction and agricultural equipment, compressors, stationary power generators and other industrial equipment.

And now RADAC can make *Cu*proBraze heat exchangers, too!

"If you need it… we can make it!" is a motto that aptly describes RADAC's manufacturing capability as well as its commitment to its customers. "Most of us here have been working with copper and brass all of our lives," says James E. Cornwell, Vice President of Manufacturing. "We can work with aluminum, too, but for the most part we focus on customers who demand the performance of copper and brass."

Flexiblity Counts

RADAC was among the first to pay heed to early announcements of *Cu*proBraze technology. "The idea of brazing rather than soldering copper and brass together had tremendous appeal to us from the beginning," says Cornwell. "We closely examined the *Cu*proBraze technology and its implications for our markets. Our customers indicated that they would be interested in *Cu*proBraze products if we could make them."

The challenge was to build a production line that would suit RADAC's manufacturing style. After seeing a demonstration of a high-volume, continuous-belt furnace, the technical staff concluded that it needed a more flexible process to be able to service both its aftermarket and low-volume OEM customer needs.

"We take pride in servicing the needs of the aftermarket. We sell to radiator shops, end-users and distributors. Our customers know what goes wrong with radiators in the field. They are highly knowledgeable customers who constantly demand better performance from heat exchangers in extreme applications."

To illustrate, Cornwell explained how RADAC makes plate-fin radiator cores. These rugged heat exchangers are conventionally made with solder processes. RADAC is now the first company to adopt *Cu*proBraze technology in the manufacture of plate-fin radiators. "A brazed copper-brass, plate-fin radiator perhaps represents the ultimate in toughness for industrial heat exchanger applications," says Cornwell. "Our customers are motivated more by performance than cost. The plate-fin design is harder to make but it is more durable than other types of radiators, so we make them for our customers."

Cornwell also sees *Cu*proBraze opening up new markets for brazed copper-brass radiators with serpentine-fins; and brazed copper-brass charge air coolers with internal fins. "*Cu*proBraze charge air coolers can withstand higher temperatures than aluminum CACs. That's an important benefit because clean diesel engines run hotter. We expect that market to grow rapidly in the next few years."

RADAC daily takes orders for specially built, one-of-a-kind radiator cores, including some very large radiators. It also takes orders for 10, 20 or 50 cores of one size and type. The company needed a production line that could process batches of small or large radiator cores. More than anything else, it needed a batch furnace that would be flexible enough to quickly switch between large "one-off" specialty cores and medium-volume production of smaller replacement cores based on OEM part numbers.

Innovations in Manufacturing

As word of *Cu*proBraze technology spread, RADAC's customers began expressing a demand for the durability and efficiency promised by the new technology. Finally, the company contacted Dr. Stan Casper of ISOTEK, a highly regarded expert in furnace design and brazing.

The International Copper Association, Ltd. (ICA)

is the leading organization for the promotion of the use of copper worldwide. The Association's twenty-nine members represent about 80 percent of the world's refined copper output, and its six associate members are among the world's largest copper and copper alloy fabricators. ICA is responsible for guiding policy, strategy and funding of international initiatives and promotional activities. With headquarters in New York City, ICA operates in 28 worldwide locations through a network of regional offices and copper development associations.

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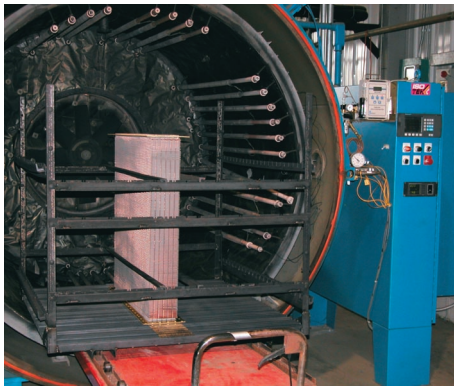
RADAC wanted a furnace that would meet its requirements for flexible manufacturing of all types and sizes of cores. Dr. Casper parlayed his expertise on radiators, furnaces and brazing into a furnace configuration that is exactly right for RADAC's product mix.

The result was a unique design of a controlled-atmosphere brazing (CAB) furnace. The new *Cu*proBraze CAB batch furnace can braze very large heat-exchanger cores. Indeed, it can hold cores with length-by-width dimensions as large as 65 in. × 65 in. (1.65 m × 1.65 m).



RADAC uses a large controlled atmosphere batch furnace for brazing heat exchangers.

Production Worthy Processes

According to Cornwell, *Cu*proBraze suppliers moved up the learning curve in the past few years, which now allows RADAC to deliver a level of quality and performance beyond anything done before. The company experimented with dozens of samples of binders from brazing paste suppliers. Together they learned to fine-tune the pastes and processes, continually improving the quality of the manufactured products. Closer tolerances and better process equipment also contributed to success. "Brazing pastes have gotten very, very good in recent years," said Cornwell. As a result, RADAC can easily exceed customer expectations with *Cu*proBraze products. RADAC's brazed copper-brass heat exchangers are easily superior to soldered products.

RADAC has come a long way in developing production-worthy processes. "Our brazing processes are working better than we could have imagined when we began looking at the technology."

RADAC purchases high frequency (HF) welded tubes from Thermasys, which is one of the largest manufacturers of tubes in North America. It is more cost-effective to purchase tubes from a volume producer than to invest in tube fabrication equipment. "We are in the heat-exchanger business, not in the tube business," says Cornwell.

RADAC has 17 different tube-to-fin configurations with many options available for customizing any product to fit a customer's application. RADAC makes its own fins, including serpentine fins made from *Cu*proBraze copper alloy strip or plate-fins made from thin sheets of the *Cu*proBraze copper alloy. The plates range from 0.003 inches to 0.005 inches (0.08 mm to 0.13 mm) in thickness, depending on the density required. Serpentine-fin thickness ranges from 0.0022 inches to 0.005 inches (0.07 mm to 0.13 mm). Serpentine and plate fin designs can be manufactured with or without louvers depending on the application.

RADAC has developed a unique option that is analogous to what is known as a soft-solder face-dip. The latter involves dipping the face of a heat exchanger core in molten solder. The new option involves spraying the face of the core with a low-viscosity brazing paste prior to brazing. The coatings are only a few thousandths of an inch thick and they only extend a few millimeters deep into the core; yet many users have found that such coatings stiffen the fins and provide corrosion protection in harsh environments. Therefore, RADAC offers this extra coating as an option for its *Cu*proBraze product line.

Looking Ahead

According to Cornwell, RADAC is receiving requests from customers for *Cu*proBraze in practically every product category, for example, construction equipment, forklifts, commercial trucks, and power generators. He attributes the strong demand to the fact that most of its customers are extremely knowledgeable of heat exchanger technology and they are eager to obtain superior products for their special applications. He has even received orders for passenger car radiators, because the knowledgeable customer prefers the excellent corrosion resistance of a copper-brass radiator compared to alternatives and is willing to pay extra for the superior quality. "Our customers demand the superior performance so it's only natural that they would demand *Cu*proBraze," concludes Cornwell. ■

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