



## Industrial Lubricants





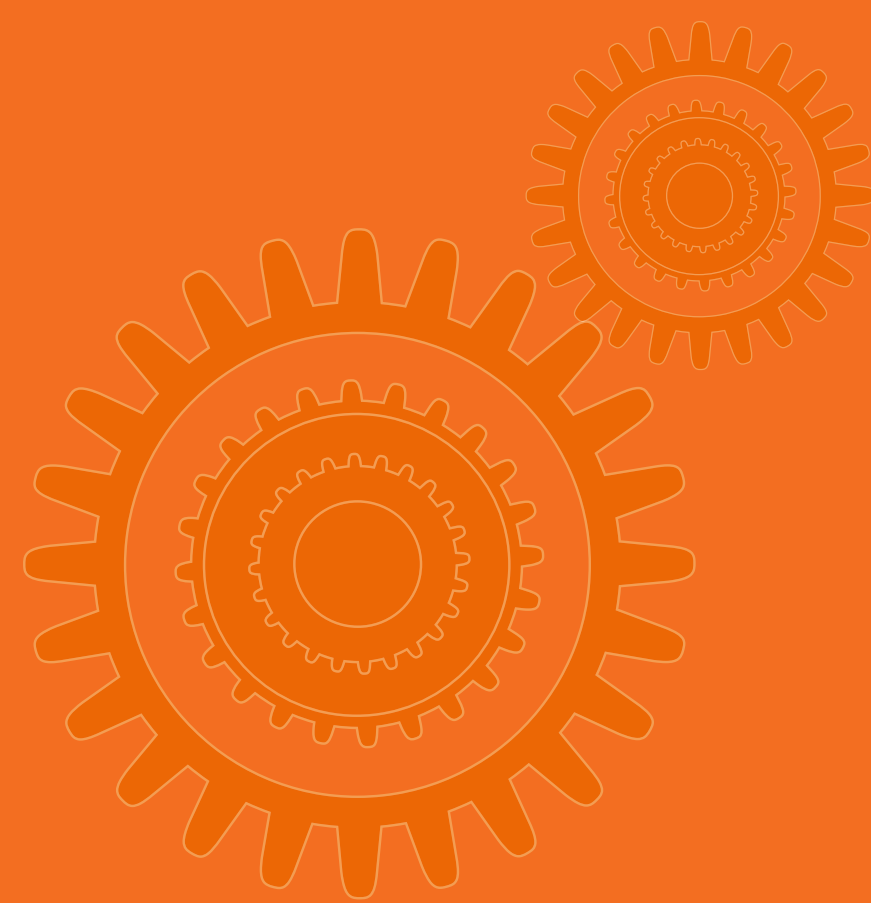
## PetroChina Lubricant Company

PetroChina Lubricant Company (The Company) is the exclusive professional lubricant company subordinated to CNPC. The Company integrates R&D, manufacturing, marketing, and service. It is the largest integrated supplier of lubricating oil and grease products in China.

The Company was established on December 19th, 2000. It then created and launched the lubricant brand, "KunLun". It has 8 production-marketing integrated companies in: Daqing, Dalian, Chengdu, Xinjiang, Xiamen, Shanghai, Liaohe, and Karamay. It has 8 marketing companies in: Beijing, Guangzhou, Lanzhou, Jinan, Wuhan, Xi'an, Nanjing, and Kunming. It has 2 specialized petrochemical companies, 2 production bases, and 2 R&D centers. With these companies, it has established a nationwide network that includes: R&D, production, and marketing. Meanwhile, The Company has also established several joint laboratories and joint scientific research & training bases for oil products together with: China FAW Group, Shanghai Jiaotong University (SJTU), and many other colleges and universities. Therefore, The Company has the ability to independently undertake national-grade practical research and development project of lubricating products under certain special requirements.

With the application of world-class automatic blending and production lines of lubricants, The Company has the ability to produce 20 major product categories, with more than 700 types of lubricants. These include lubricants such as: engine oil, gear oil, hydraulic oil, grease, metalworking fluids, marine lubricants, and lubricant additives. Automobile manufacturers and many OEM equipment manufacturers elect to use The Company's products because of the following: The Company's excellent process equipment, the recognitions from global standard organizations, European and American industrial associations, the technical certification from global manufacturers (Daimler Chrysler, Volkswagen, Benz, Volvo, MAN), and the professional accreditation from national manufacturers (China FAW Group, Shanghai Automotive Industry Corporation (SAIC), Dongfeng Motor (DFM), China National Heavy Duty Truck (CNHTC), Xuzhou Construction Machinery Group (XCMC), Longong Group, Baosteel Group). Because of its leading national products, The Company had been designated as the exclusive lubricant supplier in the National Day Military Parade and the Antarctic Science Expedition. With these grand accomplishments, The Company demonstrates that it has the technical and innovative capability to solve the toughest lubricating issues in the military field, power transmission & transformation, high-speed railway transportation, nuclear power, robotics, and many more.

PetroChina Lubricant Company has a lot planned for the future. It plans to achieve internationalization, advance overseas strategies, and seize the strategic opportunity of the "One Belt, One Road" initiative. It will strive to be the leading pioneer of "Made in China 2025" and "Internet Plus". It will also actively seek to establish long-term cooperative relationships with related industry leaders. Most importantly, PetroChina Lubricant Company will devote itself to become a world-class lubricant company.



# Contents

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01	KunLun HM Hydraulic Oil
02	KunLun HV Hydraulic Oil
03	KunLun Hydraulic Transmission Fluid
04	KunLun CKD Industrial Gear Oil
05	KunLun KG/S Fully Synthetic Industrial Gear Oil
06	KunLun Universal Compressor Oil
07	KunLun TSA Turbine Oil
08	KunLun QC 320 Heat Transfer Oil
09	KunLun DRE 68W Refrigerator Oil
10	KunLun L-DRA Refrigerator Oil



# KunLun HM Hydraulic Oil

KunLun HM Hydraulic Oil is a high quality hydraulic oil specially developed for use in many hydraulic systems and equipment. The oil is formulated from selected paraffinic base stock treated with anti-rust, antioxidant and anti-wear additives. The oil is available in a wide range of viscosities to suit all practical requirements.

## Performance Standards

KunLun HM Hydraulic Oil meets the following performance requirements:

- Cincinnati Milacron P-68, P-69 & P-70
- DENISON HF-2, HF-0
- DIN 51524 Part 2
- JCMAS P041 (HK)
- US Steel 126, 127
- Vickers M-2950-S (Mobile Equipment)
- Vickers I-286-S3 (Industrial Equipment)

- Provides excellent filterability and tolerance to contamination.
- Maintains working components in clean operational condition.
- Exhibits robust oxidation, rust and corrosion protection.
- Good anti-foam to prevent airlock and system failure.
- Prolongs useful service life of the oil and reduces maintenance cost.

## Applications

KunLun HM Hydraulic Oil is recommended for use in most hydrodynamic power transmission systems, hydraulic controls and hydrostatic systems. It is also suitable for use as heavy-duty lubricant for bearings, reduction units etc, where operating conditions require special anti-wear properties. It is also suitable for use as circulating oil in general bearing lubrication.

## Benefits

KunLun HM Hydraulic Oil provides the following benefits:

- Minimizes sludge and deposit formation.
- Performs excellent wear protection.
- Passes wet and dry Denison T6C pump test.

## Typical Characteristics

KunLun HM Hydraulic Oil					
ISO VG	32	46	68	100	150
Kinematic Viscosity					
40°C, mm²/s	32.8	47.6	69.6	100.0	148.1
100°C, mm²/s	5.6	7.1	8.9	11.4	14.5
Viscosity Index	106	105	103	100	96
Specific Density,15°C,g/cm³	0.870	0.876	0.883	0.887	0.893
Flash Point, COC,°C	215	220	225	230	240
Pour Point,°C	-24	-24	-21	-12	-12

# KunLun HV Hydraulic Oil

KunLun HV Hydraulic Oil is a high quality anti-wear hydraulic fluid specially formulated with shear stable viscosity index improver to impart superior viscosity-temp characteristics. Developed for use in most types of hydraulic equipment operating in wide temperature conditions. The oil is available in a wide range of viscosities to suit most practical requirements.

## Performance Standards

KunLun HV Hydraulic Oil meets the following performance requirements:

- Cincinnati Milacron P-68, P-69 & P-70
- DENISON HF-2, HF-0
- DIN 51524 Part 3
- JCMAS P041 (HK)
- US Steel 126, 127
- Vickers M-2950-S (Mobile Equipment)
- Vickers I-286-S3 (Industrial Equipment)

## Benefits

KunLun HV Hydraulic Oil provides the following benefits:

- Maintains good lubricity over a wide temperature operating range by maintaining fluid viscosity even under severe conditions.
- Provides good anti-wear properties.
- Minimizes sludge and deposit formation.
- Prevents rust and corrosion in hydraulic system.
- Provides good anti-foam features to prevent airlock and operation irregularities of system.
- Prolongs useful service life of the oil and reduces maintenance cost.

## Applications

KunLun HV Hydraulic Oil is recommended for use in hydraulic systems operating under wide climatic temperature variation. It is especially suitable for marine hydraulic power-pack systems.

## Typical Characteristics

KunLun HV Hydraulic Oil					
ISO VG	15	32	46	68	100
Kinematic Viscosity					
40°C, mm²/s	16	31.9	47.7	68.7	97.1
100°C, mm²/s	4.0	6.5	8.3	11.5	14.3
Viscosity Index	156	162	150	165	152
Specific Gravity, 15°C,g/cm³	0.838	0.854	0.864	0.878	0.876
Flash Point, COC,°C	150	210	220	225	230
Pour Point,°C	-39	-39	-36	-36	-31



# KunLun Hydraulic Transmission Fluid

KunLun Hydraulic Transmission Fluid is a transmission and drivetrain oil formulated to meet Caterpillar TO-4 requirements.

## Performance Standards

KunLun Hydraulic Transmission Fluid meets the following performance requirements:

- API CF, CF-2
- Allison C-4
- Caterpillar TO-4
- Eaton Fuller
- Komatsu KES 07.868.1
- ZF TE-ML 03C, 07F

## Benefits

KunLun Hydraulic Transmission Fluid provides the following benefits:

- Provides excellent friction control.
- Exhibits less brake noise.
- Reduces gear wear.
- Exhibits good elastomer compatibility.
- Provides excellent oxidation stability.
- Prolongs the life of brakes and transmissions.

## Applications

- KunLun Hydraulic Transmission Fluid is recommended for hydraulic transmission of heavy trucks, buses, and earth moving vehicles.
- KunLun Hydraulic Transmission Fluid may also be used in transmissions where fluid meeting the performance level of ZF or Eaton Fuller is required.

## Typical Characteristics

KunLun Hydraulic Transmission Fluid				
Grade, SAE	10W	30	50	60
Kinematic Viscosity				
40°C, mm²/s	41.2	85.0	195.6	294.3
100°C, mm²/s	6.7	10.7	17.9	23.22
Viscosity Index	118	102	100	98
Specific Gravity, 15°C,g/cm³	0.871	0.887	0.899	0.903
Flash Point,°C	210	230	235	240
Pour Point,°C	-30	-18	-15	-12

# KunLun CKD Industrial Gear Oil

KunLun CKD Industrial Gear Oil is a mild extreme pressure gear lubricant formulated from high quality base oils and sulphur-phosphorous extreme pressure additives.

## Performance Standards

KunLun CKD Industrial Gear Oil meets the following performance requirements:

- US Steel 224
- David Brown S1.53.101(E)
- AGMA 9005-E02
- DIN 51517 Part 3

## Benefits

KunLun CKD Industrial Gear Oil provides the following benefits:

- Exhibits very good anti-wear and EP properties.
- Passes FZG stage 12.
- Gives good thermal and oxidation stability.
- Exhibits non corrosive to steel, cast iron, copper and bronze.
- Provides superior antirust properties.
- Maintains excellent demulsibility.

## Applications

KunLun CKD Industrial Gear Oil is recommended for splash or pressure circulation lubrication of most types of enclosed gears, especially where operating conditions involve heavy loads, high speeds and high relative sliding velocities at elevated ambient and operating temperatures. It is also suitable for lubrication of other heavily loaded parts and components such as transmission couplings and plain bearings.

## Typical Characteristics

KunLun CKD Industrial Gear Oil							
ISO VG	68	100	150	220	320	460	680
Kinematic Viscosity							
40°C, mm²/s	69.4	99.2	150.0	228.3	314.6	450.7	674.9
100°C, mm²/s	9.0	11.3	14.8	19.1	23.9	30.4	39.9
Viscosity Index	103	98	98	95	96	97	98
Specific Gravity, 15°C ,g/cm³	0.884	0.890	0.893	0.897	0.898	0.901	0.901
Flash Point, COC,°C	220	225	230	230	235	240	240
Pour Point,°C	-12	-12	-12	-12	-9	-9	-6

# KunLun KG/S Fully Synthetic Industrial Gear Oil

KunLun KG/S Fully Synthetic Industrial Gear Oil is an excellent quality extreme pressure gear lubricant manufactured from the polyalphaolefine family. It is specially designed for use under severe conditions such as extremely high or low temperatures. It has excellent antiwear properties, which is exemplified by the stage 12 FZG results. The most advanced additive system is selected to provide superior oxidative and thermal stability.

## Performance Standards

KunLun KG/S Fully Synthetic Industrial Gear Oil meets the following performance requirements:

- US Steel 224
- AGMA 9005-E02
- David Brown S1.53.101
- DIN 51517 Part 3

## Benefits

KunLun KG/S Fully Synthetic Industrial Gear Oil provides the following benefits:

- Excellent antiwear and EP properties to protect gears against scuffing and wear.
- Exceptional load-carrying capability.
- Superior thermal and oxidation stability.
- Superior rust and corrosion inhibition.
- Impressive water-separating characteristics.

## Applications

KunLun KG/S Fully Synthetic Industrial Gear Oil is recommended for all types of enclosed gearboxes, especially those operating at extreme temperatures, or under severe service conditions, such as heavily loaded plain or rolling element bearings.

## Typical Characteristics

KunLun KG/S Fully Synthetic Industrial Gear Oil							
ISO VG	68	100	150	220	320	460	680
Viscosity, Kinematic							
at 40°C, cSt	69.9	99.5	147.9	222.3	320.5	453.9	681
at 100°C, cSt	11.6	15.5	20.6	28.1	37.3	47.8	62.1
Viscosity Index	161	166	163	164	165	164	158
Flash Point, COC,°C	222	226	240	255	254	255	258
Pour Point,°C	-45	-45	-45	-42	-42	-39	-33
Specific Gravity, g/cm³ (15°C)	0.850	0.852	0.855	0.861	0.860	0.872	0.871

# KunLun Universal Compressor Oil

KunLun Universal Compressor Oil is a premium quality air compressor oil formulated from high quality base oils, high temperature antioxidant, anti-rust, anti-wear and anti-foam additives.

## Performance Standards

KunLun Universal Compressor Oil meets the following performance requirements:

DIN 51506 Class VDL

## Benefits

KunLun Universal Compressor Oil provides the following benefits:

- Resists carbon formation on delivery valves and piston rings.
- Protects against rust.
- Provides good anti-wear property.
- Provides good oxidation stability.
- Resists the formation of sludge.

## Applications

KunLun Universal Compressor Oil is recommended for lubrication of reciprocating, rotary screw slide vane air compressors where the air delivery temperatures are high (200°C or more).

## Typical Characteristics

KunLun Universal Compressor Oil					
ISO VG	32	46	68	100	150
Kinematic Viscosity					
40°C, mm²/s	32.6	45.9	66.8	101.4	149.8
100°C, mm²/s	5.7	7.3	8.7	11.3	14.6
Viscosity Index	114	104	104	98	96
Specific Gravity, 15°C,g/cm³	0.858	0.866	0.871	0.880	0.886
Flash Point, COC,°C	205	228	220	228	235
Pour Point,°C	-15	-18	-21	-21	-15

# KunLun TSA Turbine Oil

KunLun TSA Turbine Oil is a premium industrial turbine oil formulated from highly refined base stock with highly effective rust, oxidation, zinc-less ashless anti-wear / extreme pressure agent and foam inhibitors.

## Performance Standards

KunLun TSA Turbine Oil meets the following performance requirements:

- DIN 51515 Part 1
- DIN 51524 Part 1
- U.S. Military MIL-H-17672D
- Cincinnati Milacron P-38, P-54, P-55, P-57
- Denison HF-1
- GE GEK-32568
- Solar Turbines ES9-224

## Benefits

KunLun TSA Turbine Oil provides the following benefits:

- Resists oil oxidation and formation of sludge and deposits.
- Provides effective rust and corrosion protection.
- Exhibits very good anti-foam and air release properties that prevent erratic system operations.
- Maintains good demulsibility properties that separate entrained water quickly and prevent formation of emulsions.
- Reduces sludge formation.

KunLun TSA Turbine Oil is recommended for lubrication of steam, water, gas turbines that demand for excellent rust, oxidation control and filterability. These features contribute to longer fluid life and reduced system maintenance.

It is also recommended for general bearing lubrication for industrial machineries such as turbo-blowers and air compressors etc.

## Typical Characteristics

KunLun TSA Turbine Oil				
ISO VG	32	46	68	100
Kinematic Viscosity				
40°C, mm²/s	32.6	47.1	67.7	100.1
100°C, mm²/s	5.7	7.0	8.8	11.6
Viscosity Index	110	108	103	104
Specific Gravity, 15°C,g/cm³	0.857	0.864	0.872	0.878
Flash Point, COC,°C	220	224	222	224
Pour Point,°C	-33	-15	-18	-15

# Kunlun QC 320 Heat Transfer Oil

KunLun QC 320 Heat Transfer Oil is formulated from selected paraffinic base stocks used for heat transfer systems. It has excellent oxidation and thermal stability and is able to withstand decomposition.

## Performance Standards

KunLun QC 320 Heat Transfer Oil provides the following benefits:

- Resists to high-temperature degradation.
- Prevents deposit and sludge formation.
- Prevents deposit and sludge formation during operation starts.
- Maintains good demulsibility and air-separation performance.
- Prevents the formation of steam and air bubbles at the hottest points.
- Exhibits good oxidation resistance and high temperature stability.

## Applications

KunLun QC 320 Heat Transfer Oil is recommended for all 'open' or 'closed' system with:

- Maximum operating temperature for open systems is 200°C.
- Maximum operating temperature for closed systems (sealed with cold oil or inert gas) is 320°C.

## Caution

When starting-up a new unit or restarting an existing unit after maintenance, and also in the case of irregular operation at normal temperature caused by residual moisture in the oil, the temperature of the unit should be reduced to around 100°C and all the steam blown off before returning to the normal working temperature.

## Typical Characteristics

Kunlun QC 320 Heat Transfer Oil	
Kinematic Viscosity	
40°C, mm²/s	43.9
100°C, mm²/s	6.8
Viscosity index	98
Specific Gravity, 15°C,g/cm³	0.850
Flash Point, COC,°C	225
Pour Point,°C	-9



# KunLun DRE 68W Refrigerator Oil

KunLun DRE 68W Refrigerator Oil is a premium grade refrigeration compressor oil made from specially selected naphthenic wax-free base oils.

## Benefits

- KunLun DRE 68W Refrigerator Oil has the following performance characteristics and benefits:
- Very low pour and flow points with good high temperature performance.
  - Compatible with most commonly used refrigerants.
  - Low carbon residue.
  - Good chemical and thermal stability.
  - Low moisture content and high dielectric strength.
  - Resist foaming.
  - Compatible with seal materials.

## Applications

KunLun DRE 68W Refrigerator Oil is recommended for use in refrigeration and air-conditioning compressors of both reciprocating and rotary types. It is suitable for use with R12 and R22 refrigerant.

## Typical Characteristics

KunLun DRE 68W Refrigerator Oil	
ISO VG	68
Kinematic Viscosity	
40°C, mm²/s	62.5
100°C, mm²/s	7.0
Viscosity Index	53
Flash Point, COC,°C	173
Pour Point,°C	-30
Specific Gravity, 15°C,g/cm³	0.905

# KunLun L-DRA Refrigerator Oil

High temperature hydro-treated naphthenic base oils of lower pour point intended for use in compression refrigeration systems containing non-hydroflurocarbon refrigerants such as R12, R22, R502 and ammonia.

## Benefits

- KunLun L-DRA Refrigerator Oil has the following performance characteristics and benefits:
- Excellent thermal and chemical stability for long service life to reduce oil thickening and deposit formation.
  - Low waxing tendency for good low temperature performance.
  - Excellent lubricity against wear of compressor parts.
  - Low moisture content as received.

## Applications

- Reciprocating and rotary refrigeration compressor systems.
- Ammonia refrigeration compressors where operating conditions are moderate and economical oils are desired.

## Typical Characteristics

KunLun L-DRA Refrigerator Oil				
ISO VG	32	46	68	100
Kinematic Viscosity, cSt @ 40°C	32	46	68	100
Flash Point,COC,°C	170	185	195	205
Pour Point,°C	-33	-30	-27	-21
Copper Corrosion ,100°C x 3h	1a	1a	1a	1a
Neutralisation Number, mg/KOH g	<0.04	<0.04	<0.04	<0.04

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