

# Emkarate<sup>®</sup> RL Refrigeration Lubricants

High performance synthetic lubricants offering reliability and energy efficiency in billions of compressors worldwide

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## Engineered to Perform

The Emkarate® RL range are synthetic polyol esters (POE) lubricants formulated specifically for use in refrigeration and air-conditioning compressors using HFC refrigerants. These products provide effective wear protection for bearing surfaces, increased system life and improved efficiency, and are 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.

**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+	RL7H	RL10H	RL15H	RL22H	RL32H	RL46H	RL68H	RL100H	RL170H	RL220H
Viscosity @ 40°C (cSt)	ASTM D445	5.8	7.2	9.7	15.1	18.9	32.5	45.3	66.6	96.5	170	215
Viscosity @ 100°C (cSt)	ASTM D445	1.9	2.3	2.7	3.6	4.2	5.8	7.1	9.4	11.3	17.0	18.8
Viscosity Index	ASTM D2270	131	143	124	125	120	121	116	120	103	107	98
Pour Point (°C)	ASTM D97	-60	-51	-51	-50	-52	-46	-46	-39	-28	-25	-25
Density @ 20°C (g/ml)	ASTM D1298	0.926	0.918	0.949	0.978	0.995	0.977	0.977	0.977	0.969	0.968	0.975
Flash Point COC (°C)	ASTM D92	184	196	205	222	240	258	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	<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
<b>Emkarate® RL22H</b>	Y	Y	Y	Y		Y
<b>Emkarate® RL32H</b>	Y	Y	Y	Y		Y
<b>Emkarate® RL46H</b>	Y	Y	Y	Y	Y	Y
<b>Emkarate® RL68H</b>	Y	Y	Y	Y	Y	Y
<b>Emkarate® RL100H</b>			Y	Y	Y	Y
<b>Emkarate® RL170H</b>			Y	Y	Y	
<b>Emkarate® RL220H</b>			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.



## Retrofit Information Available

As CFC and HCFC refrigerants are phased out, you'll need to replace or retrofit your existing lubricant with a compatible alternative such as Emkarate® RL polyol ester lubricant. This is a critical step, and here's why: existing mineral oil lubricants are not miscible with HFCs. Even when the mineral oil lubricant has been drained from a system and replaced with a synthetic lubricant, such as Emkarate® RL lubricant, residual mineral oil may make up as much as 10 percent of the lubricant charge. This can severely affect the miscibility of the Emkarate® RL lubricant, which can lead to fouling or coating of the evaporator and can reduce the operating efficiency to unacceptable levels.

To prevent mineral oil contamination, it is essential that as much mineral oil as possible be removed from your system. CPI® has developed a retrofit procedure to assure proper removal.

This retrofit information is available from your CPI® representative.

In addition to our Emkarate® RL lubricants, CPI® offers lubricants for a variety of refrigeration applications, including domestic air conditioning and refrigeration, automotive, and "lower GWP" refrigerants.

Please consult CPI® for your specific application.

## CPI®: At the Forefront in Research and Product Technology

CPI® Fluid Engineering began developing synthetic lubricants for the industrial market in 1971. CPI® was the first producer of polyol ester lubricants developed specifically for environmentally safe refrigerants. In fact, CPI® was one of a group of companies that earned the 1993 Stratospheric Ozone Protection Award from the Environmental Protection Agency. CPI® is ISO 9001 and ISO/RC-14001 Certified.

CPI® is a global leader in the synthetic lubricant industry with operations in the Americas, Europe, Africa and the Asia Pacific region.

CPI® offers unique products backed by unparalleled services—including engineering consultation, comprehensive lubricant analysis, and specialty lubricant development. For hard-working products designed to perform, turn to CPI®.

## 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
	Screw	RL 220H
CARRIER CARLYLE	Reciprocating	RL 68H
CARRIER TRANSICOLD	Reciprocating (Marine Containers)	RL 22H
COPELAND	Reciprocating & Scroll	RL 32-3MAF, 32CF & 22CF
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
FRASCOLD	Reciprocating	RL 32H, 68H
	Screw	RL 170H
FRIGOPOL	Reciprocating (60-DLB-13 to 80-DLB-30)	RL 32H
GRASSO (GEA)	Reciprocating	RL 68H & 100H
HARTFORD	Reciprocating	RL 32H & 68H
HANBELL	Screw (RA, RB & V series)	RL 170H & 220H
HISPACOLD	Reciprocating	RL 68H
JIANGSU XUJEMEI	Reciprocating	RL 22H & 32H
LOCKHEED MARTIN	Oil can be used to service Lockheed owned compressors	RL 68H
McQUAY (J&E Hall)	Centrifugal	RL 32H
	Screw	RL 68H, 68HB, 100H & 220H
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
	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



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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® RL717 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 the Americas, 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 Hydrofluoro Olefins (HFOs), 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/RC-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.