

MicroGroove Research Focuses on Commercial Refrigeration, Alternative Refrigerants and Heat Pumps

As the number of applications for MicroGroove technology continues to grow, so too does the need for research to help guide engineers in the design of industry-first products.

The Copper Alliance is working closely with industry to support the advancement of heat transfer technologies that will lead to safer, eco-friendly and energy-efficient heat exchanger designs.

Circling the Globe

This year MicroGroove exhibited in three major expositions, including the AHR Expo in New York City, ACREX India in New Delhi and the China Refrigeration Expo in Beijing.

Interest in MicroGroove was high as visitors expressed interest in using MicroGroove for a wide range of applications including refrigerated transport, R744 coils and commercial and industrial applications, where the smaller diameter copper tubes offer higher efficiencies, compactness and reduced refrigerant volumes as well as excellent durability.

Companies such as Super Radiator Coils (Richmond, Virginia), Cancoil Thermal Corporation (Kingston, Ontario), LU-VE (Uboldo, Italy), Lordan (Kfar Szold, Israel) and SPIROTECH (New Delhi, India) displayed their latest product designs featuring MicroGroove tubes.

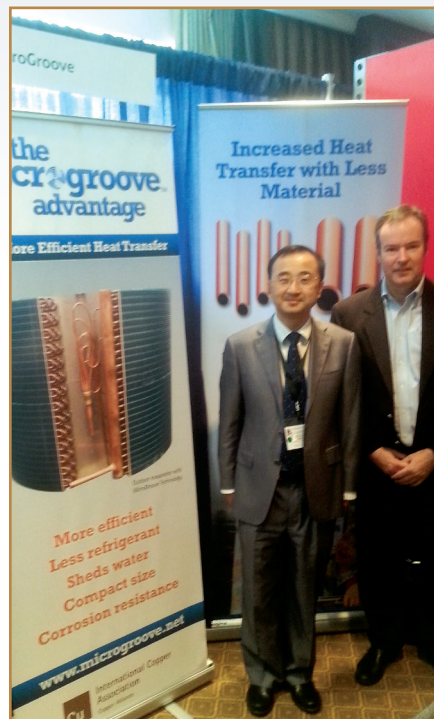
SPIROTECH received a Special Mention for the "ACREX Award of Excellence" in the Green Product category, specifically for its 5-mm copper tube heat exchanger coils. The nomination pointed out that the coils can be used in all the HVACR products which use new generation refrigerants; in particular, in products using natural refrigerants such as propane (R290), isobutane (R600a) and carbon dioxide (R744).

In Beijing, the focus was on natural refrigerants such as propane as well as "all copper" antimicrobial coils. A new software package for the design of refrigeration equipment was demonstrated. "China continues to pave the way in advancing the use of copper in HVACR applications," said Nigel Cotton, MicroGroove Team Leader for the International Copper Association.

Heat Pumps, Too

MicroGroove participated at the International Energy Agency's Heat Pump Conference in Montreal in May. The same advantages that apply to air-conditioners and refrigeration equipment also apply to the evaporator and condenser coils used in residential heat pumps, including hot-water heat pumps as well as heat pumps that are used to heat indoor spaces.

Copper round tubes with plate fins easily shed water, which is a crucial advantage for heat-pump evaporators. A brochure titled "MicroGroove Technology for Heat Pumps" was produced and distributed to HPC attendees. It can be downloaded from the new MicroGroove Heat Pump microsite, which can be accessed via microgroove.net.



Professor Guoliang Ding from Shanghai Jiao Tong University and Nigel Cotton from ICA at the IEA Heat Pump Conference in Montreal.

At the IEA HPC, Professor Guoliang Ding delivered a technical paper titled, "Experimental investigation and structure optimization of distributors used in heat pump air conditioner with microgroove

tubes." He described how to optimize the coil design to allow for additional branch circuits in the design of heat pumps with smaller diameter copper tubes.

See You at Purdue

Several papers about smaller-diameter copper tubes are slated for presentation at the Fifteenth International Refrigeration and Air Conditioning Conference which will be held from July 14-17 on the campus of Purdue University.

Papers from China include "Investigation of application of suction-line heat exchanger in R290 air conditioner with small diameter tube" by Tao Ren *et al.*; and "Influence of oil on heat transfer characteristics of R410A flow-boiling in conventional and small size microfin tubes" by Haitao Hu *et al.*

The coauthors of these two papers include ICA technical staff as well as researchers from the Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University; and the Key Lab of HVAC, Beijing University of Civil Engineering and Architecture.

Additionally, a review paper titled "New Copper-based Heat Exchangers for Alternative Refrigerants" by Yoram Shabtay and John Black will be presented.

"The Copper Alliance supports the development of new applications for smaller diameter copper tubes," says Nigel Cotton, MicroGroove Team Leader for the International Copper Association. "A variety of ICA-sponsored research on tubes and coils frees individual OEMs and their technical staffs to focus on product development. We look forward to continuing our relationship with industry to encourage the use of copper in the development of efficient and eco-friendly products."

Join the MicroGroove Group on LinkedIn to share your ideas about research directions and product development. www.linkedin.com/groups/Microgroove-4498690