



Aerospace Technology within Your Reach

SINOPEC



SINOPEC Marine Lubricant Handbook



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PREFACE

Sinopec Lubricant Co., Ltd in step with the international marine diesel engine maker and shipping industry development, developed series of marine trunk piston engine oil, marine cylinder oil and marine system oil suitable for the ship. Follows the scientific research development procedure, these products passed engine rig test and field test, and got the approval by famous diesel engine manufactures e.g. MAN, WARTSILA, MHI-MME, MAK, DAIHATSU and YANMAR etc..

Sinopec Lubricant Co., Ltd is able to provide all kinds of lubricants for marine auxiliary machines. These products mainly include gear oil, hydraulic oils, turbine oils, air compressor oils, refrigerator compressor oils, greases and heat transfer oils etc..Sinopec Lubricant Co., Ltd can provide complete lubrication project for every kind of ships.

Sinopec Lubricant Co., Ltd has four Research Institute, has set up special used oil analysis system, established Global Marine Lubricants Testing &Service Center. Not only could provide the lubrication product for the ships, but also provide the comprehensive lubrication service for ship owners, depend upon the analysis and research ability.

With the domestic and foreign ship owners' trust and support, Sinopec Lubricant Co., Ltd will make SINOPEC (Great Wall) Lubricant to be world famous brand.



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A large, stylized blue letter 'B' is the central focus of the header. It is partially overlaid by a vertical light blue bar on the left and a horizontal light blue bar with multiple thin lines at the bottom. The background features a faint, light blue image of a mountain range.

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BRIEF INTRODUCTION

Sinopec Lubricant Co.,Ltd. is the largest high-tier lubricant manufacturer and marketer in China with a production capacity of over 1.46million tons of packaged lubricants per year. With 5 regional sales center across China, many more sales subsidiaries all over the world, 11 lube oil & grease blending and manufacturing branches domestic and 1 branch company in Singapore, as well as two independent Research Institute in Beijing and Shanghai, It integrates the function of lubricant manufacturing, research, storage, transportation, sales and service.

Equipped with world-class automatic blending and packaging production line, Sinopec Lubricant Co.,Ltd. provide over 700 kinds of lube oils and greases in all 20 categories including crankcase oil, industrial gear oil, hydraulic oil, greases, anti-coolant, brake fluid, metal working fluid, marine oil and additives, etc., which are widely used in the fields of aviation, space flight, automobile, machinery, metallurgy, mining, petrochemical engineering, electronics, etc. As one of China Aviation Partners, Sinopec Lubricant Co., Ltd. is devoted to providing lubrication service for Shenzhou series manned space flight and Chang'e series lunar probe satellite, making great contributions to the development of China aviation and space flight causes.

With high-quality raw material and high-tech formulations evaluated by strict engine and bench tests, our products fully meet national standards, as well as other requirements of special specification standards of ISO, API, etc. With stable product quality, the company has completed ISO16949 and HSE management system certification.R&D institutes in Beijing, Shanghai and Chongqing all have "National Laboratory" certificates, and can undertake application research projects of both national



and ministerial level, independently formulating various lubricant products to meet special market requirements under the technological support of RIPP (Research Institute of Petroleum processing). Some products have got technology certificates from world famous automobile manufacturers, such as Daimler-Chrysler, VW, Mercedes-Bens, Volvo, and MAN and became the first lubricant option of some large-scale group Corporations including FAW-VW, Dongfeng Motor Corp., Shanghai GM, Shanghai VW, Chery, Baosteel Group Corp., etc. Besides, Sinopec has established its Automobile Industry Technology Center with Sinopec Lubricant Co., Ltd. as the core to serve as the platform for cooperation with the automobile industry.

In the process of development, Sinopec Lubricant Co., Ltd. has gradually nurtured its unique brand culture and strategy on international development. Insisting in building a high-tech, high-quality, international brand image, Sinopec lubricants have entered into more than 50 countries and regions such as Australia, New Zealand, Malaysia, etc. Service network of marine oil have been set up in Singapore, The Emirates, South Africa and ready to expand to Europe and America. July 2013, Singapore Lubricants & Grease production base was Officially put into operation. In 2013, the brand value of "Great wall Lubricant" boosted 23.28 billion RMB, ranked 52ed in China's most valuable brand list in 2013 and 1st in Chinese lubricant Industry.

Devoted to development of Chinese lubricant causes, Sinopec Lubricant Co., Ltd. has actively participated in international competition and made efforts in seeking long-term cooperation relationship with relative industries to achieve mutual development.

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Marine Engine Oil 1-13



Marine Cylinder Oil 50100

SINOPEC marine cylinder oil 50100 is blended by high-quality base oil and super performance additives. This unique formulation has been specifically developed for latest electronic injection engines, and especially it is suitable for the 2 stroke engine which is long stroke or under the operation of low speed sailing. It meets the requirement of the latest MAN two stroke engine.

Advantages

- ⊙ Excellent neutrality can protect the engine from the cold corrosion caused by long stroke or under load.
- ⊙ Excellent viscosity-temperature behavior meets the requirements of latest generation engine designs operating at higher-pressure and higher-temperature.
- ⊙ Excellent anti-wear performance reduces the friction and wear-off of metallic components and extends the life of engine parts.
- ⊙ Excellent detergency and dispersancy prevent carbon deposits on cylinder ring groove and cylinder liner and ensure the cleanness of engine combustion chamber.
- ⊙ Good diffusivity performance drives oil quickly reaching and spreading out over the cylinder surface to form oil films to reduced liner and ring wear-off.
- ⊙ Excellent overall performance reduces the cylinder oil consumption.
- ⊙ It can restrain the low temperature corrosion caused by low speed sailing.

Approval Information

- ⊙ It is approved by MAN and MHI-MME.

Applications

- ⊙ Fit for lubrication of marine low speed two stroke crosshead diesel engine cylinders using fuel oil with sulfur content more than 1.5%. It is the best choice of cylinder oil for the Mark 8 and newer engine of MAN. Especially it is suitable for the under load engine whose actual power is less than 60% of the rated power.

Typical Properties

Items	Marine Cylinder Oil 50100
SAE Grade	50
Viscosity@100°C, mm ² /s	19.99
Viscosity Index	98
Flash Point (COC), °C	258
Pour Point, °C	-15
TBN, mgKOH/g	100.0



Marine Cylinder Oil 5080S

SINOPEC marine cylinder oil 5080S is blended by high-quality base oil and super performance additives. It is developed for new electronic injection engine and it meets the requirement of cylinder which is long stroke or under load.

Advantages

- ⊙ Excellent viscosity-temperature behavior meets the requirements of latest generation engine designs operating at higher-pressure and higher-temperature.
- ⊙ Excellent neutrality can neutralize the acid caused by the combustion of fuel to protect the engine from acid corrosion.
- ⊙ Excellent anti-wear performance reduces the friction and wear-off of metallic components and extends the life of engine parts.
- ⊙ Outstanding detergency and dispersancy prevent carbon deposits on cylinder ring groove and cylinder liner and ensure the cleanness of engine combustion chamber.
- ⊙ Good diffusivity performance drives oil quickly reaching and spreading out over the cylinder surface to form oil films to reduced liner and ring wear-off.
- ⊙ Excellent overall performance provides the cylinder of the marine engine with comprehensive protection.

Approval Information

- ⊙ It is approved by Wartsila.

Applications

- ⊙ Fit for lubrication of marine low speed two stroke crosshead diesel engine cylinders using fuel oil with sulfur content more than 1.5%. It is not recommended for the Mark 8 and newer engine of MAN.

Typical Properties

Items	Marine Cylinder Oil 5080S
SAE Grade	50
Viscosity@100°C, mm ² /s	18.63
Viscosity Index	96
Flash Point (COC) , °C	252
Pour Point, °C	-15
TBN, mgKOH/g	80.8

Marine Cylinder Oil 5070S

SINOPEC marine cylinder oil 5070S is blended by refined paraffin base oil and super performance additives. It is developed for new electronic injection engine.

Advantages

- ⊙ Excellent viscosity-temperature behavior meets the requirements of engines operating at higher-pressure and higher-temperature.
- ⊙ Outstanding neutrality can neutralize the acid caused by the combustion of fuel to protect the engine from acid corrosion.
- ⊙ Outstanding anti-wear performance reduces the friction and wear-off of metallic components and extends the life of engine parts.
- ⊙ Outstanding detergency and dispersancy prevent carbon deposits on cylinder ring groove and cylinder liner and ensure the cleanness of engine combustion chamber.
- ⊙ Good diffusivity performance drives oil quickly reaching and spreading out over the cylinder surface to form oil films to reduced liner and ring wear-off.
- ⊙ Outstanding overall performance provides the cylinder of the marine engine with comprehensive protection.

Approval Information

- ⊙ It is approved by MAN, Wartsila and MHI-MME.

Applications

- ⊙ Fit for lubrication of marine low speed two stroke crosshead diesel engine cylinders using fuel oil with sulfur content more than 1.5%. It is not recommended for the Mark 8 and newer engine of MAN.

Typical Properties

Items	Marine Cylinder Oil 5070S
SAE Grade	50
Viscosity@100°C, mm ² /s	19.00
Viscosity Index	98
Flash Point (COC), °C	268
Pour Point, °C	-18
TBN, mgKOH/g	70.2



Marine Cylinder Oil 5040

SINOPEC marine cylinder oil 5040 is blended by refined paraffin base oil and super performance additives.

Advantages

- ⊙ Good neutrality can neutralize the acid caused by the combustion of fuel to protect the engine from acid corrosion.
- ⊙ Good anti-wear performance reduces the friction and wear-off of metallic components and extends the life of engine parts.
- ⊙ Good detergency and dispersancy prevent carbon deposits on cylinder ring groove and cylinder liner and ensure the cleanness of engine combustion chamber.
- ⊙ Good diffusivity performance drives oil quickly reaching and spreading out over the cylinder surface to form oil films to reduced liner and ring wear-off.
- ⊙ The ash content is lower than 70 BN cylinder oil and it reduces the wear and tear caused by Calcium Carbonate after combustion.

Approval Information

- ⊙ It is approved by MAN and Wartsila.

Applications

- ⊙ Fit for lubrication of marine low speed two stroke crosshead diesel engine cylinders using fuel oil with sulfur content between 0.5% and 1.5%.

Typical Properties

Items	Marine Cylinder Oil 5040
SAE Grade	50
TBN, mgKOH/g	40.1
Viscosity@100°C, mm ² /s	18.61
Viscosity Index	97
Flash Point (COC), °C	274
Pour Point, °C	-15

Marine Cylinder Oil 5025

SINOPEC marine cylinder oil 5025 is blended by high-quality base oil and super performance additives. This unique formulation has been specifically developed for sulfur emission control areas (SECAs) from 1th January 2015, It is approved by MAN and Wartsila.

Advantages

- ⊙ Excellent viscosity-temperature behavior meets the requirements of latest generation engine designs operating at higher-pressure and higher-temperature.
- ⊙ Excellent anti-wear performance reduces the friction and wear-off of metallic components and extends the life of engine parts.
- ⊙ Outstanding detergency and dispersancy prevent carbon deposits on cylinder ring groove and cylinder liner and ensure the cleanness of engine combustion chamber.
- ⊙ Good diffusivity performance drives oil quickly reaching and spreading out over the cylinder surface to form oil films to reduced liner and ring wear-off.

Approval Information

- ⊙ It is approved by MAN, Wartsila and MHI-MME.

Applications

- ⊙ Fit for lubrication of marine low speed two stroke crosshead diesel engine cylinders using fuel oil with sulfur content less than 0.5% including new type fuels (e.g., LNG or LPG, etc.).

Typical Properties

Items	Marine Cylinder Oil 5025
SAE Grade	50
Viscosity@100°C, mm ² /s	19.12
Viscosity Index	99
Flash Point (COC), °C	272
Pour Point, °C	-15
TBN, mgKOH/g	25.9



Marine System Oil 3005

SINOPEC marine system oil 3005 is blended by high-quality base oil and super performance additives. It is developed for the new generation of electronic injection engine and it meets the extreme pressure requirement of servo hydraulic system.

Advantages

- ⊙ Outstanding extreme pressure anti-wear performance. It completely meets the requirement of servo hydraulic system. The failure stage of load carrying capacity (FZG) is more than 11.
- ⊙ It can protect the gear of camshaft and piston inner channel. Especially it is suitable for new generation of electronic injection engine.
- ⊙ Good detergency and dispersancy can suspend the greasy filth of crankcase and carbon deposits in the oil to prevent them assembling and precipitating on the surface or tube. It keeps the engine clean and the oil tube fluent.
- ⊙ Excellent anti-corrosion performance. It can prevent the bearing and the bearing bush from corrosion to protect the engine. It can extend the life of engine parts and reduce the expense of maintenance.
- ⊙ Good anti-emulsification and water diversion performance make the oil be purified easily to keep the stability of oil.
- ⊙ Good economic efficiency. Its viscosity is lower than Marine System Oil 4008 and it can reduce the loss of rub. It is suitable for the new built vessel.

Approval Information

- ⊙ It is approved by MAN, Wartsila and MHI-MME.
- ⊙ It is approved by Stern Tube Manufacturer KEMEL.

Applications

- ⊙ It is suitable for the 2 stroke low speed engine such as the X, RT-flex, RTA engine of Wartsila, ME, MC engine of MAN and all engines of MHI-MME.
- ⊙ It is also suitable for the stern tube, intermediate shaft and other auxiliary equipment.

Typical Properties

Items	Marine System Oil 3005
Viscosity Grade	30
TBN, mgKOH/g	5.68
Viscosity@100°C, mm ² /s	10.59
Viscosity Index	98
Flash Point (COC), °C	266
Pour Point, °C	-18
FZG	11

Marine Trunk Piston Engine Oil 3030/4030/4040

SINOPEC marine trunk piston engine oil 3030/4030/4040 are prepared from paraffinic mineral base stock by blending with selected multiple additives of superior performance. The product is designed and formulated for lubrication in marine medium-speed diesel engine which used high sulfur content fuel. Especially suitable for the working temperature and pressure increased.

Advantages

- ⊙ Excellent anti-wear performance reducing the friction and wear-off of metallic components and extends the life of engine parts efficiently.
- ⊙ Excellent neutralization ability to neutralize the acid products caused by the combustion of fuel efficiently.
- ⊙ Excellent detergency and dispersancy to remove asphaltene and keep cleanliness of oil ring and bottom of piston crown. Extending oil changing period significantly.
- ⊙ Good anti-oxidation ability and thermal stability. Effectively inhibit the formation of oxidation products and keep the engine parts cleanliness and provide good corrosion and antirust effect for engines.
- ⊙ Meet API CF specification.

Approval Information

- ⊙ Related products have been approved by WÄRTSILÄ, MAN, MAK, DAIHATSU and YANMAR.
- ⊙ SINOPEC marine trunk piston engine oil 4030/4040 obtained the approval from KEMEL, a noted stern tube manufacture.

Applications

- ⊙ SINOPEC marine trunk piston engine oil 3030/4030/4040 is suitable for lubrication in marine medium-speed trunk piston diesel engine or diesel fueled generator sets burning high sulfur content fuel.
- ⊙ Among them, 4040 is suitable for engine which used fuel with sulfur content no more than 3.5%; 3030/4030 is suitable for engine which used fuel with sulfur content no more than 3.0%.
- ⊙ The products are also suitable for lubrication of auxiliary equipment (e.g. stern tube etc..)

Typical Properties

Items	TPEO3030	TPEO4030	TPEO4040
SAE Grade	30	40	40
TBN, mgKOH/g	29.4	30.3	40.1
Viscosity@100°C, mm ² /s	10.37	13.56	14.35
Viscosity Index	100	99	98
Flash Point (COC), °C	244	256	246
Pour Point, °C	-15	-15	-12



Marine Trunk Piston Engine Oil 3012/4012

SINOPEC marine trunk piston engine oil 3012/4012 are prepared from paraffinic mineral base stock by blending with selected multiple additives of superior performance. The product is designed and formulated for lubrication in marine four-stroke medium-speed trunk piston diesel engine which used low sulfur content fuel and shows good economic efficiency.

Advantages

- ⊙ Outstanding anti-wear performance reducing the friction and wear-off of metallic components and extends the life of engine parts efficiently.
- ⊙ Excellent detergency and dispersancy to remove asphaltene and keep cleanliness of oil ring and bottom of piston crown. Extending oil changing period significantly.
- ⊙ Excellent anti-oxidation ability and thermal stability. Effectively inhibit the formation of oxidation products and keep the engine parts cleanliness and provide good corrosion and antirust effect for engines.
- ⊙ Meet API CF specification.

Approval Information

- ⊙ Related products have approved by MAK,DAIHATSU and YANMAR.

Applications

- ⊙ TPEO 3012 and 4012 are suitable for lubrication in marine four-stroke medium-speed trunk piston diesel engine or stationary diesel fueled generator sets burning fuels with sulfur content around 0.5%.
- ⊙ The products are also suitable for lubrication of auxiliary equipment, e.g. stern tube etc..

Typical Properties

Items	TPEO3012	TPEO4012
SAE Grade	30	40
Viscosity@100°C, mm ² /s	10.15	14.94
Viscosity Index	99	99
Flash Point (COC), °C	256	268
Pour Point, °C	-18	-15
TBN, mgKOH/g	13.4	14

LNG Dual Fuel Marine Engine Oil

SINOPEC LNG dual fuel marine engine oil is prepared from an excellent mineral base stock by blending with additives of superior performance. It meets the hard situation of LNG dual fuel marine engine. It is designed for LNG/diesel dual fuel four-stroke marine high-speed diesel engine specifically.

Advantages

- ⊙ Low ash content to be benefit of protecting valves from wear.
- ⊙ Outstanding detergency and dispersancy to prevent oil sludge and sediment, thus keep the engine in clean state.
- ⊙ Excellent anti-oxidation ability and thermal stability to reduce the generation of oxides and extend the life of use.
- ⊙ Excellent anti-wear performance to reduce the friction and wear-off of metallic components and extend the engine life.
- ⊙ Specifically it is designed for LNG Dual Fuel diesel engine to meet its special requirements.

Applications

- ⊙ Cylinder and crankcase lubrication of four-stroke marine high-speed engine using diesel fuel and LNG.

Typical Properties

Items	LNG Dual Fuel Marine Engine Oil
SAE Grade	15W-40
Viscosity@100°C, mm ² /s	14.41
Viscosity Index	143
Flash Point (COC), °C	229
Pour Point, °C	-27
TBN, mgKOH/g	10.6
Ash Content (W/W), %	1.18



CI-4 Diesel Engine Oil

SINOPEC CI-4 diesel engine oil is a high-performance diesel engine oil. Manufactured from high-quality base stock by blending with selected multiple additives of superior performance. The product provides outstanding lubrication for high-speed four-stroke diesel engines under severe operating conditions.

Advantages

- ⊙ Outstanding detergency and dispersancy to prevent carbon deposit.
- ⊙ Excellent anti-oxidation ability and thermal stability to reduce the generation of oxides and extend the life of use.
- ⊙ Outstanding alkalinity retention and good corrosion-proof properties to effectively prevent the corrosion from acidic substance generated from combustion of sulfur-containing fuel.
- ⊙ Excellent lubricating property to reduce the friction and sediment under severe conditions.
- ⊙ Specifically designed for diesel engines with environmental performance, suitable for Euro IV emission standard requirements.
- ⊙ It meets the specification of API CI-4, ACEA E7, Cummins CES 20076/77, MB-Approval 228.2, MTU Type II etc.

Approval Information

- ⊙ Get the following Certification :
API CI-4/SL, JASO DH-1, Cummins CES 20078, MACK EO-M Plus, MB-Approval 228.3, Volvo VDS-3, MAN M3275, Renault RLD-2.

Applications

- ⊙ CI-4 Diesel Engine Oil is suitable for lubrication of heavy duty and high pressure generator, life boat, emergency generator, small marine high-speed diesel engine and so on.
- ⊙ The best choice for high-speed four-stroke diesel engines and generator sets which need engine oil to meet API CI-4 or lower than API CI-4 specification and use diesel fuel or distilled fuel with sulfur content lower than 0.2%.

Viscosity Grade

- ⊙ SAE15W-40, 20W-50, 10W-30, 10W-40

Typical Properties

Items	CI-4 Diesel Engine Oil			
	15W-40	20W-50	10W-30	10W-40
SAE Grade	15W-40	20W-50	10W-30	10W-40
Viscosity@100°C, mm ² /s	15.78	18.43	10.74	14.43
Pour Point, °C	-34	-26	-39	-42
HTHS (150°C, 10 ⁶ s ⁻¹), mPa·s	4.33	5.02	3.17	3.83
TBN, mgKOH/g	11.0	11.0	9.5	9.7

CH-4 Diesel Engine Oil

SINOPEC CH-4 diesel engine oil is a high-performance diesel engine oil. Manufactured from high-quality base stock by blending with selected multiple additives of superior performance. The product provides outstanding lubrication for high-speed four-stroke diesel engines under severe operating conditions.

Advantages

- ⊙ Outstanding alkalinity retention and good corrosion-proof properties to effectively prevent the corrosion from acidic substance generated from combustion of sulfur-containing fuel.
- ⊙ Outstanding detergency and dispersancy to prevent carbon deposit.
- ⊙ Excellent anti-oxidation ability and thermal stability to reduce the generation of oxides and extend the life of use.
- ⊙ Excellent lubricating property to reduce the friction and sediment under severe conditions.
- ⊙ It meets the specification of API CH-4, ACEA E7, JASO DH-1, Cummins CES20076/77, MB-Approval 228.2/3, MAN M3275, MTU Type II etc.

Approval Information

- ⊙ Get the following Certification:
API CH-4/SL, Cummins CES 20078, MACK EO-M Plus, Volvo VDS-3, Renault RLD-2.

Applications

- ⊙ CH-4 Diesel Engine Oil is suitable for lubrication of heavy duty and high pressure generator, life boat, emergency generator, small marine high-speed diesel engine and so on.
- ⊙ The best choice for high-speed marine four-stroke diesel engines and generator sets which need engine oil to meet API CH-4 or lower than API CH-4 specification and use diesel fuel or distilled fuel with sulfur content lower than 0.2%.

Viscosity Grade

- ⊙ SAE15W-40, 20W-50, 10W-30, 10W-40

Typical Properties

Items	CH-4 Diesel Engine Oil			
	15W-40	20W-50	10W-30	10W-40
SAE Grade	15W-40	20W-50	10W-30	10W-40
Viscosity@100°C, mm ² /s	15.85	19.22	11.44	15.26
Pour Point, °C	-34	-26	-36	-39
HTHS (150°C, 10 ⁶ s ⁻¹), mPa·s	4.38	5.01	3.2	4.28
TBN, mgKOH/g	10.4	10.8	10.2	9.5



HANGXING 580 Diesel Engine Oil

SINOPEC HANGXING 580 diesel engine oil is prepared from paraffinic mineral base stock by blending with selected multiple additives of superior performance. The product is suitable for high-speed marine diesel engines under severe operating conditions. HANGXING 580 is designed for high-speed marine diesel engines specially.

Advantages

- ⊙ Outstanding anti-wear performance to reduce the friction and wear-off of metallic components and extend the engine life.
- ⊙ Improving neutralization ability of acidic products and protect engine parts from rust and corrosion.
- ⊙ Outstanding detergency and dispersancy to control sediment formation and keep cleanliness of engine parts. Extending oil changing period significantly.
- ⊙ Outstanding anti-oxidation ability and thermal stability to reduce the generation of oxides and extend the life of use.
- ⊙ Meet API CF-4 specification.

Applications

- ⊙ The best choice for high-speed marine diesel engines and generator sets which need engine oil to meet API CF-4 or lower than API CF-4 specification and use diesel fuel or distilled fuel with sulfur content lower than 0.2%.

Typical Properties

Items	HANGXING 580 Diesel Engine Oil
SAE Grade	15W-40
Viscosity@100°C, mm ² /s	15.28
Viscosity Index	142
Flash Point (COC), °C	228
Pour Point, °C	-24
TBN, mgKOH/g	10.5

HANGXING 300 Series Diesel Engine Oil

SINOPEC high-speed marine diesel engine oil HANGXING 300 series are prepared from a paraffinic mineral base stock by blending with selected multiple additives of superior performance. The product is specifically designed for high-speed and high-power marine diesel engines and meets high-speed marine diesel engines' requirements under severe operating conditions.

Advantages

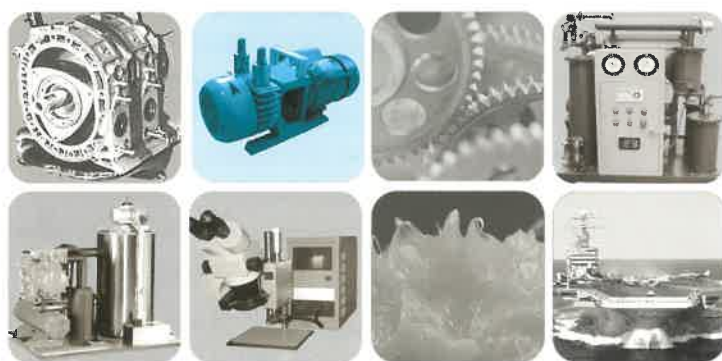
- ⊙ Good anti-wear performance and decrease wear and tear of engine parts effectively.
- ⊙ Good neutralization ability to neutralize the acidic products and protect engine parts from rust and corrosion.
- ⊙ Good detergency and dispersancy to keep cleanliness of engine parts. Extending oil changing period significantly.
- ⊙ Good anti-oxidation ability and thermal stability, in favor of keeping the use life of the oil.
- ⊙ Meet API CD specification.

Applications

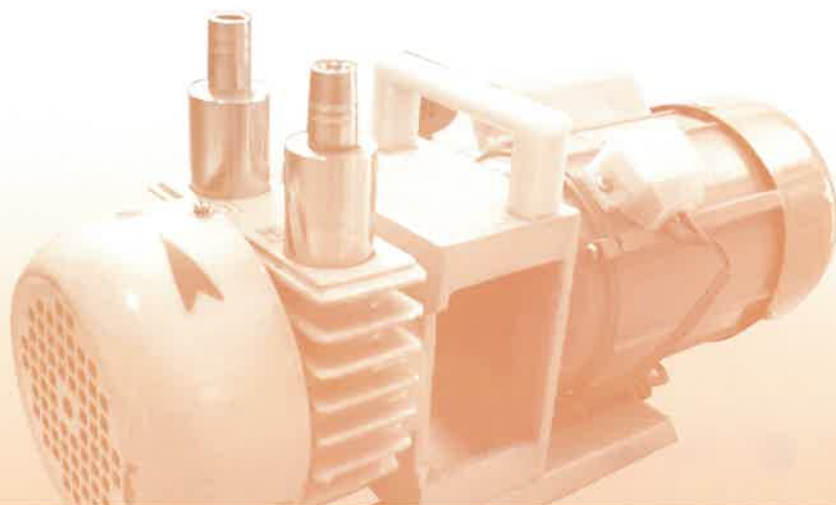
- ⊙ The best choice for high-speed marine diesel engines and generator sets which need engine oil meet API CD specification and use diesel fuel or distilled fuel with sulfur content lower than 0.2%.

Typical Properties

Items	HANGXING340	HANGXING380
SAE Grade	40	15W-40
Viscosity@100°C, mm ² /s	85	139
Viscosity Index	8.59	8.57
Flash Point (COC), °C	258	232
Pour Point, °C	-14	-30
TBN, mgKOH/g	14.76	14.38



Oils for Marine Auxiliary Equipment 14-26



HV Low Temperature Hydraulic Oil

SINOPEC HV low temperature hydraulic oil is prepared from deep-processed base stock of high viscosity index, added with multiple additives of superior performance by a blending process of the world advanced technology level.

Advantages

- ⊙ Super anti-wear performance hereditary from SINOPEC HM oil and even better performance at high/low temperatures. Provide excellent starting power and fluidity at lower temperature and better protection at higher temperature as well as anti- emulsifying performance, to effectively extend the life of use.
- ⊙ Outstanding thermo-viscosity performance, shear stability, oxidation stability and less change in viscosity, to ensure steady operation of the hydraulic system.
- ⊙ Excellent anti-wear property and anti-rusting/corrosion-proof performance to prolong the life of hydraulic equipment.
- ⊙ Excellent anti-foaming, air-releasing and anti-emulsifying performances to minimize the probability of oil aging caused by air/water contamination.
- ⊙ Excellent sealing part adaptability to effectively prevent oil leakage.

Approval Information

- ⊙ Eaton-Vickers
- ⊙ Cincinnati P68(ISO 32), P70(ISO 46), P69(ISO 68)

Applications

- ⊙ Suitable for in hydraulic and transmission systems of anchor windlass, unloading machines, cable hoisters, anti-shakers, emergency fire pumps, bottom valves, hatches, scuttles and gangplank connectors etc., also in lubrication of gear transmission, bearings and other industrial machinery of general load.
- ⊙ Especially suitable for use in MP/HP hydraulic systems installed outdoor, in cold area or environment of changing temperature or other harsh conditions. †

Typical Properties

Items	HV Low Temperature Hydraulic Oil					
ISO Viscosity Grade	15	22	32	46	68	100
Viscosity@40°C, mm ² /s	15.17	20.83	32.17	47.23	68.40	100.7
Viscosity Index	151	171	170	165	158	155
Flash Point (COC), °C	178	180	210	216	221	240
Pour Point, °C	-45	-45	-42	-39	-39	-36



EAL HF-E Biodegradable Hydraulic Oil

SINOPEC EAL HF-E series oils are super premium, high performance fully synthetic Hydraulic Oils. It is biodegradable with a low eco-toxicity and is particularly suited for use in environmentally sensitive areas.

SINOPEC EAL HF-E series oils are formulated from select, high-quality, high-VI synthetic base oil materials and high technology additive system, providing a superior balance of biodegradability, lubrication performance and compatibility with the environment.

Advantages

- ⊙ Ready biodegradability and low eco-toxicity, reducing potential for environmental damage.
- ⊙ Excellent temperature-viscosity characteristics, assuring high level system lubrication at high and low temperature.
- ⊙ Excellent wear protection, effective under all operation conditions including low and severe duty situations.

Approval Information

- ⊙ EU Ecolabel Certificate
- ⊙ Denison Certificate
- ⊙ Eaton Certificate

Applications

- ⊙ Hydraulic systems where spills or leakage could result in damage to the environment.
- ⊙ Environmentally sensitive waters with ship driving and hydraulic system of marine equipment.

Typical Properties

Items	EAL HF-E 32	EAL HF-E 46	EAL HF-E 68
Kinematic Viscosity@40°C, mm ² /s	31.19	42.64	71.53
Kinematic Viscosity@100°C, mm ² /s	6.18	7.82	11.03
Pour Point, °C	-39	-42	-42
Biodegradability, %	>60		
Eco-toxicity Acute Fish Toxicity, 96h, LC50/(mg/L) Acute Daphnia Toxicity, 48h, EC50/(mg/L) Bacterial Inhibition, 3h, EC50/(mg/L)	>100		

L-CKD Industrial Closed Gear Oil

With excellent load-carrying ability, SINOPEC L-CKD industrial closed gear oil guarantees heavy-duty gear operating smoothly, reducing scratch of gear surface and diminishing operation noise effectively.

Advantages

- ⊙ Outstanding extreme pressure load carrying ability and anti-wear characteristics, prevents seizure, scuffing or spalling of gear teeth and bearing surfaces under shock-loaded conditions, extend the useful life of equipment.
- ⊙ Excellent thermal stability and anti-oxidation performance, minimizes build-up of harmful sludge and varnish deposits and so reduces wear.
- ⊙ Good anti-rust and anti-corrosion characteristics, prevents iron parts from rusting, protects copper-containing bearings, bushings from corrosive attack.
- ⊙ Good anti-foaming resistance, ensures a continuous lubricant film present at all times, and prevents overflow from gear-boxes and oil reservoirs.
- ⊙ Excellent water separability, prevents emulsion formation and sustains effective lubrication.

Approval Information

- ⊙ Approved by Rexroth Bosch Group, SEW and ROSSI GEARMOTORS.

Technical Specifications

- ⊙ GB 5903 (L-CKD)
- ⊙ ISO 12925-1 (L-CKD)
- ⊙ AIST 224
- ⊙ AGMA 9005-E02 EP

Applications

- ⊙ Specific marine applications include closed gear transmission systems including main propulsion, centrifuges, deck machinery such as winches, windlasses, cranes, and elevators. Non-gear applications include heavily loaded bearings operating at slow speeds.
- ⊙ Enclosed industrial gear drives equipped with circulation or splash-lubrication systems, operating under normal, heavy or shock-loaded conditions.

Typical Properties

Items	L-CKD Industrial Closed Gear Oil							
ISO Viscosity Grade	68	100	150	220	320	460	680	1000
Viscosity (40°C) , mm ² /s	68.24	98.76	150	217	313	432	662	1059
Viscosity Index	101	92	92	93	92	97	103	114
Flash Point (COC), °C	234	248	235	242	250	238	246	246
Pour Point, °C	-15	-12	-12	-9	-9	-12	-12	-12
Copper Corrosion (100°C, 3h), Level	1b	1b	1b	1b	1b	1b	1b	1b
Rust Test (Method B, 24h)	No Rust							



L-CKT Fully Synthetic Heavy Duty Industrial Gear Oil

SINOPEC L-CKT fully synthetic heavy duty industrial gear oil is blended with synthetic type base oil with high viscosity index and super level multi-functional additive which demonstrates outstanding performance unmatched by the mineral type oil.

Advantages

- ⊙ Excellent load-carrying ability and anti-wear performance prolong the service life of the equipment.
- ⊙ Great cleanliness provides reliable lubrication for high-precision devices.
- ⊙ Outstanding anti-corrosion and antirust performance guarantees gear against corrosion and wear.
- ⊙ Perfect high-and-low temperature performance ensure comprehensive lubrication of devices under extreme temperature and severe temperature changing.

Technical Specifications

- ⊙ ISO 12925-1 (L-CKT)
- ⊙ AIST 224
- ⊙ AGMA 9005-E02 EP

Applications

- ⊙ Suitable for various heavy duty industrial gear units and other gears likely to cause vibration load, and suitable for both in circulation system and splash lubrication system.
- ⊙ Suitable for lubrication under heavy-load or impact-load operation condition and boundary lubrication as major lubrication.
- ⊙ Suitable for closed gear mechanical lubrication and providing initiate and operation normally under extreme temperature condition.
- ⊙ Suitable for long drain interval gear units or gear box, especially for inconvenient oil changing and equipment require no lubricating maintenance.
- ⊙ Suitable for lubricating the gear case of purifiers such as ALFA LAVAL etc.

Typical Properties

Items	L-CKT Fully Synthetic Heavy Duty Industrial Gear Oil				
ISO Viscosity Grade	150	220	320	460	680
Viscosity (40°C), mm ² /s	145.6	205.3	317	433.9	674.5
Viscosity Index	167	176	180	188	202
Flash Point (COC), °C	244	252	258	270	268
Pour Point, °C	-49	-46	-43	-34	-28
Copper Corrosion (100°C, 3h), Level	1b	1b	1b	1b	1b
Rust Test (Method B, 24h)	No Rust				

L-TSA Turbine Oil

SINOPEC L-TSA turbine oil is prepared from deep processed super quality base stock by blending with multiple-purpose additives, showing outstanding anti-rusting and corrosion-proof performances.

Advantages

- ⊙ Excellent anti-rusting and corrosion-proof performances to protect equipment and prevent rust and corrosion.
- ⊙ Excellent oxidation stability, air releasing, anti-foaming and anti-emulsifying performance to ensure prolongs life of the oil.

Approval Information

- ⊙ Siemens TLV 901304
- ⊙ Alstom Power HTGD 90117
- ⊙ Shanghai Electric Power Generation Equipment Co. Ltd. Turbine Works
- ⊙ Dong Fang Turbine Co. Ltd
- ⊙ Hang Zhou Steam Turbine Co. Ltd
- ⊙ Turbine Company of Nan Jing Turbine & Electric Machinery (Group) Co. Ltd

Applications

- ⊙ TSA turbine oil is suitable for lubrication and sealing of steam, gas and water turbine packages installed in power plants, onboard of large/middle size cargo ships or in other industrial uses.
- ⊙ It can also be used in lubrication or hydraulic system of general-purpose mechanical equipment.
- ⊙ Widely used in turbine equipment such as SHINKO etc..

Typical Properties

Items	L-TSA Turbine Oil		
	32	46	68
ISO Viscosity Grade	32	46	68
Viscosity@40°C, mm ² /s	33.8	45.2	68.9
Viscosity Index	115	102	108
Flash Point (C.O.C), °C	200	218	222
Pour Point, °C	-9	-9	-9
Oxidation Stability (D943), h	>5500	>5500	>5000



Synthetic Compressor Oil 4502

SINOPEC synthetic compressor oil 4502 is prepared by blending of synthesized oil as base stock, with various well-chosen functional additives. According to Viscosity of 40°C, Synthetic compressor Oil 4502 can be classified as: ISO VG32, 46, 68, 100, 150.

Advantages

- ⊙ Outstanding oxidation stability under high-temperature to extend drain interval up to 4,000hrs~8,000hrs.
- ⊙ Excellent performance under high/low temperatures performance.
- ⊙ Higher flash point and ignition point and lower volatility.
- ⊙ Less tendency of carbon residue/deposition to ensure safe operation of the compressor.
- ⊙ Good cleaning performance, effectively solve and remove carbon residue/deposition formed from low quality compressor oil.
- ⊙ Good water separation properties, to ensure the effective operation of compressor under humid environment.
- ⊙ Good compatibility with the sealing materials.

Applications

- ⊙ 4502 synthetic compressor oil is recommended for lubrication of LP/MP/HP rotary type compressors or middle/small size reciprocating type compressors.
- ⊙ Suitable for nitrile elastomer, fluorinated elastomer and silicone elastomer.

Typical Properties

Items	Synthetic Compressor Oil 4502		
	46	68	100
ISO Viscosity Grade	46	68	100
Viscosity@40°C, mm ² /s	46.7	69.3	105.32
Flash Point (C.O.C), °C	229	246	253
Pour Point, °C	-30	-27	-26

Synthetic Refrigerator Oil 4524

SINOPEC synthetic refrigerator oil 4524 is formulated from synthetic POE base stocks and a well-chosen additives package. According to Viscosity of 40°C, Synthetic Refrigeration Oil 4524 can be classified as: ISO VG32, 46, 68, 100.

Advantages

- ⊙ Lower pour point, higher flash point and very lower Content of water.
- ⊙ Good miscibility with various refrigerants such as R134a, R404, R407c and R410. Reduction of the sediments of the lubricating oil in the evaporator, improving cooling efficiency.
- ⊙ Excellent heat stability, hydrolyze stability. Optimum metal and nonmetal material compatibility in compressor. Longer compressor life.
- ⊙ Outstanding lubrication, reduce wear and extend compressor life, reduce energy consumption.
- ⊙ Biodegradable.

Applications

- ⊙ The product is recommended for the lubrication for various refrigeration compressors running with HFCs refrigerants such as R134a, R404, R407, R410 applied to industrial, civil, marine refrigeration and automotive air conditioning compressors lubrication.

Typical Properties

Items	Synthetic Refrigerator Oil 4524			
ISO Viscosity Grade	32	46	68	100
Appearance	Clear and Homogeneous Liquid			
Viscosity@40°C, mm ² /s	31.71	45.32	67.16	100.5
Flash Point (COC), °C	244	256	275	258
Pour Point, °C	-52	-45	-42	-37
Density (20°C), kg/m ³	986	960	965	962



L-QB300 Heat Transfer Oil

SINOPEC L-QB300 heat transfer oil is manufactured from the highly refined narrow fraction mineral base oil and detergent dispersant, high-temp oxidation resistant additive, suitable for closed heat transmission system of forced circulation or unforced circulation not more than 300°C.

Advantages

- ⊙ Narrow fraction, high Initial Boiling Point.
- ⊙ Excellent thermal oxidation stability, long service life.
- ⊙ Less evaporation, high flash point.
- ⊙ High specific heat capacity, good heat transfer performance.
- ⊙ Good low-temperature fluidity.
- ⊙ Good compatibility with the material of the system, no corrosion.

Technical Specifications

The product meets the following specifications:

- ⊙ GB 23971-2009
- ⊙ DIN51522

Applications

- ⊙ Suitable for closed heat transfer system of forced circulation or unforced circulation, suitable for drying, heating processes, such as vessel, food processing, chemical industry, etc.

Typical Properties

Items	L-QB300 Heat Transfer Oil
Initial Boiling Point, °C	348
Flash Point, °C	226
Pour Point, °C	-12
Corrosion (100°C, 3hrs) , Grade	1
Density (20°C) , kg/m ³	868.5

Extreme Pressure Lithium Base Grease

SINOPEC extreme pressure lithium base grease is thickened by lithium 12-hydroxystearate, it is made from deeply refined mineral oil with extreme pressure additive, rust and oxidation inhibitor through special process.

Advantages

- ⊙ Excellent extreme pressure property.
- ⊙ Excellent mechanical stability.
- ⊙ Good oxidation stability.

Applications

- ⊙ Multi-purpose, EP grease for general applications.
- ⊙ The product can be daubed by brush, also can be injected by grease gun.
- ⊙ Application temperature range: -20°C~120°C.

Typical Properties

Items	Extreme Pressure Lithium Base Grease	
	No.2	No.3
Worked Cone Penetration, 0.1 mm	282	248
Oil Separation (100°C, 24hrs) , %	3.2	0.2
Similar Viscosity (-10°C, 10s ⁻¹) , Pa·s	490	736
Prolonged Worked Cone Penetration (10 ⁵) , 0.1mm	291	270
Dropping Point, °C	186	196
EP Properties (Four Ball Test) P _B , N	784	784
EP Properties Timken OK Load, N	178	178

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Lithium Grease with Molybdenum Disulfide

SINOPEC lithium grease with molybdenum disulfide is thickened by lithium 12-hydroxystearate, it is made from deeply refined mineral oil with molybdenum disulfide anti-wear agent, rust and oxidation inhibitor through special technical process.

Advantages

- ⊙ Excellent extreme pressure and anti-wear property.
- ⊙ Excellent mechanical stability.
- ⊙ Good colloid stability.
- ⊙ Good anti-rust property.

Applications

- ⊙ Lithium Grease with MoS_2 for open gears and chains or other EP friction points.
- ⊙ The product can be daubed by brush, also can be injected by grease gun.
- ⊙ Application temperature range: $-20^{\circ}C \sim 120^{\circ}C$.

Typical Properties

Items	Lithium Grease with Molybdenum Disulfide	
	No.2	No.3
Appearance	pass	
Worked Cone Penetration (60) , 0.1mm	276	236
Dropping Point, $^{\circ}C$	196	203
Oil Separation (100 $^{\circ}C$, 24hrs) , %	3.4	1.2
Prolonged Worked Cone Penetration (10 5), 0.1mm	291	264
Water Washout (38 $^{\circ}C$, 1hrs) , %	1.25	1.25
EP Properties (Four Ball Test) P_B , N	618	618

Super Grease

Thickened by new thickening agent, Super Grease is made from deeply refined high viscosity mineral oil with oxidation inhibitors and viscosity index improver through special technique process.

Advantages

- ⊙ Excellent high temperature performance. Maintain certain degree of consistency even at high temperature and have long service life.
- ⊙ Outstanding EP and anti-wear properties. The spherical thickener can form micro-rolling particle layer on contact surface, effectively reduce friction coefficient between metal surface and extend service life.
- ⊙ Excellent rust and corrosion resistant property. Resist metal surface corrosion even with seawater presented.
- ⊙ Do not contain any heavy metal, nitrite and other chemicals that will do harm to human's health and pollute environment.

Applications

- ⊙ For high and low temperature applications,also fit for rust prevention of spare parts.
- ⊙ Application temperature range: -20°C to 160°C.

Typical Properties

Items	Super Grease				
	No.0	No.1	No.1A	No.2	No.3
Appearance	Smooth orange buttery				
Worked Cone Penetration, 0.1mm	372	325	310	283	237
Dropping Point, °C	210	330	330	330	330
Oil Separation (100°C, 24hrs) , %	---	3.2	2.9	2.3	2.1
Roll Stability Penetration 100h Change (1/4 Cone)					
No Water	---	±6	±7	±9	±9
20% Water	---	±2	±2	±3	±3
EP Properties Timken OK load N	178	200	222	222	222
Four Ball Wear (392N, 60min) , mm	0.49	0.40	0.40	0.41	0.41
EP Properties Weld Point, P ₀ N	3090	3920	3920	4905	4905



Extreme Pressure Lithium Complex Grease

Thickened by metal complex soap, it is made from deeply refined mineral oil with extreme pressure additives, rust and oxidation inhibitors.

Advantages

- ⊙ Excellent high temperature performance. It can remain on spot at friction pairs under high temperature. It provides continuous protection to bearings and friction pairs. Effectively extend service life under high temperature condition.
- ⊙ Good EP and anti-wear properties. Satisfy lubricating bearings of heavy load or impact load mechanical equipment.
- ⊙ Excellent oxidation resistant performance. Ensure longer service life during application process.

Applications

- ⊙ Complex grease with high and low temperature applications.
- ⊙ Application temperature range: -20~160°C.

Typical Properties

Items	Extreme Pressure Lithium Complex Grease			Test Methods
	No.1	No.2	No.3	
Worked Cone Penetration, 0.1mm	328	274	245	GB/T 269
Dropping Point, °C	280	280	280	GB/T 3498
10 ⁵ Stroke Penetration Change Rate from 60 Stroke, %	5.11	8.76	8.94	GB/T 269
EP Properties (Four Ball Test)				
P _D , N	3089	3923	3923	GB/T 12583
ZMZ, N	446	496	496	
EP Properties Timken OK Load, N	156	156	156	SH/T 0203
Similar Viscosity (-10°C, 10s ⁻¹), Pa·s	185	488	820	SH/T 0048

Semi-fluid Gear Grease 7408

Thickened by metal soap, it is made from deeply refined base oil with EP and anti-wear additives, rust and oxidation inhibitors through special manufacture process.

Advantages

- ⊙ Good EP and anti-wear properties. Satisfy lubricating requirements for gear of heavy load or impact load equipment.
- ⊙ Good adhesiveness. It provides continuous protection to gear.
- ⊙ Excellent flow character ensures its pumpability.
- ⊙ Good mechanical stability. It provides stable protection to gear.
- ⊙ Excellent oxidation resistant performance. Ensure longer service life during application process.
- ⊙ Simple application process. Easy to add grease.
- ⊙ Replace gear oil. It can reduce leakage, prolong renewing period, reduce equipment maintenance and consume.

Applications

- ⊙ It is used for low-to-middle speed (line velocity lower than 15m/s), heavy-load closed gear, worm, sprocket wheel. Special for reduction box with high- temp, dust, Iron phosphorus.
- ⊙ Application temperature range:-20°C~100°C.

Typical Properties

Items	Semi-fluid Gear Grease 7408			Test Methods
	No.0	No.00	No.000	
Appearance	Light Brown Semi Fluid Paste			Visual
Unworked Penetration, 0.1mm	369	413	466	GB/T 269
Dropping Point, °C	201	190	188	GB/T 3498
Evaporation Loss (120°C), %	0.87	0.70	0.70	SH/T 0337
Corrosion (45# Steel, 100°C, 3h)	Pass			SH/T 0331
Extreme-Pressure Properties (Four-ball Method)				
Last Nonseizure Load, N	1234	1177	1079	GB/T 3142
Weld Point, N	3924	3090	3090	
Load-wear Index, N	624	566	521	



Flushing Oil 27



Marine Flushing Oil

SINOPEC marine flushing oil which is composed of refined mineral oil and high quality additives, can be used in the Marine equipment of main engine, stern tube, steering engine, deck machinery and also be used in the hydraulic piping system with the characters of cleanliness, rust prevention and without polluting Marine system oil used later.

Advantages

- ⊙ Outstanding cleanliness. The lower viscosity and good liquidity can take away dirt from piping system immediately.
- ⊙ Excellent rust prevention, keep equipment away from getting rusty before using system oil.
- ⊙ Excellent demulsibility, can separate water from oil at short time so that prolong the oil life used in circulation and meet the cleaning requirements of main engine and hydraulic piping system.
- ⊙ Outstanding compatibility, can compatible with the system oil without precipitation.
- ⊙ Good anti-oxidation stability, convenient to freight and storage.
- ⊙ Non-poisonous and no peculiar smell, high flash point, good safety performance.

Approval Information

- ⊙ Approved by Nantong Rainbow Offshore & Engineering Equipment Co., Ltd.

Applications

- ⊙ Suitable for lubrication and hydraulic piping system cleaning in the construction and maintenance of ship.
- ⊙ Compatible with the host and vice engine system oil well without precipitation.

Typical Properties

Items	Marine Flushing Oil
Viscosity @40°C, mm ² /s	30.39
Flash Point (Open), °C	212
Pour Point, °C	-15
Copper Corrosion (100°C, 3h), Grade	1
Cleanliness, Grade	9



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