

Evaporator Coils with Small-Diameter Copper Tubes Deliver the Same Performance with Less Materials, Says International Copper Association

Test Data from Chigo Compares Coil Designs for Two Tube Types

New York, NY (November 30, 2010) — The International Copper Association (ICA) today announced that manufacturers continue to reduce materials requirements in designs of heat exchangers for air conditioning and refrigeration products through the use of MicroGroove™ technology. Products made with inner-grooved, small tubes of copper use less materials yet deliver the same performance as products made with larger tubes. For example, a design study from the Chigo Air Conditioning Company, Foshan, Guangdong, China demonstrates the benefits of using small tube copper with microgrooves. Chigo is a member of a small tube copper research consortium that includes the ICA, two universities and several major manufacturers of air conditioning and refrigeration products.

The design study is for a residential air conditioning product. Two evaporator coils were made with the same arrangement of tubes but different tube sizes. The smaller tubes allowed for a more compact design, a reduction in the heat exchange area of the evaporator, and an overall reduction of materials usage, including less fin, tube and refrigerant. The reduction of tube wall thickness for the smaller diameter tube further reduced tube material. The incremental decrease in tube size reduced the estimated cost of materials by 40 percent.

Cooling capacity, power consumption, energy efficiency ratio, air volume and refrigerant charge were compared for the two designs. Despite reductions in heat exchange area, tube and fin materials and refrigerant volume, the product made with small tubes of copper operated at a slightly higher efficiency than similar product made with larger tubes. Some modifications were made in the design and width of the plate fin. The flow path was optimized for smaller tubes in the evaporator design. The report also includes an analysis of the manufacturing process and measures taken to ensure high-quality production of coils with smaller diameter copper tubes.

“With the same performance, small tube copper replaces seven millimeter copper tubes, leading to the cost reduction, so there are good expectations for the market potential,” says Mr. Shunyi You, the lead author of the report. “The products are sold widely abroad, including Europe, USA and South East Asia.” Mr. You is the chief engineer at Chigo’s Technical Center in Foshan.

More information about this design study is available online at www.microgroove.net. For more information about heat exchanger coils made with small tube copper, visit www.microgroove.net.

About ICA

The International Copper Association, Ltd. (ICA) is the leading organization for promoting the use of copper worldwide. ICA’s mission is to promote the use of copper by communicating the unique attributes that make this sustainable element an essential contributor to the formation of life, to advances in science and technology, and to a higher standard of living worldwide. Visit www.copperinfo.com for more information about ICA.

###