**MicroGroove Technology Case Study Shows How to Optimize Fin Designs for Air Conditioners Made with Smaller Diameter Copper Tubes, says International Copper Association**

*Researchers from ICA and SJTU Design Eleven Different Fin-and-Tube Heat Exchangers and Correlate Performance with Fin Design*

**New York, NY (12 August 2013)** — The International Copper Association (ICA) announced that a technology case study “Developing a Low Charge R290 Air Conditioner Using Smaller Diameter Copper Tubes” was presented at the Fourth IIR Conference on Thermophysical Properties and Transfer Processes of Refrigerants. (The TPTPR conference is an international conference held every four years in various cities. See [www.tptpr2013.nl](http://www.tptpr2013.nl) for more information on the 2013 conference held in Delft, the Netherlands.)

The research was conducted by Yifeng “Frank” Gao and Ji “Kerry” Song of the ICA Shanghai office in cooperation with Jingdan Gao and Professor Guoliang Ding of the Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, Shanghai.

A step-by-step methodology for optimizing fins to smaller diameter tubes is presented. Furthermore, laboratory results are given as a graph representing the performance of eleven designs of heat exchangers with fin pitches between 1.4 mm and 1.1 mm. As the fin pitch decreases, the experimentally measured values of the Colburn heat transfer factors increases. The resultant graph of proposed Colburn heat transfer factor (or *j* factor) versus air Reynolds number allows for the prediction the heat transfer rate of fin-and-tube heat exchanger with 5-mm diameter tubes. The mean deviations of the proposed *j* correlation are 6.5 percent.

When using smaller diameter copper tubes, the highest efficiencies can be realized by optimizing the fin design to the smaller diameter tubes. The investigators optimized the louver fins for 5-mm diameter tubes using a method based on Computational Fluid Dynamic (CFD).

“This ICA-sponsored research is of special interest to product design engineers from companies that are switching to MicroGroove smaller diameter copper tubes for condenser and evaporator coils,” says Nigel Cotton, MicroGroove Team Leader for the International Copper Association. “ICA is developing tools to assist in the development of fin designs optimized for the smaller diameter copper tubes. No matter the refrigerant, this methodology can be followed to optimize the fin designs.”

Visit www.microgroove.net for information and join our discussion on LinkedIn: [www.linkedin.com/groups/Microgroove-4498690](http://www.linkedin.com/groups/Microgroove-4498690).

**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.microgroove.net](http://www.microgroove.net) for more information about ICA.

**About Shanghai Jiao Tong University**

Shanghai Jiao Tong University (SJTU) was founded in 1896 and is one of the oldest universities in China. Through its century-long history, SJTU has nurtured many outstanding figures and made significant contributions to science and technology. The Institute of Refrigeration and Cryogenics at SJTU is renowned for its world-class research in air-conditioning and refrigeration. Visit [www.sjtu.edu.cn](http://www.sjtu.edu.cn) for more information about SJTU.

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