



SA Performance

The Truth About PAG Lubricants

For almost 30 years Ingersoll Rand and Sullair have used PAG/POE lubricant blends as the primary factory fill in their rotary screw compressors. These are excellent fluids, which have been proven to offer a long service life while remaining varnish free. These fluids are comprised of Polyalkylene Glycol (PAG) and Pentaerythritol Ester (POE). The PAG is an excellent long life lubricant, and this type of ester is hydrolytically stable.

Common PAG/POE Lubricants

PAG/POE based lubricants (commonly referred to as PAG's) such as Sullair's Sullube* and Ingersoll Rand's Ultra Coolant* are some of the most successful lubricants on the market with upwards of 40% of rotary screw compressors in the North American market having used one of these fluids while under warranty. Quincy, Atlas Copco and Gardner Denver also have PAG based lubricants as options to their customers, but do not leverage this chemistry as a standard factory fill.

Benefits of a PAG / POE Lubricant

With these fluids having been used in such a large percentage of compressors, an incredible amount of field experience in addition to laboratory

testing has been conducted over the years. The most prominent differentiating points for a PAG lubricant include:

- **Varnish Free** – Varnish is incredibly detrimental to a compressors performance; plugging bearing orifices, cooler tubes, thermal blocks, and separators.
- **Long Life** – A true PAG/POE is typically rated from 8,000 to 10,000 hours. Some of today's variations are proven at up to 16,000 hours with new additive technologies.
- **Corrosion** – All compressors have some degree of moisture, aiding in the risk of rust/corrosion formation. PAG's offer excellent corrosion protection, especially when blended with a barium corrosion inhibitor.
- **High Flash Point** – With a rotary screw compressor, thermal events are always a concern. High pressures seen in air compressors along with lubricant misting increase the risk of these events. PAG/POE blend lubricants offer very high flash points, which reduce the likelihood of an undesirable event from occurring in a system. *(continued on next page)*

What to Expect in Genuine Formulations

Genuine PAG formulations consist of the same base fluids and additives, along with the appropriate concentrations as used in the OEM fluids. This includes approximately 60%-70% PAG, 25%-30% POE, and a proper system of additives.

The primary additives in a PAG formulation include an optimized ratio of antioxidants to ensure a long fluid life, along with a barium corrosion inhibitor which is proven to be the most effective type available.

Generic Equivalents to Genuine Formulations

Aftermarket variations of PAG lubricants vary greatly, and caution should be taken to ensure the chemical makeup of the lubricant meets both distributor and end customer expectations. These variations include:

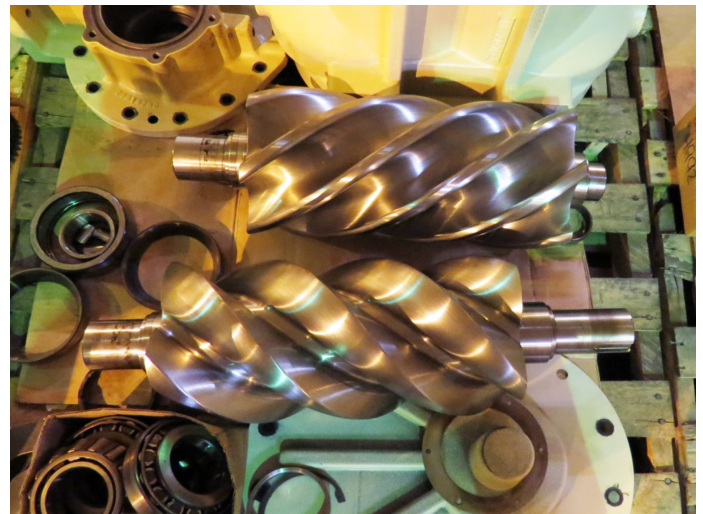
- **PAG Blends** – PAG blends do contain Polyalkylene Glycol but only in the range of 10%-50%, and then use a large percentage of ester in the fluid. There are no mandates or regulations that state a fluid must contain a certain amount of an ingredient to claim it is the main base stock. A company can use a very small amount of PAG and tell their customers that they are buying a fluid 'just like' the OEM lubricants.
- **PAG Replacements** – PAG replacements don't even use Polyalkylene Glycol in their fluids, and instead incorporate a synthetic hydrocarbon with a diester to achieve compatibility. This will

typically be referred to as a PAG Replacement or OEM PAG Replacement. Many customers are left unaware of the product they are receiving because of this product description.

Improper ester ratios can impact short term seal compatibility and longer term seal deterioration. Formulations containing no PAG, or insufficient PAG can be very susceptible to varnishing and sludge buildup.

Genuine Formulation Performance

The picture below is a rotary screw compressor which has run a Genuine Formulation PAG for its entire service life. With over 50,000 hours, the compressor saw a bearing failure and required a rebuild. Visual inspection of the rotors shows a clean, mirror-like finish with no varnish or sludge buildup.



This example is an excellent representation of the performance that should be expected from a PAG/POE lubricant.

* Sullube is a registered trademark of Sullair Corporation

* Ultra Coolant is a registered trademark of Ingersoll Rand Co.