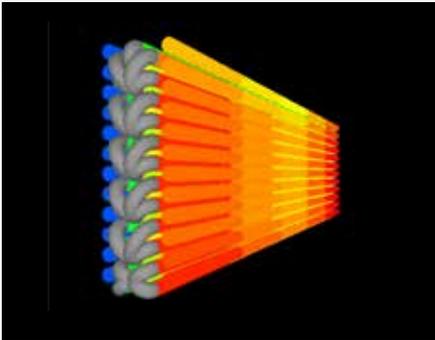


CoilDesigner Software to Include MicroGroove Tubes

Newly developed MicroGroove™ correlations are in development for implementation in CoilDesigner®, a proprietary heat exchanger design and optimization tool developed by the Modeling and Optimization Consortium within the Center for Environmental Energy Engineering (CEEE) at the University of Maryland. CoilDesigner is developed with the support of over 30 HVAC&R companies worldwide and is the result of more than 15 years of research and programming effort.



CoilDesigner allows for visualization of temperature distribution. (Image courtesy of OTS.)

The International Copper Association (ICA) has been cooperating with Optimized Thermal Systems, Inc. (OTS) to implement newly developed correlations into CoilDesigner. Research conducted at international universities and by private manufacturers has resulted in the development of new airside and refrigerant-side correlations, particularly for 5-mm MicroGroove tubes. Once implemented into CoilDesigner, these correlations will allow HVAC&R system designers and engineers to model heat exchangers using 5-mm MicroGroove tubes.

CoilDesigner is a highly customizable software tool that allows designers to simulate and optimize the performance of heat exchangers. Users can shorten product development costs and bring products to market more quickly. OTS has an exclusive license agreement with the University of Maryland to provide customized versions and assist

in the development of CoilDesigner software. OTS actively works with various HVAC&R designers around the globe to optimize heat exchanger geometry, including investigation of the use of small diameter tubes.

Surface Enhancements

Additional collaboration has been conducted with Burr Oak Tool, Inc. (BOTI) to understand the effects of tube expansion methods on internal surface enhancements, their related effect on heat exchanger performance and their implications for manufacturing.

The collaboration with BOTI addresses manufacturing challenges relating to the internal surfaces of the copper tubes, including MicroGroove tubes. Specifically, BOTI is developing non-mechanical expansion technology to expand MicroGroove tubes without deforming internal tube enhancements. This new expansion technology offers the opportunity to create complex and relatively fragile geometries. With this new software methodology in place, the effects of enhancements can be explored to identify new geometries that increase heat transfer performance.

According to recent collaborative studies by ICA, OTS and BOTI, microfins could increase refrigerant-side heat transfer coefficients as much as 300 percent, depending on the tube diameter. For a heat exchanger made with 5-mm MicroGroove tubes, the use of microfin tubes rather than smooth tubes could

increase heat capacity by more than 20 percent; alternatively, it could reduce fin material mass and tube material mass up to 10 percent and 17 percent, respectively. Such findings are the result of extensive literature review paired with supplemental analysis using CoilDesigner. Additional work is ongoing to further investigate MicroGroove behavior and potential. A synopsis of this research is available from microgroove.net/technical-literature.

Manufacturing Technology

The Copper Alliance recently organized a webinar presented by Brian McConnell, President of BOTI, in which the manufacturing technology to produce heat exchanger coils from MicroGroove Copper Tubes was described. According to experts at BOTI, the equipment to build small diameter tubes into all sizes of coils is already available, and manufacturing processes are familiar, economical and reliable. "We, at Burr Oak Tool, have focused our efforts on understanding and addressing our customers' perceived challenges of, and timeline for, transitioning to smaller diameter tube coil production" says Jason Halling, Manager of Business Development & Marketing at Burr Oak Tool.

For information on CoilDesigner, visit www.ceee.umd.edu. For information on MicroGroove, visit microgroove.net. For more about BOTI, visit www.burroak.com. For information on OTS, visit www.optimizedthermalsystems.com. 



New equipment in the fin line includes presses for fin stamping. (Photograph courtesy of BOTI.)