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INNOVATION FOR LUBRICATION

Parts Solutions
I N T E R A C T I V E
COMPRESSOR OIL SYSTEM

Synthetic Compressor Lubricants

The synthetic compressor oils tested are formulated using polyalphaolephins (PAO), esters and polyglycols. These synthetic oil chemistries are widely available and well accepted for use in compressor applications.

1. PAO (polyalphaolephins) synthetic compressor oils are commonly used in rotary screw compressors as well as vane and reciprocating compressors. These oils provide long life in screw compressors often exceeding 8,000 hours under normal operating conditions. PAOs have excellent water resistance and excellent thermal and oxidative stability. They can be used in wide ranging operating temperatures and they have excellent cold temperature properties. They are compatible with most seals, paints and plastics as well as petroleum and ester type compressor oils. PAOs are also available in food grade. PAOs are not compatible with polyglycol type compressor oils. PAOs are typically less expensive than polyglycols and esters.
2. Synthetic ester based compressor oils are commonly found in reciprocating compressor applications because of their low carbon forming tendencies. They are also used in rotary screw and vane compressors. Synthetic esters have a long life in rotary screw compressors, often exceeding 8,000 hours. Some synthetic ester oils are aggressive toward seals, paints and plastics and these compatibilities should be checked. Most synthetic esters used for compressors have good water resistance and excellent thermal and oxidative stability. They are compatible with PAOs and petroleum based products. They may not be compatible with polyglycol-based compressor oils. These oils are typically more expensive than PAOs, but less expensive than polyglycols.
3. Polyglycol synthetics are commonly used in rotary screw compressors. These oils have a long life often exceeding 8,000 hours under normal operating conditions and are often used in applications that compress process gasses, as they do not readily absorb these gasses. Polyglycol oils have good thermal and oxidative stability, however their ability to separate water is poor because they are not water soluble and their density is approximately 1. Therefore, at oil temperatures above 90°C the water evaporates. They exhibit good compatibility with paints and plastics but may affect seals and lacquered surfaces in housings, cages and oil coolers, for instance these made of aluminum. These oils, including **Sullair Sullube 32** and **Ingersol-Rand SSR Ultra-Coolant** are generally not compatible with mineral oils as a result of their pressure-viscosity coefficient which is lower than that of other oils. In addition, they are typically very expensive.

Viscosity in all lubricated equipment is an important consideration. Generally, rotary screw compressors use an ISO-46 and sometimes ISO-32 compressor oil.

Desired Performance Characteristics and Results

Oils used in rotary screw compressors operate in severe environments. The oil in the compression chamber is exposed to high heat as well as moisture. The oil is further exposed to high volumes of oxygen and constant churning. The oil is expected to lubricate the screws and bearings for extended periods of time (up to 8,000 hours). In view of the basic conditions in which rotary screw compressor oil operates, the oil needs to perform well in the following areas: