

# Trends in Cooling Technology and Coil Design

Nearly 110 years have passed since the first installation of air conditioning in 1902. Although thermodynamics is widely considered a complete science today, new designs of heat pumps, air conditioners and refrigerators are flourishing.

Why has interest in the design of air-conditioning and refrigeration (ACR) products intensified so much in recent years?

## A Climate of Innovation

Many factors are contributing to a climate of innovation in the ACR industry today, including

- Phase out of high-ODP and high-GWP refrigerants
- Use of eco-friendly refrigerants
- Energy efficiency standards
- Sustainable development
- Advances in component technology
- Computer simulation of components and system performance
- Responsiveness to needs and wants in the marketplace

The phasing out of popular CFC and HCFC refrigerants has been a major factor in spurring innovations in cooling technology in the past 20 years. Likewise, energy efficiency and sustainability have necessitated invention. End-users have their eyes on energy efficiency ratings and OEMs are highly motivated to use less material in their products.

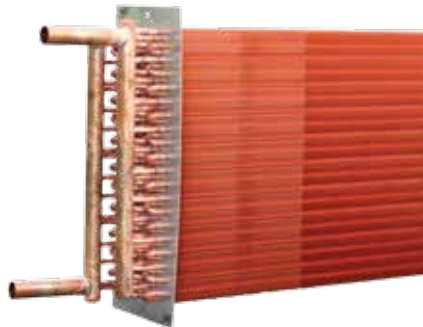
Advances in component technology have also influenced overall system design. For example, there are now many types of compressors available. Each has advantages and disadvantages, depending on the application. Also, variable refrigerant flow systems are becoming more common. Control systems and electronic valves allow control over the path of refrigerant flow through the tubes of condensers and evaporators depending on the cooling requirements.

Computer modeling is now commonly used to simulate total system design. Decisions about refrigerants, coils and components are now made with the assistance of increasingly accurate performance simulations.

## Advances in Coil Design

Redesign of the coil has seen the use of smaller diameter copper tubes with inner-grooves increasing the internal heat transfer coefficient and raising COPs. Such improvements in coil performance may also be favorable for the use of new refrigerants, less materials, higher operating pressures (due to the smaller diameter tubes) and variable refrigerant flow (due to the increased number of branches).

System design is dramatically changed for the better by using smaller diameter, inner-grooved copper tubes in the coil designs.

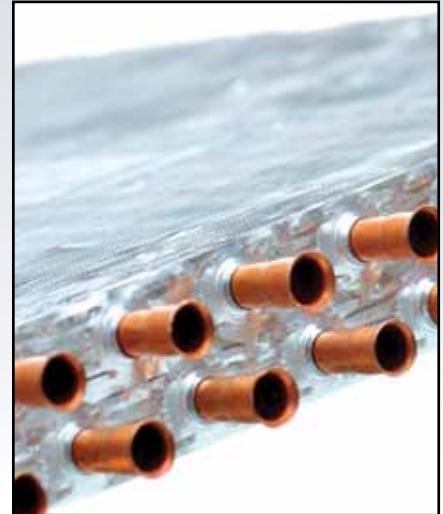


## Antimicrobial Materials

Another factor influencing the design of air conditioning and refrigeration systems is new published research on copper's efficacy against the spread of fungi in air conditioning systems.

OEM companies such as the Chinese air-conditioning giant Chigo and Hydronics in France have already developed all-copper products expressly for their antimicrobial properties.

The use of all copper coils is not new but their use expressly to inhibit the growth of fungi and bacteria is a recent development that is expected to be an important factor in the development of innovative air conditioning and refrigeration products.



Bio build up on the coil may be reduced by using all copper coils, helping to maintain high levels of energy efficiency for longer times and avoiding energy efficiency drop off over time.

## The Most Important Factor

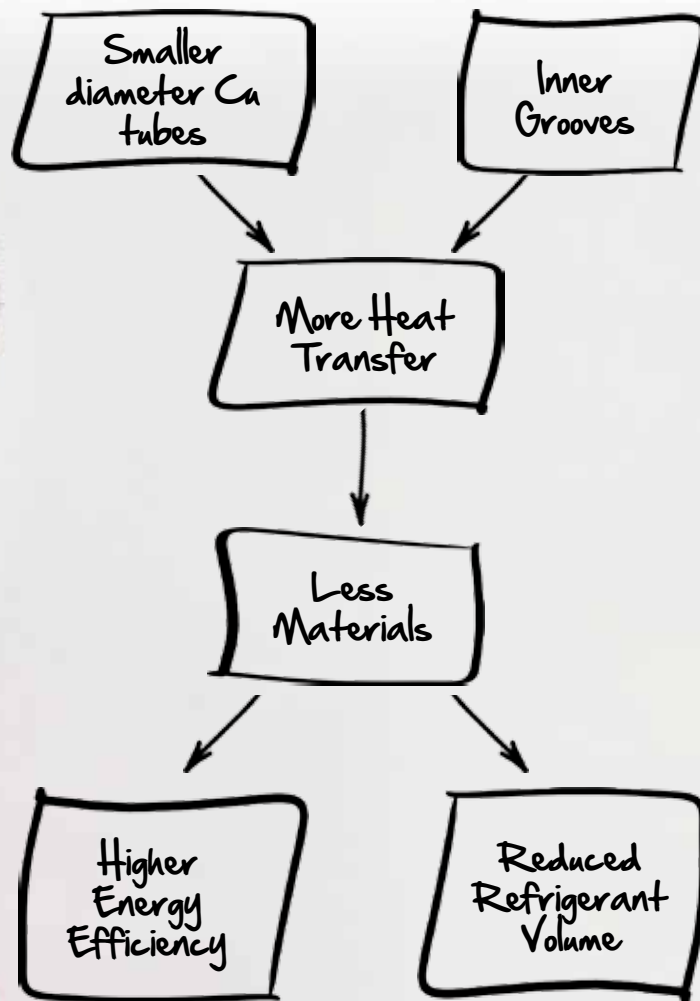
Perhaps the most important factor driving the development of new products is a better understanding of attitudes toward comfort and refrigeration in different climates and cultures. ACR product developers are responding better to the real needs and wants of end users in the built environment. They are right-sizing air conditioning and refrigeration products to allow for precise temperature and humidity control in specific zones without waste.

The result is that end-users will enjoy healthy, eco-friendly products that deliver cooling capacity with high energy efficiency when as well as where it is most desirable.

For more information about MicroGroove smaller-diameter, inner grooved copper tubes, visit [www.microgroove.net](http://www.microgroove.net). There you can find technical papers and recently archived webinars as well as a supplier directory. 

Please visit the MicroGroove exhibit at the 2012 AHR Expo, Booth 2729.

# the microgroove™ advantage



## IT'S A GAME CHANGER

MicroGroove™ technology is changing the game of air conditioning and refrigeration (ACR) OEM product design.

OEMs are going back to their drawing boards. They are designing ACR products with high energy-efficiency, while minimizing materials usage and reducing refrigerant volume.

The resulting ACR products are smaller and lighter yet can be produced using familiar manufacturing methods.

It's a whole new game!

For more information, or to join a free webinar, visit

[www.microgroove.net](http://www.microgroove.net).

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**Next webcast:**

March 27, 2012



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