**MicroGroove Dominates in Cool Display Cabinets with Propane as a Refrigerant**

*Smaller Diameter Copper Tubes Allow for Smaller Volumes of A3 Flammable Refrigerant*

**New York, New York (8 August 2017)** – According to the International Copper Association, Inc. (ICA), MicroGroove has played a key role in the development of refrigeration systems made with 150 grams of propane (R290). This application has already been quite successful and has widely proliferated in the past few years.

Practically every major manufacturer of “reach in” cool display cases now offers models with propane as a refrigerant. The reasons are not hard to see. With a GWP of three, propane is extremely attractive as an ecofriendly refrigerant. It is affordable and readily available.

Smaller diameter copper tubing (typically 5 mm) is exactly what’s needed to reduce the refrigerant charge. As a bonus, the efficiency of the system increases. The compressors for this application are widely available.

Propane was widely adopted by manufacturers in 2016. Many OEMs have completely revamped their product lines to make way for the increased demand for propane-based refrigeration systems. One of the first was True Manufacturing of O’Fallon, Missouri. Other companies adopting propane include AHT Cooling Systems, Beverage Air, Fogel, Liebherr, Minus Forty Technologies Corp., MTL Cool., Novum Refrigeration Technologies, Traulsen, Turbo Air and Welbilt (formerly Manitowoc). Major brands and store chains too are aligning with this eco-friendly refrigerant.

**Motives for Switching to Propane**

The phasedown of HFCs by such regulations as the F-Gas regulations of the European Union, the SNAP process of the EPA and the Kigali Amendment to the Montreal Protocol contributed the interest in low-GWP hydrocarbons such as propane.

Yet it is the attractive physical properties of propane that have led to its quick adoption, once the regulatory hurdles in favor of propane and against HFCs were in place. Its excellent thermodynamic properties and the fact that it is readily available and affordable are important factors. Refrigeration systems that use propane as a refrigerant have high-efficiency and high-performance. They have also proven to be extremely reliable.

Although propane is classified as an A3 flammable refrigerant, it is safe to use when proper protocols are followed. Propane is not a drop-in replacement. The refrigeration systems must be specifically designed for R290 and comply with the charge limit of 150 grams.

The low-charge limit restricts the use of propane to refrigeration systems with fractional horsepower compressors. This is okay for convenience store applications but for large applications multiple independent refrigeration circuits must be used.

Currently, a working group within the International Electrotechnical Commission (IEC) is developing a standard that would allow for 500 grams of propane to be used in refrigeration systems. If accepted, the new standard could be published in 2018 and as a reference standard it could influence standards issued in the U.S. for example by the EPA and Underwriters Laboratories (UL).

**Technical Presentations**

Recently, Yoram Shabtay made a presentation titled “Select case studies of copper heat exchanger coils for natural refrigerants,” which was warmly received at the June 2017 ATMOsphere America Conference in San Diego. [www.atmo.org/media.presentation.php?id=1051](http://www.atmo.org/media.presentation.php?id=1051).

Eoin Lennon of Novum Refrigeration Technologies made a presentation titled “Novum’s Natural Refrigerant Choice” in which a unique cassette design of R290 refrigeration systems were described. [www.atmo.org/media.presentation.php?id=1070](http://www.atmo.org/media.presentation.php?id=1070)

Howard Feig of AHT Cooling Systems reported that AHT 15,000 propane cases have already been installed in North America. [www.atmo.org/media.presentation.php?id=1071](http://www.atmo.org/media.presentation.php?id=1071)

“We can expect that propane will play a key role in refrigeration systems for many years to come,” said Nigel Cotton, MicroGroove Team Leader for the International Copper Association. “As MicroGroove tubes and coils are uniquely suited for use with propane, particularly with respect to reduced refrigerant charge, the upsurge in the use of propane will also establish smaller diameter copper tubes in the supply chain and contribute to broader use of MicroGroove technology in refrigeration, air-conditioning and heat pump applications.”

The website www.microgroove.net includes additional data relating to heat exchanger design and manufacturing technology. It also includes links to the MicroGroove series of webinars. A technical literature section provides links to technical papers relating to laboratory experiments, tube circuitry optimization, fin design and manufacturing equipment.

**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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