**Asia Leads the Way with MicroGroove Technology**

*Smaller Diameter Copper Tubes Improve Efficiency*

**Shanghai, China (8 April 2019)** – The ACR Industry is truly global with respect to supply and demand for every product category. One can find cold-vending machines, refrigerated display cases, heat pumps and air conditioners practically anyplace there are electric outlets available.

In recent years, MicroGroove technology has been broadly adopted in China, Japan, India and other Asian countries. MicroGroove coils made from smaller diameter inner-grooved copper tubes deliver an unprecedented combination of reliability and energy efficiency. They are more affordable than traditional designs because they use less material. Many coil manufacturers have added MicroGroove heat exchanger production lines to their plants or even built new facilities dedicated to the production of MicroGroove heat exchangers.

Professor Guoliang Ding pioneered the use of MicroGroove technology at the Institute of Refrigeration and Cryogenics (IRC) at Shanghai Jiao Tong University (SJTU). He and his colleagues conducted computer simulations and laboratory experiments demonstrating the advantages of smaller diameter copper tubes in residential air conditioning applications. They showed how refrigerant charge could be substantially reduced with smaller-diameter copper tubes and still meet performance objectives.

Subsequently, various design principles emerged of great value to OEMs seeking to optimize material usage in air conditioning and refrigeration applications. Today, the latest simulation tools from China are contained in HXSim software available from the International Copper Association (ICA).

According to the ICA, the use of smaller diameter copper tubes continues to grow in China. ICA China founded the Refrigeration and Air-Conditioning Heat Exchanger Technology Alliance (HETA) with the Shanghai Society of Refrigeration. HETA members include Gree, Midea, Haier, Hisense, Chigo and TCL.

HETA aims to deepen cooperation with these OEMs, to research heat exchanger technology and strengthen the advantages of copper heat exchanger technology. Through their cooperation on the HETA platform, OEMs are realizing the full potential of smaller-diameter copper tubes and applying this technology to construction of high efficiency heat-exchangers and appliance products.

Ji Song of HETA delivered a presentation titled “Systematic study on small diameter copper tube heat exchanger technology” at the Fifth International Conference on Refrigeration Technology (ICRT) in December 2018, Zhuhai, Guangdong, China in Session PS4 on “Heat and Mass Transfer.” The session was chaired by Guoliang Ding, Professor, Shanghai Jiao Tong University; and Jinping Liu, Professor, South China University of Technology.

Japan is another technological leader in air-conditioning and refrigeration. In its university and OEM laboratories, experienced heat-exchanger engineers, physical scientists, computer simulation specialists and system designers continue to research the advantages of MicroGroove technology in real world applications. They are investigating ecofriendly refrigerants, copper tube performance and system innovations.

According to Masahiko Wada of the Japan Copper Development Association (Japan CDA), “The key benefits of MicroGroove are higher efficiency and less materials usage. We enjoy sharing the latest developments in MicroGroove technology with researchers from around the world.”

A seminar for OEMs was recently held by the Japan CDA. Research on small diameter, high performance inner-grooved copper tubes was presented for the next generation refrigerants and equipment. Attendees learned how to improve the heat transfer performance by reducing copper tube diameters. For tubes with smaller diameters, the tube wall can be thinner, the refrigerant can be reduced and the conductivity per unit volume increases. These advances makes copper more competitive versus alternatives. Professor Inoue of Tokyo University of Marine Science and Technology and Professor Miyara of Saga University described laboratory experiments on copper tubes and the effect of copper tube diameter on heat exchanger performance. The seminar was attended by more than twenty engineers from Daikin, Panasonic, Hitachi, Mitsubishi, and Toshiba and other OEMs as well as representatives from three copper tube makers.

Japan is a major player in the development of air conditioners, refrigeration and heat pumps and is home to major OEMs such as Daikin, Panasonic and Mitsubishi. Japan has led the way in the development of new technologies such mini-splits and variable refrigerant volume systems. Japan’s Daikin was one of the original members of the consortium that facilitated the adoption of MicroGroove technology by Chinese OEMs. Researchers from Daikin are frequent contributors of technical papers on the latest advances in small tube technology. MicroGroove technology has been successfully used in the manufacture of residential air-conditioners for the global market as well as for light-commercial refrigeration systems and large condensers and gas coolers.

“Truly MicroGroove is a global phenomenon,” says Nigel Cotton, MicroGroove Team Leader for the International Copper Association. “The coils are made around the world, in China, Japan, South Korea, Thailand, Vietnam and India; in several EU countries; and in the United States, Canada and Mexico. It is a breakthrough, “game-changing technology” in every send of that phrase; and it is paving the way to more eco-friendly solutions for human comfort and the cold chain.” For more information, visit www.microgroove.net.

**About ICA**

ICA brings together the global copper industry to develop and defend markets for copper and to make a positive contribution to society’s sustainable-development goals. Headquartered in New York, the organization has offices in four primary regions: Asia, Europe and Africa, Latin America and North America. Copper Alliance® programs and initiatives are executed in nearly 60 countries through its regional offices. For additional information please visit copperalliance.org.

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