KLÜBER LUBRICATION

your global specialist

Energy efficiency and reliability

thanks to refrigeration compressor oils from Klüber Lubrication

We share your goals

The main task of a compressor oil is to protect the compressor effectively and reliably against friction and wear. This is the only way refrigerating plants can deliver the performance that is crucial for your productivity. If the compressor fails due to inadequate lubrication, this can also have drastic consequences for the rest of the supply chain, right through to the consumer.

Refrigeration oils also have to meet increasingly demanding challenges: the compatibility of the lubricating oil with the refrigerant used is a particular issue due to the extreme temperature differences in the refrigeration cycle.

What's more, the adoption of the European F-Gas Regulation (EU Regulation 517/2014) for refrigeration system oils means that eco-friendly refrigerants are becoming even more important. In view of the ongoing public debate about GWP (Global Warming Potential) and ODP (Ozone Depletion Potential), natural refrigerants are experiencing a significant increase in market share. Klüber Lubrication's refrigeration compressor oil portfolio supports operators in transitioning to applications using natural refrigerants.

The refrigeration oils we develop and produce meet the challenges of lubricating refrigeration compressors even under extreme conditions. Their improved energy efficiency when using natural refrigerants such as ammonia, carbon dioxide and hydrocarbons is a major benefit. Our services make savings and energy consumption transparent in accordance with IPMVP (International Performance Measurement and Verification Protocol). They are also based on a TÜV-certified measurement methodology. This allows us to make an auditable and crucial contribution to significantly reducing the high proportion of energy consumption and associated costs attributable to refrigeration compressors.

Your benefits when using Klüber Summit refrigeration oils

- Longer oil change intervals due to low residue formation tendency, low change in viscosity, high thermal stability and lower evaporation losses
- Lower energy consumption due to lower friction coefficient with high base oil quality.
- Better oil separation thanks to the high chemical stability and high purity of our oils
- Fewer gas reactions
- Excellent compressor performance and efficiency
- Lower lubricant consumption
- Fewer filter obstructions
- Lower spare part costs
- Less maintenance effort

Product overview Klüber Summit refrigeration oils

Refrigerant	Refrigeration oil as defined in DIN 51503-1	Product	Art. No.	NSF	Application	Viscosity at 40 °C [mm²/s]	Oil base	Pour-point [°C]
Ammonia (R717)	KAA	Klüber Summit RHT 68 Klüber Summit RHT 100	050057 050159		Paraffin-based mineral oil specifically for am-monia refrigeration compressors	68 100	MIN	–39 –30
Ammonia (R717)	KAA	Klüber Summit RHT FG 68	050139	H1	Refrigeration oil specifically for ammonia refrigeration compres-sors in the food industry	68	MIN	–36
Ammonia (R717)	KAA	Klüber Summit RSB 68	050220		Semi-synthetic refrige-ration compressor oil for NH_3 refrigerating plants and heat pumps	68	PAO/ MIN	–46
Ammonia (R717) CO_2 (R744) Propane (R290)	KAA	Klüber Summit R 100 Klüber Summit R 150 Klüber Summit R 200 Klüber Summit R 300 Klüber Summit R 400	050040 050137 050041 050042 050210	H1	Synthetic compressor oils specifically for highly stressed ammonia and CO_2 refrigeration compressors	32 46 68 105 150	PAO	–60 –51 –51 –43 –39
CO_2 (R744)	KB	Klüber Summit RPE 744-85	050246		Synthetic compressor oil for CO_2 refrigeration compressors	85	POE	–43
Ammonia (R717)	KAA	Klüber Summit RAB 68	050046		Synthetic refrigeration oil with very good clea-ning and dissolving effect for ammonia refrigeration compressors Acts as a "seal swelling agent".	54	AB	–31
Ammonia (R717)	KAA	Klüber Summit RPA 68	050063		Synthetic refrigeration oil specifically for highly stressed ammonia refri-geration compressors	60	PAO/AB	–48
HFKW	KD	Klüber Summit RPE 32 Klüber Summit RPE 68 Klüber Summit RPE 170	050047 050049 050107		Synthetic refrigeration compressors for refrigerant based on FPM and HFPM	32 68 163	POE	–35 –33 –20
Ammonia (R717)	KAB	Klüber Summit RPS 52	050062	H1	Synthetic refrigeration oil based on PG for ammonia refrigeration systems with dry evaporation	52	PG	–34

MIN = mineral oil; PAO = polyalphaolefin oil; POE = polyolester; AB = alkylbenzene; PG = polyglycol oil

Qualified refrigeration oils for your ammonia refrigerating plant

Refrigerant			**Ammonia (R717)**		
Klüber Summit	**RHT series**	**RSB 68**	**PAO R series**	**RAB series**	**RPS 52**
Miscibility with NH_3	**Not miscible**	**Not miscible**	**Not miscible**	**Not miscible**	**Miscible**
Refrigeration oil as defined in DIN 51503-1	**KAA**	**KAA**	**KAA**	**KAA**	**KAB**
Low temperature fluidity	++	+++	++++	++	++++
Viscosity index	++	+++	++++	+	++++
Oxidation stability	+	+++	++++	++	+++
Miscibility with other mineral oils	++++	++++	++++	++++	Not miscible
Evaporation stability	++	+++	++++	-	+++
Chemical stability	++	+++	++++	+	+++
Compatibility with elastomers	+++	+++	++	++++	+

++++ extremely good, +++ very good, ++ good, + satisfactory, - poor

Oil change process

1. A used oil sample is taken for determination of the used oil condition. The following values must be analysed in order to determine any cleaning procedure that may be necessary: Infrared spectrum, Water content, TAN, XRF, Viscosity, Visual assessment

The oil circuit should be cleaned if the condition of the used oil warrants it.

For this purpose, drain 10 % of the current oil and fill Klüber Summit Varnasolv. After adding the product continue the production for two days. All circuits will be cleaned without any production loss. As an alternative, drain 20 % of the current oil fill and replace it with Klüber Summit RAB 68. While cleaning, monitor the differential pressure of the oil filter. The cleaning cycle is complete after approx. 80 to 100 operating hours.

4. Drain all of the oil.

5. Replace filter and add new Klüber oil.

6. Start the compressor and take the first oil sample after 10 to 50 operating hours. The oil analysis shows the success of the cleaning procedure and the reference values of the plant after the oil changeover.

7. Start Oil Condition Analysis supported by Klüber Lubrication: (1st analysis after 50 operating hours, the next after approx. 3,000 to 5,000 operating hours and thereafter depending on the oil condition)

Hint:
When changing from naphthene-based mineral oil to Klüber Summit R 200, it is advisable to renew shaft and O-ring seals or use Klüber Summit RPA 68!

Our services tailored to refrigeration compressors

Lubrication Condition Analysis (LuCA):
The oil and grease analysis service in our laboratories provides information about composition, impurities and wear, as well as oxidation and aging. This creates the basis for efficient maintenance processes and effective predictive maintenance in accordance with the principles of risk management and Total Productive Maintenance.

Accompanying continuous oil analyses (trends) contribute to operating safety. As a result, oil change intervals can be adapted to the oil's actual condition.

Energy efficiency:
What does the Klüber Energy Efficiency solution mean for refrigeration compressors?

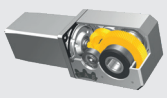
By switching to qualified Klüber Summit refrigeration oils, average **energy savings of between 2 and 5%*** can be achieved, depending on the system design.

Improving efficiency using our refrigeration oils

Klüber Energy Efficiency

Services for the optimal energy efficiency of your lubricant application. Reports on specific savings.	Energy consulting (tribo-system)	Energy measurement	Energy analysis	Reporting (energy and cost savings)

Energy consulting



– Evaluation of the plants and a report on potential energy savings

– Find out which of your plants has real potential for energy savings

Energy measurement

– Professional measurement of all relevant influencing factors before and after application optimisation

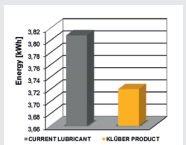
– Maximise efficiency during measurement to avoid repetition

Energy analysis

– Analysis of measurement data

– Complete transparency with regard to savings and energy consumption

Reporting



– Translation of the analysis results into relevant KPIs

– Comprehensible reporting of relevant KPIs: ROI, cost saving and energy consumption

* Based on the comparison of machine operation before and after implementation of a carefully selected Klüber lubricant under representative customer operating conditions. Energy savings were determined using Klüber's TÜV-certified methodology, based on ISO 50015 and IPMVP (EVO 10000-1:2022). Result derived from several hundred Klüber Energy Efficiency projects conducted at customer sites worldwide. Individual results may vary depending on equipment, operating conditions and application.

Internationally active and part of an industry network

Over more than nine decades, Klüber Lubrication has gained a wealth of experience in solutions for all kinds of tribological challenges. The group of companies operates internationally and supplies its high-quality products worldwide.

The development of innovative products that take specific customer requirements into account is very important to us. We do this in our own laboratories. Our refrigeration oils are classified according to DIN.

Our membership of national associations such as Deutscher Kälte- und Klimatechnischer Verein (DKV) (German Society of Refrigeration and Air Conditioning), Verband deutscher Kühlhäuser und Kühllogistiker (VDKL) (Association of German Cold Storage and Refrigeration Logistics Companies) and of the Research Council for Refrigeration Technology (FKT) gives us important insights into the topics and trends that are relevant to the industry.

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Klüber Lubrication München GmbH & Co. KG
Geisenhausenerstraße 7
81379 München
Germany

Local first-instance court Munich, Germany
Certificate of registration 46624

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Klüber Lubrication – your global specialist

Innovative tribological solutions are our passion. Through personal contact and consultation, we help our customers to be successful worldwide, in all industries and markets. With our ambitious technical concepts and experienced, competent staff we have been fulfilling increasingly demanding requirements by manufacturing efficient high-performance lubricants for more than 95 years.

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