FUCHS LUBRICANTS (UK) PLC

Compressor Lubrication

Technologically advanced lubricants for HC gas compressors

Compressor Lubrication

GAS COMPRESSORS

The function of a compressor is primarily to reduce a gas into a smaller volume, which creates an increase in pressure and temperature. There are two main types of compressor design; positive displacement and turbo 'dynamic.'

Positive displacement compressors draw the gas into an enclosed chamber and then compress it until the desired pressure and density are achieved. These types are either reciprocating piston or rotary compressors, such as vane and screw, and are generally used for compressing low volumes of gas at very high pressure (e.g. gas re-injection of hydrocarbon reservoirs).

Dynamic designs compress gas using the ram effect, literally forcing the gas into a confined space, such as gas export pipelines and distribution networks. These are used to move large volumes of gas at a relatively low pressure and can be centrifugal, radial and axial types.

HC GAS COMPRESSOR LUBRICATION

Effective compressor lubrication performs many functions:

- Reduces friction and vibration, thereby lowering the energy requirement and heat build-up.
- Cools rubbing mating faces and maintains working tolerances.
- Decreases wear to extend machine life and reduce maintenance costs.
- Improves gas seals on piston rings and packings.
- Prevents corrosion, flushes away contaminants and prohibits carbon, sludge and foam build-up.
- Extends the life of cylinders, valves, packings and rings.

The most important factor to consider when selecting a lubricant for gas compressors is viscosity, but there are many other demands to bear in mind.

Cylinder and Packing Lubrication

The cylinders on reciprocating compressors need regular injections of oil in order to provide adequate lubrication and prolong the life of cylinders and piston rod packings. Piston compressors generate the highest gas pressure and are typically difficult to achieve optimum lubrication.

Over lubrication can cause carry-over into the gas stream, creating hard deposits in the valves and passages, and overheating of the packing rings. Under lubrication reduces the longevity and effectiveness of pistons, rings, cylinders and packings. The correct type and viscosity of the oil, and the amount to be injected, depends on the gas composition, temperature and operating pressures.

Frame Lubricant Selection

The choice of compressor lubricant depends on the type of compressor and gas being compressed, the amount of compression and the final discharge temperature. The frame reservoir needs a constant supply of pressurised lubricant to feed the rotating drive, crankshaft, crosshead and connecting rods.

Double-acting reciprocating compressors often require two different forms of lubrication for both the frame and cylinders. However, in certain conditions, it is possible to lubricate both the frame and cylinders with one lubricant, but consideration must be given to the operating conditions and the type of gas being compressed.

FUCHS SYNTHETIC COMPRESSOR OILS

FUCHS LUBRICANTS UK PLC is part of the FUCHS Group; the world's largest independent lubricant manufacturer. We supply a wide range of high quality, synthetic compressor oils, which are proven in use around the world and are recognised by many leading companies.

Our lubricants often exceed the requirements of OEM's, due to their ability to resist the degradation caused by gas dilution and oxidation and to extend cylinder life beyond expectation. Because of the operational benefits of our lubricants, our customers are able to vastly reduce their overall purchasing expenditure.

PRODUCT RANGE

RENOLIN GC-UCL Series

Semi-synthetic fluids for the lubrication of cylinders and packing glands in gas compressors. Forms a tenacious film on surfaces, even under extreme conditions, to offer excellent protection against water vapour and hydrocarbon gases. Has low carbon forming properties to provide a cleaner operation at high temperatures. Recommended for use in reciprocating compressors working with a variety of gases.

Benefits

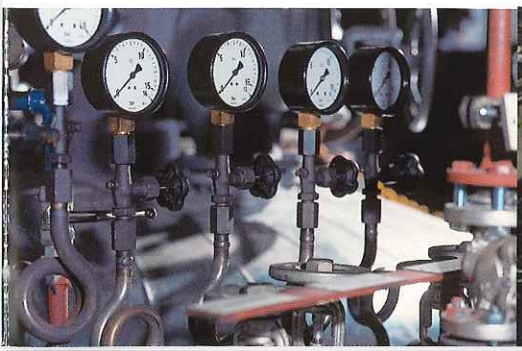
- Prolongs cylinder and packing life
- High pressure gas service
- Highly adhesive to improve sealing and provide smoother, cleaner operation
- Reduces injection feed rates
- Excellent corrosion protection

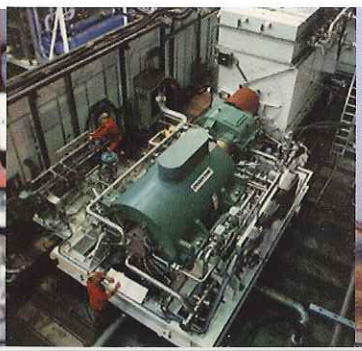
RENOLIN HC Series

Polyalkyleneglycol (PAG) synthetic lubricants specially formulated for use in flooded screw gas compressors. Resists dilution by hydrocarbon and other compressed gases. Has a high viscosity index, excellent lubricity and is shear stable. Is insoluble in water at temperatures above 70°C. Does not form carbon build-up on valves and elbows, reducing the risk of explosion.

Benefits

- Improved rust and oxidation inhibition
- High anti-wear performance
- High load carrying capability
- Can be used both as crankcase and cylinder lubricant





PRODUCT RANGE

RENOLIN SE Series

Premium synthetic compressor lubricants based on advanced synthetic ester (POE) technology. Contains a synergistic blend of anti-wear, anti-corrosion and anti-oxidant additives to enhance performance. Suitable for use in rotary, reciprocating and screw compressors, dependent upon viscosity. ISO VG 32, 46, 68 and 100 available.

Benefits

- Provides low coefficient of friction and reduced power consumption
- Highly resistant to oxidation
- Reduces carbon deposits in valves and exhaust lines leading to reduced maintenance and down-time costs
- Improved safety due to reduced fire risk
- Extended drain periods
- Compatible with mineral oils

RENOLIN UNISYN OL Series

High-performance, synthetic Polyalphaolefin (PAO) based compressors oils. Recommended for use in flooded or oil injection screw-type air compressors (ISO VG 32, 46, 68) and for piston and rotary vane compressors (ISO VG 100, 150). Can also be used as hydraulic fluids according to DIN 51 524. Displays excellent viscosity-temperature behaviour and ensures that an optimal lubricating film is formed even at high temperatures, high loads and after long periods of use. Offers extended oil life and improved operational reliability of components.

Benefits

- High natural viscosity index
- Excellent oxidation stability
- Low evaporation losses
- Excellent wear protection (EP & AW)
- Excellent FE8 performance
- Good demulsifying properties
- Excellent corrosion protection
- Good compatibility with elastomers
- Good low foaming / air release characteristics
- Suitable for high-temperature applications
- Exceeds various industry specifications

Gas Solubility in the Lubricant

Dilution of the oil by the process gas will lower the lubricant viscosity. Excessive dilution can be caused by the compressor design, the gas stream composition and sometimes by a combination of both.

The solubility of the gas is more likely at lower temperatures. In wet sump reciprocating and flooded screw compressors, the compressed gas and the lubricant are in contact with each other. Hydrocarbon gases are infinitely soluble in mineral oil and PAO based lubricants.

The lubricant selection process is therefore critical, as the solubility of natural gas and other hydrocarbons is much higher in mineral (petroleum) oils and Polyalphaolefins (PAO) than in other synthetics, such as Esters and Polyalkyleneglycols (PAG). The use of a higher viscosity lubricant can effectively compensate for dilution. Higher discharge gas pressure will cause greater dilution, while a higher discharge gas temperature will cause less.

Monitoring of In-Service Compressor Lubricants

Testing for oxidation and lubricant contamination and degradation is an imperative component of any analysis package. Viscosity and Total Acid Number (TAN) are important analytical tests in order to identify oxidation of the oil.

Under normal service, compressors can be monitored every 500 hours or monthly. Once trends are established the sampling period can be adjusted accordingly, depending on the gas stream composition and machine duty. Additional tests can include ISO / NAS particle counting, ash content and pour point determination.

Please contact your local FUCHS Technical Specialist, for information on our CENT lubricant condition monitoring system.

TYPES OF COMPRESSOR LUBRICANT

Mineral Oils are conventional lubricants but are limited in high temperature applications by thermal and oxidative instability. Because of the solubility of hydrocarbon gas in mineral oils, mineral based lubricants are generally unsuitable for many gas compressors.

Polyalphaolefins (PAO) are synthetic lubricants widely used in screw, vane and reciprocating compressors. Under normal operating conditions they have excellent thermal and oxidative stability, good water resistance and superior 'cold start' properties. They are also compatible with mineral and ester based compressor oils, but not with polyalkyleneglycols.

Polyalkyleneglycols (PAG) are commonly used in rotary screw compressors and for cylinder lubrication. They are ideal in applications that compress process gasses, as they have a low solubility with hydrocarbons and are therefore less affected by dilution and reduced viscosity. PAG's have good compatibility with seals and plastics and display good thermal and oxidative stability. They are suitable for gas streams with high molecular weight, wet gas or high levels of carbon dioxide but are not recommended for air compressors.

Synthetic Esters are used in screw and vane compressors, but are also well suited to reciprocating types because of their low carbon forming tendencies. Esters can be aggressive with certain seals and plastics and should therefore be approved by the manufacturer prior to use. They provide excellent thermal and oxidative qualities and offer good water resistance.

Compressor Lubrication

The products listed represent only a small selection of our whole range. Where advice is required on specific application details, please contact one of our lubrication specialists.

Information was correct and valid at the time this publication was printed. Please be aware that this information may change due to the continual product development within this field.

The most suitable lubricant should be selected after consulting the equipment manufacturer, the operator, manufacturers of ancillary machinery and the lubricant manufacturer.

A comprehensive consultation should precede any lubricant change, so that the optimal lubricant can be selected for the appropriate application.

Always read the Material Safety Data Sheet before handling a product. If you are in any doubt, please contact **Fuchs Lubricants (UK) plc.**

Several photos were provided courtesy of **Dresser-Rand Co.**

Please Contact:

FUCHS LUBRICANTS (UK) PLC

Registered Office: New Century Street, Hanley, Stoke-on-Trent ST1 5HU

Tel: +44 (0) 8701 200 400

Fax: +44 (0) 1782 202 072

Email: contact-uk@fuchs-oil.com

Website: www.fuchslubricants.com