

AUTOMOTIVE LUBRICANTS



FOREWORD

The Product Manual of Sinopec Lubricant Company is reorganized to meet the requirements of our clients for understanding and correct selection of series lubricants. Comprising such fascicles as automotive lubricants, marine lubricants, industrial lubricants, greases, special synthetic lubricants and so on, the manual provides specific introduction to products in terms of features and benefits, technical specifications, recommended applications and typical properties, etc.

This fascicle is the one about automotive lubricants, collecting over 60 kinds of products manufactured by Sinopec Lubricant Company, including ten categories, i.e., gasoline engine oil, diesel engine oil, general engine oil, motorcycle oil, unconventionally fuelled engine oil, railway engine oil, transmission fluid, engine coolant, brake fluid and automobile shock absorber oil, etc.

Due to limit of space, it is impossible for us to give introduction to all products as well as information. Please dial our service hotline: 400-810-9886 or 800-810-9886 for further information.

Thanks for your care for lubricants!

BRIEF INTRODUCTION

China Petroleum & Chemical Corporation (hereinafter referred to as "Sinopec Corp.") is a listed company on domestic and international stock exchanges with integrated upstream, midstream and downstream operations, strong oil & petrochemical core businesses and a complete marketing network. The Company was incorporated on 25th February, 2000 by China Petrochemical Corporation (hereinafter referred to as "Sinopec Group") as the sole initiator, pursuant to the Company Law of the People's Republic of China. Sinopec issued 16.78 billion H shares in Hong Kong, New York and London Stock Exchanges on 18th and 19th October, 2000. The Company floated 2.8 billion A shares in Shanghai Stock Exchange on 16th July, 2001. As of end 2007, the Company's total number of shares were 86.7 billion, of which 75.84% were held by Sinopec Group, 19.35% were shares listed overseas and 4.81% were domestic public shares.

Sinopec Corp. is one of the largest integrated energy and chemical company in China. The scope of its business mainly covers oil and gas exploration and production, extraction, pipeline transmission and marketing; oil refining; production, marketing, storage and transportation of petrochemicals, chemical fibers, chemical fertilizers and other chemical products; import, export and import/export agency business of crude oil, natural gas, refined oil products, petrochemicals, chemicals, and other commodities and technologies; research, development and application of technology and information. The Company is China's largest producer and supplier of refined oil products (including gasoline, diesel and jet fuel, etc.) and major petrochemical



products (including synthetic resin, synthetic fiber monomers and polymers, synthetic fiber, synthetic rubber, chemical fertilizer and petrochemical intermediates). It is also China's second largest crude oil producer.

Sinopec Corp. has established a standardized structure of corporate governance and adopted a management system of centralized decision-making, delegated authorities at different levels and business operations handled by specialized business units. It has more than 80 subsidiaries and branches including wholly-owned, equity-holding and equity-sharing companies, engaging in oil and gas exploration and production, refining, chemicals, marketing, R&D and foreign trade. Business assets and principal markets are located in the east, south and middle part of China, where China's most developed and dynamic economy lies.

As an endeavor to become a multinational energy and chemical company with fairly strong international competitiveness, Sinopec Corp. will seriously implement strategies of resource, market, integration and internationalization with more focus on innovation of science, technology and management expertise, as well as improvement of employees' quality.

Sinopec Group, the largest shareholder of Sinopec Corp., is a super-large petroleum and petrochemical group incorporated by the State in 1998 based on the former China Petrochemical Corporation. Funded by the State, it is a State authorized investment arm and State-owned controlling company.

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GASOLINE ENGINE OILS

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SM/CF 0W-50 Fully Synthetic Engine Oil

Advantages

- ⊙ Fully synthetic general purpose engine oil adopting world leading technology, providing overall protection for engine
- ⊙ Super cleaning performance lasting long, facilitating strong power for engine
- ⊙ Excellent anti-wear performance, effectively reducing wear and prolonging service life of engine
- ⊙ Excellent anti-oxidation ability, providing long-lasting and perfect lubrication
- ⊙ Selecting fully synthetic high performance base stock and special additive to nurture good performance with long oil drain interval
- ⊙ Strict element controlling method for longer service life of exhaust catalytic converter

Performance specification

The product meets the following specifications:

- ⊙ API SM/CF
- ⊙ Q/SH303 482-2007

Applications

- ⊙ Special recommendation for such various high class passenger cars, racing cars and coaches with multi-valves, turbochargers, directly injecting engines as Lexus, BMW 7 Series, Benz S class, Audi 8, etc.
- ⊙ Suitable for engines requiring oils such as SM, SL, SJ series

Viscosity grade and type

- ⊙ SAE 0W-50 Fully synthetic engine oil

Typical properties

Items	SM/CF 0W-50 fully synthetic engine oil
Kinematic viscosity (100℃), mm ² /s	17.70
Flash point (COC), ℃	222
Pour point, ℃	-49

SM Gasoline Engine Oil

Advantages

- ⊙ Super cleaning performance lasting long, facilitating strong power for engine
- ⊙ Excellent anti-wear performance, effectively reducing wear and prolonging service life of engine
- ⊙ Synthetic base stock providing excellent anti-oxidation ability, long-lasting and perfect lubrication
- ⊙ Selecting high performance synthetic base stock and special additive to nurture better performance with longer oil drainage
- ⊙ Strict element controlling method for longer service life of exhaust catalytic converter
- ⊙ 5W-20, 5W-30 and 10W-30 have fantastic fuel economy, promoting energy efficiency
- ⊙ 5W-30 and 5W-40 have perfect low temperature startup performance, meeting requirement of running in cold area; 5W-40 and 10W-40 have wide range of viscosity for universal use in most part of China in year round

Performance specification

The product meets the following specifications:

- ⊙ API SM
- ⊙ Q/SH PRD 150-2008
- ⊙ 5W-20, 5W-30 and 10W-30 meet requirements of ILSAC GF-4 for promoting energy efficiency

Certification and approval

- ⊙ Volkswagen VW504 00/507 00, VW502 00/505 01; General Motors GM9986231; Chrysler Automotive MS 6395

Applications

- ⊙ Special recommendation for such various high class passenger cars, racing cars and coaches with multi-valves, turbochargers, directly injecting engines as Lexus, BMW 7 Series, Benz S class and Audi 8, etc.
- ⊙ Suitable for engines requiring oils such as SM, SL, SJ series
- ⊙ Products with viscosity grades of 5W-20, 5W-30 and 10W-30 can be applied to engines requiring oils such as GF-4, SM, GF-3, SL, GF-2 and SJ

Viscosity grade and type

- ⊙ SAE 5W-20, 5W-30, 5W-40, 10W-30 and 10W-40 synthetic engine oils
- ⊙ SAE 0W-30 and 0W-40 fully synthetic engine oils

Typical properties

Items	SM gasoline engine oil				
	5W-20	5W-30	5W-40	10W-30	10W-40
SAE viscosity grade	5W-20	5W-30	5W-40	10W-30	10W-40
Kinematic viscosity (100°C), mm ² /s	9.12	11.55	15.23	10.32	15.04
Flash point (COC), °C	230	236	222	230	230
Pour point, °C	-41	-41	-42	-40	-36

SL Gasoline Engine Oil

Advantages

- ⊙ Excellent anti-oxidation ability, providing long-lasting and effective lubrication
- ⊙ Excellent anti-wear performance out of special additive, effectively prolonging service life of engine
- ⊙ Outstanding carbon deposit and sludge inhibiting abilities, keeping engine clean for long time
- ⊙ New environment friendly formulation of low phosphor content to protect three-way catalytic converter (TWC) effectively
- ⊙ 5W-30 and 5W-40 have perfect low temperature startup performance, meeting requirement of running in cold area; 5W-40 and 10W-40 have wide range of viscosity suitable for universal use in most part of China in year round
- ⊙ 5W-20, 5W-30 and 10W-30 have fantastic fuel economy, promoting energy efficiency

Performance specification

The product meets the following specifications:

- ⊙ API SL
- ⊙ GB 11121-2006 SL
- ⊙ 5W-20, 5W-30 and 10W-30 have won approval of ILSAC GF-3

Certification and approval

- ⊙ BMW Longlife-01, GM9986166, Peugeot-Citroen PSA B712233, PSAB712294, Porsche, Daimler-Chrysler MB229.1, MB229.3, and Hyundai MS515-06

Applications

- ⊙ Special recommendation for such various high class passenger cars, racing cars and coaches as BMW 5 Series, Benz E class, Toyota Crown, Hyundai Rohens and Acura, etc.
- ⊙ Suitable for engines requiring oils such as SH, SL, SJ series
- ⊙ 5W-20, 5W-30 and 10W-30 can be applied to engines requiring oils such as SL, GF-3, SJ, GF-2, SH, etc.

Viscosity grade and type

- ⊙ SAE 5W-20, 5W-30, 5W-40, 10W-30, 10W-40 and 15W-40

Typical properties

Items	SL gasoline engine oil				
	5W-20	5W-30	5W-40	10W-30	10W-40
SAE viscosity grade	5W-20	5W-30	5W-40	10W-30	10W-40
Kinematic viscosity (100°C), mm ² /s	8.858	10.86	14.09	10.58	15.23
Flash point (COC), °C	224	234	222	232	224
Pour point, °C	-43	-41	-41	-42	-36

SJ Gasoline Engine Oil

Advantages

- ⊙ Excellent detergency and dispersancy, keeping engine clean, effectively inhibiting carbon deposit and sludge occurring in frequent start-stop mode in urban traffic
- ⊙ Outstanding anti-wear and anti-oxidation abilities, fully protecting engine
- ⊙ Suitable for various kinds of medium and high class cars, effectively protecting three-way catalytic converter (TWC)
- ⊙ 5W-30 and 5W-40 have perfect low temperature startup performance, meeting requirement of cold area; 5W-40 and 10W-40 have wide range of viscosity suitable for universal use in most part of China in year round
- ⊙ 5W-20, 5W-30 and 10W-30 have fantastic fuel economy, promoting energy efficiency

Performance specification

The product meets the following specifications:

- ⊙ API SJ
- ⊙ GB 11121-2006 SJ
- ⊙ 5W-30 and 10W-30 have won approval of ILSAC GF-2

Certification and approval

- ⊙ Peugeot-Citroen PSA B712231, Chery Q/SQR04.340, Volkswagen VW502 00/505 00, Daimler MB229.1

Applications

- ⊙ Special recommendation for urban traffic use cars such as Bora, Elysee, Sagotan, Passat, Jetta and Citrone ZX, etc.
- ⊙ Suitable for gasoline engines requiring oils such as SJ, SH, SG and so on
- ⊙ 5W-30 and 10W-30 can be applied to engines requiring oils such as SJ, GF-2, SH, SG and so on

Viscosity grade and type

- ⊙ SAE 5W-30, 5W-40, 10W-30, 10W-40, 15W-40, 20W-50

Typical properties

Items	SJ gasoline engine oil				
	5W-30	5W-40	10W-30	10W-40	15W-40
SAE viscosity grade	5W-30	5W-40	10W-30	10W-40	15W-40
Kinematic viscosity (100°C), mm ² /s	11.32	13.79	10.62	14.28	15.41
Flash point (COC), °C	237	230	226	237	230
Pour point, °C	-38	-35	-30	-39	-30

SG Gasoline Engine Oil

Advantages

- ⊙ Excellent detergency, dispersancy and high temperature anti-oxidation performance, keeping engine clean
- ⊙ Reducing black sludge occurring in operating mode of frequent start-stop service
- ⊙ Excellent anti-wear ability, effectively prolonging service life of engine
- ⊙ Low volatility, reducing consumption of engine oil
- ⊙ Good compatibility with rubber, resulting in effective protection of sealed material against leakage

Performance specification

The product meets the following specifications:

- ⊙ API SG
- ⊙ GB 11121-2006 SG

Certification and approval

- ⊙ Benz MB 227.5
- ⊙ Volvo VDS
- ⊙ Mack EO-K2
- ⊙ Volkswagen VW501 01/505 00

Applications

- ⊙ Recommendation for various kinds of economic type cars for use in urban traffic, such as Santana 2000, Santana LX, Passat Century Star, Jetta GT, Jetta and so on
- ⊙ Suitable for gasoline engines requiring oils such as SG, SF, SE and so on

Viscosity grade and type

- ⊙ SAE 5W-30, 10W-30, 10W-40, 15W-40 and 20W-50

Typical properties

Items	SG gasoline engine oil				
	5W-30	10W-30	10W-40	15W-40	20W-50
SAE viscosity grade	5W-30	10W-30	10W-40	15W-40	20W-50
Kinematic viscosity (100℃), mm ² /s	10.66	10.82	15.06	14.38	19.30
Flash point (COC), ℃	228	220	220	226	236
Pour point, ℃	-35	-33	-34	-28	-20

SF Gasoline Engine Oil

Advantages

- ⊙ Good low temperature dispersancy and high temperature anti-oxidation ability
- ⊙ Reducing wear of engine, prolonging its service life
- ⊙ Low volatility, reducing consumption of engine oil
- ⊙ Good compatibility with rubber, resulting in effective protection of sealed material against leakage

Performance specification

The product meets the following specifications:

- ⊙ API SF
- ⊙ GB 11121-2006 SF

Applications

- ⊙ Recommendation for carburetor type mini vehicle, light bus as well as light truck, such as Xiali, Alto, Changhe, Daihatsu, Songhuajiang, Wuling, Jilin and so on
- ⊙ Suitable for gasoline engine requiring oils such as SF, SE and so on

Viscosity grade and type

- ⊙ SAE 30, 40, 5W-30, 10W-30, 10W-40, 15W-40 and 20W-50

Typical properties

Items	SF gasoline engine oil					
	30	5W-30	10W-30	10W-40	15W-40	20W-50
SAE viscosity grade	30	5W-30	10W-30	10W-40	15W-40	20W-50
Kinematic viscosity (100℃), mm ² /s	11.25	10.32	10.84	13.69	14.18	19.43
Flash point (COC), ℃	244	235	232	256	226	236
Pour point, ℃	-21	-38	-33	-35	-26	-21

SE Gasoline Engine Oil

Advantages

- ⊙ Good high temperature lubricity and low temperature dispersancy
- ⊙ Good oxidation stability, anti-wear property

Performance specification

The product meets the following specifications:

- ⊙ API SE
- ⊙ GB 11121-2006 SE

Applications

- ⊙ Universally applied to carburetor type mini vehicle, light bus as well as light truck, such as Xiali, Alto, Changhe, Daihatsu, Songhuajiang, Wuling, Jilin and so on
- ⊙ Suitable for gasoline engine requiring oil of SE

Viscosity grade and type

- ⊙ SAE 30, 40, 10W-30 and 15W-40

Typical properties

Items	SE gasoline engine oil	
	10W-30	15W-40
SAE viscosity grade	10W-30	15W-40
Kinematic viscosity (100°C), mm ² /s	10.71	14.70
Flash point (COC), °C	218	229
Pour point, °C	-30	-27



DIESEL ENGINE OILS

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Diesel Passenger Car Engine Oil

Advantages

- ⊙ Especially developed for diesel engines of Volkswagen equipped with turbochargers and electrically controlled high pressure pump nozzles, providing more reliable protection for cam lifter, pump and nozzle
- ⊙ Synthetic engine oil with promoting energy efficiency apparently
- ⊙ Perfect high/low temperature lubricity, possible to be used in year round
- ⊙ Excellent detergency and dispersancy, effectively preventing formation of sludge and carbon deposit, ensuring cleaning of engine
- ⊙ Outstanding anti-oxidation and anti-wear abilities, better protecting engines

Performance specification

The product meets the following specifications:

- ⊙ ACEA A3/B3
- ⊙ Q/SH303 401-2008

Certification and approval

- ⊙ Volkswagen VW505 00/505 01

Applications

- ⊙ Suitable for lubrication of various kinds of diesel passenger car engines
- ⊙ Especially suitable for diesel engines of Volkswagen equipped with turbochargers and electrically controlled high pressure pump nozzles, for high class cars equipped with modern high performance direct injection type gasoline engines and turbocharging diesel engines
- ⊙ Suitable for engines requiring oils meeting Europe ACEA A3/B3 standard and lower, for lubrication of diesel engine cars such as Audi, Passat, Jetta and so on

Typical properties

Items	Diesel passenger car engine oil
SAE viscosity grade	5W-40
Kinematic viscosity (100°C), mm ² /s	14.49
Low temperature dynamic viscosity (-30°C), mPa·s	5950
Low temperature apparent viscosity (-35°C), mPa·s	21900
High temperature and high shear viscosity (150°C, 10 ⁶ s ⁻¹), mPa·s	3.87
Sulphate ash content, % (mass fraction)	1.22
Vaporization loss (Noack method), % (mass fraction)	9.1

CJ-4 Diesel Engine Oil

Advantages

- ⊙ Effectively dispersing ash and deposit, controlling sludge in engine and deposit in piston ring, keeping engine clean, reducing kinetic energy loss out of frictional wear
- ⊙ Adopting high viscosity index base stock and strong anti-oxidation additive, ensuring perfect high temperature anti-oxidation property, reducing corrosion and wear for engine from high temperature sludge and deposit, providing effective protection for engine under high temperature and prolonging its service life
- ⊙ Providing effective protection for environmental friendly diesel engines with EGR or DPF, making it meet emission requirements of Euro IV/ Euro V standard
- ⊙ Ultra low vaporization loss, effectively improving effect on fuel economy, oil consumption, exhaust discharge and engine wear out of vaporization of engine oil at high temperature
- ⊙ Good compatibility with rubber, resulting in effective protection of sealed material against leakage

Performance specification

The product meets the following specifications:

- ⊙ API CJ-4
- ⊙ API SM
- ⊙ ACEA E7

Certification and approval

- ⊙ Benz MB228.3
- ⊙ Cummins 20081
- ⊙ Caterpillar CAT ECF-3/ECF-1
- ⊙ Mack EO-O PREMIUM PLUS
- ⊙ Volvo VDS-4
- ⊙ Detroit Diesel PGOS 93K218

Applications

- ⊙ Suitable for all heavy duty vehicles driven by imported diesel engines equipped with EGR or DPF
- ⊙ Also suitable for vehicles driven by imported or domestic engines without EGR or DPF
- ⊙ Suitable for high speed four stroke diesel engines adopting other new technologies and meeting Euro III, IV emission standards
- ⊙ Suitable for engines requiring oils such as CJ-4, CI-4+, CI-4, CH-4, CG-4 and CF-4

Viscosity grade and type

- ⊙ SAE 5W-40, 10W-40 and 15W-40

Typical properties

Items	CJ-4 diesel engine oil
SAE viscosity grade	5W-40
Kinematic viscosity (100℃), mm ² /s	15.0
Flash point (COC), ℃	234
Pour point, ℃	-30

CI-4 Diesel Engine Oil

Advantages

- ⊙ Specially designed for engines with EGR and turbochargers, meeting requirements of Euro IV and V emission standards
- ⊙ Super strong compatibility with soot, effectively avoiding problems as wear, thickened engine oil, difficult oil supply etc caused by soot
- ⊙ Outstanding detergency and dispersancy against formation of deposit, keeping oil filter clean
- ⊙ Perfect anti-wear property, reducing wear on engine cylinder liner and bearing bush
- ⊙ Strong adaptability of sealed material, promoting super strong power

Performance specification

The product meets the following specifications:

- ⊙ API CI-4
- ⊙ GB 11122-2006 CI-4

Certification and approval

- ⊙ A variety of international engine manufacturer certificates including Volvo VDS-3, Daimler MB 228.1/228.3, Man M73275 and Cummins CES 20078/76/71

Applications

- ⊙ Suitable for engines of Volvo, Daimler, Cummins, Man, etc., imported or manufactured by their joint ventures
- ⊙ Suitable for high class diesel engines, domestically made or imported, with requirement of high cleanness and low emission, suitable for engines meeting requirements of China IV emission standard
- ⊙ Suitable for heavy duty vehicles in severe operating mode, such as urban traffic bus, long distance bus and so on
- ⊙ Suitable for engines adopting various emission treatment systems other than DPF
- ⊙ Suitable for engines requiring oils such as CI-4, CH-4, CF-4, CF and CD

Viscosity grade and type

- ⊙ SAE 15W-40, 10W-40, 10W-30, 5W-30 and 5W-40

Typical properties

Items	CI-4 diesel engine oil		
	10W-40	15W-40	20W-50
SAE viscosity grade	10W-40	15W-40	20W-50
Kinematic viscosity (100°C), mm ² /s	14.92	14.83	18.26
Pour point, °C	-34	-30	-29
High temperature and high shear viscosity (150°C, 10 ⁶ s ⁻¹), mPa·s	3.75	3.99	4.96
Base number, mgKOH/g	9.8	10.2	9.92

CH-4 Diesel Engine Oil

Advantages

- ⊙ High efficiency detergency, reducing carbon deposit, avoiding blockage of engine filter
- ⊙ Stable oil film, promoting strong power
- ⊙ Excellent TBN retention and good anti-corrosion ability against acid corrosion caused by combustion of fuel
- ⊙ Excellent anti-oxidation and anti-acidification abilities, effectively prolonging oil drain interval
- ⊙ Meeting requirements for engines of Euro III emission standard, suitable for engines using fuels with different sulphur content

Performance specification

The product meets the following specifications:

- ⊙ API CH-4
- ⊙ GB 11122-2006 CH-4

Certification and approval

- ⊙ A variety of international engine manufacturer certifications including Mack EO-M Plus, Daimler MB 228.3, Cummins CES 20076/71, Volvo DS-2, Renault and so on
- ⊙ Recommended by domestic factories such as Dalian Diesel Engine, Dongfeng Motor, Weifang Diesel Engine, Foton Motor, Xiamen Kinglong Motor and so on

Applications

- ⊙ Suitable for engines of foreign and domestic brands with above certificates and recommendations
- ⊙ Suitable for various container trailers with heavy duty, high pressure turbocharged and large power, and engineering vehicles, power generation units, large size agricultural equipment and other engineering equipment for mining, construction, etc.
- ⊙ Suitable for engines meeting requirements of China III emission standard
- ⊙ Suitable for engines requiring oils such as CH-4, CF-4, CF, CD and so on

Viscosity grade and type

- ⊙ SAE 10W-30, 10W-40, 15W-40 and 20W-50

Typical properties

Items	CH-4 diesel engine oil		
	10W-30	15W-40	20W-50
SAE viscosity grade	10W-30	15W-40	20W-50
Kinematic viscosity (100°C), mm ² /s	10.68	14.83	19.20
Pour point, °C	-39	-34	-26
High temperature and high shear viscosity (150°C, 10 ⁶ s ⁻¹), mPa·s	3.35	4.12	4.86
Base number, mgKOH/g	10.7	11.0	10.9

CF-4 Diesel Engine Oil

Advantages

- ⊙ High efficiency cleaning ability, reducing carbon deposit, keeping engine clean and reducing wear of engine
- ⊙ Adopting high efficiency anti-wear agent, maintaining effective anti-wear ability and prolonging service life of engine
- ⊙ Excellent viscosity and temperature properties, providing outstanding viscosity maintaining ability and keeping little change of viscosity in service
- ⊙ Good TBN retention with strong anti-corrosion ability as well as excellent anti-oxidation ability at high temperature and large load

Performance specification

The product meets the following specifications:

- ⊙ API CF-4
- ⊙ GB 11122-2006 CF-4

Certification and approval

- ⊙ A variety of international engine manufacturer certifications including Cummins CES 20075/74/73, Daimler MB 228.1, Mack EO-K2 and Volvo VDS
- ⊙ Recommended by domestic factories such as China FAW, SINOTRUK, Dongfeng Motor, Xiamen Kinglong Motor, Hangzhou Engine, Dalian Diesel Engine, Shanghai Diesel Engine, Weifang Diesel Engine, Foton Motor, China North Vehicle Neoplan Bus and so on

Applications

- ⊙ Suitable for engines of foreign and domestic brands with above certifications and recommendations
- ⊙ Suitable for direct injection diesel engines of heavy duty, high pressure turbocharged and large power, for large size power generation units, for domestic vehicle engines of heavy duty, durative running, for engines of large power engineering machinery working in heavy dust environment
- ⊙ Suitable for diesel engines requiring oils such as CF-4, CF and CD and so on

Viscosity grade and type

- ⊙ SAE 0W-30, 0W-40 fully synthetic type
- ⊙ SAE 40, 50, 5W-30, 5W-40, 10W-30, 10W-40, 15W-40 and 20W-50

Typical properties

Items	CF-4 diesel engine oil			
	10W-30	10W-40	15W-40	20W-50
SAE viscosity grade	10W-30	10W-40	15W-40	20W-50
Kinematic viscosity (100°C), mm ² /s	10.75	15.22	14.65	18.86
Pour point, °C	-33	-39	-31	-26
High temperature and high shear viscosity (150°C, 10 ⁶ s ⁻¹), mPa·s	3.28	4.14	4.28	4.92
Base number, mgKOH/g	12.2	11.7	12.1	11.9

CF Diesel Engine Oil

Advantages

- ⊙ Providing better anti-wear protection than CD grade diesel engine oil, further decreasing wear of engine, effectively prolonging service life of engine
- ⊙ Excellent detergency and dispersancy, ensuring engines clean when using various kinds of fuel, and effectively preventing piston ring sticking
- ⊙ Good oxidation stability
- ⊙ Appropriate formulation system, effectively reducing consumption of engine oil
- ⊙ Good anti-foaming property, ensuring sufficient oil supply
- ⊙ Good compatibility with rubber, effectively protecting sealed material against leakage

Performance specification

The product meets the following specifications:

- ⊙ API CF
- ⊙ GB 11122-2006 CF

Applications

- ⊙ Especially suitable for engines of complex fuel (e.g. with high sulphur content), low speed but high torque output
- ⊙ Suitable for military or civil diesel engines of power generation units, dozers, excavators, mining equipment and so on
- ⊙ Suitable for large scale military mixed fleet including armoured carriers
- ⊙ Suitable for non-direct injection diesel engines of high pressure turbocharged, large power and overloading, requiring oils of CF grade (including CD and CC)

Viscosity grade and type

- ⊙ SAE 30, 40, 50 and 15W-40

Typical properties

Items	CF diesel engine oil	
	40	15W-40
SAE viscosity grade	40	15W-40
Kinematic viscosity (100℃), mm ² /s	15.41	14.98
Flash point (COC), ℃	235	223
Pour point, ℃	-12	-28

CF-2 Two Stroke Diesel Engine Oil

Advantages

- ⊙ Excellent cleaning property at high temperature, keeping engines clean
- ⊙ Outstanding anti-wear and lubricity, reducing wear and prolonging service life of engine
- ⊙ Outstanding anti-rust and acid neutralization properties, providing excellent protection for engine

Performance specification

The product meets the following specifications:

- ⊙ API CF-2
- ⊙ Q/SH PRD 108-2008

Applications

- ⊙ Suitable for two stroke diesel engine of medium turbocharged, sulphur-contained fuels powered, and other engines, requiring API CF-2 (including CD-II)

Viscosity grade and type

- ⊙ SAE 40, 50 and 15W-40

Typical properties

Items	CF-2 two stroke diesel engine oil		
	15W-40	40	50
SAE viscosity grade	15W-40	40	50
Kinematic viscosity (100℃), mm ² /s	14.36	14.89	18.91
Flash point (COC), ℃	225	248	256
Pour point, ℃	-26	-13	-9

CD Diesel Engine Oil

Advantages

- ⊙ Excellent detergency and lubricity at high temperature, effectively controlling formation of high temperature deposit, keeping engines clean
- ⊙ Good properties of anti-oxidation, anti-corrosion and anti-wear, preventing wear, rustiness of parts and corrosion of bearing bush, and prolonging service life of engine

Performance specification

The product meets the following specifications:

- ⊙ API CD
- ⊙ GB 11122-2006 CD

Applications

- ⊙ Suitable for diesel engines with recommendation of CD and CC oils
- ⊙ As factory and service fill oil recognized by Dongfeng Motor Corporation
- ⊙ As factory fill oil by China National Heavy Duty Truck Group Corp., Ltd
- ⊙ As appointed oil by Steyr Engine

Viscosity grade and type

- ⊙ SAE 30, 40, 50, 5W-40, 10W-30, 15W-40 and 20W-50

Typical properties

Items	CD diesel engine oil			
	5W-40	10W-30	15W-40	20W-50
SAE viscosity grade	5W-40	10W-30	15W-40	20W-50
Kinematic viscosity (100°C), mm ² /s	14.21	11.14	14.67	18.76
Kinematic viscosity (40°C), mm ² /s	85.2	68.4	110.6	146.4
Flash point (COC), °C	220	232	225	240
Pour point, °C	-38	-32	-27	-22



ENGINE OILS

AUTOMOTIVE LUBRICANTS
(16 – 18)



SG/CF-4 Engine Oil

Advantages

- ⊙ Meeting requirements of mixed fleet
- ⊙ Excellent anti-oxidation property, effectively prolonging oil drain interval
- ⊙ Excellent detergency and dispersancy, making engines cleaner, reducing formation of black sludge caused by start-stop service
- ⊙ Excellent anti-wear and anti-friction property, effectively protecting frictional parts of engines
- ⊙ Outstanding TBN (Total Base Number) retention, protecting engines from corrosive wear
- ⊙ Low volatility, reducing consumption of engine oil
- ⊙ Good compatibility with rubber, effectively protecting sealed material against leakage

Performance specification

The product meets the following specifications:

- ⊙ API SG/CF-4
- ⊙ GB 11121-2006 SG, GB 11122-2006 CF-4

Certification and approval

- ⊙ Benz MB 228.1, Cummins CES 20075, Volvo VDS and Mack EO-K2

Applications

- ⊙ Suitable for bus/car/truck engines of normal aspiration, direct injection, equipped turbochargers and multi-valves, fuelled with gasoline or diesel oil and working in various severe conditions
- ⊙ Suitable for large power, heavy duty diesel engines of such machines as mine vehicles, various trucks, trailers and other engineering vehicles, and for lubrication of diesel engines requiring oils of API CF-4, CE and CD
- ⊙ Suitable for lubrication of gasoline engines requiring oils of API SG, SF and SE
- ⊙ Especially suitable for large scale mixed fleet of gasoline and diesel engines

Viscosity grade and type

- ⊙ SAE 10W-30, 15W-40 and 20W-50

Typical properties

Items	SG/CF-4 engine oil		
	10W-30	15W-40	20W-50
SAE viscosity grade	10W-30	15W-40	20W-50
Kinematic viscosity (100℃), mm ² /s	11.36	14.33	18.80
Kinematic viscosity (40℃), mm ² /s	69.9	108.5	157.6
Flash point (COC), ℃	215	226	228
Pour point, ℃	-31	-28	-23

SG/CD Engine Oil

Advantages

- ⊙ Meet all performance requirements of SG gasoline engine oil and CD diesel engine oil
- ⊙ Excellent detergency and dispersancy, and high and low temperature fluidity performance
- ⊙ Good shear stability, extreme pressure and anti-wear properties
- ⊙ Outstanding oxidation resistance and excellent anti-rust performance

Performance specification

The product meets the following specifications:

- ⊙ API SG/CD
- ⊙ GB 11121-2006 SG, GB 11122-2006 CD

Applications

- ⊙ Suitable for gasoline engine requiring oils of SG, SF and SE, and diesel engine requiring oils of CD and CC
- ⊙ Suitable for lubrication of engines of various kinds of cars and large coaches

Viscosity grade and type

- ⊙ SAE 40, 50, 10W-30, 15W-40 and 20W-50

Typical properties

Items	SG/CD engine oil	
	10W-30	15W-40
SAE viscosity grade	10W-30	15W-40
Kinematic viscosity (100°C), mm ² /s	11.50	15.50
Flash point (COC), °C	210	220
Pour point, °C	-35	-27
Low temperature dynamic viscosity, mPa·s	6310 (-25°C)	6010 (-20°C)
Low temperature apparent viscosity, mPa·s	21400 (-30°C)	28600 (-25°C)
High temperature and high shear (150°C, 10 ⁶ s ⁻¹), mPa·s	2.96	4.20

SF/CD Engine Oil

Advantages

- ⊙ Meeting performance requirements of CD diesel engine oil and SF gasoline engine oil
- ⊙ Excellent detergency and dispersancy, providing good protection for engine
- ⊙ Sufficient capability neutralizing acidic substances produced by fuel combustion, avoiding corrosive wear

Performance specification

The product meets the following specifications:

- ⊙ API SF/CD
- ⊙ GB 11121-2006 SF, GB 11122-2006 CD

Applications

- ⊙ Suitable for light/medium duty diesel engines requiring oils of CD and CC
- ⊙ Suitable for economic cars requiring gasoline engine oil of SF and SE

Viscosity grade and type

- ⊙ SAE 40, 50, 10W-30, 15W-40 and 20W-50

Typical properties

Items	SF/CD engine oil				
	10W-30	15W-40	40	50	20W-50
SAE viscosity grade	10W-30	15W-40	40	50	20W-50
Kinematic viscosity (100°C), mm ² /s	10.51	15.08	14.21	18.69	19.86
Flash point (COC), °C	226	228	239	265	251
Pour point, °C	-33	-26	-15	-11	-18



MOTORCYCLE OILS

AUTOMOTIVE LUBRICANTS
(19 – 29)



Fully Synthetic 2T Motorcycle Oils

Advantages

- ⊙ Minimum exhaust level
- ⊙ Keeping engines clean
- ⊙ Effectively preventing engine piston from scratching and sticking
- ⊙ Rapid reaction for changing engine speed
- ⊙ With diluent, facilitating mixing with gasoline in injection system or automatic lubricant injection system in advance
- ⊙ Prolonging service life of engines

Performance specification

The product meets the following specifications:

- ⊙ ISO EGD
- ⊙ Q/SH303 257-2007

Applications

- ⊙ Suitable for two stroke engines working in extremely severe conditions, such as engines of karts and racing motorcycles
- ⊙ Suitable for such machines as timber cutting chain saw, grass cutter, motor sleigh and so on
- ⊙ Recommended fuel/oil ratio range from 25:1 to 50:1

Typical properties

Items	Fully synthetic 2T motorcycle oils
Kinematic viscosity (100°C), mm ² /s	6.92
Viscosity index	165
Pour point, °C	-15
Flash point (COC), °C	102

FC 2T Motorcycle Oil

Advantages

- ⊙ Relatively low exhaust, reducing environmental pollution
- ⊙ Reducing carbon deposit, keeping engines clean
- ⊙ Preventing engine piston from scratching and sticking
- ⊙ Rapid reaction for changing engine speed
- ⊙ With diluent, facilitating mixing with gasoline in injection system or automatic lubricant injection system in advance
- ⊙ Prolonging service life of engine

Performance specification

The product meets the following specifications:

- ⊙ JASO FC
- ⊙ SH/T 0675-1999

Applications

- ⊙ Suitable for two stroke gasoline engines working in severe conditions, such as engines of those air-cooled, medium/high duty motorcycles with displacement over 50mL
- ⊙ Suitable for such machines as timber cutter, grass cutter, motor sleigh, atomizer, outboard engine and so on
- ⊙ Recommended fuel/oil ratio at 25~50:1

Typical properties

Items	FC 2T motorcycle oil
Kinematic viscosity (100℃), mm ² /s	8.810
Pour point, ℃	-15
Flash point (COC), ℃	110
Flash point (closed), ℃	120

FB 2T Motorcycle Oil

Advantages

- ⊙ Increasing power efficiency, ensuring smooth driving and powerful output
- ⊙ Good detergency and dispersancy, preventing pollution on ignition plug, reducing stem in vent
- ⊙ Ideal anti-wear property, preventing wear of piston and cylinder liner, prolonging service life of engine
- ⊙ With diluent, facilitating mixing with gasoline in injection system or automatic lubricant injection system in advance

Performance specification

The product meets the following specifications:

- ⊙ JASO FB
- ⊙ SH/T 0675-1999

Applications

- ⊙ Suitable for small size, air cooled, two stroke gasoline engine working in moderate conditions, such as those air cooled, low duty, two stroke motorcycles engine with displacement less than about 50mL
- ⊙ Suitable for such machines as timber cutter, grass cutter, motor sleigh, atomizer and so on
- ⊙ Recommended fuel/oil ratio at 25~50:1

Typical properties

Items	FB 2T motorcycle oil
Kinematic viscosity (100℃), mm ² /s	8.772
Pour point, ℃	-15
Flash point (COC), ℃	145
Flash point (closed), ℃	122

TC-W3 Outboard Engine Oil

Advantages

- ⊙ Better properties than TC-W2 for its excellent lubricity, detergency and anti-rust ability
- ⊙ Extremely low biological toxicity, effectively reducing environmental pollution
- ⊙ Good fluidity at low temperature, suitable for both winter and summer

Performance specification

The product meets the following specifications:

- ⊙ NMMA TC-W3
- ⊙ SH/T 0676-2005

Applications

- ⊙ Suitable for two stroke water-cooled outboard gasoline engine
- ⊙ Suitable for two stroke engines for motorboat and assault boat
- ⊙ Suitable for air-cooled two stroke motorcycle
- ⊙ Recommended fuel/oil ratio at 25~50:1

Typical properties

Items	TC-W3 outboard engine oil
Kinematic viscosity (100℃), mm ² /s	7.11
Pour point, ℃	-40
Flash point (COC), ℃	148

TC-W2 Outboard Engine Oil

Advantages

- ⊙ Excellent lubrication, detergency and anti-rust ability, reducing carbon deposit on ignition plug
- ⊙ Low smoke and emission, beneficial to environment
- ⊙ Good fluidity at low temperature, suitable for both winter and summer

Performance specification

The product meets the following specifications:

- ⊙ NMMA TC-W2
- ⊙ SH/T 0676-2005

Applications

- ⊙ Suitable for lubrication of water-cooled, two stroke outboard engine below 85hp
- ⊙ Suitable for lubrication of two stroke engine of motorcycle and assault boat
- ⊙ Suitable for lubrication of air-cooled, two-stroke motorcycle
- ⊙ Recommended fuel/oil ratio at 25~50:1

Typical properties

Items	TC-W2 outboard engine oil
Kinematic viscosity (100℃), mm ² /s	6.92
Pour point, ℃	-31
Flash point (COC), ℃	166

SJ MA 10W-50 Fully Synthetic 4T Motorcycle Oil

Advantages

- ⊙ Outstanding fully synthetic engine oil with super strong oxidation stability, ensuring smooth, high speed running of engine at high temperature
- ⊙ Small vaporization loss, ensuring low consumption of engine oil even running at high temperature
- ⊙ Good high/low temperature properties, meeting driving requirements under various weather conditions, even -35℃~50℃
- ⊙ Appropriate friction factor, avoiding slippage of wet clutch
- ⊙ Acquiring JASO (Japanese Automobile Standards Organization) MA certification for engine oil for four stroke motorcycles

Performance specification

The product meets the following specifications:

- ⊙ API SJ
- ⊙ JASO MA
- ⊙ Q/SH PRD 057-2007

Applications

- ⊙ Suitable for lubrication of various kinds four stroke motorcycle engine, especially outstanding in motorcycle with wet clutch

Typical properties

Items	SJ MA 10W-50 fully synthetic 4T motorcycle oil
SAE viscosity grade	10W-50
Kinematic viscosity (100℃), mm ² /s	18.78
Density (20℃), kg/m ³	849.4
Flash point (COC), ℃	240
Pour point, ℃	-46

SJ MA 4T Motorcycle Oil

Advantages

- ⊙ Excellent detergency and dispersancy, reducing formation of deposit in engine
- ⊙ Excellent shear resistance, keeping strong engine power
- ⊙ Providing more stable gear and clutch operations
- ⊙ Minimizing wear, providing overall protection for engine and prolonging its service life
- ⊙ Acquiring JASO (Japanese Automobile Standards Organization) MA certification

Performance specification

The product meets the following specifications:

- ⊙ API SJ
- ⊙ JASO MA
- ⊙ Q/SH PRD 057-2007

Applications

- ⊙ Suitable for various kinds of air/water-cooled high class four stroke engines of imported, JV-made or domestic motorcycles such as Honda, Suzuki, Yamaha, Kawasaki and so on
- ⊙ Especially suitable for four stroke motorcycle with displacement over 250ml

Typical properties

Items	SJ MA 4T motorcycle oil
SAE viscosity grade	10W-40
Kinematic viscosity (100℃), mm ² /s	14.61
Pour point, ℃	-33
Flash point (COC), ℃	218

SG MA 4T Motorcycle Oil

Advantages

- ⊙ Good detergency and dispersancy, reducing formation of deposit, keeping engine clean
- ⊙ Excellent shear resistance property, keeping strong engine power
- ⊙ Good lubricity, keeping smooth running of engine
- ⊙ Effectively reducing wear, providing perfect protection for engine

Performance specification

The product meets the following specifications:

- ⊙ API SG
- ⊙ JASO MA
- ⊙ Q/SH PRD 057-2007

Applications

- ⊙ Suitable for various kinds of air/water-cooled medium class four stroke motorcycle
- ⊙ Especially suitable for engines of motorcycles such as Wuyang-Honda, Jialing, Dayang, Taiyang, Xiaxing, Zhufeng, Jianshe, Piaggio, Nanfang, Qingqi, Qianjiang, Longxin, Zongshen, Yingang, Changling, Chituma, Chunlan, Haojue, Lifan, Xindazhou, Macat and so on

Typical properties

Items	SG MA 4T motorcycle oil	
	10W-40	15W-40
SAE viscosity grade	10W-40	15W-40
Kinematic viscosity (100℃), mm ² /s	14.87	14.77
Pour point, ℃	-33	-28
Flash point (COC), ℃	224	223

SF MA 4T Motorcycle Oil

Advantages

- ⊙ Effectively cleaning engine, preventing sticking of piston and reducing wear of engine
- ⊙ Excellent friction performance, preventing slippage of clutch
- ⊙ Stable oxidation stability, prolonging oil drainage

Performance specification

The product meets the following specifications:

- ⊙ API SF
- ⊙ JASO MA
- ⊙ Q/SH PRD 057-2007

Applications

- ⊙ Especially suitable for engines of motorcycles such as Wuyang-Honda, Jialing, Dayang, Taiyang, Xiaxing, Zhufeng, Jianshe, Piaggio, Nanfang, Qingqi, Qianjiang, Longxin, Zongshen, Yingang, Changling, Chituma, Chunlan, Haojue, Lifan, Xindazhou, Macat and so on

Typical properties

Items	SF MA 4T motorcycle oil			
	10W-30	10W-40	15W-40	20W-50
SAE viscosity grade	10W-30	10W-40	15W-40	20W-50
Kinematic viscosity (100°C), mm ² /s	10.92	15.14	15.45	19.00
Pour point, °C	-33	-33	-26	-21
Flash point (COC), °C	220	224	225	238

SE MA 4T Motorcycle Oil

Advantages

- ⊙ With high performance detergent and dispersant, keeping engine clean
- ⊙ Good lubricity, keeping smooth engine running
- ⊙ Excellent friction performance, preventing slippage of clutch

Performance specification

The product meets the following specifications:

- ⊙ API SE
- ⊙ JASO MA
- ⊙ Q/SH PRD 057-2007

Applications

- ⊙ Suitable for various kinds of air/water cooled, low/medium class, four stroke motorcycle
- ⊙ Especially suitable for four stroke engine in summer

Typical properties

Items	SE MA 4T motorcycle oil	
	15W-40	40
SAE viscosity grade	15W-40	40
Kinematic viscosity (100℃), mm ² /s	14.85	13.52
Pour point, ℃	-26	-14
Flash point (COC), ℃	226	230

Motorcycle Gear Oil

Advantages

- ⊙ Outstanding carrying capacity, preventing scratching and wear of gears
- ⊙ Excellent lubricity, ensuring stable operation of transmission
- ⊙ Perfect oxidation stability and anti-rust ability, prolonging service life of oil and gears

Performance specification

The product meets the following specifications:

- ⊙ API GL-5
- ⊙ MIL-L-2105D
- ⊙ GB 13895-92

Applications

- ⊙ Suitable for transmission system of motorcycle in high speed/vibration, high speed/low torque, low speed/high torque operating modes

Typical properties

Items	Motorcycle gear oil
SAE viscosity grade	80W/90
Kinematic viscosity (100℃), mm ² /s	16.00
Pour point, ℃	-30
Flash point (COC), ℃	228



**NONCONVENTIONAL FUEL
POWERED ENGINE OILS**
AUTOMOTIVE LUBRICANTS
(30—36)



CNG Engine Oil

Advantages

- ⊙ Excellent high temperature lubricity, detergency and dispersancy, keeping engine clean
- ⊙ Adopting new style low ash content additive, preventing blockage of ignition plug and reducing pollution out of emission
- ⊙ Perfect anti-corrosion, anti-rust and anti-wear properties
- ⊙ Preventing pre-ignition, carbon deposit on valves, wearing and ring sticking

Performance specification

The product meets the following specifications:

- ⊙ Cummins CES 20074
- ⊙ Q/SH303 077-2007

Applications

- ⊙ Suitable for vehicles fuelled with compressed natural gas (CNG) such as those buses with CNG engines made by Cummins, Benz, Dongfeng, Shanghai Diesel Engine and so on
- ⊙ Appointed oil for Cummins natural gas engine, Shanghai Diesel Engine T6114 gas engine and Benz natural gas engine in China

Typical properties

Items	CNG engine oil
SAE viscosity grade	15W-40
Kinematic viscosity (100℃), mm ² /s	14.99
Pour point, ℃	-27
Flash point (COC), ℃	224

Stationary Gas Engine Oil

Advantages

- ⊙ Adopting new type low ash content additive, effectively protecting engine
- ⊙ Perfect properties of deposit controlling, anti-oxidation and anti-nitration
- ⊙ Effectively preventing carbon deposit and wear of valve, ensuring durative and powerful output
- ⊙ Excellent lubricity and protection ability against scratching, effectively prolonging service life of engine

Performance specification

The product meets the following specifications:

- ⊙ API CF
- ⊙ Q/SH PRD 146-2008

Applications

- ⊙ Suitable for stationary type natural gas engines of large power and turbocharged, manufactured by Caterpillar, Waukesha, Cooper and so on

Typical properties

Items	Stationary gas engine oil
SAE viscosity grade	40
Kinematic viscosity (100℃), mm ² /s	14.82
Flash point (COC), ℃	268
Pour point, ℃	-15

LPG/CNG Gas Engine Oil Type

Advantages

- ⊙ Low ash content formulation exclusively for CNG and LPG passenger cars, effectively reducing engine wearing subject to the dryness and insufficient lubrication of gas, reducing formation of deposit, avoiding blockage of ignition plug and pre-ignition of engine
- ⊙ Outstanding high/low temperature properties, avoiding formation of black sludge in start-stop operation, obtaining long oil drain interval
- ⊙ Low sulphur formulation, meeting requirements of environment protection

Performance specification

The product meets the following specifications:

- ⊙ API SJ
- ⊙ Q/SH PRD 148-2008

Applications

- ⊙ Suitable for LPG or CNG single fuel passenger cars, and LPG/gasoline or CNG/gasoline dual fuel passenger cars

Typical properties

Items	LPG/CNG gas engine oil type II
SAE viscosity grade	15W-40
Kinematic viscosity (100℃), mm ² /s	14.2
Flash point (COC), ℃	232
Pour point, ℃	-27

LPG/CNG Gas Engine Oil Type I

Advantages

- ⊙ Low ash content formulation exclusively for gas engine of passenger cars, providing full lubrication for engine
- ⊙ Appropriate ash content, reducing formation of deposit on ignition plug
- ⊙ Effective constituents, reducing wear of valve system
- ⊙ Environment friendly engine oil with low volatility

Performance specification

The product meets the following specifications:

- ⊙ API SF
- ⊙ Q/SH PRD 147-2008

Applications

- ⊙ Suitable for LPG or CNG single fuel passenger cars, and LPG/gasoline or CNG/gasoline dual fuel passenger cars

Typical properties

Items	LPG/CNG gas engine oil type I
SAE viscosity grade	15W-40
Kinematic viscosity (100°C), mm ² /s	15.01
Flash point (COC), °C	223
Pour point, °C	-24

LPG Bus Engine Oil

Advantages

- ⊙ Low ash content formulation exclusively for LPG passenger car engine
- ⊙ Effectively solving problem of insufficient lubrication and part wearing caused by gas, providing special anti-wear protection for engine
- ⊙ Balanced formulation with appropriate ash content, reducing wear and formation of deposit, avoiding blockage of ignition plug and pre-ignition of engine
- ⊙ Outstanding high/low temperature properties, avoiding formation of black sludge due to alternant running at high and low speed, ensuring effective lubrication
- ⊙ Appointed oil for Peixin gas engine made by Weifang Diesel Engine

Performance specification

The product meets the following specifications:

- ⊙ API SJ
- ⊙ API CF
- ⊙ Q/SH303 076-2007

Applications

- ⊙ Meeting lubrication requirements of LPG engine made by companies such as Weifang Diesel Engine, Yulin Diesel Engine and Dongfeng Motor, Being appointed oil for Peixin gas engine by Weifang Diesel Engine
- ⊙ Suitable for lubrication of LPG single fuel passenger cars or oil/gas dual fuel passenger cars

Typical properties

Items	LPG bus engine oil
SAE viscosity grade	15W-40
Kinematic viscosity (100℃), mm ² /s	15.02
Flash point (COC), ℃	228
Pour point, ℃	-27

Ethanol Gasoline Engine Oil

Adopting highly refined base stock with high viscosity index and a variety of good quality additives, special gasohol engine oil with excellent performance not only meets the requirements of SJ specification in standard of American Petroleum Institute and the national standard of China for gasoline engine oil, but also passes strict fleet test, satisfying the requirements for lubrication of gasohol (especially E10) engine.

Advantages

- ⊙ Especially designed for engines fuelled with gasohol, with excellent anti-wear and anti-oxidation properties, providing overall lubrication for engines fuelled with gasohol
- ⊙ Outstanding detergency and dispersancy, effectively inhibiting formation of carbon deposit and sludge due to start-stop operating mode in urban traffic
- ⊙ Strong TBN retention and outstanding anti-rust ability, effectively inhibiting corrosion of engine parts caused by product of ethanol combustion
- ⊙ Good compatibility with rubber, ensuring durative and effective sealing of whole lubrication system
- ⊙ Suitable for lubrication of passenger car fuelled with gasohol or required SJ and below gasoline engine oil, effectively protecting three-way catalytic converter

Performance specification

The product meets the following specifications:

- ⊙ API SJ
- ⊙ GB 11121-2006 SJ
- ⊙ Q/SH303 399-2005

Applications

- ⊙ Specially suitable for lubrication of engines fuelled with gasohol (especially E10)
- ⊙ Suitable for lubrication of engines requiring oils of SJ, SH, SG, SF and SE

Typical properties

Items	Ethanol gasoline engine oil
SAE viscosity grade	10W-40
Kinematic viscosity (100℃), mm ² /s	14.71
Flash point (COC), ℃	217
Pour point, ℃	-31

Biogas Engine Oil

Advantages

- ⊙ Exclusive formulation, effectively inhibiting oxidation and nitration of oil
- ⊙ Appropriate ash content, fully protecting engine valve from wear, reducing formation of deposits on ignition plug
- ⊙ Outstanding lubricity and anti-deposition ability, making engine run smoothly
- ⊙ Effectively reducing damage to engine parts caused by combustion of high sulphur content biogas, providing full lubrication for engine

Performance specification

The product meets the following specifications:

- ⊙ API CD

Applications

- ⊙ Suitable for biogas engines manufactured by Caterpillar, Waukesha, Cooper and so on

Typical properties

Items	Biogas engine oil
SAE viscosity grade	40
Kinematic viscosity (100°C), mm ² /s	15.6
Flash point (COC), °C	252
Pour point, °C	-16



RAILWAY ENGINE OILS

AUTOMOTIVE LUBRICANTS

(37 – 38)



Locomotive Oil 4th Generation

Advantages

- ⊙ Excellent thermal and oxidation stability, detergency and dispersancy, effectively avoiding formation of deposits, keeping engine highly clean
- ⊙ Outstanding anti-wear, anti-scratch and oil film protection abilities, preventing wear of parts, prolonging service life of parts
- ⊙ High base number and excellent TBN retention, effectively neutralizing combustion product of fuel containing sulphur, prolonging oil drain interval

Performance specification

The product meets the following specifications:

- ⊙ LMOA 4th generation oil specification
- ⊙ GB 17038-1997

Applications

- ⊙ Suitable for locomotive powered by high sulphur content fuel (over 0.5% of sulphur content)
- ⊙ Suitable for locomotive requiring locomotive oil 4th generation
- ⊙ Suitable for various kinds of medium/high speed four stroke locomotive including ND5 locomotive
- ⊙ Also suitable for lubrication of some marine engines

Typical properties

Items	Locomotive oil 4 th generation
SAE viscosity grade	40
Kinematic viscosity (100℃), mm ² /s	14.2
Flash point (COC), ℃	260
Pour point, ℃	-11
Total base number, mgKOH/g	11

Locomotive Oil 3rd Generation

Advantages

- ⊙ Excellent high temperature lubricity, detergency, dispersancy and anti-corrosion ability
- ⊙ Perfect anti-wear ability, preventing excess wear of parts, prolonging service life
- ⊙ High base number, producing strong neutralizing ability, effectively preventing corrosion of parts caused by combustion product

Performance specification

The product meets the following specifications:

- ⊙ LMOA 3rd generation oil specification
- ⊙ TB/T 2933-1998

Applications

- ⊙ Suitable for turbocharged diesel engine with large power and heavy load
- ⊙ Suitable for diesel locomotive requiring 3rd generation oil of LMOA (Locomotive Maintenance Officers Association), such turbocharged locomotives as NY5, NY6, NY7, ND4, Dongfeng and so on
- ⊙ Meeting requirements of marine diesel engine, diesel generator of drilling rigs

Typical properties

Items	Locomotive oil 3 rd generation
SAE viscosity grade	40
Kinematic viscosity (100℃), mm ² /s	14.90
Flash point (COC), ℃	252
Pour point, ℃	-9



TRANSMISSION FLUIDS

AUTOMOTIVE LUBRICANTS

(39 – 56)



Manual Transmission Fluid for Passenger Vehicles (MTF)

Adopting highly refined mineral base stock with high viscosity index and a variety of good quality additives, manual transmission fluid for passenger vehicles with excellent performance meets not only the OEM specifications requirements of many passenger vehicles, but also the lubrication requirements of manual transmission of various kinds of passenger vehicle.

Advantages

- ⊙ Excellent fuel economy, effectively prolonging oil drainage, reducing operation costs
- ⊙ Excellent property of changing gear with synchronizer, increasing easiness of driving
- ⊙ Excellent extreme pressure anti-wear property, effectively protecting gears
- ⊙ Excellent fluidity at low temperature
- ⊙ Good carrying capacity, preventing gears from scratching and wear, prolonging service life
- ⊙ Excellent thermal and oxidation stability, reducing formation of oxide

Performance specification

The product meets the following specifications:

- ⊙ API GL-4
- ⊙ OEM specification requirements of Toyota and so on
- ⊙ Q/SH303 528-2009

Applications

- ⊙ Specially suitable for lubrication of manual transmission with synchronizer, suitable for passenger vehicles with manual transmission of various brands

Typical properties

Items	Manual transmission fluid for passenger vehicles (MTF)		
	75W/80	75W/85	75W/90
SAE viscosity grade	75W/80	75W/85	75W/90
Kinematic viscosity (100°C), mm ² /s	8.84	12.42	14.68
Flash point (COC), °C	215	222	222
Pour point, °C	-42	-40	-40

Manual Transmission Fluid for Commercial Vehicles (MTF)

Adopting highly refined mineral base stock with high viscosity index and a variety of good quality additives, manual transmission fluid for commercial vehicles with excellent performance meets the lubrication requirements not only of equipment with synchronizer, but also of manual transmission of various kinds of imported or domestic commercial vehicles, as well as meets the OEM specifications requirements of many commercial vehicles.

Advantages

- ⊙ Excellent fuel economy, effectively prolonging oil drainage, reducing operation costs
- ⊙ Excellent property of changing gear with synchronizer, increasing easiness of driving
- ⊙ Good carrying capacity, preventing gears from scratching and wear, prolonging service life of transmission, effectively protecting key parts
- ⊙ Excellent shear stability
- ⊙ Excellent thermal and oxidation stability, reducing formation of oxide
- ⊙ Reducing emission of pollutants, effectively protecting environment

Performance specification

The product meets the following specifications:

- ⊙ API GL-4
- ⊙ Eaton S-series
- ⊙ MAN 341TL
- ⊙ Volvo 97305
- ⊙ ZF-TE-ML-02D
- ⊙ Q/SH303 529-2009

Applications

- ⊙ Specially suitable for lubrication of manual transmission for commercial vehicles with synchronizer, suitable for commercial vehicles with manual transmission of various brands

Typical properties

Items	Manual transmission fluid for commercial vehicles (MTF)		
SAE viscosity grade	75W/80	75W/85	75W/90
Kinematic viscosity (100°C), mm ² /s	9.35	12.25	15.38
Flash point (COC), °C	228	216	226
Pour point, °C	-40	-37	-40

Fully Synthetic Transmission Gear Oil

Adopting synthetic good quality base stock with super high viscosity index and super multi-functional additives, Fully synthetic transmission gear oil with wide range of viscosity grade can make possible frequent shifting on bumpy ridge-way and normally working in severe conditions such as very high/low temperature. It provides good protection for parts of gearbox, and save 3%-5% of fuel comparing with mineral transmission gear oil. The product has acquired technical recognition of Germany Volkswagen and OTS of Shanghai Volkswagen.

Advantages

- ⊙ Outstanding heat and oxidation stability, ensuring fill-for-life protection to transmission under normal maintenance and servicing conditions
- ⊙ Wide range of viscosity grade, meeting lubrication requirements for working in all temperature area in all day long
- ⊙ Excellent high and low temperature performance, meeting lubrication requirements for working in all different circumstance
- ⊙ Saving 3%~5% of fuel comparing with mineral transmission gear oil

Performance specification

The product meets the following specifications:

- ⊙ VW 501.50
- ⊙ Fiat 9.55550
- ⊙ API GL-4
- ⊙ Q/SH PRD 154-2008

Applications

- ⊙ Suitable for lubrication of manual transmission of various kinds of vehicles

Typical properties

Items	Fully synthetic transmission gear oil
SAE viscosity grade	75W/90
Kinematic viscosity (100℃), mm ² /s	18
Viscosity index	225
Flash point (COC), ℃	215
Pour point, ℃	-42

Automatic Transmission Oil for Buses

With stable property, automatic transmission oil for buses is concocted with base stock of high viscosity index and imported good quality compound additives by internationally advanced techniques. The product is suitable for automatic transmission for commercial vehicles.

Advantages

- ⊙ Good properties of anti-wear, anti-oxidation, anti-rust and anti-corrosion
- ⊙ Good anti-foaming ability
- ⊙ Good frictional durability
- ⊙ Meeting long oil drain interval and other oil requirements of automatic transmission for urban traffic bus with heavy duty and other commercial vehicles

Performance specification

The product meets the following specifications:

- ⊙ Voith H55.6335.3x
- ⊙ ZFTE-ML 14B
- ⊙ Q/SH303 520-2008

Applications

- ⊙ Suitable for automatic transmission for bus rapid transit (BRT) fleets, school bus fleets, emergency vehicles, recreation vehicles, commercial utility vehicles etc.

Typical properties

Items	Automatic transmission oil for buses
Kinematic viscosity (100°C), mm ² /s	7.054
Kinematic viscosity (40°C), mm ² /s	33.48
Flash point (COC), °C	206
Copper plate corrosion (150°C, 3h)	1b

Automatic Transmission Fluid TO-4

Automatic transmission fluid TO-4 is blended with base stock of high property and various excellent functional additives. It is suitable for powershift transmission device and drive device requiring transmission fluid of Caterpillar TO-4 specification as well as hydrodynamic powershift for modern engineering machineries.

Advantages

- ⊙ Excellent oxidation and thermal stability and detergency and dispersancy, providing longer period protection for powershift transmission of off-highway equipment
- ⊙ Perfect carrying capacity, meeting operation requirements of heavy duty vehicles
- ⊙ Perfect properties of anti-wear, anti-corrosion and friction, prolonging service life of clutch, and controlling slippage
- ⊙ Excellent anti-foaming ability, ensuring effective transfer of power
- ⊙ Outstanding fluidity at low temperature, providing protection for relevant parts in conditions of startup and low temperature

Performance specification

The product meets the following specifications:

- ⊙ Caterpillar TO-4
- ⊙ ZF TE-ML 02, ZF TE-ML 03
- ⊙ Q/SH303 533-2009

Applications

- ⊙ Suitable for power conversion device and final drive device requiring Caterpillar TO-4 transmission fluid, for hydraulic system, hydrostatic transmission system for engineering machinery as well as construction machinery

Typical properties

Items	Automatic transmission fluid TO-4		
	10W	50	30
SAE viscosity grade	10W	50	30
Kinematic viscosity (100°C), mm ² /s	6.6	19.1	10.78
Kinematic viscosity (40°C), mm ² /s	43.0	227	97.67
Viscosity index	105	94	93
Flash point (COC), °C	213	247	244

Automatic Transmission Fluid ATF+4

Automatic transmission fluid ATF+4 is designed as per requirements of automatic transmission of chrysler, adopting unique base stock and additive technique. It makes transmission reach best performance, especially is suitable for chrysler, JEEP, dodge brands cars, where MS-9602 specification oil is required.

Advantages

- ⊙ Perfect anti-wear ability, providing best anti-wear protection for transmission system
- ⊙ Perfect oxidation stability, reducing oxidation of oil at high temperature
- ⊙ Outstanding fluidity at low temperature, providing protection for relevant parts in conditions of startup and low temperature

Performance specification

The product meets the following specifications:

- ⊙ Chrysler MS 9602

Applications

- ⊙ As service oil for chrysler vehicles and others requiring oil meeting ATF+3 or ATF+4 specification

Typical properties

Items	Automatic transmission fluid ATF+4
Kinematic viscosity (100℃), mm ² /s	7.457
Kinematic viscosity (40℃), mm ² /s	34.84
Viscosity index	189
Flash point (COC), ℃	204

Automatic Transmission Fluid ATF VI

Automatic transmission fluid ATF VI is blended with hydrogenation refined base stock of high property and various functional additives. It is suitable for automatic transmission of latest model cars, and can be used in power steering systems and the hydraulic transmission system.

Advantages

- ⊙ Outstanding oxidation and heat stability, good detergency, preventing formation of sludge and oil deterioration
- ⊙ Outstanding fluidity at low temperature, improving fuel economy
- ⊙ Perfect anti-wear and anti-corrosion abilities, providing best protection for transmission system, prolonging service life
- ⊙ Appropriate friction property, providing good sense of shifting
- ⊙ Excellent anti-foaming ability, ensuring effective transfer of power
- ⊙ Good compatibility with rubber sealed material, meeting adaptability of diverse rubber materials, effectively preventing leakage

Performance specification

The product meets the following specifications:

- ⊙ GM DEXRON®-VI

Applications

- ⊙ Suitable for automatic power transmission system of vehicle (automatic transmission), and hydraulic transmission system
- ⊙ Suitable for automatic transmission system, power steering system and other hydraulic systems of construction machinery
- ⊙ Suitable for lubrication of various industrial hydraulic coupling, high speed pump and so on

Typical properties

Items	Automatic transmission fluid ATF VI
Kinematic viscosity (100℃), mm ² /s	5.987
Kinematic viscosity (40℃), mm ² /s	30.29
Viscosity index	148
Flash point (COC), ℃	220

Automatic Transmission Fluid ATF IIIH

Automatic transmission fluid ATF IIIH is blended with base stock of high property and various functional additives. It is mult-functional fluid, suitable for automatic transmission of vehicles, some of power steering systems and the hydraulic transmission system. The product has won recognition of transmission manufacturers can be used in multi-vehicles' automatic transmissions.

Advantages

- ⊙ Outstanding oxidation and heat stability and detergency, preventing formation of paint film sludging and carbon deposit
- ⊙ Excellent friction property, providing good sense of shifting
- ⊙ Excellent anti-foaming ability, ensuring effective transfer of power
- ⊙ Outstanding fluidity at low temperature, good compatibility with rubber sealed material, effectively protecting sealed material, preventing leakage

Performance specification

The product meets the following specifications:

- ⊙ General Motors, GM DEXRON-IIIH
- ⊙ Ford Motors, Ford MERCON
- ⊙ Allison C-4
- ⊙ Q/SH PRD 159-2008

Applications

- ⊙ Suitable for automatic transmission, hydraulic transmission systems of vehicles
- ⊙ Suitable for automatic transmission system, power steering system and other hydraulic systems of construction machinery

Typical properties

Items	Automatic transmission fluid ATF IIIH
Kinematic viscosity (100°C), mm ² /s	7.322
Kinematic viscosity (40°C), mm ² /s	33.89
Viscosity index	185
Flash point (COC), °C	198

Automatic Transmission Fluid ATF IID

Automatic transmission fluid ATF IID is blended with good quality base stock and various functional additives. It is suitable for automatic transmission of vehicles, some of power steering systems and the hydraulic transmission system.

Advantages

- ⊙ Good friction property, making automatic transmission operate stable, reliable and smooth
- ⊙ Good oxidation and heat stability, preventing oil deterioration
- ⊙ Good anti-wear and anti-corrosion properties, prolonging service life of parts

Performance specification

The product meets the following specifications:

- ⊙ General Motors GM DEXRON-IID
- ⊙ Ford Motors Ford MERCON
- ⊙ Q/SH PRD 159-2008

Applications

- ⊙ Suitable for automatic transmission, hydraulic transmission systems of vehicles
- ⊙ Suitable for automatic transmission system, power steering system and other hydraulic systems of construction machinery

Typical properties

Items	Automatic transmission fluid ATF IID
Kinematic viscosity (100℃), mm ² /s	7.531
Flash point (COC), ℃	230
Copper strip corrosion (150℃, 3h)	1b

No.8 Heavy Duty Hydraulic Transmission Fluid

No.8 heavy duty hydraulic transmission fluid is blended with refined base stock and imported good quality compound additives by internationally advanced process. It is suitable for hydraulic transmission system of engineering machinery, especially those of heavy duty and others requiring hydraulic transmission fluid.

Advantages

- ⊙ Good properties of anti-wear, anti-rust and anti-corrosion
- ⊙ Good anti-foaming ability
- ⊙ Good friction property
- ⊙ Good oxidation stability

Performance specification

The product meets the following specifications:

- ⊙ Q/SH303 532-2009

Applications

- ⊙ Suitable for hydraulic transmission system of engineering machinery
- ⊙ Especially suitable for hydraulic transmission system of heavy duty engineering machinery and others requiring hydraulic transmission fluid

Typical properties

Items	No.8 heavy duty hydraulic transmission fluid
Kinematic viscosity (100℃), mm ² /s	8.401
Viscosity index	143
Pour point, ℃	-42

Hydraulic Transmission Fluid

Hydraulic transmission fluid is blended with good quality base stock and multi-functional additives. It is universally suitable for construction machinery and industrial machinery, and which equipped with hydrodynamic powershift transmission systems.

Advantages

- ⊙ Good viscosity and temperature properties, effectively transferring kinetic energy, ensuring little power loss in any case
- ⊙ Good compatibility with rubber materials, effectively preventing failure of seals
- ⊙ Good anti-wear and appropriate friction property, providing good sense of shifting

Performance specification

The product meets the following specifications:

- ⊙ Q/SH303 064-2007

Applications

- ⊙ Suitable for construction machinery, and hydrodynamic powershift transmission systems and hydraulic coupling of other equipment
- ⊙ Suitable for automatic transmission of various kinds of light duty bus and truck

Typical properties

Items	Hydraulic transmission fluid	
SAE viscosity grade	6	8
Kinematic viscosity (100°C), mm ² /s	5.940	7.712
Brookfield (-18°C), mPa.s	1898	1772
Flash point (COC), °C	228	217
Pour point, °C	-34	-35

Dual Purpose Oil for Hydraulic and Transmission Systems

Dual purpose oil for hydraulic and transmission systems is prepared with mineral base stock of high viscosity index and good quality multi-functional additives. Conforming to John Deere (J20c) specification, it meets hydraulic, transmission and wet brake with a common oil system. It is especially suitable for lubrication of hydraulic and transmission systems of imported powerful tractor, engineering and port machineries.

Advantages

- ⊙ Having multiple functions for hydraulic, transmission and wet brake systems
- ⊙ Special viscosity index improves, ensuring good viscosity retention even in conditions of high temperature and heavy duty, prolonging service life of hydraulic transmission systems
- ⊙ Outstanding fluidity and startup ability at low temperature, providing smooth cold start-up and comfortable operation
- ⊙ Special friction improver, providing smooth wet brake, reducing vibration, no noise, prolonging service life of device

Performance specification

The product meets the following specifications:

- ⊙ John Deere (J20c)
- ⊙ FCrd (M2C134-D)
- ⊙ Massey-Ferguson (M1135, M1141 and 1143)
- ⊙ API GL-4
- ⊙ Q/SH303 091-2007

Applications

- ⊙ Suitable for lubrication domestic or imported powerful tractor, and other agriculture, forestry equipments with a common oil
- ⊙ Suitable for hydraulic and transmission systems, wet brake and power output devices of various engineering and construction machineries system for transmission, differential, final drive, hydraulic, power take-off wet brake and power steering mechanisms

Typical properties

Items	Dual purpose oil for hydraulic and transmission systems
Kinematic viscosity (100℃), mm ² /s	9.67
Viscosity index	153
Flash point (COC), ℃	220
Pour point, ℃	-33

Continuously Variable Transmission Fluid (CVTF)

Continuously variable transmission fluid (CVTF) is blended with highly refined mineral base stock of high viscosity index and/or synthetic base stock and special additives. It is verified, after various items of performance test, its outstanding performance meets lubrication requirements of vehicle continuously variable transmission. It can be used to various brand vehicles with continuously variable transmission, whether imported or domestic.

Advantages

- ⊙ Outstanding fuel economy, effectively prolonging oil drainage, reducing operation costs
- ⊙ Outstanding fluidity, providing perfect comfort for driving and riding
- ⊙ Outstanding availability at low temperature
- ⊙ Outstanding heat and oxidation stability, reducing formation of oxide
- ⊙ Outstanding friction property
- ⊙ Outstanding shear stability

Applications

- ⊙ Specially suitable for lubrication of vehicle equipped with continuously variable transmission, for various brand vehicles with continuously variable transmission

Typical properties

Items	Continuously variable transmission fluid (CVTF)
Kinematic viscosity (100℃), mm ² /s	6.98
Flash point (COC), ℃	225
Pour point, ℃	-48

Automotive Dual Clutch Transmission Fluid (DCTF)

Automotive dual clutch transmission fluid (DCTF) is blended with highly refined mineral base stock of high viscosity index and/or synthetic base stock and special additives. It is especially developed for vehicles with dual clutch transmission. It is verified, after various items of performance test, it can be used to various brand vehicles with dual clutch transmission, whether imported or domestic.

Advantages

- ⊙ Outstanding fuel economy, effectively prolonging oil drainage, reducing operation costs
- ⊙ Outstanding availability at high/low temperature
- ⊙ Outstanding heat and oxidation stability, reducing formation of oxide
- ⊙ Outstanding friction property
- ⊙ Outstanding bearing property of gears
- ⊙ Outstanding synchronism
- ⊙ Outstanding shear stability

Applications

- ⊙ Specially suitable for lubrication of automotive dual clutch transmission, for various brand vehicles with dual clutch transmission

Typical properties

Items	Automotive dual clutch transmission fluid (DCTF)
Kinematic viscosity (100°C), mm ² /s	7.28
Viscosity index	175
Flash point (COC), °C	225

Differential Gear Oil

Differential gear oil is blended with refined mineral base stock oils and good quality additives. Its quality grade is equal to that of GL-5. Meanwhile, the product has excellent anti-corrosion ability, especially strong for brass parts. With good low temperature property, it ensures normal operation of device at low temperature and meets quality requirements of differential OEM manufacturers such as Eaton. The product has several grades such as 80W/90, 85W/140 and so on in terms of its viscosity grade.

Advantages

- ⊙ Equal quality grade to GL-5, with perfect properties of extreme pressure, carrying capacity, anti-oxidation and anti-rust
- ⊙ Better anti-corrosion performance, effective protection for gearboxes parts
- ⊙ Meeting relevant property requirements for differential gear oil of OEMs such as Eaton

Performance specification

The product meets the following specifications:

- ⊙ Q/SH303 525-2009
- ⊙ Meeting relevant property requirements for differential gear oil of Eaton, obtaining its technical certificate and recommendation

Applications

- ⊙ Lubrication for mechanical locking differential and similar transfer cases
- ⊙ Especially suitable for lubrication of Eaton's locking differential gears

Typical properties

Items	LD 80W/90	LD 85W/140	Testing method
Kinematic viscosity (100℃), mm ² /s	16.19	27.71	GB/T 265
Viscosity index	109	96	GB/T 1995
Flash point (COC), ℃	200	200	GB/T 3536
Pour point, ℃	-33	-12	GB/T 3535

Fully Synthetic Heavy Duty Automotive Gear Oil

Adopting the completely new synthetic oil technology, fully synthetic heavy duty automotive gear oil is blended with well-chosen new multi-functional additives by internationally advanced process. With higher viscosity index, good anti-oxidation property and outstanding carrying capacity, the product can meet the lubrication requirement of rear axle hypoid gear of various vehicles, prolonging oil drainage, bearing possible heavy shock. Its performance is totally better than that of GL-5 heavy duty mineral automotive gear oil.

Advantages

- ⊙ Adopting synthetic oil technology, providing the product very high viscosity index, good low/high temperature property, reducing startup resistance and wear
- ⊙ Well-chosen sulphur and phosphor compound additive, providing outstanding carrying capacity, being capable of working in such strict conditions as low speed/high torque, high speed/heavy duty and so on
- ⊙ Outstanding heat stability and anti-oxidation property, effectively reducing formation of oxide and sludge, prolonging service life
- ⊙ Lower friction, effectively reducing startup and operation resistance, saving fuel and reducing operation costs
- ⊙ Stable oil membrane, effectively preventing wear and scratch as well as chemical actions such as corrosion or spall on surface of gear
- ⊙ Good anti-foaming ability, compatibility with sealed rubber material of conventional vehicles
- ⊙ Balanced formulation, producing good anti-corrosion and anti-rust properties

Performance specification

The product meets the following specifications:

- ⊙ API GL-5
- ⊙ MIL-L-2105D
- ⊙ Q/SH PRD 155-2008

Applications

- ⊙ Suitable for lubrication of drive axle (front/rear axle) and some transmission gears, especially for vehicles with hypoid gears

Typical properties

Items	Fully synthetic heavy duty automotive gear oil
SAE viscosity grade	75W/90
Kinematic viscosity (100°C), mm ² /s	16.5
Viscosity index	225
Flash point (COC), °C	215
Pour point, °C	-42

Heavy Duty Automotive Gear Oil

Heavy duty automotive gear oil is blended with highly refined base stock oils of high viscosity index and well-chosen sulphur and phosphor multi-functional additives by internationally advanced process. It can meet the strict application requirements for drive axle of various vehicle manufacturers, large scale military or civil mixed fleet, or construction machinery. It also provides the 110 grade of oil, more options for clients, as per requirements of SAE J306.

Advantages

- ⊙ Well-chosen sulphur and phosphor compound additive, providing outstanding anti-wear property and carrying capacity, being capable of working in such strict conditions as climbing slope with heavy load, emergency brake and so on
- ⊙ Outstanding thermal resistance and oxidation stability, effectively reducing formation of oxide
- ⊙ Excellent extreme pressure and shock resistance abilities, effectively preventing chemical actions such as corrosion or spalling on surface of gear
- ⊙ Balanced formulation, producing good anti-corrosion and anti-rust properties

Performance specification

The product meets the following specifications:

- ⊙ API GL-5
- ⊙ MIL-L-2105D
- ⊙ Benz MB 235.6
- ⊙ GB 13895-92
- ⊙ Q/SH PRD 155-2008

Applications

- ⊙ Suitable for lubrication of drive axle (front/rear axle) and some transmission gears, especially for vehicles with hyperbolic gears, adaptable to conditions of high speed/low torque, low speed/large torque or high speed/shock load

Typical properties

Items	Heavy duty automotive gear oil					
	75W/90	80W/90	85W/90	85W/110	85W/140	90
SAE viscosity grade	75W/90	80W/90	85W/90	85W/110	85W/140	90
Kinematic viscosity (100°C), mm ² /s	16.5	16	16.5	21.27	27.09	16.6
Viscosity index	225	104	96	95	101	97
Flash point (COC), °C	215	228	230	226	228	228
Pour point, °C	-42	-30	-20	-21	-16	-13

Moderate Duty Automotive Gear Oil

Moderate duty automotive gear oil is blended with good quality mineral base stock and good quality additives. It may meet the lubrication requirements of gears in light/moderate duty vehicles.

Advantages

- ⊙ Excellent gear carrying capacity, effectively preventing gears from scratching and wear
- ⊙ Excellent oxidation stability, reducing formation of oxide
- ⊙ Excellent anti-rust property, effectively preventing gear unit from rusting
- ⊙ Excellent defoaming property

Performance specification

The product meets the following specifications:

- ⊙ API GL-4
- ⊙ MB 235.5
- ⊙ Q/SH PRD 116-2008

Applications

- ⊙ Suitable for lubrication of drive shaft (axle) and some transmission gearboxes in light/moderate duty vehicles

Typical properties

Items	Moderate duty automotive gear oil			
	80W/90	85W/90	90	140
SAE viscosity grade	80W/90	85W/90	90	140
Kinematic viscosity (100℃), mm ² /s	16.38	19.26	18.47	27.12
Flash point (COC), ℃	233	242	262	279
Pour point, ℃	-30	-21	-18	-12



ENGINE COOLANTS

AUTOMOTIVE LUBRICANTS

(57— 59)



Organic Type Engine Coolant

Advantages

- ⊙ Adopting internationally advanced organic acid salt inhibiting technology, reducing crevice corrosion of aluminium and cavitation corrosion of cast iron, prolonging service life of engine parts, and providing durative anti-corrosion protection for cooling system
- ⊙ Strong hard water resistance ability, not easy to produce incrustation and gel deposition of silicate
- ⊙ Excellent heat transfer and outstanding protection ability at high temperature, providing perfect high temperature anti-corrosion protection for aluminium heat transfer surface in engines of modern vehicles
- ⊙ Harmless for rubber pipe and sealing material, prolonging service life of water pump and seals
- ⊙ Storable for year round with perfect stability
- ⊙ Outstanding universality, suitable for engines made of different metals, realizing one anti-freeze fluid for a mixed fleet
- ⊙ Possibly realizing all day long protection for engines used in mainland of China in year round
- ⊙ Providing anti-freeze protection at minimum temperature of -60°C , and anti-boil protection at maximum temperature of 116°C
- ⊙ An environment friendly product without harmful or potentially toxic chemicals, neither forming carcinogenic product with potential hazard to human body, nor damaging water system and soil ecosystem

Performance specification

The product meets the following specifications:

- ⊙ ASTM D3306
- ⊙ ASTM D4985
- ⊙ Q/SH PRD 145-2008

Applications

- ⊙ Suitable for passenger cars or trucks requiring engine coolant
- ⊙ Providing outstanding and durative high temperature anti-corrosion protection for aluminium alloy of modern engines and cast iron liner of diesel engines, suitable for engines fuelled by gasoline, diesel, LPG and CNG

Typical properties

Items	Organic type engine coolant					Testing method
	YF-1	YF-2	YF-2B	YF-2A	YF-3	
Color	Blue liquid					Visual observation
Boiling point, $^{\circ}\text{C}$	108	109	110	111	113	SH/T 0089
Freezing point, $^{\circ}\text{C}$	-26	-36	-41	-47	-51	SH/T 0090
PH value	8.3	8.3	8.4	8.4	8.5	SH/T 0069

FD Type Engine Coolant

Advantages

- ⊙ Excellent cooling ability, suitable for cooling system of various vehicles in cold weather
- ⊙ Outstanding anti-corrosion property, providing excellent high temperature anti-corrosion protection for aluminium heat conductive surface in automotive engine
- ⊙ With low freezing point and high boiling point, realizing all day long protection for engines used in mainland of China in year round, providing anti-freeze protection at minimum temperature of -52°C , and anti-boil protection at maximum temperature of 116°C
- ⊙ After simulated service corrosion test of 1176h, the test piece still looks new, demonstrating perfect performance

Performance specification

The product meets the following specifications:

- ⊙ ASTM D3306
- ⊙ ASTM D4985
- ⊙ SH/T 0521-1999

Applications

- ⊙ Suitable for passenger cars or trucks requiring engine coolant
- ⊙ Providing outstanding and durable high temperature anti-corrosion protection for aluminium alloy of modern engines and cast iron liner of diesel engines, suitable for engines fuelled by gasoline, diesel, LPG and CNG

Typical properties

Items	FD type engine coolant					Testing method
	FD-1	FD-2	FD-2B	FD-2A	FD-3	
Color	Transparent liquid with brilliant green					Visual observation
Odor	No peculiar smell					Olfaction
Density (20°C), kg/m^3	1064.1	1072.4	1078.3	1080.8	1082.1	SH/T 0068
Boiling point, $^{\circ}\text{C}$	108	109	110	111	113	SH/T 0089
Freezing point, $^{\circ}\text{C}$	-26	-36	-41	-46	-51	SH/T 0090
PH value	10.1	10.3	10.5	10.6	10.7	SH/T 0069

High Freezing Point Engine Coolant

Advantages

- ⊙ Adopting plural corrosion inhibitor, meeting requirements for engine coolant of high ratio of performance to cost with freezing point from -15℃ to 0℃ in south China
- ⊙ Excellent defoaming property, maintaining good defoaming ability when malfunction of defoamer or no defoamer
- ⊙ Perfect incrustation resistance ability
- ⊙ Environment friendly additive without content of chrome, phosphor, amine salt and nitrite
- ⊙ Providing outstanding anti-corrosion protection for all metallic parts of cooling system

Performance specification

The product meets the following specifications:

- ⊙ Q/SH303 516-2007

Applications

- ⊙ Suitable for cooling system of various commercial or industrial engines of passenger cars, trucks as well as stationary power unit
- ⊙ Suitable for areas where perennial temperature is above 0℃, such as south China, Southeast Asia and Middle East
- ⊙ With service life of 1-2 years

Typical properties

Items	High freezing point engine coolant			Testing method
	No. -10	No. -15	No. -20	
Color	Green	Green	Green	Visual observation
Density (20℃), kg/m ³	1031.2	1042.6	1050.2	SH/T 0068
Boiling point, ℃	102.3	104.6	106	SH/T 0089
Freezing point, ℃	-11	-16	-21	SH/T 0090
PH	10.02	10.10	10.12	SH/T 0069



BRAKE FLUIDS

AUTOMOTIVE LUBRICANTS
(60— 62)



DOT5.1 Synthetic Brake Fluid

Advantages

- ⊙ Boric acid ester brake fluid with high boiling point of dry/wet equilibrium reflux, small viscosity at low temperature, outstanding high/low temperature property
- ⊙ Excellent anti-rust, anti-corrosion, anti-oxidation and compatibility with rubber, ensuring safe and stable braking actions

Performance specification

The product meets the following specifications:

- ⊙ FMVSS NO.116 DOT5.1
- ⊙ GB 12981-2003 HZY5

Applications

- ⊙ Suitable for brake system and clutch system of various high class passenger cars, engineering machinery and heavy duty vehicles with hydraulic brake, meeting application requirements of vehicles under freezing and torrid weather conditions

Typical properties

Items		Specifications	Typical properties		
Equilibrium reflux boiling point (ERBP), °C		≥260	270		
Wet equilibrium reflux boiling point (WERBP), °C		≥180	184		
Kinematic viscosity (-40°C), mm ² /s		≤900	810		
Kinematic viscosity (100°C), mm ² /s		≥1.5	2.110		
pH		7.0~11.5	7.8		
Metal corrosivity (100°C, 120h) Mass variation, mg/cm ²	Tin	±0.2	0.00		
	Steel	±0.2	0.00		
	Aluminium	±0.1	0.00		
	Cast iron	±0.2	0.00		
	Red copper	±0.4	0.02		
	Brass	±0.4	0.03		
	Zinc	±0.4	0.05		
Evaporation property (100°C, 168h)		Evaporation loss, %	≤80		
		Residuum pour point, °C	≤-5		
Rubber compatibility (70h)	SBR cup	70°C	Root cylinder increment, mm	0.15~1.4	0.62
			Hardness variation, IRHD	0~10	5
	cup	120°C	Root cylinder increment, mm	0.15~1.4	0.78
			Hardness variation, IRHD	0~15	6
	EPDM cup or test piece	70°C	Volume change, %	1~10	1.80
			Hardness variation, IRHD	0~10	3
		120°C	Volume change, %	1~10	2.45
			Hardness variation, IRHD	0~15	3

Precautions in application

- ⊙ Avoiding splash on surface of painted part
- ⊙ With hygroscopicity, requiring airtight storage after unsealing
- ⊙ Avoiding pollution from dirt, mineral oil, fuel and water, otherwise causing malfunction brake
- ⊙ With toxic materials such as diol, polyglycol ether, avoiding eating by accident, keeping out of reach of children

DOT4 Synthetic Brake Fluid

Advantages

- ⊙ Boric acid ester brake fluid with high boiling point of dry/wet equilibrium reflux, outstanding high/low temperature property
- ⊙ Excellent anti-rust, anti-corrosion, anti-oxidation and compatibility with rubber, ensuring safe and stable braking actions

Performance specification

The product meets the following specifications:

- ⊙ FMVSS NO.116 DOT4
- ⊙ GB 12981-2003 HZY4

Applications

- ⊙ Suitable for brake system of various passenger cars and heavy duty trucks with hydraulic brake, and clutch system of engineering machinery, meeting application requirements of vehicles under conditions of torrid, cold or freezing weathers, or in mountain areas

Typical properties

Items		Specifications	Typical properties		
Equilibrium reflux boiling point (ERBP), °C		≥ 230	260		
Wet equilibrium reflux boiling point (WERBP), °C		≥ 155	163		
Kinematic viscosity (-40°C), mm ² /s		≤ 1800	1175		
Kinematic viscosity (100°C), mm ² /s		≥ 1.5	2.127		
pH		7.0~11.5	8.9		
Metal corrosivity (100°C, 120h) Mass variation, mg/cm ²	Tin	± 0.2	0.00		
	Steel	± 0.2	0.00		
	Aluminium	± 0.1	0.00		
	Cast iron	± 0.2	0.00		
	Red copper	± 0.4	0.09		
	Brass	± 0.4	0.10		
Evaporation property (100°C, 168h)	Evaporation loss, %	≤ 80	72		
	Residuum pour point, °C	≤ -5	< -5		
Rubber compatibility (70h)	SBR cup	70°C	Root cylinder increment, mm	0.15~1.4	0.52
		70°C	Hardness variation, IRHD	0~10	4
	120°C	70°C	Root cylinder increment, mm	0.15~1.4	0.67
		70°C	Hardness variation, IRHD	0~15	6
	EPDM cup or test piece	70°C	Volume change, %	1~10	1.44
			Hardness variation, IRHD	0~10	1
		120°C	Volume change, %	1~10	2.35
			Hardness variation, IRHD	0~15	3

Precautions in application

- ⊙ Avoiding splash on surface of painted part
- ⊙ With hygroscopicity, requiring airproof storage after unsealing
- ⊙ Avoiding pollution from dirt, mineral oil, fuel and water, otherwise causing malfunction brake
- ⊙ With toxic materials such as polyglycol ether, avoiding eating by accident, keeping out of reach of children

DOT3 Synthetic Brake Fluid

Advantages

- ⊙ Boric acid ester brake fluid with high boiling point of dry/wet equilibrium reflux, outstanding high/low temperature property
- ⊙ Excellent anti-rust, anti-corrosion, anti-oxidation and compatibility with rubber, ensuring safe and stable braking actions

Performance specification

The product meets the following specifications:

- ⊙ FMVSS No.116 DOT3
- ⊙ GB 12981-2003 HZY3

Applications

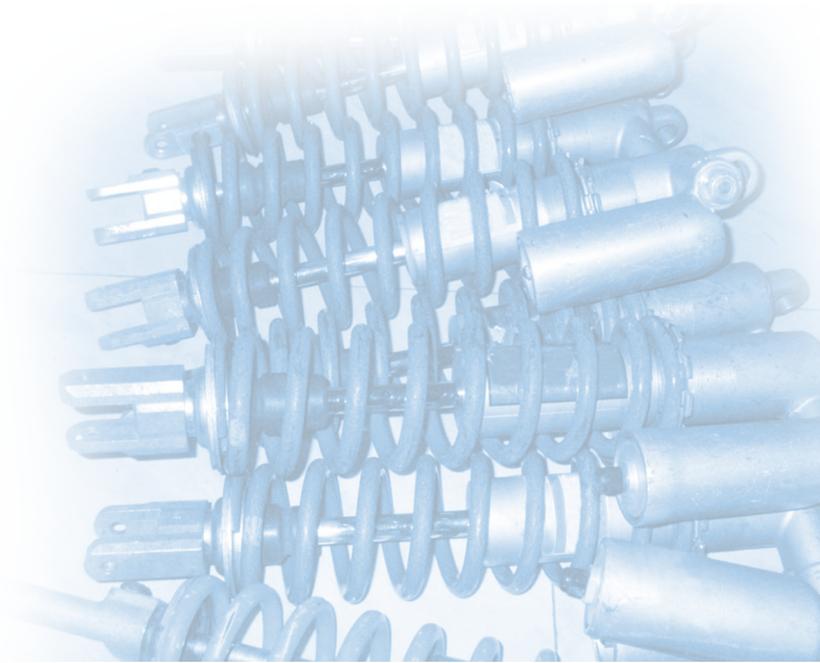
- ⊙ Suitable for brake system of various passenger cars and heavy duty trucks with hydraulic brake, and clutch system of engineering machinery, meeting application requirements of vehicles under conditions of torrid, cold or freezing weathers, or in mountain areas.

Typical properties

Items		Specifications	Typical properties	
Equilibrium reflux boiling point (ERBP), °C		≥205	223	
Wet equilibrium reflux boiling point (WERBP), °C		≥140	155	
Kinematic viscosity (-40°C), mm ² /s		≤1500	1250	
Kinematic viscosity (100°C), mm ² /s		≥1.5	2.040	
pH		7.0~11.5	9.3	
Metal corrosivity (100°C, 120h) Mass variation, mg/cm ²		Tin	±0.2	
		Steel	±0.2	
		Aluminium	±0.1	
		Cast iron	±0.2	
		Red copper	±0.4	
		Brass	±0.4	
		Zinc	±0.4	
Evaporation property (100°C, 168h)		Evaporation loss, %	≤80	
		Residuum pour point, °C	≤-5	
Rubber compatibility (70h)	SBR cup	70°C	Root cylinder increment, mm	0~10
			Hardness variation, IRHD	0.15~1.4
		120°C	Root cylinder increment, mm	0~15
			Hardness variation, IRHD	0.15~1.4
	EPDM cup or test piece	70°C	Volume change, %	1~10
			Hardness variation, IRHD	0~10
		120°C	Volume change, %	1~10
			Hardness variation, IRHD	0~15
				2
				3.50

Precautions in application

- ⊙ Avoiding splash on surface of painted part
- ⊙ With hygroscopicity, requiring airproof storage after unsealing
- ⊙ Avoiding pollution from dirt, mineral oil, fuel and water, otherwise causing malfunction brake
- ⊙ With toxic materials such as diol, polyglycol ether, avoiding eating by accident, keeping out of the reach of children



SHOCK ABSORBER OILS

AUTOMOTIVE LUBRICANTS
(63— 64)



Automobile Shock Absorber Oil

As a special product dedicated to automobile shock absorber, automobile shock absorber oil is blended with highly refined base stock with high viscosity index and multi-functional additives. Product with different specification may be selected according to recommended service life of shock absorber.

Advantages

- ⊙ Outstanding high/low temperature properties, with application conditions of all weather and biotemperature, propitious application at temperature of -45℃ to 50℃
- ⊙ High viscosity index, super viscosity and temperature properties, ensuring outstanding viscosity stability
- ⊙ Super strong anti-oxidation ability, effectively prolonging service life of parts in shock absorber
- ⊙ Outstanding anti-wear, anti-friction properties, effectively protecting parts of shock absorber
- ⊙ Unique balanced formulation system, good foam stability and rubber compatibility, ensuring normal and smooth application of parts in shock absorber

Performance specification

The product meets the following specifications:

- ⊙ Q/SH303 094-2007

Applications

- ⊙ Suitable for hydraulic shock absorber of automobiles under various severe conditions

Typical properties

Items	Automobile shock absorber oil		
	I	II	III
Grade of product	I	II	III
Kinematic viscosity (100℃), mm ² /s	3.364	3.282	3.326
Kinematic viscosity (40℃), mm ² /s	11.36	11.17	11.64
Viscosity index	187	179	170
Flash point (COC), ℃	182	180	188
Pour point, ℃	-56	-51	-51

Motorcycle Shock Absorber Oil

As a special product dedicated to motorcycle shock absorber, motorcycle shock absorber oil is blended with highly refined base stock with high viscosity index and multi-functional additives. It is applied to all kinds of motorcycle shock absorbers working under severe conditions.

Advantages

- ⊙ Outstanding high/low temperature properties, with application conditions of all weather, propitious application at temperature of -40℃ to 50℃
- ⊙ High viscosity index, good viscosity and temperature properties, ensuring good viscosity stability
- ⊙ Relatively strong anti-oxidation ability, providing fill-for-life protection to shock absorber
- ⊙ Excellent anti-wear and friction reducing abilities, effectively protecting parts of shock absorber
- ⊙ Good foam stability and rubber compatibility, ensuring normal and smooth running of shock absorber parts

Performance specification

The product meets the following specifications:

- ⊙ Q/SH303 065-2007

Applications

- ⊙ Suitable for motorcycle shock absorber
- ⊙ Especially suitable for all kinds of shock absorbers working under severe conditions

Typical properties

Items	Motorcycle shock absorber oil		
ISO viscosity grade	15	22	32
Kinematic viscosity (40℃), mm ² /s	13.79	20.14	32.66
Flash point (COC), ℃	182	213	225
Pour point, ℃	-45	-35	-36



APPENDIX

AUTOMOTIVE LUBRICANTS
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Guidelines for Storage and Application

- ◆ Normally stored in drum, bulk oil is likely to be affected by condensed water and various kinds of pollutants, forming sludge-like matter at bottom of the drum which may bring negative effect to application of lubricants. Therefore, the bottom of the drum should be designed in socket form or to be inclined with oil drain hole through which deposits will be discharged out on schedule. Furthermore, the inside of the drum should be cleaned regularly.
- ◆ Lubricant, not weatherable, should be stored indoor as practicable as possible. It is a must for drummed lubricant unpacked, lubricant in bulk and lubricating grease.
- ◆ Lubricant drum exposed in open air should be laid down so far as possible. Note that rolling is not allowable. The oil drain hole at end should not be put above. If vertically placed, bottom-up is preferable with a downward cover. Or, the drum may be slightly tilted to keep the drain hole upward and rain water inaccessible.
- ◆ In order to prevent aqueous vapour from entering the drum, it should be covered as soon as possible.
- ◆ Vessels for little storage or refilling must be equipped with cover and kept clean by regular ablution and drying with cloth. Waste cotton yarn is prohibited because fiber out of it shall enter the lubrication system of equipment by way of vessel and block up the fluid of lubricant.
- ◆ Each lubricant should be contained in dedicated vessel with its name labeled on to avoid confusion.
- ◆ Lubrication system of new or overhauled equipment must be cleaned and running-in as prescribed.
- ◆ Congener lubricants from different manufacturers should not be used as the same. Otherwise, test must be carried out. Products of different quality grades from the same manufacture are not allowed to be mixed up for use. Substitute must abide by the rule of “higher for lower” and their viscosity grade should be the same.

Guidelines for Application of HSE

1) Impact of lubricant on environment

Discarded lubricant is toxic waste hard to be degraded in nature. The following precautions should be taken in order to minimize the impact of lubricant on environment in process of or after completion of application:

- ⦿ When lubricant is taken out of drum, appropriate measures should be taken to prevent it from splashing upon the ground.
- ⦿ After applied, lubricant should not be dumped about at will but be collected and intensively disposed.
- ⦿ Lubricant should be managed as per its purpose by dedicated personnel. Mark should be adopted for identification of new oil from old one. In this case, confusion may be avoided and waste shall not occur.

2) Precautions to guarantee application safety of lubricant

- ⦿ When applied, lubricant with higher flash point should be preferably selected.
- ⦿ Safety articles should be adopted to avoid direct contact with lubricant in process of operation.
- ⦿ Ventilation device should be installed in applicability, to lower concentration of oil mist in the air.
- ⦿ It should be equipped with appropriate cleaning appliance, medical treatment and first aid supply.
- ⦿ Dedicated personnel should be appointed, if possible, for the execution of the above precautions.

3) Precautions to guarantee human health in application of lubricant

- ⦿ Labor protection articles should be used as prescribed. Direct contact of skin should be avoided with lubricant, especially in case of cuts or scratches in body.
- ⦿ Clothes saturated with oil should be stripped off. Dirty rags should not be used to wipe oil stains off skin for lest of hurt.
- ⦿ Clean water and detergent should be equipped in work place so that oil stains carelessly caused can be eliminated. Gasoline or kerosene is prohibited for cleaning of skin.
- ⦿ Supervisor should be made known if any part of body suffers from tetter, ulceration or other allergic symptoms.

Quality Grades of Engine Oil by American Petroleum Institute (API)

Gasoline engine oil:		
SA	Applied to old type engine in moderate condition.	Pure mineral oil without additive.
SB	Applied to light duty gasoline engine.	The 1 st engine oil with additive, with certain anti-oxidation and anti-abrasion abilities.
SC	Applied to 1964 model of engine.	With anti-sludging and anti-rust abilities at low temperature.
SD	Applied to 1968 model of engine.	With high/low temperature deposit and wear resistances.
SE	Applied to 1972 model of engine.	With better abilities for high temperature oxidation, low temperature rust and high temperature deposit resistances.
SF	Applied to 1980 model of engine.	With better oxidation stability than SE, meanwhile, anti-wear is improved.
SG	Applied to 1989 model of engine.	Inhibiting deposit of engine, oxidation of engine oil, reducing wear of engine, and lowering formation of sludging at low temperature.
SH	Applied to 1993 model of engine.	Stricter procedures for test than SG, better volatility and filterability resistances.
SJ	Applied to 1996 model of engine.	Added bench test and simulation test based on SH, volatility is improved.
SL	Applied to 2001 model of engine.	Improving fuel economy, protecting exhaust purification system, preventing catalytic converter from catalyst damage, better protection for engine and longer oil drainage.
SM	Applied to models of engine after 2004.	Improving fuel economy, better anti-oxidation and anti-wear properties, providing better protection for engine and longer oil drainage, effectively protecting the environment.

Diesel engine oil:		
CA	Applied to light duty engine.	Applied with high quality fuel, with anti-corrosion property.
CB	Applied to medium duty engine of 1949 model.	Applied with poor quality fuel, with anti-corrosion and deposit reducing properties.
CC	Applied to medium duty engine of 1961 model.	Applied to turbocharging diesel engine with light duty, preventing high/low temperature deposit, rust and corrosion.
CD	Applied to heavy duty engine of 1955 model.	Applied to turbocharging diesel engine with heavy duty, effectively reducing wear and preventing formation of deposit.
CD-II	Applied to heavy duty engine (two stroke) of 1985 model.	Applied to two stroke engine, effectively reducing wear and deposit.
CE	Applied to heavy duty engine of 1983 model.	Applied to turbocharging engine of high speed and heavy duty.
CF	Applied to 1994 model engine.	Applied to various diesel engine used on non-highway purpose.
CF-2	Applied to heavy duty engine (two stroke) of 1994 model.	Applied to two stroke heavy duty engine, effectively preventing wear, adhere to ring and formation of deposit.
CF-4	Applied to 1990 model engine.	Applied to engine of heavy duty truck and that of engineering machinery, effectively reducing oil consumption and formation of deposit.
CG-4	Applied to 1994 model engine.	Applied to engine of heavy duty high way truck and site equipment (only to low sulphur diesel).
CH-4	Applied to 1999 model engine.	Meeting 1998 American emission standard and covering application of both high and low sulphur content fuel.
CI-4	Applied to 2003 model engine.	Applied to diesel engine equipped with exhaust gas recirculation (EGR) device.
CJ-4	Applied to 2006 model engine.	Applied to diesel engine equipped with diesel particulate filter (DPF) device.

Viscosity Classification of Engine Oil by Society of Automotive Engineers (SAE)

Viscosity classification of engine oil:

SAE J300-2007 (i.e. the following table), viscosity classification by SAE, includes “W” and the other grades. Related to low temperature startup, the “W” grade focuses on the minimum pumping temperature of engine oil and the viscosity under 0°C. The other grades just indicate the viscosity at 100°C. Engine oils conforming to both “W” and other grades are called multi-grade oils. Since the classification just marks the upper limit in range of viscosity at low temperature, the engine oil of lower “W” grade shall accord with the viscosity requirement of any engine oil with higher “W” grade. That is, engine oil “10W” shall meet the viscosity requirements of that of “15W”, “20W” or “25W”.

Viscosity grade of engine oil, SAE J300-2001

SAE viscosity grade	Kinematic viscosity at low temperature CP Max.	Boundary pumping viscosity CP Max.	100°C Kinematic viscosity		High temperature and high shear viscosity CP(150°C, 106s-1) Min.
			Min.	Max.	
0W	6250 (-35°C)	6000 (-40°C)	3.8	---	---
5W	6600 (-30°C)	6000 (-35°C)	3.8	---	---
10W	7000 (-25°C)	6000 (-30°C)	4.1	---	---
15W	7000 (-20°C)	6000 (-25°C)	5.6	---	---
20W	9500 (-15°C)	6000 (-20°C)	5.6	---	---
25W	13000 (-10°C)	6000 (-15°C)	9.3	---	---
20	---	---	5.6	<9.3	2.6
30	---	---	9.3	<12.5	2.9
40	---	---	12.5	<16.3	2.9 (1)
40	---	---	12.5	<16.3	3.7 (2)
50	---	---	16.3	<21.9	3.7
60	---	---	21.9	<26.1	3.7

- (1) SAE grade 0W-40, 5W-40 and 10W-40
- (2) SAE grade 15W-40, 20W-40, 25W-40 and 40

Quality Grade of Automotive Gear Oil by American Petroleum Institute (API)

API GL-1

This grade of oil is used for lubrication of the helical bevel gears, the turbine rear axle and some manual transmission of the vehicles in moderate conditions of low flank pressure and sliding velocity. In this case, pure mineral oil can be used and the performance shall be satisfactory. Anti-oxidation agent, anti-rust agent, defoamer and depressant can improve the performance, but attrition improver and extreme pressure additive are not appropriate for use.

API GL-2

This grade of oil is used for lubrication of turbine rear axle of vehicle under the load, temperature and sliding velocity with which API GL-1 fails to deal.

API GL-3

This grade of oil is used for lubrication of manual transmission and medium load rear axle of spiral bevel gear working in rigorous situations. The carrying capacity of the lubricant is higher than that of API GL-2 but lower of API GL-4.

API GL-4

This grade of oil is used for lubrication of various gears in conditions of high speed/low torque and low speed/high torque, especially for low load hyperbolic gears used in vehicles and other devices for vehicles.

API GL-5

This grade of oil is used for lubrication of various gears in vehicles and other devices for vehicles in conditions of high speed and shock load, high speed/low torque and low speed/high torque, especially for rear axle of hyperbolic gears.

Viscosity Classification of Automotive Gear Oil by Society of Automotive Engineers (SAE)

In accordance with engine oil classification, viscosity classification of automotive gear oil also falls into two groups, one group is grade “W” indicating low temperature properties, and the other group indicates the viscosity at 100 °C .

SAE J306-1998

SAE viscosity grade	Temperature/°C at which viscosity reaches 150000 (mPa·s), not higher than	Kinematic viscosity at 100°C	
		Not lower than	Not higher than
70W	-55	4.1	---
75W	-40	4.1	---
80W	-26	7.0	---
85W	-12	11.0	---
80	---	7.0	11.0
85	---	11.0	13.5
90	---	13.5	24.0
140	---	24.0	41.0
250	---	41.0	---

Note not to treat viscosity grade of engine oil as that of gear oil. Viscosity of SAE 80W gear oil is similar to that of SAE 20W-20, while SAE 90 gear oil to SAE 50 engine oil. Restriction of 150000mPa.s is adopted just because of the lubrication requirement of transmission bearing which may fail when viscosity is too high. Some transmissions demand engine oil with lower viscosity to ensure its smooth operation.

Notes to Commonly Used Abbreviations

AAMA	American Automobile Manufacturers Association
ACC	American Chemistry Council (formerly CMA)
ACEA	European Automobile Manufacturers Association
AGMA	American Gear Manufacturers Association
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
CCMC	Committee of Common Market Automobile Constructors (former ACEA)
CEC	Conseil Europeen de Coordination
CMA	Chemical Manufacturers Association
DIN	Deutsches Institut für Normung
EMA	Engine Manufacturers Association
GB	China National Standard (Guobiao)
ILSAC	International Lubricant Standard and Approval Council
ISO	International Standard Organization
JAMA	Japan Automobile Manufacturers Association
JASE	Society of Automotive Engineers (Japan)
JASO	Japanese Automobile Standards Organization
JIS	Japanese Industrial Standard
LMOA	Locomotive Maintenance Operator Association
MIL	Military Standards
NF	French Test Standards
NLGI	National Lubricating Grease Institute
NMMA	National Marine Manufacturers Association
NPRA	National Petroleum Refiners Association
SAE	Society of Automotive Engineers
VG	Viscosity Grade
VI	Viscosity Index

Announcements

The product typical data listed in the manual is average value calculated by the Company according to the product data manufactured in a certain period of time. It represents or guarantees neither the accordance of the data with that of product made anytime, nor a kind of quality index for judgment of qualification of product. The data in the manual is just reference for the clients of lubricants.

The name, specification and data of the products listed in the manual are tried to be correct and accurate. Due to everlasting study and improvement of all products carried out by the Company for better meeting the requirements of our clients, notice shall not be made if relevant data of the products listed in the manual is already changed.

For the sake of better understanding of product applications, the names of some products have been adjusted. In this case, actual name on the package shall prevail.

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