**Open Structure of Round Copper Tubes with Plate Fins Offers Superior Drainage and Cleaning Compared to Flat Aluminum Tubes with Serpentine Fins**

**New York, New York (14 December 2016)** – According to the Copper Alliance, important advantages of round tube plate fin (RTPF) coils are ease of cleaning and good condensate drainage.

The “plate fins” of RTPF coils typically are oriented vertically so water drains easily from the top to the bottom of the sheets. The tubes penetrate the sheets at right angles and water easily flows around them. The same holds true for RTPF coils made from smaller diameter copper tubes. There may be more tubes penetrating the plate fins but water flows easily around the smaller diameter tubes.

The open structure of a round tube plate fin (RTPF) is a major advantage of MicroGroove heat exchangers compared to aluminum microchannel heat exchangers. That’s why MicroGroove heat exchangers are commonly used in the outdoor evaporators of heat pumps especially in colder climates where frosting may be an issue.

**Research on Wavy Fins**

A wavy fin is a plate fin with no holes and so it drains even better. Wavy fin designs have been found to be more effective for heat pumps where the outdoor evaporators may be subject to frosting; and for refrigeration equipment where frosting and condensation cancels the advantages of slit and louvre type fins due to the clogging of the openings. Also, enhanced fins such as slit or louvered fins aggravate the dust accumulation in the condensers of refrigerated display cabinets. Condensers in display cabinets are especially prone to dust accumulation because they are positioned close to the floor.

Supported in part by International Copper Association, researchers at the Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, conducted research to examine the feasibility of replacing 9.52 mm copper tubes with 5 mm diameter tubes in the condensers of refrigerated display cabinets [1].

Wavy fins were chosen for this application because of considerations about dust accumulation. The fin structure was selected by theoretical analysis and the flow path of 5-mm diameter tube heat exchanger was analyzed using a heat exchanger simulation tool to find a suitable balance between heat transfer and pressure drop. The simulation results suggested that cost of the condenser could be reduced by 26 percent using the 5-mm tube with performance the same as the 9.52 mm prototype. The experimental data validated the simulation results, proving the feasibility of applying the small diameter tubes in display cabinets.

In related research, the CEEE investigated the design space for wavy fin heat exchangers having copper tube outer diameters ranging from 2 mm to 5 mm. They found that existing correlations were not applicable to the design space, thus justifying the need for new equations [2, 3].

For more information, visit [www.microgroove.net](http://www.microgroove.net). Join the MicroGroove Group on LinkedIn to share your ideas about research directions and product development. [www.linkedin.com/groups/Microgroove-4498690](http://www.linkedin.com/groups/Microgroove-4498690).

**References**

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**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](http://www.copperinfo.com) for more information about ICA.

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