HOW IS PROATEQ DIFFERENT?

Georgetown's Cooling Systems Energy Efficiency (CSEE) Solution, which is also called PROATEQ, belongs to a product family referred to as PROA that stands for **P**olarized **R**efrigerant **O**il **A**dditive. Unlike other oil additives, as a polarized refrigerant additive, it remedies oil fouling in HVAC equipment. Oil fouling is internal, non-mechanical degradation that increases operating cost and cannot be addressed by external means. To be precise, it is a heat transfer enhancement, which in an article entitled *Heat Transfer Enhancement* published in the April 2006 ASHRAE Journal, Ph.D. Mechanical Engineers Detlef Westphalen, Kurt Roth, and James Brodrick all agreed that "heat transfer enhancements can improve the heat exchanger effectiveness of internal and external flows."

One of Georgetown's main service offerings is the installation of ProaTEQTM. ProaTEQ is a proprietary chemical formulation developed by EnSaTEQ Corporation of Woodville AL. It was first developed in 1996, field tested for most of 1997, and went to market in 1998. To date, ProaTEQ has been used to treat over 100,000 Tons of refrigeration equipment in the US, involving over 400 separate projects, including both Comfort HVAC and Industrial Process Cooling applications, in all types of chillers and DX units, of all sizes. ProaTEQ is inserted into refrigeration systems and initially mixes with compressor oil and is transported through the system in conjunction with the small amount of compressor oil that migrates through the full system. ProaTEQ improves the performance of existing refrigeration systems both chemically and mechanically, as will be described below.

Oil Fouling is a well-known problem in refrigeration systems, as I'm sure your staff if fully aware. The attached paper "Oil Fouling in Air Conditioning and Refrigeration Systems" explains the problem and provides five ASHRAE literature citations on the subject. According to ASHRAE, performance of refrigeration equipment can be degraded by up to as much as 30% to 40% due to the buildup of residue from unwanted compressor oil on the inner surfaces of heat transfer elements.

ProaTEQ is formulated to contain a non-invasive polarized molecule which chemically displaces all organic residues adhering to metallic surfaces in the evaporator and condenser and intermediate refrigerant lines, by virtue of a more powerful van der Waals force. It penetrates the residues, then dislodges them, then strongly and permanently adheres to the metallic surface, forming a 1-molecule thick layer, or "coating", which coating permanently prevents additional organic residues from forming again. This chemical "cleaning and protective coating" is a one time, permanent treatment, which never needs re-treatment, even when and if compressor oil is changed in the system. Dislodged residues are captured in filter-drier components and removed. Depending on the age of the unit and the amount of residue previously built up, the unit can see immediate and considerable improvement in the Btu/hr cooling capacity of the unit, at no increase in power draw, thus reducing the kW/Ton of the unit, reducing cycling, reducing wear, saving energy, reducing energy and peak demand charges, reducing PPG's carbon footprint, and prolonging the life of the unit.

In addition to the chemical benefit of "cleaning and coating" described above, ProaTEQ also delivers a significant lubricity benefit, thus improving the performance of the unit mechanically, again reducing wear, reducing power draw, and extending life. In testing conducted by an independent and highly regarded laboratory, the Southwest Research Institute, in San Antonio, TX, using the ASTM D-3233 Falex Pin and Vee Block (Method A) Test, performed in 2005, when lubricated with a high quality refrigerant compressor oil (the "base oil" on the SWRI Letter attached), it took an applied force of 610 lbs before the V-Jaws penetrated the oil and scored the rotating test cylinder. When the base oil was mixed with 10% ProaTEQ, it took a compressive force of 1,581 lbs before the V-Jaws penetrated the lubricant and scored the rotating test cylinder. Thus the addition of ProaTEQ more than doubled the lubricity and wear-reduction effect in this well-known and well-accepted test.

The efficacious impact of PROATEQ during project engagements has been documented primarily by reputable, independent 3rd-party engineering organizations (NIST, Siemens, CH2M HILL, US Army, Oak Ridge National Energy Laboratories, and DOE – Berkley Labs). Information disseminated by other companies selling PROAs such as Powertron's Permafrost, ArtiKool, Compress Shield, ColderFlow, and several others, in many instances, is simply misleading and borderline fraudulent as it is primarily generated by internal marketing and sales resources – with absolutely no outside confirmations or certifications as to product's effectiveness.