ZEROL® AUTOMOTIVE

HIgh Performance
Air Conditioning Lubricants

Why ZEROL®?

Shrieve has developed a market leading presence in the refrigeration and air conditioning compressor lubricant markets.

Providing a complete range of technically advanced ZEROL® lubricants for application in mobile systems.

We offer a full range of synthetic technologies, from OEM compliant products for existing HFC systems, through to lubricants for new applications employing primary alternate refrigerants such as HFO-1234yf and CO_2.

Current Systems

For R134a Belt Driven Systems - **ZEROL® RFL-X**	
Features	**Benefits**
Double end-capped PAG with optimized miscibility in R134a	Maximized oil return to the compressor ensuring highest system efficiency
Exceptional EP performance, primarily derived from the di-capped base fluid structure	Excellent hydrodynamic and boundary lubrication properties, resulting in minimized levels of wear
Lower water absorbing tendency compared to alternative PAG products	Helps to improve system reliability and lifetime

For R134a Belt Driven Systems - **ZEROL® PAG**	
Features	**Benefits**
Single end-capped PAG lubricant, formulated with wear prevention technology	Good hydrodynamic and boundary lubrication properties, resulting in minimized levels of wear
Specifically designed for R134a refrigerant in mobile air conditioning systems	Full miscibility with R134a across the full MAC operating temperature range
Excellent thermal, chemical and hydrolytic stability	Helps to reduce downtime and lowers maintenance costs

System Performance Enhancers for R134a - **ICE^{32}**	
Features	
Offers a no flush rejuvenation of lubricant	Helps to extend compressor life by reducing wear
Helps to reduce system noise	Aids in the reduction of interior humidity

For HFO-1234yf (R1234yf) Belt Driven Systems - **ZEROL® HD**	
Features	**Benefits**
Double end-capped PAG technology optimized for HFO-1234yf	Offers highest level of system efficiency
Specifically developed additization technology	Helps to ensure thermal, chemical and hydrolytic system stability
Lower water absorbing tendency compared to alternative PAG products	Helps to improve system reliability and lifetime

System Performance Enhancers R1234yf - **ZEROL® HFO**	
Features	
Chemically stabilizes R1234yf & R134a automotive A/C systems	Works with PAG and POE lubricant technologies in HFO and HFC systems
Improves extreme pressure (EP) and antiwear properties of the compressor lubricant	Fully compatible with the #1 OEM PAG Oil for R1234yf systems
Captures and eliminates free radical and acidic species	

Next Generation Systems

For CO_2 (R744) Based Systems - **ZEROL® RFL-EP**	
Features	**Benefits**
Double end-capped PAG for optimized CO2 miscibility	Maximizes oil return to the compressor for system efficiency, without loss of hydrodynamic/boundary lubrication properties
Exceptional load bearing (EP) properties	Lubrication properties are not compromised even under elevated pressure and temperature conditions
Thermal, chemical and hydrolytic stability	Prolongs stable operating conditions, reduces downtime and lowers maintenance costs

Ester Technology Systems

Systems Utilizing Ester Lubrication Technology - **ZEROL® ESTER**	
Features	**Benefits**
Branched POE technology	Optimized chemical stability in the system
Low moisture content and acid value tolerances	Minimizes acid formation during system lifetime
Excellent electrical insulating properties	Suitable for use in hermetic systems

Quick-check product guide

Use the table below to quickly find the air-conditioning lubricant for your needs.

Which product is right for you?

Product	R1234yf	R134a	R456A	R744	Initial Fill	After Market	Belt Driven	Hybrid / Electric
ZEROL® RFL-X		✓			✓	✓	✓	
ZEROL® PAG		✓				✓	✓	
ICE^{32}		✓				✓	✓	
ZEROL® HD	✓	✓	✓		✓	✓	✓	✓
ZEROL® HFO	✓		✓		✓	✓	✓	✓
ZEROL® RFL-EP				✓	✓	✓	✓	
ZEROL® ESTER	✓	✓		✓	✓	✓		✓

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Our technical abilty...

Shrieve offers tailored solutions to a range of industries around the world.

A combination of many performance attributes has led to a broad global acceptance and usage of synthetics such as polyalkylene glycol (PAG) and polyol ester (POE) for the lubrication of mobile air conditioning (MAC) compressors.

PAG technology broadly predominates due to the excellent lubricity, stability, system compatibility and wide temperature operating range which are inherent features of this type of chemistry.

Further to legislation requiring the adoption of less ozone depleting refrigerant technologies in MAC systems, PAG lubricants remain the preferred lubricants of choice for new refrigerant types, including both HFO-1234yf and CO2.

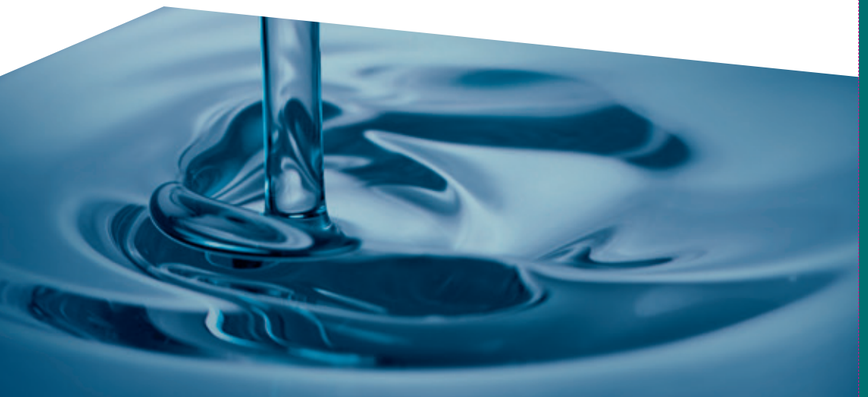
ZEROL® air conditioning lubricants for automotive applications have significant market acceptance and have received extensive worldwide OEM approvals.

Formulation Development

Shrieve has made continuing investment in the development of lubrication technology for the automotive segment. From our technology centers in the United States and China, we are able to work with OEMs to provide lubrication solutions for the latest compressor designs and refrigerants.

Our capabilities include:

- A world class expert application engineering and formulation development team.
- Specific laboratory analysis tools including the determination of refrigerant-lubricant mixture properties (pressure, viscosity and temperature testing) as part of our product development programme.
- Tailored lubricant formulation expertise.



Shrieve

40 YEARS OF GREAT CHEMISTRY

1978 - 2018

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