

Emkarate® Refrigeration Lubricants from CPI Engineering Services

High performance synthetic lubricants offering reliability and energy efficiency in over 1 Billion compressors worldwide

Emkarate® RL



EMKARATE® RL

Product Description

The Emkarate® range are synthetic polyol esters (POE) lubricants formulated specifically for use in refrigeration and air-conditioning compressors using HFC refrigerants. This product provides effective wear protection for bearing surfaces for increased system life and improved efficiency and is suitable for both initial fill and service fill. The combination of low temperature characteristics and unparalleled chemical and thermal stability enable the use of Emkarate® RL products over wide operating temperature ranges.



Emkarate® RL is the only name you need to know.

CPI® is the world's leading supplier of synthetic lubricants to the refrigeration and air conditioning industry. The Emkarate® RL polyol ester (POE) lubricants are designed to meet all your needs.

Emkarate® is the only name you need to know when you require an OEM approved synthetic refrigeration lubricant for appliance, large industrial systems, air conditioning (residential, commercial, or transport) and automotive or aftermarket applications.

More than 1 billion compressors filled with Emkarate® RL.

The Emkarate® RL brand provides a complete range of viscosities coupled with quality, reliability and performance for original fill oils and retrofit aftermarket service oils. Today more compressor manufacturers have given their 'stamp of approval' by using CPI® compressor lubricants compared to any other manufacturer.

Emkarate® RL Refrigeration lubricants have been extensively and successfully evaluated for use with the new, low Global warming Potential (GWP) refrigerant gases that are entering the HVAC market, following F gas regulations. Emkarate RL are ideal for:

- **HFO: R1234yf, R1234ze and R1233zd.**
- **Hydrocarbon: R600a Isobutane and R290 Propane.**
- **HB grades are specifically designed for the high pressures of R744 Carbon Dioxide.**
- **HFC/HFO blends.**
- **HFC/hydrocarbon 'drop-in' blends: R416A, 417A, 422A-D, R419A.**
- **HFC R32.**

Emkarate® RL still offer the same substantial operational and efficiency benefits over mineral oils, with these new refrigerant types.

Performance-Tested Physical Properties

Emkarate® RL lubricants are designed for standard factory fill of air conditioning and industrial refrigeration equipment, as well as for OEM retrofitting operations. CPI's laboratory studies and OEM compressor tests have afforded a product line specifically designed to meet key system needs. Emkarate® RL lubricants are not hazardous under 29 CFR 1910.1200. They provide improved properties over conventional mineral oils in all aspects, including viscosity index, flash and fire points, and pour point.

Typical Properties of Emkarate® RL Lubricants

Analysis	Method	RL5H+	RL22H	RL32H & HB	RL32-3MAF	RL46H	RL68H & HB	RL100H & HB	RL170H	RL220H
Viscosity @ 40°C (cSt)	ASTM D445	5.8	18.9	32.5	31.2	45.3	66.6	96.5	170	215
Viscosity @ 100°C (cSt)	ASTM D445	1.9	4.2	5.8	5.6	7.1	9.4	11.3	17.0	18.8
Viscosity Index	ASTM D2270	131	120	121	125	116	120	103	107	98
Pour Point (°C)	ASTM D97	-60	-52	-46	-40	-46	-39	-28	-25	-25
Density @ 20°C (g/ml)	ASTM D1298	0.926	0.995	0.977	0.981	0.977	0.977	0.969	0.968	0.975
Flash Point COC (°C)	ASTM D92	184	240	258	240	260	270	260	290	280
Acid Value (mg KOH/g)	ASTM D974	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

The Emkarate® RL range is available in a variety of packages. These values are not intended for use in preparing specifications. Additional information is available upon request.

Emkarate® Series Application Guide

	Residential Air Conditioning			Industrial & Commercial Refrigeration & Air Conditioning		
	Reciprocating	Rotary	Centrifugal	Reciprocating	Screw	Scroll
Emkarate® RL22H	Y	Y	Y	Y		Y
Emkarate® RL32H & HB	Y	Y	Y	Y		Y
Emkarate® RL46H	Y	Y	Y	Y	Y	Y
Emkarate® RL68H & HB	Y	Y	Y	Y	Y	Y
Emkarate® RL100H & HB			Y	Y	Y	Y
Emkarate® RL170H			Y	Y	Y	
Emkarate® RL220H			Y	Y	Y	

Emkarate® RL's advanced design produces market leading performance and provides:

- **Superior wear protection for reliability**
- **Greater lubricity and improved energy efficiency**
- **Excellent performance in low temperature applications**

As refrigeration technology moves forward there is an even greater demand for enhanced lubricant performance and reliability. CPI® leads the way by continuing to invest in synthetic lubricant technology in order to meet the demands of the market and more importantly its customers.

Outstanding Miscibility

The performance of an HFC system is optimized when the lubricant and refrigerant mix to form a single, clear phase (that is, they are miscible). Miscibility lowers the viscosity of the lubricant carried through the system, so the lubricant can more efficiently return to the compressor. Mineral oils are not miscible with HFCs. Emkarate® RL lubricants however, have been specially designed for enhanced miscibility.

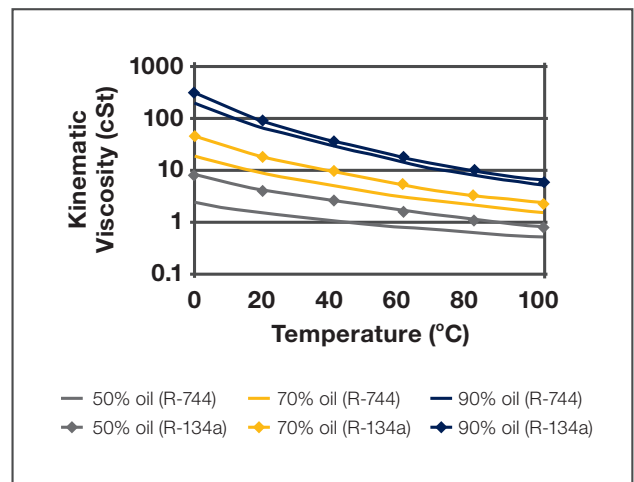
Excellent Thermal Stability

Sealed tube results (ASHRAE-97) indicate that Emkarate® RL lubricants provide excellent stability in the presence of HFC refrigerants. In addition to outstanding stability, these lubricants show no adverse effects to metals and other materials of construction.



Lubricants for CO₂ Refrigerants - RL68HB and RL100HB

CPI Fluid Engineering offers lubricants for CO₂ applications in subcritical and transcritical applications. RL68HB and RL100HB are polyol ester lubricants that have been formulated to meet the requirements of miscibility and oil return for CO₂ systems operating with DX heat exchangers. CPI Fluid Engineering recommends that when using CO₂ in applications that traditionally use POE lubricants (with HFC) the POE viscosity should be at least two viscosity grades higher. Our understanding of system operation and its broad product offering for CO₂ refrigerants allows you to choose the right lubricant for CO₂ systems.



Lubricants for Next Generation Lower GWP Refrigerants

CPI Fluid Engineering is focused on developing lubricants for current and future refrigerants. This is why we collaborate with major manufacturers of both synthetic and natural refrigerants to keep current with emerging technologies. CPI Fluid Engineering uses its technology expertise to stay engaged with the industry by being members on various technical committees. Recent developments have focused on lubricants for new Hydrofluoro Olefin (HFO) refrigerants technology that require special consideration. Investigation with HFO refrigerants has indicated that POE lubricants and formulated POE lubricants are good options for performance and stability requirements.

Emkarate® Refrigeration Lubricants - Approval List

Industrial and Commercial Compressor Manufacturers - HFC/HCFC Systems

EQUIPMENT MANUFACTURER	COMPRESSOR TYPE / (MODEL)	APPROVED EMKARATE RL GRADE(S)
BITZER	Reciprocating	RL 32H & 68H
	Screw	RL 170H
BLISSFIELD	Reciprocating	RL 68H
BOCK	Reciprocating	RL 22H, 32H, 46H, 68H & 100H
CARRIER	Centrifugal Chillers (17DA & 17EA)	RL 32H
	Externally Geared Centrifugal Chillers (17EX, 17FA & 17MPS)	RL 68H
CARRIER CARLYLE	Reciprocating	RL 68H
CARRIER TRANSICOLD	Reciprocating (Marine Containers)	RL 22H
DAIKIN MCQUAY	Centrifugal	RL 32H
	Screw	RL 68H, 68HB, 100H & 220H
DALIAN BINGSHAN	Reciprocating	RL 32H
	Screw	RL 170H
DANFOSS COMMERCIAL (MANEUROP)	Scroll (SZ, MFZ & LFZ)	RL 32H
	Reciprocating (LTZ & NTZ)	RL 32H
DORIN	Reciprocating	RL 22H, 32H, 46H & 68H
DUNHAM BUSH	Reciprocating	RL 32H & 68H
	Screw	RL 68H
EMERSON COPELAND	Reciprocating & Scroll	RL 32-3MAF, 32CF & 22CF
	Scroll R744 CO2 Z0	RL 68HB
FRASCOLD	Reciprocating	RL 32H, 68H
	Screw	RL 170H
	Subcritical R744 CO2 SK compressor	RL 68HB
FRIGOPOL	Reciprocating (60-DLB-13 to 80-DLB-30)	RL 32H
GRASSO (GEA)	Reciprocating	RL 68H & 100H
HARTFORD	Reciprocating	RL 32H & 68H
HANBELL	Screw compressors (RA, RB & V series)	RL 170H & 220H
HISPACOLD	Reciprocating	RL 68H
J & E Hall	Centrifugal	RL 32H
	Screw	RL 68H, 68HB, 100H & 220H
JIANGSU XUEMEI	Reciprocating	RL 22H & 32H
LOCKHEED MARTIN	Oil can be used to service Lockheed owned compressors	RL 68H
MAYEKAWA	Mycom Inter-soluble R404A, R507A, R410A	RL68H
PRESTCOLD	Reciprocating	RL 32-3MAF
REFCOMP	Reciprocating (SRC-F, SRC-M, SRC-L & SRC-P)	RL 32H & 68H
ROLTEC	Screw	RL 46H & 170H
ROYCE	Reciprocating	RL 32H
SABROE	Reciprocating	RL 32H, 46H & 68H
	Screw	RL 68H, 100H, 170H & 220H
TECUMSEH	Reciprocating	RL 22H
THERMOKING	Reciprocating	RL 32H
TRANE	Screw	RL 68H
	Scroll	RL 32HB
NATO MILITARY NSN	NSN 6850P4314-H	RL 32H
	NSN 9150-99-870-1432	RL 32HB
	NSN 9150-01-443-9390 & NSN 9150-01-443-9396	RL 46H
	NSN 9150-01-435-1899, NSN 9150-01-410-8972 & NSN 9150-01-387-4469	RL 68H
VATANU-COOL	Orbital Vane Rotary (OVR)	RL 220H
YANTAI MOON	Reciprocating	RL 32H

This approvals list should be used as a guide only. CPI® Fluid Engineering recommends that users confirm with the original equipment manufacturer (OEM) which Emkarate® RL grade is qualified for use with a particular combination of compressor model, refrigerant and application. OEM's advice should always be taken. Only use approved lubricants.

Your source for competitive advantage and reliability in refrigeration lubricants



Emkarate is available in the following packaging options:

1Ltr can, 5Ltr can, 20Ltr pail, 200Ltr drum, 1000Ltr IBC & 22Te bulk tank

As well as Emkarate® RL lubricants being the world leader for HFC refrigeration and air conditioning, Emkarate® RL HB grades are specifically designed for R744 Carbon Dioxide refrigeration, Emkarate® RL2000 is a specialist automotive air conditioning lubricant, Emkarate® R717 is a hydrotreated mineral oil for Ammonia refrigeration and lower viscosity Emkarate® RL grades are suitable for light commercial hydrocarbon refrigeration.

This brochure covers only a few of the many possible lubricants for various applications. Please consult your OEM and CPI® for specific information on our complete product line as well as viscosity recommendations.

CPI® is a world leader in the synthetic lubricants industry with operations in North America, Europe, Africa and Asia Pacific regions. In addition to our Emkarate® RL lubricants, CPI® offers lubricants for any refrigeration application including domestic and automotive air conditioning, commercial and industrial refrigeration and low Global Warming Potential (GWP) refrigerants such as Carbon Dioxide, Hydrocarbons and Ammonia. CPI® also offers a comprehensive range of Industrial Lubricants for Process gas, Hydrocarbon gas, Air Compressors, Vacuum Pumps, Hydraulics, Gears, Chains, Turbine, Landfill Gas, Field Gas, Chemical Process and many NSF H1 & H2 Food Grade applications. CPI® is ISO 9001 and ISO 14001 accredited and earned the 1993 Stratospheric Ozone Protection Award from the Environmental Protection Agency. Also registered for the manufacture of Halal, Kosher and Pareve products.

Emkarate® RL lubricants are authorized under applicable Lubrizol patents covering the basic combination of chlorine free refrigerants with polyol ester type synthetic lubricants. The Emkarate® trademark and servicemark CPI® and the trademark Solest are registered in the United States and other countries.