

### MaxR – An Evolution in Lubrication Technology

Refrigerant oil additives are a simple, effective way to increase the efficiency of compressors and heat exchangers in air-conditioning and refrigeration systems. The idea of oil additives certainly is not a new technology and in fact some products were introduced as far back as the mid 1980's. Over the years new technologies were developed and products were categorized in to one of two groups: Refrigerant Oil Additives and Polarized Refrigerant Oil Additives (PROA). This is NOT MaxR.

Products marketed strictly as "oil additives" were blended into the systems existing refrigerant to supplement the systems cooling efficiencies. Polarized Refrigerant Oil Additives, or PROA's, introduced the use of a negatively charged molecule to the blend that was attracted to the metal surface of the compressor and condenser coils. These early polarized additives performed better than standard refrigerants as they provided a coating to exposed metal surfaces and increased efficiency by reducing operating friction, but the technology was fundamentally flawed.

Until July of 1996, the only PROA's available were produced and marketed from the same formula and patent. Several companies were licensed to use the patent and yielded a number of seemingly independent companies. Each licensee was responsible for its manufacturing procedures. Finished products were private labeled and marketed under several different trade names. This falsely created the appearance of competitive products developed with competitive technologies.

The inherent lack of compound and production controls produced an assorted range of products that performed in an equally varied manner. To complicate matters even more was that the patent under which each of these products was produced was not a product patent or a formula patent, but an application patent for the introduction of commercially available Chlorinated a-Olefin or Chlorinated Paraffin lubricant into air conditioning and refrigeration systems.

The transfer of technology turned out not to be a simple matter. Prior to this point Chlorinated a-Olefin lubricant incorporating the use of PROA technology, was used for high stress metal working such as roll-forming of steel, steel stamping and high speed machining. Chlorinated a-Olefin was not manufactured by chemical companies to perform as a PROA, and when used as such, created an environment within the system that resulted in a number of seriously consequences. The most serious problem associated with using a Chlorinated a-Olefin as a PROA was its corrosive potential and the release of free chlorine into the system.

Ultimately customers believed that they had a choice of competitive products, independently developed and tested to some kind of demanding standard. In fact these "competitive products" were founded with the same technology and rushed to market without the benefit of either an adequate experience curve or sufficient field testing. The result, an industry shrouded in confusion, misinformation, false claims, skepticism and lost confidence.

### The MaxR Difference

Trans Bio Energy has developed its own proprietary approach to resolving the problem of eroding efficiency in the form of its MaxR line of products. But the industry had developed a cautious attitude towards oil additives as a whole. Before the MaxR technology could be released Trans Bio had to be sure that they were not about to repeat the problems experienced by its predecessors. As a result the company consciously committed itself to invest the time and research dollars necessary to ensure the performance of their product.

MaxR – 100 is designed as a concentrated metal conditioner and surface modifier for air conditioning, refrigeration, chiller and heat pump applications. Where competitive products produce only a surface film or coating, MaxR's proprietary technology utilizes a "molecular bonding technology" to form an electrochemical bond with the systems metal surfaces.

### Molecular Bonding Oil Additive

Technically classified as a Molecular Bonding Oil Additive, MaxR products are not intended to “treat” the equipment’s primary lubricant, but uses it only as a carrier/transport medium to distribute the MaxR throughout the equipment to treat the systems metal surfaces and return the displaced debris back to the lubricant filtration system.

MaxR–100 contains an activated polar molecule that has been highly polarized and charged (negatively) at one end. Each charged molecule has an affinity for metal and as the system continues to circulate the polarized molecule displaces the build-up of refrigerant oil in the condenser and evaporator coils and electrochemically bonds with metal surfaces. Ultimately the MaxR 100 forms a microscopic, protective lubricant layer that is one molecule thick that physically bonds to become a part of the equipment’s metal surface.

The two most important benefits of the MaxR treatment are the improved heat transfer of the evaporator and condensing coils and the increased lubricity of the refrigerant oil.

It is extremely important to note that MaxR–100 does **not** include chemical elements of the **Halogen group**, particularly, **chlorine and fluorine, sulfur or phosphorous** which may combine with hydrogen and form highly corrosive acids as experienced by customers who have used competitive products.

MaxR does not contain PTFE (Teflon) or any other particulate that could cause corrosion or change mechanical tolerance in an air conditioning or refrigeration system.

### Prolongs the life of mechanical equipment

MaxR-100 contains an element that increases the lubricity of refrigerant oil thereby significantly reducing mechanical coefficient of friction between the parts resulting in reduced wear, tear and maintenance, on the equipment. Independent lubricity testing reports that untreated refrigerant oil samples failed under pressures of 300 psi. Samples tested with MaxR–100 did not even fail at the tests maximum pressure of 4,500 psi.

Unlike so many of the products available MaxR does not operate as an “Oil Additive” treatment and does blend into the existing refrigerant. MaxR products are not intended to “treat” or “modify” the equipments primary lubricant. MaxR products utilize the primary lubricant only as a carrier medium to distribute the MaxR treatment throughout the equipment to treat the metal surfaces and return debris back to the filtration system.

MaxR products form a microscopic, protective “lubricant layer” that physically becomes part of the equipment’s metal surface providing continuous lubrication protection. This electrochemically bonded lubricant layer can provide protection even during a catastrophic loss of primary lubricant.

MaxR products have been tested to The American Society of Heating, Refrigeration and Air-Condition Engineers (ASHRAE) test for Miscibility, Metal Compatibility and Flock test. MaxR-100 has also been tested to ANSI/ASHRAE 37-1988 and American Refrigeration Institute, ARI Standard 340/360-2000 without issues.

MaxR-100 is produced in four types of refrigerant oils to be compatible with the base oil that is currently used in the refrigeration and air-condition systems. MaxR-100 is the only safe product, to our knowledge, for use in ammonia charged gas refrigeration systems.