Hi friend.
Welcome to YEFE (Shenzhen)Lubricating Oil Co.,Ltd.I'm Li,the sales manager.
YEFE Lubricating Oil is a company that focuses on the production and sales of
motorcycle lubricants and automotive lubricants We have produced more than
300 bottle types in different sizes and shapes,our factory is more than 80000m² .
We provides engine oil and industrial lubricants to over 60 Fortune Global 500 companies
Presently,our products have been sold in more than 20 countries in Southeast
Asia,Africa and even South American.Our vision is to be the High quality
Sincerely hope to cooperate with you.

Thanks

亿菲（深圳）润滑油有限公司出品
YEFE (shenzhen) lubricating oil co.. LTD
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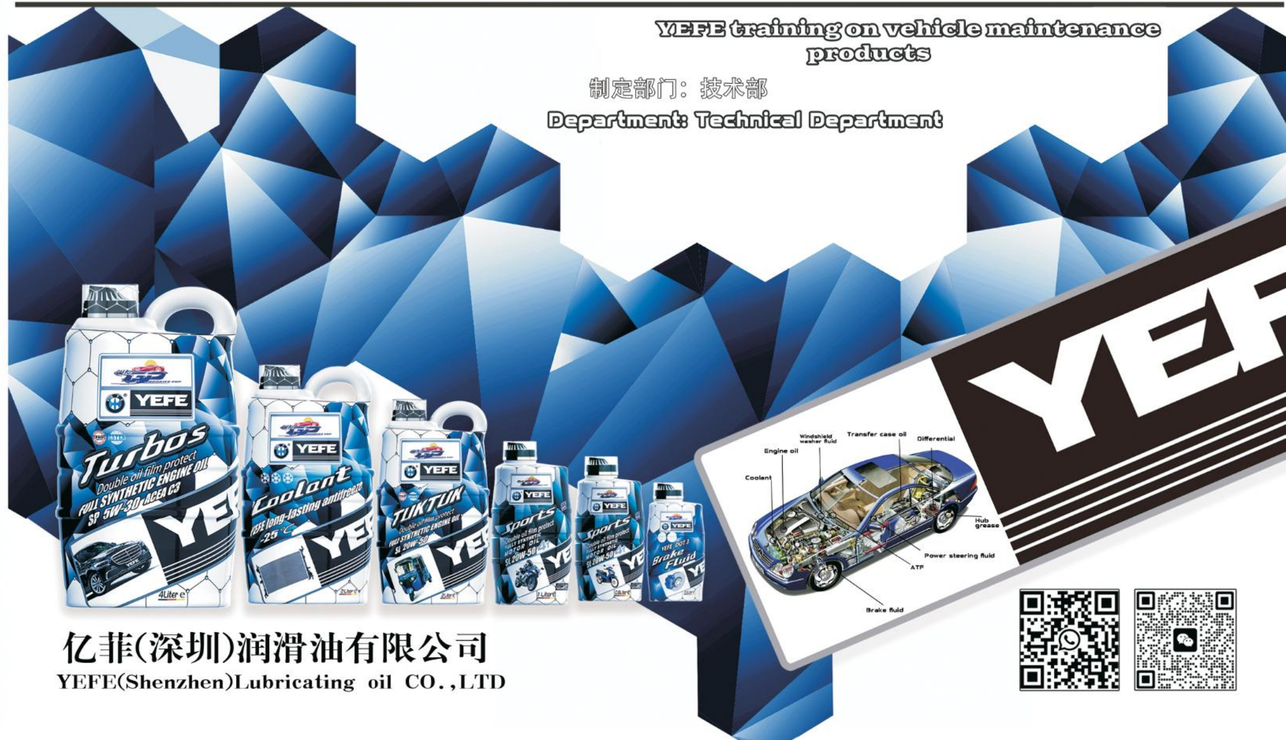
Lubricating oil export
NUMBER ONE

亿菲车用养护品培训

YEFE training on vehicle maintenance producte

制定部门：技术部
Department: Technical Department



亿菲(深圳)润滑油有限公司
YEFE(Shenzhen)Lubricating oil CO.,LTD

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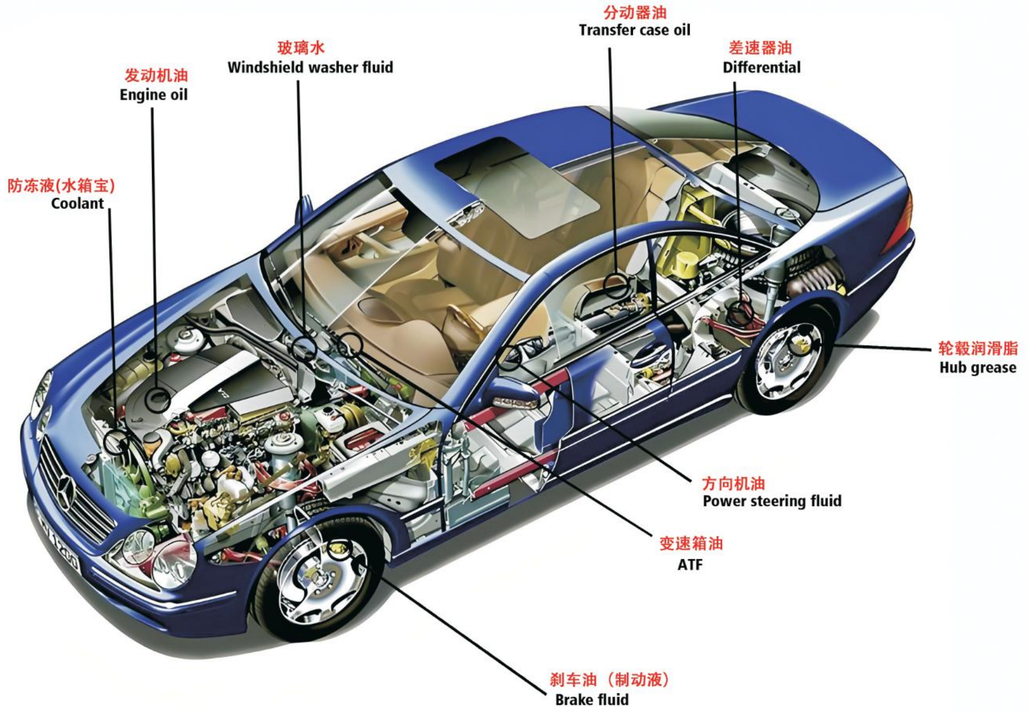
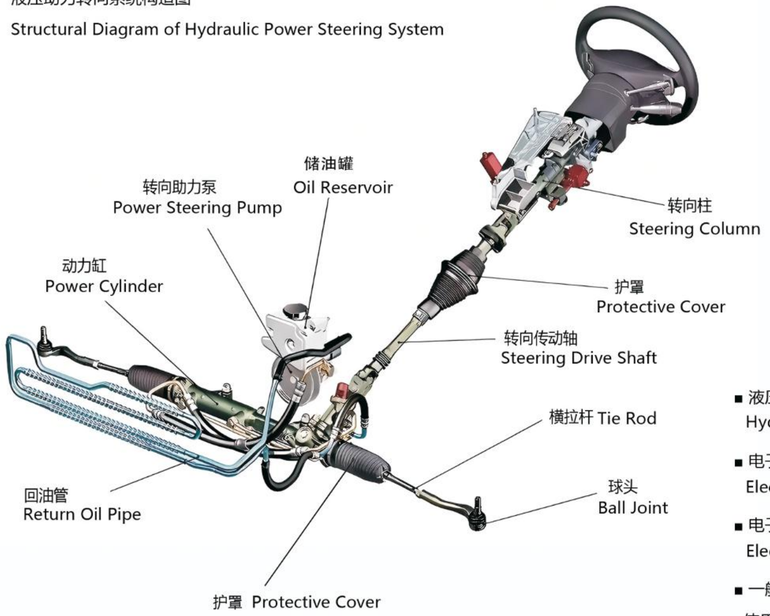


液压助力转向系统构造图

Structural Diagram of Hydraulic Power Steering System



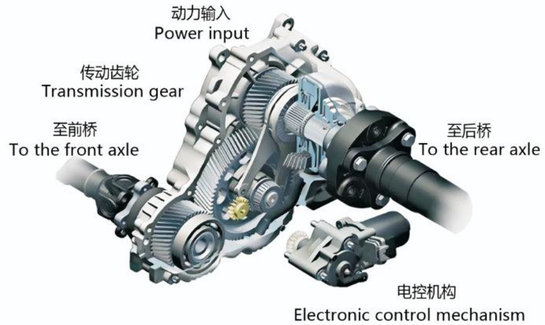
- 液压助力转向系统
  Hydraulic Power Steering System
- 电子液压助力转向系统
  Electronic Hydraulic Power Steering System
- 电子助力转向系统
  Electronic Power Steering System
- 一般使用8#液力传动油也可以

  使用ATF高粘度传动液

  Generally, #8 hydraulic transmission oil can be used, and ATF high-viscosity transmission fluid can also be used.

齿轮传动式分动器

Gear-driven transfer case

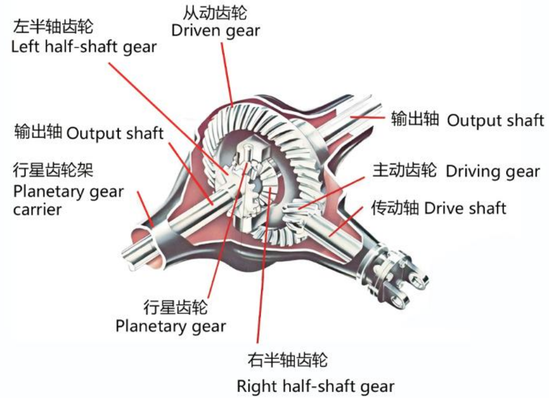


分动器：四驱车专用，将变速箱动力分配至四轮，一般使用 GL-5 75W-85重负荷齿轮油。更换频度：一般10万公里换油；

Transfer case：Specifically for four-wheel drive vehicles. It distributes the power from the transmission to all four wheels. Generally, GL-5 75W-85 heavy-duty gear oil is used. Replacement frequency: Generally, the oil should be changed every 100,000 kilometers.

普通差速器三维示意图

Three-dimensional schematic diagram of a common differential

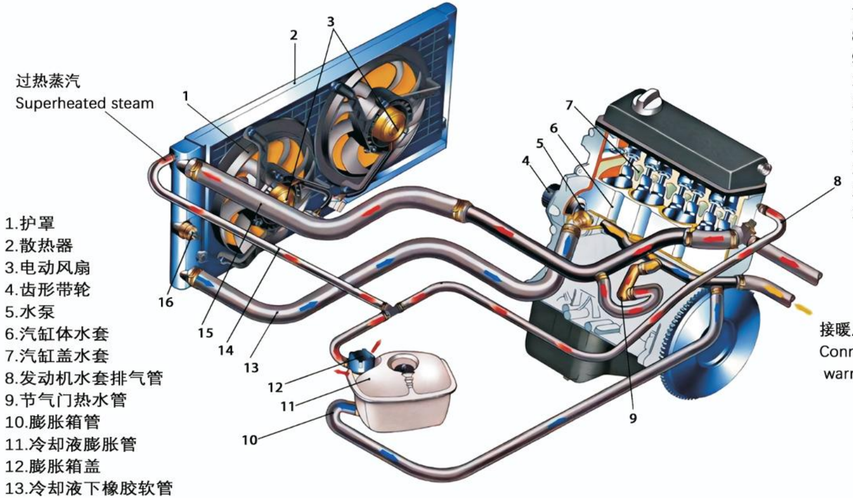


差速器：转向时保持四轮转速均衡/一般使用GL-5 75W-85重负荷齿轮油。更换频度：一般8万公里换油

Differential：It keeps the rotational speeds of the four wheels balanced when turning. Generally, GL-5 75W-85 heavy-duty gear oil is used. Replacement frequency: Generally, the oil should be changed every 80,000 kilometers.

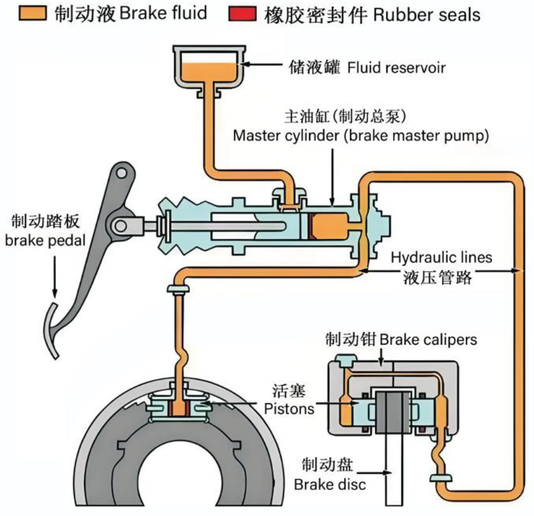
Radiator coolant (for use in high-temperature environments)
Antifreeze (-25℃) for use in cold environments
Antifreeze (-40℃) for use in extremely cold environments
Replacement frequency: Add at any time.

水箱宝(高气温环境使用)
防冻液(-25℃)寒冷环境使用
防冻液(-40℃)极寒环境使用
更换频度：随时添加



1. Protective cover
2. Radiator
3. Electric fan
4. Toothed pulley
5. Water pump
6. Cylinder block water jacket
7. Cylinder head water jacket
8. Engine water jacket exhaust pipe
9. Throttle hot water pipe
10. Expansion tank pipe
11. Coolant expansion pipe
12. Expansion tank cap
13. Lower rubber hose for coolant
14. Radiator exhaust pipe
15. Upper rubber hose for coolant
16. Two-speed thermal switch for electric fan

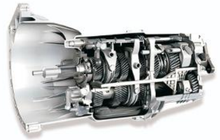
1.护罩
2.散热器
3.电动风扇
4.齿形带轮
5.水泵
6.汽缸体水套
7.汽缸盖水套
8.发动机水套排气管
9.节气门热水管
10.膨胀箱管
11.冷却液膨胀管
12.膨胀箱盖
13.冷却液下橡胶软管
14.散热器排气管
15.冷却液上橡胶软管
16.电动风扇双速热敏开关



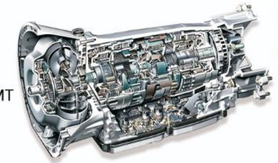
1.目前制动液有分为DOT3(醇醚型)、DOT4(酯型)、DOT5.1(硼酸酯型) 分别对应国标HZY3、HZY4、HZY5
2.更换频度：根据环境而定，一般2年更换。
3.轮毂专用润滑脂目前主要为2#复合极压锂基脂。
4.更换频度：随时添加

1.Currently, brake fluids are classified into DOT3 (alcohol-ether type), DOT4 (ester type), and DOT5.1 (borate ester type), which respectively correspond to the national standards HZY3, HZY4, and HZY5.
2.Replacement frequency: It depends on the environment. Generally, it needs to be replaced every two years.
3.At present, the special grease for wheel hubs is mainly No. 2 complex extreme pressure lithium-based grease.
4.Replacement frequency: Add it at any time as needed.

MT

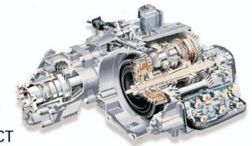


AMT



CVT

DCT



发动机通过燃烧液化天然气（LNG）、压缩天然气（CNG）、液化石油气（LPG）、汽油、柴油等燃料产生能量。发动机通过内部零件将能量输出。然后，与离合器和变速器共同控制输出能量的大小。最终，能量通过差速器到达轮胎以驱动车辆。目前，主流的变速器主要包括手动变速器（MT）、自动手动变速器（AMT）、无级变速器（CVT）、双离合变速器（DCT）等。

The engine generates energy by burning fuels such as LNG (liquefied natural gas), CNG (compressed natural gas), LPG (liquefied petroleum gas), gasoline, diesel, etc. It outputs the energy through the internal components of the engine. Then, jointly with the clutch and the transmission, it controls the magnitude of the output energy. Eventually, the energy reaches the tires through the differential to drive the vehicle. Currently, the mainstream transmissions mainly include MT (manual transmission), AMT (automated manual transmission), CVT (continuously variable transmission), DCT (dual-clutch transmission), etc.

汽油发动机机油润滑油道
Lubricating oil passages for gasoline engine oil

- 油底壳
- Oil pan

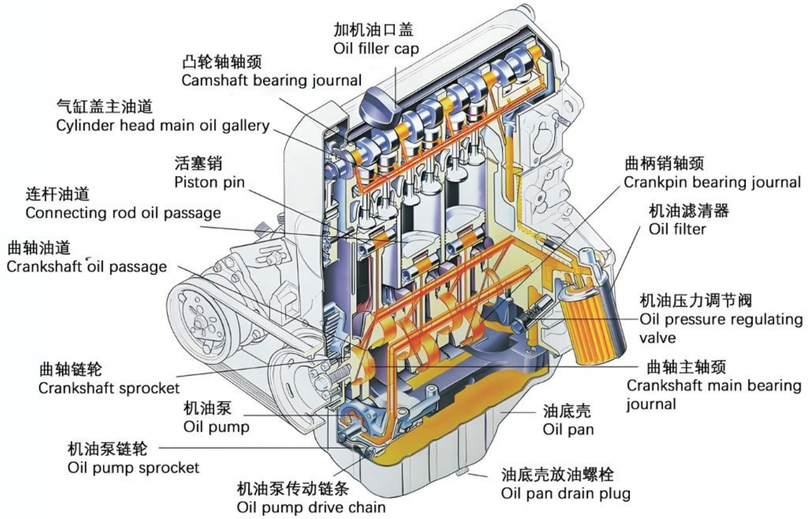
- 凸轮轴 - 挺杆
- Camshaft - tappet

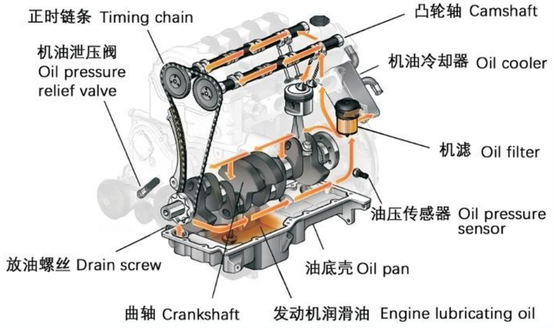
- 机油滤芯
- Oil filter element

- 活塞 - 汽缸
- Piston - cylinder

- 机油冷却
- Oil cooling

- 曲轴 - 轴瓦
- Crankshaft - bearing shell

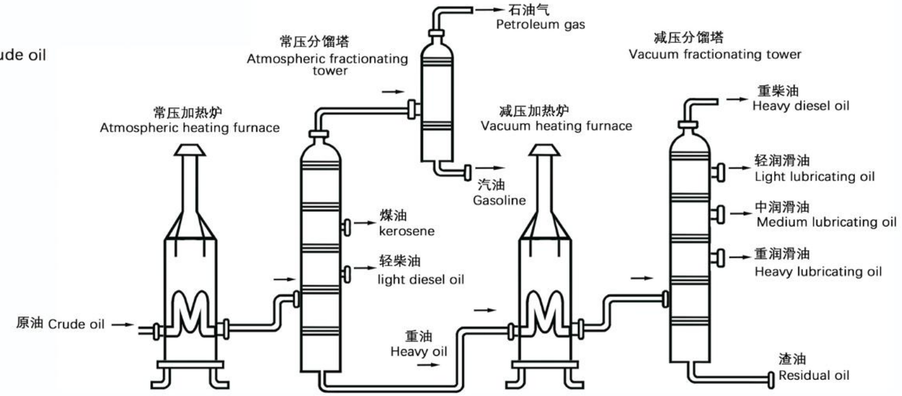




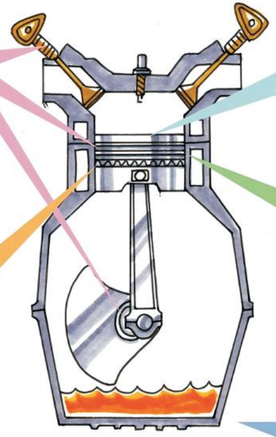
发动机油通过机油泵将发动机油泵送到各个润滑区域，首先通过机油滤芯过滤发动机有中磨损杂质、油泥与胶质，再通过水箱水冷却发动机油，然后通过各个润滑油道到达关键的润滑部位，最终发挥发动机油的功能。

The engine oil is pumped by the oil pump to various lubrication areas. Firstly, the engine oil passes through the oil filter to filter out the wear impurities, sludge and gum in the engine oil. Then, the engine oil is cooled by the water in the radiator. After that, it reaches the key lubrication parts through various lubricating oil passages and finally plays the functions of the engine oil.

原油-润滑油提炼过程
The refining process of crude oil into lubricating oil



发动机油的5大功能
Five major functions of engine oil.



润滑作用 Lubricating effect

让进气门和凸轮轴、汽缸和活塞、曲轴和轴承等金属之间 形成油膜，减少摩擦，使发动机运转平稳。

It forms an oil film between metals such as the intake valve and the camshaft, the cylinder and the piston, and the crankshaft and the bearing,reducing friction and enabling the engine to operate smoothly.

密封作用 Sealing effect

填充于汽缸和活塞间的间隙，防止发动机燃烧室的压缩气体和燃气漏出，从而充分发挥发动机的功率。

It fills the gap between the cylinder and the piston to prevent the compressed gas and combustion gas in the engine combustion chamber from leaking out, so as to fully utilize the power of the engine.

冷却作用 Cooling effect

当发动机内部燃烧气体的温度达2,000～3,000℃时，润滑油吸收发动机内部的热量来冷却活塞，防止由于过热引起的膨胀、烧结。

When the temperature of the combustion gas inside the engine reaches 2,000 to 3,000 °C, the lubricating oil cools the pistons by absorbing the heat inside the engine, preventing expansion and sintering caused by overheating.

清洁分散作用 Cleaning and dispersing effect

燃烧时产生的烟油和不溶成分妨碍发动机的正常运转。机油将这些污物吸收，使发动机内部干净。

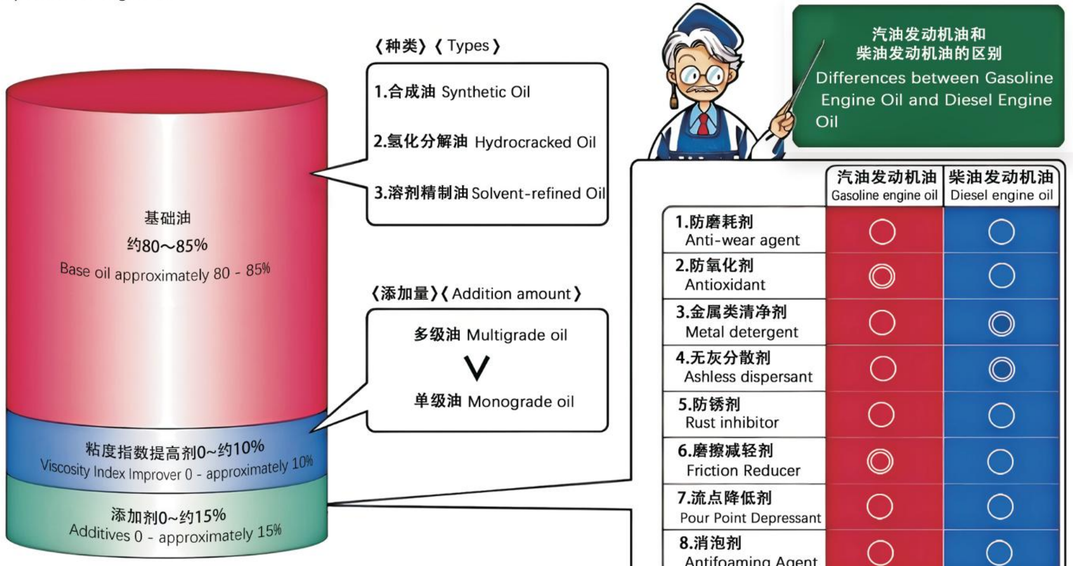
The tar and insoluble components generated during combustion will hinder the normal operation of the engine. Engine oil absorbs these contaminants to keep the inside of the engine clean.

防锈作用 Antirust effect

附着于发动机内部的金属表面，具有不让金属表面生锈、腐蚀的表面涂层剂的作用。

It adheres to the metal surfaces inside the engine and functions as a surface coating agent that prevents the metal surfaces from rusting and corroding.

发动机油的构成
Composition of engine oil

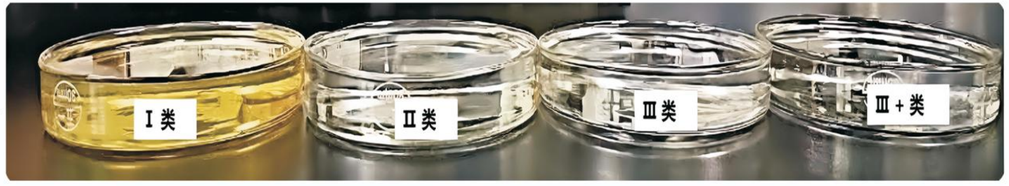


基础油 BASE OIL： Ⅰ、Ⅱ、Ⅲ、Ⅲ+、Ⅳ

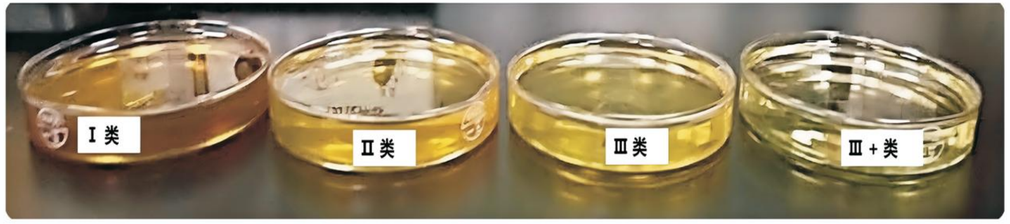
添加剂 ADDITIVES： 国产复合剂 Domestic additives package
进口复合剂 Imported additives package
补充单剂 Supplementary single agent Ⅶ PDD

基础油种类 Types of base oils	蒸发损失（250℃ 1h） Evaporation loss (at 250℃ for 1 hour)
Ⅰ	20.22%
Ⅱ	11.25%
Ⅲ	8.70%
Ⅲ+	6.20%

常温
Normal temperature



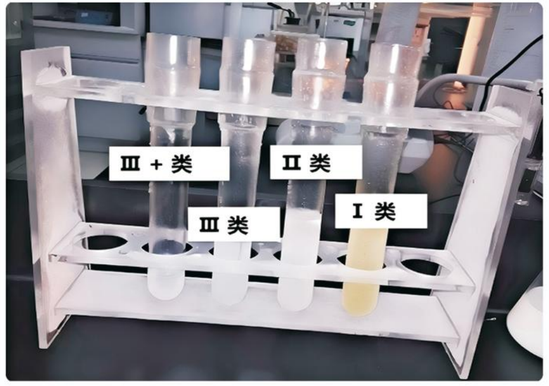
250℃
1小时后
At 250℃
After 1 hour



将四种基础油依次称量同样的量放入试管中，然后再置于-35℃恒温恒湿箱内，2h后拿出，平放如左图，3s后状态，其低温流动性依次优越(Ⅰ、Ⅱ、Ⅲ、Ⅲ+)。以此状态维持30S后观察剩余量也同样证明其流动性优劣。

Weigh the same amount of each of the four base oils in turn and put them into test tubes. Then place the test tubes in a constant temperature and humidity chamber at -35 °C. Take them out after 2 hours and lay them flat as shown in the left picture. Observe their states after 3 seconds. Their low-temperature fluidity is successively superior (I, II, III, III+).

Maintain this state for 30 seconds and then observe the remaining amounts, which can also prove the superiority and inferiority of their fluidity in the same way.



战略合作伙伴（Strategic Partner ）

台塑関係企業 FORMOSA PLASTICS GROUP　中国海油 CNOOC

加氢精制 II 类基础油
(Hydrorefined Group II Base Oil)

S-OIL

加氢异构III基础油
(Hydroisomerized Type III Base Oil)

Shell　EXXON Mobil

IV合成烃基础油
(Group IV synthetic hydrocarbon base oil)

基础油 Base Oil

Infineum　Lubrizol　Chevron　RheinChemie　Afton CHEMICAL

添加剂（Additives）

行业组织：API、SAE、ACEA、JASO、ILSAC等

API:美国石油协会简称

API:Abbreviation of the American Petroleum Institute

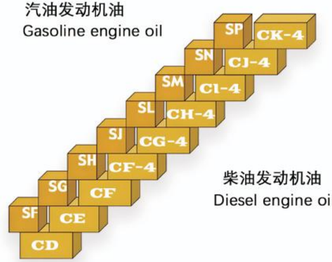
润滑油API分为汽油机油、柴油机油、汽柴通用机油三种类型。
汽油机油的第一个字母"S"代表适用于火花点火，也就是适用于汽油发动机。目前，汽油机油的最高级别为SP级；
柴油机油的第一个字母"C"代表适用于压缩点火，即适用于柴油发动机。柴油机油的最高级别为CK-4。第二个字母代表了在不同类别中的性能从A、B、C依字母顺序上升，字母越靠后，等级越高；
汽柴通用机油则按"SC"表示。
因此，通过API等级的标识，我们可以清晰地了解润滑油的性能和适用范围，选择适合自己车辆的润滑油。在保养车辆时，选择符合API标准的润滑油，可以有效提高发动机的寿命和性能。

API的分类
Classification of API (American Petroleum Institute)

API:(美国石油协会)	S	汽油发动机 Gasoline engine oil	SA、SB、SC、SD、SE、SF、SG、SH、SJ SL、SM、SN、SP
	C	柴油发动机 Diesel engine oil	CA、CB、CC、CD、CE、CF、CF-4、CG-4、CH-4、CI-4、CJ-4、CK-4
	SC	汽柴油发动机 Gasoline and diesel engine oil	/

The API classification of lubricating oils includes three types:
gasoline engine oils, diesel engine oils, and universal oils for both gasoline and diesel engines.
The first letter "S" in gasoline engine oils stands for "spark ignition", which means it is suitable for gasoline engines. Currently, the highest grade of gasoline engine oil is SP grade.
The first letter "C" in diesel engine oils represents "compression ignition", indicating that it is applicable to diesel engines. The highest grade of diesel engine oil is CK-4. The second letter represents the performance in different categories, ascending in alphabetical order from A, B, C, etc. The later the letter is in the alphabet, the higher the grade.
Universal oils for both gasoline and diesel engines are denoted by "SC".
Therefore, through the identification of API grades, we can clearly understand the performance and application scope of lubricating oils and choose the appropriate lubricating oil for our vehicles. When maintaining vehicles, choosing lubricating oils that meet API standards can effectively improve the lifespan and performance of the engine.

汽油发动机油
Gasoline engine oil



柴油发动机油
Diesel engine oil

API级别越高，机油的质量等级越高!

The higher the API level is, the higher the quality grade of the engine oil will be!

API等级	描述	适用年份
SJ	车辆制造商推荐SJ机油用于当前(1997年)以及早期乘用车、SUV、厢式货车和轻卡。SJ向下兼容，可用于SH以及更低级别油品的车辆。	应用于1997年及以前出厂发动机的维修保养服务
SL	API描述SL机油是服务于2001年及以前出厂的发动机。车辆制造商推荐SL机油用于(2001年)以及早期乘用车、SUV、厢式货车和轻卡。SL向下兼容，可用于SJ以及更低级别油品的车辆。	应用于2001年及以前出厂发动机的维修保养服务
SM	2004年推出的SM发动机油标准，旨在改善的油品抗氧化性，改善的沉积物控制，更好的磨损保护，和更好的低温性能以及提高换油周期。一些SM油也可以满足最新的ILSAC规范，以表示此油品的节能性能。SM向下兼容，可用于SL以及更低级别油品的车辆。	适用于2004年及以前出厂发动机维修保养服务
SN	API描述SN机油是服务于2011年及以前出厂的发动机。车辆制造商推荐SN机油用于当前(2011年)以及早期乘用车、SUV、厢式货车和轻卡。车辆所有者和操作者应遵循汽车制造商关于发动机油粘度和性能标准的建议。SN向下兼容，可用于SM以及更低级别油品的车辆。	适用于2011年及以前出厂发动机的维修保养服务
SP	API描述的SP机油用于2020年的发动机。这些机油也可用于当前和早期乘用车、运动型多用途车、厢式货车和轻型卡车中的汽油发动机，这些车辆按照车辆制造商的建议维护。车主和操作人员应遵守其车辆制造商关于机油粘度和性能标准的建议。	API描述的SP机油用于2020年的发动机

API标准-汽油机油
API Standards - Gasoline Engine Oil

API	Description	Applicable year
SJ	Vehicle manufacturers recommend SJ engine oil for current (in 1997) and earlier passenger cars, SUVs, vans and light trucks. SJ is backward compatible and can be used in vehicles that require SH or lower grade oils.	Applied to the maintenance services for engines manufactured in 1997 and before.
SL	The API describes that SL engine oil is for engines manufactured in 2001 and before. Vehicle manufacturers recommend SL engine oil for (in 2001) and earlier passenger cars, SUVs, vans and light trucks. SL is backward compatible and can be used in vehicles that require SJ or lower grade oils.	Applied to the maintenance and repair services for engines manufactured in 2001 and before.
SM	The SM engine oil standard, which was introduced in 2004, aims to improve the oil's antioxidant properties, enhance deposit control, provide better wear protection, offer better low-temperature performance and extend the oil change interval. Some SM oils can also meet the latest ILSAC (International Lubricant Standardization and Approval Committee) specifications to indicate the energy-saving performance of this oil. SM is backward compatible and can be used in vehicles that require SL or lower grade oils.	Applicable to the maintenance and repair services for engines manufactured in 2004 and before.
SN	The API describes that SN engine oil is for engines manufactured in 2011 and before. Vehicle manufacturers recommend SN engine oil for the current (in 2011) and earlier passenger cars, SUVs, vans and light trucks. Vehicle owners and operators should follow the recommendations of automobile manufacturers regarding the viscosity and performance standards of engine oil. SN is backward compatible and can be used in vehicles that require SM or lower grade oils.	Applicable to the maintenance and repair services for engines manufactured in 2011 and before.
SP	The SP oil described by API is used for engines in 2020. These oils can also be used in gasoline engines of current and earlier passenger cars, sport - utility vehicles, vans and light - duty trucks, which are maintained according to the vehicle manufacturers' recommendations. Vehicle owners and operators should follow the recommendations of their vehicle manufacturers regarding oil viscosity and performance standards.	The SP engine oil described by API is used for engines manufactured in 2020.

汽油机润滑油的测试数据
Test data of gasoline engine lubricating oil.

测试项目 Test items	数据对比 Data comparison					性能升级 Performance upgrade
	SJ/1997	SL/2001	SM/2004	SN/2011	SP/2020	
高温泡沫特性 High-temperature foam characteristics	≤200/50mL	↑≤100/0mL	≤100/0mL	≤100/0mL	≤100/0mL	换油周期提升 The extension of oil change interval
蒸发损失 Evaporation loss	≤22%	↑≤15%	≤15%	≤15%	≤15%	烧机油改善 Improvement in oil consumption.
EOWTT	无要求 No requirements	↑≤50%	≤50%	≤50%	≤50%	机油滤芯过滤性改善 Improvement in the filtering performance of the oil filter.
旧油MRV TP-1 Used oil MRV TP-1	无要求 No requirements	无要求 No requirements	↑在对应温度范围内 ↑ Within the corresponding temperature range	在对应温度范围内 Within the corresponding temperature range	在对应温度范围内 Within the corresponding temperature range	低温泵送性能提升 Improvement in low-temperature pumping performance.
TEOST 33C	无要求 No requirements	无要求 No requirements	无要求 No requirements	↑≤30mg	≤30mg	高温沉积物改善 Improvement in high-temperature deposits.
E85乙醇汽油乳化性 Emulsibility of E85 ethanol gasoline.	无要求 No requirements	无要求 No requirements	无要求 No requirements	↑无水分离 ↑No water separation	无水分离 No water separation	乙醇汽油兼容性改善 Improvement in the compatibility of ethanol - gasoline.
密封件相容性 Seal compatibility	无要求 No requirements	无要求 No requirements	无要求 No requirements	↑有要求 ↑There are requirements	↑有要求 ↑There are requirements	各种非金属件的兼容性提升 Improved compatibility of various non-metallic parts.
磷含量 Phosphorus content	≤0.1	≤0.1	↑0.06 ~ 0.08	0.06 ~ 0.08	0.06 ~ 0.08	对TWC后处理系统改善 Improvement of the TWC after-treatment system.
硫含量 Sulfur content	≤0.7	↑≤0.6	≤0.6	≤0.6	≤0.6	对后处理系统改善 Improvement of the after-treatment system.

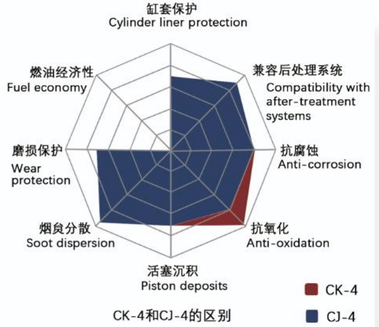
柴油机润滑油的测试数据
Test data of diesel engine lubricating oil.

测试项目 Test items		数据对比 Data comparison					性能升级 Performance upgrade
		CH-4/1998	CI-4/2002	CJ-4/2010	CK-4/2017	FA-4/2017	
HTHS	XW-30	SAEJ300	≥3.5mPa·s	≥3.5mPa·s	≥3.5mPa·s	2.9~3.2mPa·s	节能与性能适应性划分 Classification of energy conservation and performance adaptability
	XW-40				SAEJ300	不适用 Not applicable	
蒸发损失/40机油 Evaporation Loss/Grade 40 Motor Oil		≤18	≤15	≤13	≤13	≤13	降低机油耗 Reduce oil consumption
密封件相容性 Seal compatibility		无要求 No requirements	有要求 There are requirements	有要求 There are requirements 增加醋酸乙烯酯 Increase vinyl acetate	有要求 There are requirements 增加醋酸乙烯酯 Increase vinyl acetate	有要求 There are requirements 增加醋酸乙烯酯 Increase vinyl acetate	各种非金属件的兼容性提升 The compatibility of various non-metallic parts has been improved.
磷含量 Phosphorus content		无要求 No requirements	有要求 There are requirements	≤0.12%	≤0.12%	≤0.12%	提升TWC的使用寿命 Improve the service life of Three Way Catalyst (TWC).
硫含量 Sulfur content		无要求 No requirements	有要求 There are requirements	≤0.4%	≤0.4%	≤0.4%	提升NOx捕捉器使用寿命 Improve the service life of the NOx trap.
硫酸盐灰分 Sulfated ash		无要求 No requirements	有要求 There are requirements	≤1.0%	≤1.0%	≤1.0%	提升DPF的使用寿命 Improve the service life of the Diesel Particulate Filter (DPF).

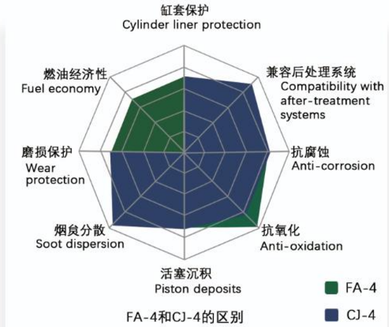
API等级	描述	适用年份
CF-4	不适用于2009后出厂的大多数柴油发动机。	适用于2009年出厂的老式发动机
CH-4	1998年出台标准。适用于高速四冲程柴油机，满足1998年尾气排放的标准要求。CH-4特别是针对高硫燃料(硫含量可以达到0.5%)的柴油机。	应用于1998年及以前出厂发动机的维修保养服务
CI-4	2002年出台标准。适用于高速四冲程柴油机，满足2002年制定2004年实施的尾气排放的标准要求。CI-4主要应用在EGR和高硫燃料(硫含量可以达到0.5%)柴油发动机中，其耐久性更长。可向下兼容CD、CE、CF-4、CG-4和CH-4。	适用于2002年及以前出厂发动机的维修保养服务
CJ-4	适用于高速四冲程柴油机，CJ-4机油设计满足2010年柴油发动机车的公路和四阶段非道路废气排放标准以及以前柴油发动机。CJ-4设计用于硫含量可达到500ppm(硫含量可以达到0.05%)柴油车。然而，使用硫含大于15ppm(0.0015%重量)燃料会降低排气后处理系统的耐久性和/或排放系统维护间隔。API CJ-4润滑油性能超过CI-4 PLUS、CI-4、CH-4、CG-4和CF-4,并能有效地润滑要求使用API标准机油的发动机。当使用高于15ppm含硫燃料的CJ-4机油时，咨询发动机制造商的获取机油更换周期。	适用于2010年及以前出厂发动机的维修保养服务
CK-4	适用于高速四冲程循环柴油机，CK-4机油设计满足2017年柴油发动机车的公路和四阶段非道路废气排放标准以及以前柴油发动机。CK-4设计用于燃料硫含量可达到500ppm(硫含量可以达到0.05%)的柴油车。然而，使用燃料硫含大于15ppm(0.0015%重量)燃料会降低排气后处理系统的耐久性和/或排放系统维护间隔。CK-4机油在维持GPF以及其他先进排放系统的耐久性方面特别有效。API CK-4增强油的抗氧性能、剪切稳定性和泡沫性能，以及防止TWC中毒、GPF堵塞、发动机磨损、活塞沉积物、低温和高温性能退化和烟食导致的粘度增加。API CK-4润滑油性能超过CJ-4、CI-4 PLUS、CI-4、CH-4、CG-4和CF-4,并能有效地润滑要求使用API标准机油的发动机。当使用高于15 ppm含硫燃料的CK-4机油时，咨询发动机制造商的获取机油更换周期。	适用于2017年及以前出厂发动机的维修保养服务
FA-4	FA-4只是针对XW-30柴油机油，主要是满足高速四冲程柴油机2017年公路温室气体排放标准。CK-4设计用于燃料硫含量达到15ppm的柴油车，使用FA-4前要参考车辆手册中关于FA-4兼容性建议。FA-4 HTHS的范围设定在2.9~3.5,这样的范围可有效减少车辆温室气体的排放。FA-4机油在维持GPF以及其他先进排放系统的耐久性方面特别有效。API FA-4增强油的抗氧性能、剪切稳定性和泡沫性能，以及防止TWC中毒、GPF堵塞、发动机磨损、活塞沉积物、低温和高温性能退化和烟矣导致的粘度增加。FA-4不能向下兼容CK-4、CJ-4、CI-4plus、CH-4。当使用高于15ppm含硫燃料的FA-4机油时，咨询发动机制造商的获取机油更换周期。	适用于2017年对温室气体排放要求的商用车辆

柴油机润滑油的测试数据
Test data of diesel engine lubricating oil.

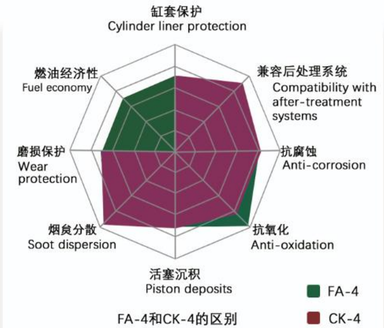
API	Description	Applicable years
CF-4	It is not applicable to most diesel engines manufactured after 2009.	Applicable to old engines manufactured in 2009.
CH-4	The standard was introduced in 1998. It is applicable to high-speed four-stroke diesel engines and meets the standard requirements for exhaust emissions in 1998. CH-4 is especially designed for diesel engines using high-sulfur fuel (the sulfur content can reach 0.5%).	Applied to the maintenance services for engines manufactured in 1998 and before.
CI-4	The standard was introduced in 2002. It is applicable to high-speed four-stroke diesel engines and meets the standard requirements for exhaust emissions formulated in 2002 and implemented in 2004. CI-4 is mainly used in diesel engines with Exhaust Gas Recirculation (EGR) and high-sulfur fuel (the sulfur content can reach 0.5%). It has longer durability. It is backward compatible with CD, CE, CF-4, CG-4 and CH-4.	Applicable to the maintenance services for engines manufactured in 2002 and before.
CJ-4	It is applicable to high-speed four-stroke diesel engines. The CJ-4 engine oil is designed to meet the on-road and Stage IV off-road exhaust emission standards for diesel engine vehicles in 2010 as well as those for previous diesel engines. The CJ-4 is designed for diesel vehicles with a sulfur content that can reach 500 ppm (the sulfur content can reach 0.05%). However, using fuel with a sulfur content greater than 15 ppm (0.0015% by weight) will reduce the durability of the exhaust after-treatment system and/or the maintenance interval of the emission system. The performance of API CJ-4 lubricating oil exceeds that of CI-4 PLUS, CI-4, CH-4, CG-4 and CF-4, and it can effectively lubricate engines that require the use of API standard engine oil. When using CJ-4 engine oil with sulfur-containing fuel higher than 15 ppm, consult the engine manufacturer to obtain the engine oil change interval.	Applicable to the maintenance services for engines manufactured in 2010 and before.
CK-4	It is applicable to high-speed four-stroke cycle diesel engines. The CK-4 engine oil is designed to meet the on-road and Stage IV off-road exhaust emission standards for diesel engine vehicles in 2017 as well as those for previous diesel engines. The CK-4 is designed for diesel vehicles with a fuel sulfur content that can reach 500 ppm (the sulfur content can reach 0.05%). However, using fuel with a sulfur content greater than 15 ppm (0.0015% by weight) will reduce the durability of the exhaust after-treatment system and/or the maintenance interval of the emission system. The CK-4 engine oil is particularly effective in maintaining the durability of the Gasoline Particulate Filter (GPF) and other advanced emission systems. The API CK-4 enhances the antioxidant performance, shear stability and foaming performance of the oil, and prevents Three Way Catalyst (TWC) poisoning, GPF clogging, engine wear, piston deposits, performance degradation at low and high temperatures and viscosity increase caused by soot. The performance of API CK-4 lubricating oil exceeds that of CJ-4, CI-4 PLUS, CI-4, CH-4, CG-4 and CF-4, and it can effectively lubricate engines that require the use of API standard engine oil. When using CK-4 engine oil with sulfur-containing fuel higher than 15 ppm, consult the engine manufacturer to obtain the engine oil change interval.	Applicable to the maintenance services for engines manufactured in 2017 and before.
FA-4	FA-4 is only applicable to XW-30 diesel engine oil, mainly to meet the on-road greenhouse gas emission standards for high-speed four-stroke diesel engines in 2017. CK-4 is designed for diesel vehicles with a fuel sulfur content reaching 15 ppm. Before using FA-4, refer to the suggestions on FA-4 compatibility in the vehicle manual. The range of High-Temperature High-Shear (HTHS) of FA-4 is set between 2.9 and 3.5, and such a range can effectively reduce the greenhouse gas emissions of vehicles. The FA-4 engine oil is particularly effective in maintaining the durability of the Gasoline Particulate Filter (GPF) and other advanced emission systems. The API FA-4 enhances the antioxidant performance, shear stability and foaming performance of the oil, and prevents Three Way Catalyst (TWC) poisoning, GPF clogging, engine wear, piston deposits, performance degradation at low and high temperatures and viscosity increase caused by soot. FA-4 is not backward compatible with CK-4, CJ-4, CI-4 plus, and CH-4. When using FA-4 engine oil with sulfur-containing fuel higher than 15 ppm, consult the engine manufacturer to obtain the engine oil change interval.	Applicable to commercial vehicles with requirements for greenhouse gas emissions in 2017.



CK-4和CJ-4的区别



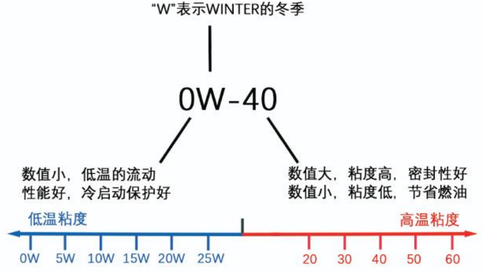
FA-4和CJ-4的区别



FA-4和CK-4的区别

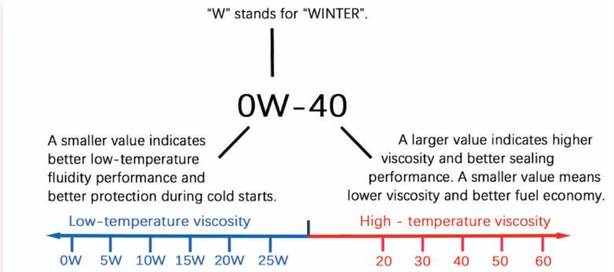
粘度选择

SAE是美国汽车工程师协会的简称，根据使用环境温度的不同，制定粘度级别：



Viscosity selection

SAE is the abbreviation of the Society of Automotive Engineers. It formulates viscosity grades according to different ambient temperature conditions.

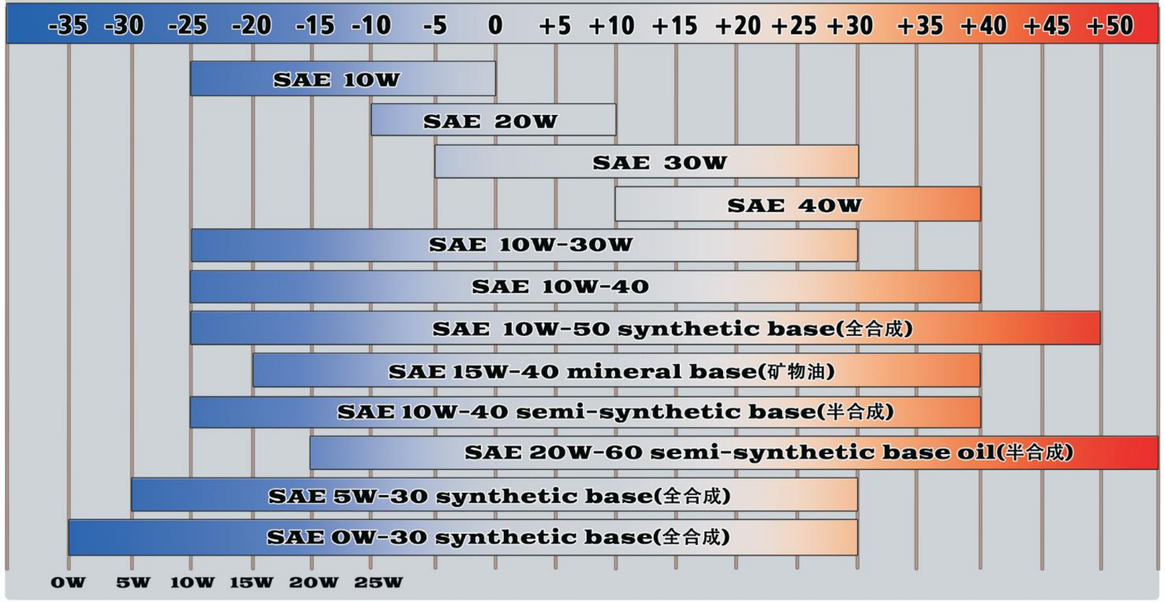


SAE粘度等级
SAE Viscosity Grade

SAE 粘度等级 SAE Grades

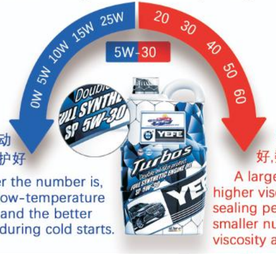
针对与外界温度推荐发动机油

For Engine Oils Recommended in Relation with the Outside Temperatures(℃)



SAE粘度等级
SAE Viscosity Grade

机油型号粘度解析 Analysis of the Viscosity of Engine Oil Models



数字越小,低温流动性越好,冷启动保护好

The smaller the number is, the better the low-temperature fluidity will be, and the better the protection during cold starts.

数字大粘度高 密封好,数字小粘度低省燃料

A larger number means higher viscosity and better sealing performance, while a smaller number means lower viscosity and better fuel economy.

机油型号 Engine oil model	冬季(汽车冷启动时是否顺畅) In winter (whether the vehicle starts smoothly when it is cold)	粘度 viscosity	机油液体表现 Performance of engine oil liquid
0W	-40℃顺畅启动缩短热车时间(推荐严寒区域) It can start smoothly at -40℃ and shorten the warm-up time.(Recommended for extremely cold regions)	20	稀(更适合新车/日韩系车) Thin (more suitable for new cars/Japanese and Korean cars).
5W	-35℃顺畅启动缩短热车时间 It can start smoothly at -35℃ and shorten the warm-up time.	30	一般(更适合新车/日韩系车) General (more suitable for new cars/Japanese and Korean cars).
10W	-30℃顺畅启动缩短热车时间 It can start smoothly at -30℃ and shorten the warm-up time.	40	稠(更适合大排量/涡轮增压车) Thick (more suitable for large-displacement/ turbocharged vehicles).
15W	天气温和的地区使用 It is used in regions with mild climates.		
20W	热带的地区使用 It is used in tropical regions.	50/60	稠(更适合老款大排量/涡轮增压车/小型商务车) Thick (more suitable for old large-displacement/ turbocharged vehicles/ small commercial vehicles)
25W	极热干旱的地区使用 It is used in extremely hot and arid regions.		

A/B系列 Series A/B — 适用于汽油发动机和轻负荷柴油发动机 Applicable to gasoline engines and light-duty diesel engines

系列编号 Series Number	性能特点 Performance characteristics / Performance features	适用车型 Applicable Vehicle Models
A3/B3	稳定的高性能机油，能长时间保持粘度， Stable high-performance engine oil that can maintain its viscosity for a long time.	适用于轿车和轻型厢式货车的汽油及柴油发动机，可支持延长换油周期，尤其适用于在恶劣条件下运行的发动机 It is applicable to gasoline and diesel engines of passenger cars and light vans, and it can support the extension of the oil change interval. It is especially suitable for engines operating under harsh conditions.
A3/B4	为高性能汽油和直喷柴油发动机提供了增强的性能，具有出色的保护和稳定性， It provides enhanced performance for high-performance gasoline engines and direct injection diesel engines, and has excellent protection and stability.	适用于需要更高高温高剪切粘度以在高应力下提供更好保护的发动机，可替代 A3/B3 级别的油 It is suitable for engines that require higher high-temperature high-shear viscosity to provide better protection under high stress, and it can be used as a substitute for oils of the A3/B3 grade.
A5/B5	专为需要低粘度机油以提高燃油经济性的现代发动机设计，高温高剪切粘度为 2.9 至 3.5MPa·s, It is specially designed for modern engines that require low-viscosity engine oil to improve fuel economy, with a high-temperature high-shear viscosity ranging from 2.9 to 3.5 MPa·s.	适用于轿车和轻型厢式货车的汽油及柴油发动机，但可能不适用于所有发动机类型，尤其是那些需要高粘度机油以提供额外保护的发动机 It is applicable to gasoline and diesel engines of passenger cars and light vans, but it may not be suitable for all engine types, especially those engines that require high-viscosity engine oil to provide additional protection.
A7/B7	专为高温高剪切粘度为2.9至3.5MPa·s 的低粘度发动机油设计， It is specially designed for low-viscosity engine oils with a high-temperature high-shear viscosity ranging from 2.9 to 3.5 MPa·s.	适用于汽油发动机和直喷柴油发动机，除了延长换油周期以外，还可以为涡轮增压发动机提供低速早燃、磨损保护以及沉积物保护 It is applicable to gasoline engines and direct injection diesel engines. Besides extending the oil change interval, it can also provide low-speed pre-ignition, wear protection and deposit protection for turbocharged engines.

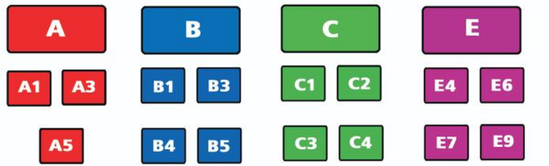
ACEA-2016 标准参数对比
ACEA-2016 Standard Parameter Comparison

C系列 Series C — 适用于带有后处理系统的汽油机和轻负荷柴油机 It is applicable to gasoline engines and light-duty diesel engines equipped with after-treatment systems.

系列编号 Series Number	性能特点 Performance characteristics / Performance features	适用车型 Applicable Vehicle Models
C1	低硫、磷、灰分（SAPS）的机油，能为配备现代后处理系统的发动机提供强大的保护 Engine oil with low sulfur, phosphorus and ash (SAPS) can provide strong protection for engines equipped with modern after-treatment systems.	适用于高性能轿车和轻型厢式货车的汽油及直喷柴油发动机，有助于保护排放控制系统，与最低高温高剪切粘度为 2.9MPa·s 的低粘度机油兼容 It is applicable to gasoline and direct injection diesel engines of high-performance sedans and light vans. It helps protect the emission control systems and iscompatible with low-viscosity engine oils with a minimum high-temperature high-shear viscosity of 2.9 MPa·s.
C2	中低 SAPS 的机油，在性能、保护和与排放控制系统的兼容性之间取得平衡 Engine oil with medium to low SAPS (sulfated ash, phosphorus and sulfur) strikes a balance among performance, protection and compatibility with emission control systems.	适用于高性能汽油和柴油发动机，能够支持延长换油周期，与最低高温高剪切粘度为 2.9MPa·s 的低粘度机油配合使用，可在发动机保护和燃油效率之间提供良好的平衡 It is applicable to high-performance gasoline and diesel engines. It can support the extension of the oil change interval. When used in combination with low-viscosity engine oils with a minimum high-temperature high-shear viscosity of 2.9 MPa·s, it can provide a good balance between engine protection and fuel efficiency.
C3	中低 SAPS 的机油，具有较高的最低高温高剪切粘度，为 3.5MPa·s Engine oil with medium to low SAPS (sulfated ash, phosphorus and sulfur) has a relatively high minimum high-temperature high-shear viscosity of 3.5 MPa·s.	适用于轿车和轻型厢式货车的高性能发动机，能够延长换油周期，适合在恶劣条件下需要更高保护和稳定性的发动机 It is applicable to high-performance engines of passenger cars and light vans. It can extend the oil change interval and is suitable for engines that require higher protection and stability under harsh conditions.
C4	低 SAPS 的机油，专为保护配备先进后处理系统的发动机而设计，与最低高温高剪切粘度为 3.5MPa·s 以下的机油兼容 Engine oil with low SAPS (sulfated ash, phosphorus and sulfur) is specially designed to protect engines equipped with advanced after-treatment systems and is compatible with engine oils whose minimum high-temperature high-shear viscosity is below 3.5 MPa·s.	适用于高性能轿车和轻型厢式货车的汽油及直喷柴油发动机 It is applicable to gasoline and direct injection diesel engines of high-performance sedans and light vans.
C5	中低 SAPS 的机油，为进一步提高燃油经济性而设计，与最低高温高剪切粘度为: 2.6MPa·s 以下的低粘度机油兼容 Engine oil with medium to low SAPS (sulfated ash, phosphorus and sulfur) is designed to further improve fuel economy and is compatible with low-viscosity engine oils whose minimum high-temperature high-shear viscosity is below 2.6 MPa·s.	适用于配备各种现代后处理系统的高性能轿车和轻型厢式货车的汽油及直喷柴油发动机，并经原厂认证可使用 It is applicable to gasoline and direct injection diesel engines of high-performance sedans and light vans equipped with various modern after-treatment systems, and has been certified by the original factory for use.
C6	中低 SAPS 的机油，专为高温高剪切粘度为 2.6MPa·s 以下的发动机油设计 Engine oil with medium to low SAPS (sulfated ash, phosphorus and sulfur) is specially designed for engine oils with a high-temperature high-shear viscosity below 2.6 MPa·s.	适用于加装了后处理系统的汽油发动机、轻型柴油发动机或直喷式柴油发动机，还可以为涡轮增压发动机提供低速早燃、磨损保护以及沉积物保护 It is suitable for gasoline engines, light-duty diesel engines or direct injection diesel engines which are equipped with after-treatment systems. Moreover, it can offer low-speed pre-ignition, wear protection and deposit protection for turbocharged engines.

E系列 Series E	适用于带有后处理系统的汽油机和轻负荷柴油机 It is applicable to gasoline engines and light-duty diesel engines equipped with after-treatment systems.	
系列编号 Series Number	性能特点 Performance characteristics / Performance features	适用车型 Applicable Vehicle Models
E4	具有卓越的活塞清洁性能和抗磨损保护性能。它可以满足严格的排放标准要求，并且在长换油周期的应用场景下也能很好地保护发动机 It has outstanding piston cleaning performance and anti-wear protection performance. It can meet the requirements of strict emission standards and can also protect the engine well in application scenarios with long oil change intervals.	适用于带EGR,SCR(没有DPF)高性能的重负荷柴油发动机 It is suitable for high-performance heavy-duty diesel engines with EGR (Exhaust Gas Recirculation) and SCR(Selective Catalytic Reduction)(without DPF, Diesel Particulate Filter).
E6	在 E4 的基础上，更加注重对后处理系统的保护。因为现代重型柴油发动机很多都配备了复杂的尾气后处理装置，如颗粒捕集器（DPF）和选择性催化还原（SCR）系统，E6 机油能够防止机油中 的灰分等成分对后处理系统造成堵塞或损坏 Based on E4, more emphasis is placed on the protection of the after-treatment system. Since many modern heavy-duty diesel engines are equipped with complex exhaust after-treatment devices, such as Diesel Particulate Filters (DPF) and Selective Catalytic Reduction (SCR) systems, E6 engine oil can prevent components like ash in the oil from causing blockages or damage to the after-treatment system.	具有优异的活塞清洁度、磨损保护和烟炱处理能力，以及与后处理系统的良好兼容性，适用于满足欧六排放标准的带DPF,EGR,SCR重型柴油发动机 It has excellent piston cleanliness, wear protection and soot-handling capabilities, as well as good compatibility with after-treatment systems. It is suitable for heavy-duty diesel engines equipped with DPF , EGR and SCR that meet the Euro VI emission standards.
E7	提供良好的抗磨损和抗氧化性能，同时也能应对高硫燃料的使用情况。在一些对燃油质量要求不是特别高的地区，E7 机油可以保证发动机在使用含硫量相对较高的柴油时，依然能够稳定运行 It provides good anti-wear and anti-oxidation properties, and can also cope with the use of high-sulfur fuels. In some regions where the requirements for fuel quality are not particularly high, E7 engine oil can ensure that the engine can still operate stably when using diesel with a relatively high sulfur content.	适用于EGR,SCR(没有DPF)需要高性能机油的重型柴油发动机，具有良好的抗磨损保护、活塞清洁度和氧化稳定性，可满足欧五排放标准 It is applicable to heavy-duty diesel engines with EGR and SCR (without DPF) that require high-performance engine oil. It has good anti-wear protection, piston cleanliness and oxidation stability, and can meet the Euro V emission standards.
系列编号 Series Number	性能特点 Performance characteristics / Performance features	适用车型 Applicable Vehicle Models
E9	针对最新一代重负荷柴油发动机推出的标准，综合了 E4、E6 和 E7 的优点，对发动机的保护更为全面。它在提供优异的抗磨损、抗氧化和清净分散性能的同时，还能与先进的发动机技术和后处理系统高度兼容，有助于降低排放，提高发动机的整体效率。 It's a standard launched for the latest - generation heavy - duty diesel engines. It combines the advantages of E4, E6 and E7, providing more comprehensive protection for engines. While offering excellent anti - wear, anti - oxidation and detergency - dispersancy performance, it's also highly compatible with advanced engine technologies and after - treatment systems, which helps to reduce emissions and improve the overall efficiency of the engine.	专为满足欧六排放标准的带DPF,EGR,SCR新型重型柴油发动机设计在燃油经济性、排放控制和发动机保护方面具有卓越性能 It is specially designed for the new heavy-duty diesel engines equipped with DPF , EGR and SCR that meet the Euro VI emission standards. It has outstanding performance in terms of fuel economy, emission control and engine protection.

ACEA:欧洲汽车制造商协会对于车辆分类是用一个字母后面加数字来表示级别的，其中字母代表"A"汽油发动机，"B"轻型柴油机，"C"带尾气处理装置的柴油机，"E"重型柴油机。
ACEA轻负荷车辆发动机机油标准分高灰和中低灰两个版本，就是大家都熟悉的A/B系列和C系列。



ACEA-2016 标准参数对比
ACEA-2016 Standard Parameter Comparison

测试项目 Test items	数据对比 Data comparison												测试结果分析 Analysis of test results
	A3/B3-2016	A3/B4-2016	A5/B5-2016	C1	C2	C3	C4	C5	E4	E6	E7	E9	
高温高剪切 (High Temperature High Shear) HTHS	≥3.5 mPa·s		2.9~3.5 mPa·s	≥2.9 mPa·s		≥3.5 mPa·s		2.6~2.9 mPa-s	≥3.5 mPa·s				节能和性能的划分 Division of energy conservation and performance
蒸发损失 Evaporation loss	≤13			≤13			≤11	≤13	≤13				降低机油耗 Reduce oil consumption
碱值 Base Number	≥8 mgKOH/g	≥10 mgKOH/g	≥8 mgKOH/g	无要求 No requirements		≥6 mgKOH/g			≥12 mgKOH/g	≥7 mgKOH/g	≥9 mgKOH/g	≥9 mgKOH/g	酸中和能力的体现 The manifestation of acid neutralization ability.
磷含量 Phosphorus content	无要求 No requirements	无要求 No requirements	无要求 No requirements	≤0.05	0.07~0.09		≤0.09	0.07~0.09	无要求 No requirements	≤0.08	无要求 No requirements	≤0.12	发动机油中的抗磨减摩与抗氧剂的主要元素 The Main Elements of Anti-wear, Friction - reducing and Antioxidant Agents in Engine Oil
硫含量 Sulfur content	无要求 No requirements	无要求 No requirements	无要求 No requirements	≤0.2	≤0.3		≤0.2	≤0.3	无要求 No requirements	≤0.3	无要求 No requirements	≤0.4	防锈、分散与抗氧剂的主要元素 The Main Elements of Rust Inhibitors,Dispersants and Antioxidants
硫酸盐灰分 Sulfated ash	0.9~1.5%	1.0~1.6%	≤1.6%	≤0.5	≤0.8		≤0.5	≤2	≤2	≤2	≤2	≤1	灰分代表机油金属元素含量高 Ash content represents a high content of metal elements in engine oil.

问：哪些车型必须使用ACEA C3机油?
答：目前国六TI(即涡轮增压加缸内直喷)车型均有加装GPF尾气处理装置，只能使用C3机油，原因在于非C3机油具有高灰分等特点，会损害车辆的GPF。而国六自然吸气发动机车型，由于没有加装GPF，可以使用非C3机油。

问：哪些车型适用ACEA C3机油?
答：C3机油在抗氧化性、磨损性能、燃油经济性及硫酸盐灰分低等方面表现更好，适用于国六有GPF和国六及以下无GPF的发动机车型。

Q: Which vehicle models must use ACEA C3 engine oil?
A: Currently, all China VI TI (Turbocharged and direct injection) vehicle models are equipped with GPF (Gasoline Particulate Filter) exhaust treatment devices, and thus can only use C3 engine oil. The reason is that non-C3 engine oils have characteristics such as high ash content, which will damage the GPF of the vehicles. As for China VI naturally aspirated engine vehicle models, since they are not equipped with GPF, they can use non-C3 engine oils.

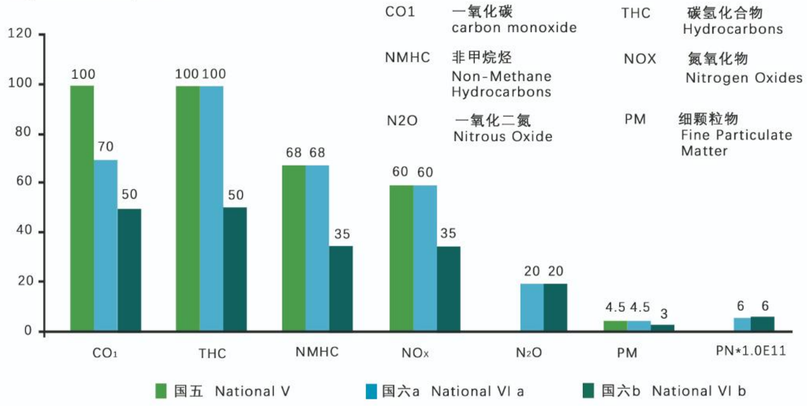
Q: Which vehicle models are suitable for ACEA C3 engine oil?
A: C3 engine oil performs better in terms of antioxidant properties, anti-wear performance, fuel economy and low sulfated ash content. It is suitable for engine models of China VI vehicles equipped with GPF and those of China VI and below vehicles without GPF.

2016年12月23日，生态环境部联合国家质监总局发布了《轻型车污染物排放限值及测量方法（中国第六阶段）》（GB 18352.6—2016）标准，并且根据不同的标准限值要求，制定"国六a"和"国六b"两个阶段依次实施轻型车国六排放标准。

On December 23, 2016, the Ministry of Ecology and Environment, jointly with the General Administration of Quality Supervision, Inspection and Quarantine, released the standard of "Limits and Measurement Methods for Emissions from Light-Duty Vehicles (China VI)" (GB 18352.6—2016). And according to the requirements of different standard limits, two phases, namely "China VI a" and "China VI b", were formulated to implement the China VI emission standards for light-duty vehicles in sequence.

要求2020年7月1日起，所有销售和注册登记的轻型汽车应符合标准国六a阶段要求，2023年7月1日起，所有销售和注册登记的轻型汽车应符合标准 国六b阶段要求。

It is required that starting from July 1, 2020, all light-duty vehicles sold and registered shall meet the requirements of the China VI a phase of the standard. Starting from July 1, 2023, all light-duty vehicles sold and registered shall meet the requirements of the China VI b phase of the standard.



CO1 一氧化碳 carbon monoxide
NMHC 非甲烷烃 Non-Methane Hydrocarbons
N2O 一氧化二氮 Nitrous Oxide
THC 碳氢化合物 Hydrocarbons
NOX 氮氧化物 Nitrogen Oxides
PM 细颗粒物 Fine Particulate Matter

·更严苛的排放法规以及超长的排放耐久性要求
-更小的TGDI发动机
-配备GPF后处理系统
-中低灰分发动机油
·燃油经济性法规
-更广泛的TGDI发动机应用
-更低粘度发动机油

·Stricter emission regulations and extremely long requirements for emission durability.
·Smaller TGDI (Turbocharged Gasoline Direct Injection) engines.
·Equipped with GPF (Gasoline Particulate Filter) after-treatment systems.
·Engine oils with medium and low ash content.
·Fuel economy regulations.
·Wider application of TGDI engines.
·Engine oils with lower viscosity.

国6b(GB 18352.6-2016)
颗粒物浓度PM-0.0030 g/km;
颗粒物粒子数量PN -6x1011/km;
NOX - 0.035g/km

China VI b (GB 18352.6—2016)
Particulate matter concentration PM - 0.0030 g/km;
Particulate number PN - 6×10¹¹/km;
Nitrogen oxides (NOX) - 0.035 g/km.

中国对汽车0EM的燃油经济性要求为：2020年小于5L/100Km，2025年小于4L,汽车0EM非常必要引入混动和新能源车才能满足政府要求

China's fuel economy requirements for automotive OEMs are as follows: less than 5 liters per 100 kilometers in 2020, and less than 4 liters per 100 kilometers in 2025. It is very necessary for automotive OEMs to introduce hybrid and new energy vehicles in order to meet the requirements of the government.

American Petroleum Institute

SP / SN Plus / SN / SM / SL / SJ

FOR GASOLINE ENGINES CERTIFIED

GF-6A / GF-6B
GF-5
GF-4

European Automobile Manufacturers Association
ACEA

A3/B3 / A3/B4 / A5/B5
C1 / C2 / C3 / C4 / C5
E4 / E6 / E7 / E9

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GM dexos1™ Gne3
GM dexos1™ Gne2
GM dexos1™ Gne1

Volkswagen.Das Auto

VW508.00
VW 502.00
VW 505.00

DAMLER

MB229.1 / MB229.3 / MB229.5/
MB229.31 / MB229.51 / MB229.71

LL-17 FE+ / LL-14 FE+ / LL-04 / LL-01

ILSAC（International Lubricant Standardization and Approval Committee）即国际润滑剂标准化及认证委员会，是一个由美国汽车制造商协会（AAMA）和日本汽车制造商协会（JAMA）共同组建的国际组织。
它在汽车润滑油领域发挥着至关重要的作用，通过制定和推广统一的润滑油标准，确保汽车发动机能够得到良好的润滑和保护。

ILSAC 负责制定汽车发动机油的性能标准。这些标准涵盖了多个关键性能指标，如润滑性、抗磨损性、抗氧化性、清洁性和燃油经济性等。例如，其制定的 GF - 系列标准（如 GF - 5、GF - 6A、GF - 6B 等），规定了发动机油在不同工况下应达到的性能要求。以抗磨损性为例，标准明确了机油在发动机活塞、曲轴等部件高速运转时，能够有效减少金属之间的摩擦和磨损，从而延长发动机的使用寿命

ILSAC (International Lubricant Standardization and Approval Committee) is an international organization jointly established by the American Automobile Manufacturers Association (AAMA) and the Japan Automobile Manufacturers Association (JAMA). It plays a crucial role in the field of automotive lubricants. By formulating and promoting unified lubricant standards, it ensures that automotive engines can be well lubricated and protected.

ILSAC is responsible for formulating the performance standards for automotive engine oils. These standards cover multiple key performance indicators, such as lubricity, anti-wear properties, anti-oxidation properties, cleanliness and fuel economy. For example, the GF-series standards (such as GF-5, GF-6A, GF-6B, etc.) formulated by it stipulate the performance requirements that engine oils should meet under different working conditions. Taking anti-wear properties as an example, the standards clearly define that engine oils can effectively reduce the friction and wear between metals when components such as engine pistons and crankshafts are operating at high speeds, thus prolonging the service life of the engine.

GF - 4（发动机油规格）
背景：GF - 4 规格的出现是为了应对当时汽车发动机技术发展对机油性能的新要求，特别是对于一些新型的发动机设计和排放法规的初步变化。
解释：GF - 4 机油在保护发动机免受磨损方面表现出色，它含有适当的抗磨添加剂，可以有效保护发动机内部的金属部件，如曲轴、凸轮轴等。在清洁性能方面，它能够防止发动机内部产生油泥和积碳，保持发动机的清洁。它也具备一定的抗氧化性能，不过相比后来的 GF - 5 和 GF - 6 规格，其抗氧化能力稍弱一些。GF - 4 主要用于一些老款的汽油发动机，但在某些特定的应用场景下，一些较新的发动机如果对机油规格兼容性较好，也可以使用符合 GF - 4 规格的机油。

GF-4 (Engine Oil Specification)
Background: The emergence of the GF-4 specification was to meet the new requirements for engine oil performance brought about by the development of automotive engine technology at that time, especially in response to the initial changes in some new engine designs and emission regulations.
Explanation: GF-4 engine oil performs excellently in protecting the engine from wear. It contains appropriate anti-wear additives, which can effectively protect the metal parts inside the engine, such as the crankshaft, camshaft, etc. In terms of cleaning performance, it can prevent the formation of sludge and carbon deposits inside the engine and keep the engine clean. It also has a certain anti-oxidation performance. However, compared with the later GF-5 and GF-6 specifications, its anti-oxidation ability is slightly weaker. GF-4 is mainly used for some older gasoline engines. But in certain specific application scenarios, some newer engines can also use the engine oil that meets the GF-4 specification if they have good compatibility with this oil specification.

GF - 5（发动机油规格）
背景：GF - 5 是在之前的机油规格基础上进一步发展而来的。它主要是为了适应当时（相较于 GF - 6 更早时期）不断提高的发动机性能和日益严格的排放标准而制定的。
解释：GF - 5 机油具有良好的抗氧化稳定性，能够抵抗机油在高温环境下氧化变质，延长机油的使用寿命。在抗磨损方面，它可以为发动机的气门机构、活塞环等关键部件提供有效的保护，减少摩擦和磨损。同时，GF - 5 机油在燃油经济性方面也有一定的提升，有助于车辆满足当时的燃油经济性标准。它适用于多种汽油发动机，包括自然吸气和涡轮增压发动机。

GF-5 (Engine Oil Specification)
Background: The GF-5 specification was further developed on the basis of previous engine oil specifications. It was mainly formulated to adapt to the continuously improving engine performance and the increasingly strict emission standards at that time (compared to the earlier period before GF-6).
Explanation: GF-5 engine oil has good antioxidant stability. It can resist the oxidation and deterioration of the oil in high-temperature environments and extend the service life of the oil. In terms of anti-wear performance, it can provide effective protection for key components such as the valve train and piston rings of the engine, reducing friction and wear. Meanwhile, GF-5 engine oil also has a certain improvement in fuel economy, which helps vehicles meet the fuel economy standards at that time. It is applicable to a variety of gasoline engines, including naturally aspirated and turbocharged engines.

GF - 6A 和 GF - 6B（发动机油规格）
背景：随着汽车发动机技术的不断进步，对润滑油的性能要求也日益提高。美国石油学会（API）制定了一系列发动机油规格来满足不同的需求。
GF - 6 规格是为了应对现代高性能发动机，特别是配备了涡轮增压、缸内直喷和自动启停等技术的发动机而开发的。
解释：GF - 6A 是一种适用于传统和现代高性能汽油发动机的机油规格。它在燃油经济性、抗磨损保护、抗氧化性能等方面都有出色的表现。
例如，它可以在发动机的各种工况下，如高速行驶、频繁启停等，有效地保护发动机部件，减少磨损。并且，它有助于提高燃油效率，降低车辆的油耗。
GF - 6B 是 GF - 6 规格中的一个子类，主要用于满足一些特殊的、对燃油经济性要求极高的小型发动机。其特点是具有较低的高温高剪切（HTHS）粘度，能够在保证发动机正常润滑的情况下，进一步降低能量损失，提高燃油经济性。但由于其粘度特性，它可能不适用于所有发动机，特别是一些对机油粘度要求较高的高性能大排量发动机。

GF-6A and GF-6B (Engine Oil Specifications)
Background: With the continuous progress of automotive engine technology, the performance requirements for lubricating oils have been increasingly rising. The American Petroleum Institute (API) has developed a series of engine oil specifications to meet different needs. The GF-6 specification was developed to cope with modern high-performance engines, especially those equipped with technologies such as turbocharging, direct injection, and automatic start-stop.
Explanation: GF-6A is an engine oil specification applicable to both traditional and modern high-performance gasoline engines. It has excellent performance in aspects such as fuel economy, anti-wear protection, and anti-oxidation performance. For example, it can effectively protect engine components and reduce wear under various engine operating conditions, such as high-speed driving and frequent start-stop. Moreover, it helps to improve fuel efficiency and reduce the fuel consumption of vehicles. GF-6B is a subclass within the GF-6 specification, mainly used to meet the needs of some special small engines with extremely high requirements for fuel economy. It is characterized by having a relatively low high-temperature high-shear (HTHS) viscosity, which can further reduce energy losses and improve fuel economy while ensuring the normal lubrication of the engine. However, due to its viscosity characteristics, it may not be suitable for all engines, especially some high-performance large-displacement engines that have higher requirements for engine oil viscosity.

GF-1相当于 SH+节能要求；GF-2相当于 SJ+节能要求；
GF-3相当于 SL+节能要求；GF-4相当于 SM+节能要求；
GF-5相当于 SN+节能要求

GF-1 is equivalent to SH + energy-saving requirements;
GF-2 is equivalent to SJ + energy-saving requirements;
GF-3 is equivalent to SL + energy-saving requirements;
GF-4 is equivalent to SM + energy-saving requirements;
GF-5 is equivalent to SN + energy-saving requirements.

dexos APPROVED

dexos1是通用汽车公司制定的机油标准，它专门针对通用旗下的车型，旨在提供高效能的合成油，以满足现代引擎的严苛要求。以下是对dexos1机油标准的详细解释：
标准背景与目的
dexos1标准由通用汽车设立，旨在超越北美汽油发动机油标准，并集合了ILSAC GF-4和其他欧洲标准的严苛要求。其核心目标包括提升发动机性能、改善燃油经济性、降低尾气排放、保护后处理设备、延长换油周期以及减轻对原油的依赖。

ILSAC简介
Introduction to ILSAC

Dexos1 is an engine oil standard developed by General Motors. It is specifically designed for GM - branded vehicles, aiming to provide high - performance synthetic oil to meet the stringent requirements of modern engines. The following is a detailed explanation of the Dexos1 engine oil standard:

Standard Background and Purpose

The Dexos1 standard was established by General Motors. It aims to exceed North American gasoline engine oil standards and incorporates the stringent requirements of ILSAC GF - 4 and other European standards. Its core objectives include enhancing engine performance, improving fuel economy, reducing exhaust emissions, protecting after - treatment devices, extending the oil change interval, and reducing dependence on crude oil.

大众机油技术特点

1、发动机结构：大众发动机有独特的结构设计，如铸铁缸体的运用。像 EA111、EA888 系列发动机采用铸铁缸体，与活塞环膨胀系数不同，需要较大间隙，为保证密封性和润滑性，要求机油有合适的粘度，所以在标准中规定了 100℃动态粘度大于 12，150℃高温高剪切粘度大于 3.5 等指标。

2、发动机技术：大众广泛应用涡轮增压等技术，使得发动机工作温度和压力升高，对机油的散热性、抗磨性和稳定性要求更高。因此在制定标准时，会着重考量机油在高温、高压环境下的性能表现，确保机油能在涡轮增压器等关键部件上形成良好油膜，减少磨损。参考行业通用标准

3、借鉴国际权威标准：会参考国际上广泛认可的机油标准，如美国石油协会（API）标准和欧洲汽车制造商协会（ACEA）标准。不过，大众会根据自身需求对这些标准进行调整和补充。例如 ACEA 标准对机油的灰分等指标有规定，大众在制定 VW50800/50900 标准时，虽然基于 ACEA C5 标准，但在灰分限值等方面有不同要求，将灰分最大值放宽到 1.0%。

4、满足排放法规：随着环保法规日益严格，大众在制定机油标准时，会考虑机油对尾气排放的影响。例如，为了满足国六等排放标准，VW50800/50900 标准的机油在降低灰分、减少颗粒物排放等方面有严格要求，以确保机油不会对车辆的尾气后处理系统造成损害，保证车辆的排放达标。

Technical Characteristics of Volkswagen Engine Oil

1. Engine Structure: Volkswagen engines feature unique structural designs, such as the use of cast - iron cylinder blocks. Engines like the EA111 and EA888 series adopt cast - iron cylinder blocks. Due to their different expansion coefficients from piston rings, a larger clearance is required. To ensure sealing and lubrication, the engine oil needs to have an appropriate viscosity. Therefore, in the standards, it is specified that the dynamic viscosity at 100°C should be greater than 12, and the high - temperature high - shear viscosity at 150°C should be greater than 3.5, among other indicators.

2. Engine Technology: Volkswagen widely applies technologies such as turbocharging, which increases the operating temperature and pressure of the engine. This places higher demands on the heat dissipation, wear resistance, and stability of the engine oil. Thus, when formulating standards, great emphasis is placed on the performance of the engine oil in high - temperature and high - pressure environments, ensuring that the engine oil can form a good oil film on key components such as turbochargers to reduce wear.Refer to Industry - wide General Standards.

3. Drawing on international authoritative standards: Volkswagen will refer to widely recognized international engine oil standards, such as the standards of the American Petroleum Institute (API) and the European Automobile Manufacturers Association (ACEA). However, Volkswagen will adjust and supplement these standards according to its own needs. For example, the ACEA standards have regulations on indicators such as the ash content of engine oil. When formulating the VW50800/50900 standards, although based on the ACEA C5 standard, Volkswagen has different requirements in terms of ash content limits. The maximum ash content is relaxed to 1.0%.

4. Meeting emission regulations: With the increasingly strict environmental protection regulations, Volkswagen will consider the impact of engine oil on exhaust emissions when formulating engine oil standards. For example, in order to meet emission standards such as China VI, the engine oil of the VW50800/50900 standard has strict requirements in reducing ash content and particulate matter emissions, etc., to ensure that the engine oil will not damage the vehicle's exhaust gas after - treatment system and ensure that the vehicle's emissions meet the standards.

大众机油认证标准对应的机油级别如下 ：

VW502.00 ： 这是大众的一种常见机油认证标准，对应的机油级别为API SN级，满足发动机基本需求。

VW503.00 ： 适用于加长换油周期，适用于AUDI S4等车型，但不包括马力超过180 bhp的引擎。

VW504.00 ： 适用于长效保养，符合欧盟四期环保要求。

VW505.00 ： 适用于乘用车柴油发动机，要求最低性能等级为CCMC PD-2。

VW506.00 ： 适用于柴油发动机，使用寿命长达50,000 km / 2年。

VW507.00 ： 适用于低SAPS油，适用于Euro 4发动机及2000年以后的VAG柴油发动机。

VW508.00 ： 适用于汽油发动机，推荐用于新的2.0 TFSI 140 kW和3.0 TDI CR 160 kW发动机。

VW509.00 ： 适用于柴油发动机，具有长寿命添加剂。

这些标准确保了机油的质量和性能，以满足大众汽车发动机的需求。选择符合这些标准的机油不仅能确保发动机的正常运行，还能延长其使用寿命。

The engine oil grades corresponding to Volkswagen's engine oil certification standards are as follows:

VW502.00: This is a common engine oil certification standard of Volkswagen. The corresponding engine oil grade is API SN, which meets the basic requirements of the engine.

VW503.00: It is applicable to extended oil change intervals and suitable for models such as the AUDI S4, but does not include engines with a horsepower exceeding 180 bhp.

VW504.00: It is suitable for long - term maintenance and complies with the EU Stage 4 environmental protection requirements.

VW505.00: It is applicable to passenger car diesel engines and requires a minimum performance level of CCMC PD - 2.

VW506.00: It is applicable to diesel engines and has a service life of up to 50,000 km / 2 years.

VW507.00: It is applicable to low - SAPS oil and suitable for Euro 4 engines and VAG diesel engines produced after 2000.

VW508.00: It is applicable to gasoline engines and is recommended for the new 2.0 TFSI 140 kW and 3.0 TDI CR 160 kW engines.

车企认证
Automobile Manufacturer Certifications

奔驰发动机机油认证标准主要分为标准灰分和低灰分两大系列。具体如下：

标准灰分机油认证标准

MB229.3：以 ACEA 认证体系中的 A3/B4 为基础，通常适用于无颗粒捕捉器的车型，机油粘度一般为 0W-40 和 5W-40，高温高剪切粘度（HTHS）大于 3.5。

MB229.5：同样基于 ACEA A3/B4 标准，适用于国五、国四的汽油车型，高温高剪切粘度大于 3.5，机油粘度常见的有 30、40。

低灰分机油认证标准

MB229.51：结合了 MB229.5 和 MB229.31 机油的标准，换油周期为 25000 公里到 50000 公里或 3 年内更换，不仅满足 ACEA 的 A3/B4，还满足 C3 标准，在 MB229.5 的高剪切保护基础上降低了灰分、硫、磷含量，适合国六车型及带有微粒捕集器 DPF 的柴油车，高温抗剪切（HTHS）的要求大于 3.5。

MB229.52：适用于排气系统含颗粒物捕捉器车型，属于高粘度高剪切油，通常标号主要以 0w-40 或者 5w-40 为主。

MB229.61：对应 ACEA 认证体系中的 C2，为中粘度中剪切油，通常标号主要以 0w-30 为主，适用于带有颗粒捕捉器及国六 b 车型，高温高剪切粘度在 2.9-3.5之间

MB229.71：以 ACEA C5 标准为基础，是低粘度低剪切油，主要强调低硫、低磷、低灰分，燃油效率有所提升，机油标号主要以 0w-20 为主，适用于配备颗粒捕捉器（DPF/GPF）的柴油以及汽油发动机轿车，高温高剪切粘度在 2.6-2.9 之间。

MB229.72：适用于排气系统含颗粒物捕捉器车型，是低粘度低剪切油，通常标号主要以 0w-20 为主。

Mercedes-Benz engine oil certification standards are mainly divided into two major series: standard ash and low ash. The details are as follows:

Standard Ash Engine Oil Certification Standards

MB229.3: Based on A3/B4 in the ACEA certification system, it is usually applicable to vehicle models without particulate filters. The oil viscosity is generally 0W-40 and 5W-40, and the high-temperature high-shear viscosity (HTHS) is greater than 3.5.

MB229.5: Also based on the ACEA A3/B4 standard, it is suitable for gasoline vehicle models of China V and China IV.The high-temperature high-shear viscosity is greater than 3.5, and common oil viscosities are 30 and 40.

Low Ash Engine Oil Certification Standards

MB229.51: It combines the standards of MB229.5 and MB229.31 engine oils. The oil change cycle is from 25,000 kilometers to 50,000 kilometers or replacement within 3 years. It not only meets A3/B4 of ACEA but also meets the C3 standard. Based on the high shear protection of MB229.5, the ash, sulfur, and phosphorus contents are reduced. It is suitable for China VI vehicle models and diesel vehicles with particulate filters (DPF), and the requirement for high-temperature shear resistance (HTHS) is greater than 3.5.

MB229.52: It is applicable to vehicle models with particulate filters in the exhaust system and belongs to high-viscosity high-shear oils. Usually, the grade is mainly 0w-40 or 5w-40.

MB229.61: Corresponding to C2 in the ACEA certification system, it is a medium-viscosity medium-shear oil. Usually, the grade is mainly 0w-30. It is suitable for vehicle models with particulate filters and China VI b, and the high-temperature high-shear viscosity is between 2.9 and 3.5.

MB229.71: Based on the ACEA C5 standard, it is a low-viscosity low-shear oil, which mainly emphasizes low sulfur, low phosphorus, and low ash, and fuel efficiency is improved. The engine oil grade is mainly 0w-20. It is suitable for diesel and gasoline engine cars equipped with particulate filters (DPF/GPF), and the high-temperature high-shear viscosity is between 2.6 and 2.9.

MB229.72: It is applicable to vehicle models with particulate filters in the exhaust system and is a low-viscosity low-shear oil. Usually, the grade is mainly 0w-20.

BMW LL-98：

这是BMW第一款长效建议机油，一般运用在2002年以前制作的宝马汽油建议机上。该标准是以ACEA A3/BX为基础，要求100℃cTs运动粘度为13.9，总碱量TBN为9.5。随着建议机技能的不断改进，该标准现已被宝马扔掉，不再引荐运用。（已废弃）

BMW LL-01：

这是BMW在2002年左右拟定的一种长效全组成机油标准，功能彻底逾越并兼容BMW Longlife-98。该机油标准以BMW LL-98为基础，对润滑油润滑保护提出了更高要求，要求100℃cTs运动粘度为12.3，总碱量TBN为10.4。该标准下具有多种粘度选项，如SAE 0W-30,0W-40,5W-30和5W-40。适用于2002年之后的宝马汽油车型，以及2003年之后的柴油车型(无车内空气循环过滤器)。

BMW LL-01 FE：

该标准相对于BMW Longlife-01而言，提高了光滑油燃油经济性标准，首要是降低了HTHS粘度方面的要求。机油粘度XW-30，对标ACEA A5B5标准，该标准首要用于装备N1x，N2x，N54，N55，N63，N74发动机的2002年款后宝马车型。

BMW LL-04：

这是2004年左右BMW专门为装备柴油颗粒过滤器（DPF）排气系统的BMW柴油机建议拟定的一种长效全组成机油标准。该标准以BMW LL-01为基础，只是在环保排放上提出了更高要求。机油粘度XW-30、XW-40，对标ACEA C3标准，适用于所有带/无微粒过滤器的柴油发动机。

BMW LL-12 FE：

符合BMW LL-12标准的机油，适用于2013年以后出产的特殊宝马柴油发动机如Nx7K1，Nx7U1，Nx7O1，以及仅容许在欧洲区域（包含挪威、瑞士和列支敦士登）用于自 2002 年款起的汽油发动机。

BMW LL-14 FE+:
符合BMW LL-14标准的机油，只容许在欧洲（包含挪威、瑞士和列支敦士登）以及美国和加拿大商场用于2014年款后的特定的汽油发动机，比如N20、Bx8，不容许用于柴油发动机。
BMW LL-17 FE+:
宝马最新的机油认证标准，粘度0W-20，对标ACEA C5标准，这种机油只允许用在2014年款后的特定BMW汽油发动机上，如N20/B38/B48/B58。
中国市场：中国市场的宝马目前主要是N20/N42/N47和B38/B48的发动机，其常见的OEM认证为BMW LL-01、BMW LL-04和BMW LL-17 FE+。

BMW LL - 98:
This is BMW's first long - term recommended engine oil, generally used in BMW gasoline engines manufactured before 2002. This standard is based on ACEA A3/BX, requiring a cTs kinematic viscosity of 13.9 at 100°C and a total base number (TBN) of 9.5. With the continuous improvement of engine technology, this standard has been abandoned by BMW and is no longer recommended for use. (Obsolete)

BMW LL - 01:
This is a long - term full - synthetic engine oil standard formulated by BMW around 2002. Its performance completely surpasses and is compatible with BMW Longlife - 98. Based on BMW LL - 98, this engine oil standard puts forward higher requirements for the lubrication and protection of lubricants. It requires a cTs kinematic viscosity of 12.3 at 100°C and a total base number (TBN) of 10.4. Under this standard, there are various viscosity options, such as SAE 0W - 30, 0W - 40, 5W - 30, and 5W - 40. It is suitable for BMW gasoline models after 2002 and diesel models after 2003 (without in - vehicle air circulation filters).

BMW LL - 01 FE:
Compared with BMW Longlife - 01, this standard improves the fuel economy standard of lubricants, mainly by reducing the requirements for HTHS viscosity. The engine oil viscosity is XW - 30, benchmarked against the ACEA A5B5 standard. This standard is mainly used for BMW models after the 2002 model year equipped with N1x, N2x, N54, N55, N63, N74 engines.

BMW LL - 04:
This is a long - term full - synthetic engine oil standard specifically formulated by BMW around 2004 for BMW diesel engines equipped with a diesel particulate filter (DPF) exhaust system. Based on BMW LL - 01, this standard only puts forward higher requirements for environmental emissions. The engine oil viscosities are XW - 30 and XW - 40, benchmarked against the ACEA C3 standard, and it is applicable to all diesel engines with/without particulate filters.

BMW LL - 12 FE:
Engine oil that meets the BMW LL - 12 standard is suitable for special BMW diesel engines produced after 2013, such as Nx7K1, Nx7U1, Nx7O1, and is only allowed to be used in gasoline engines starting from the 2002 model year in the European region (including Norway, Switzerland, and Liechtenstein).

BMW LL - 14 FE+:
Engine oil that meets the BMW LL - 14 standard is only allowed to be used in specific gasoline engines after the 2014 model year in Europe (including Norway, Switzerland, and Liechtenstein), as well as in the US and Canadian markets, such as N20 and Bx8. It is not allowed to be used in diesel engines.

BMW LL - 17 FE+:
This is BMW's latest engine oil certification standard. With a viscosity of 0W - 20, it is benchmarked against the ACEA C5 standard. This type of engine oil is only allowed to be used on specific BMW gasoline engines after the 2014 model year, such as N20/B38/B48/B58.

Chinese market: Currently, the engines of BMW in the Chinese market are mainly N20/N42/N47 and B38/B48. The common OEM certifications are BMW LL - 01, BMW LL - 04, and BMW LL - 17 FE+.

保时捷的机油认证标准主要包括 A40、C20、C30、C40 四个级别，每个级别都有特定的适用车型和性能要求。

A40 认证是保时捷针对机油产品的专项认证，对润滑油的低温启动性能、清净性、抗磨损性能、氧化稳定性等指标有着极高的要求。它主要适用于1994年后的保时捷车型，如911、BOXSTER、CAYMAN跑车、帕纳梅拉PANAMERA S/T、卡宴CAYENNE S/T/GTS等，特别是2016款以前的未带颗粒捕集器的车型。

C20 认证机油需要同时满足大众VW 508.00/509.00和ACEA C5的标准，具有低硫、低磷、低灰分的特点，并能在严苛高温工况下保持性能。它主要适用于2018款以后带或者不带颗粒捕集器的3.0T V6和2.0T L4车型。

C30 认证是保时捷更高级别的认证，它在A40规格标准基础上，在节省燃油、清洁引擎、兼容后处理装置等方面有着更加优异的表现。它主要针对柴油车，级别相当于大众的VW504/VW507，适用于2016款以后带或者不带颗粒捕集器的2.9T V6车型。

C40 认证机油则主要适用于2018年以后带或者不带颗粒捕集器的4.0T V8、以及3.0T和2.0T的H6和H4车型。

此外，保时捷还推荐使用 0W-40 型号的机油，这是先进的全合成润滑油，杂质含量低，能有效防止油泥和积碳形成，确保润滑油的粘性和流动性，从而更好地保护发动机。

Porsche's engine oil certification standards mainly include four levels: A40, C20, C30, and C40. Each level has specific applicable models and performance requirements.

A40 The certification is a special certification for Porsche's engine oil products. It has extremely high requirements for indicators such as the low - temperature starting performance, detergency, anti - wear performance, and oxidation stability of the lubricant. It is mainly applicable to Porsche models produced after 1994, such as the 911, BOXSTER, CAYMAN sports cars, PANAMERA S/T, CAYENNE S/T/GTS, etc., especially models without a particulate filter before the 2016 model year.

C20 Certified engine oil needs to meet the standards of Volkswagen VW 508.00/509.00 and ACEA C5 simultaneously. It is characterized by low sulfur, low phosphorus, and low ash content, and can maintain its performance under harsh high - temperature conditions. It is mainly applicable to 3.0T V6 and 2.0T L4 models with or without a particulate filter after the 2018 model year.

C30 This certification is a higher - level certification of Porsche. Based on the A40 specification standard, it performs more outstandingly in aspects such as fuel saving, engine cleaning, and compatibility with post - treatment devices. It is mainly targeted at diesel vehicles and is equivalent to Volkswagen's VW504/VW507 level. It is applicable to 2.9T V6 models with or without a particulate filter after the 2016 model year.

C40 The certified engine oil is mainly suitable for 4.0T V8 models, as well as 3.0T and 2.0T H6 and H4 models with or without a particulate filter after 2018.

In addition, Porsche also recommends using 0W - 40 engine oil. This is an advanced fully synthetic lubricant with a low impurity content. It can effectively prevent the formation of sludge and carbon deposits, ensure the viscosity and fluidity of the lubricant, thus providing better protection for the engine.

欧洲引擎润滑油质量管理体系（EELQMS）是由欧洲汽车制造商协会、欧洲石油添加剂制造商技术委员会（ATC）和欧洲润滑剂行业技术协会（ATIEL）联合开发的，总部位于比利时布鲁塞尔。
EELQMS 是一个自发性的汽车发动机润滑油质量管理体系。其设立目的是帮助润滑油营销商确保润滑油在市场上所宣称的质量和性能得以保证。
EELQMS 明确了成员在设计、开发、生产或营销发动机润滑剂过程中应遵循的详细要求。通过整合所有这些要素，EELQMS 为开发高质量润滑油以有效支持汽车性能方面的宣称提供了全面的指导方针。满足这些要求是每个 EELQMS 润滑油营销成员的责任。
该体系旨在推动定制化发动机润滑剂的改进与发展，以满足汽车工业不断增长的技术要求，并且协助润滑油营销商确保其在市场上所宣称的润滑油质量和性能得以实现。
主要职能：

建立 EELQMS 质量管理体系。
确保有独立的评估考核机制，通过内部和 / 或外部审计师对开发和制造过程进行监督，明确指定报告对象，以实现监督和责任追究。
在符合 ATC 或 ACC 定义准则要求的基础上，开展所有发动机测试认证实验，执行所有相关守则，特别是：
按照 ATIEL 守则进行 VGRA（粘度等级）相关操作；
按照 ATIEL 守则进行基础油交换相关操作；
按照 ATC 守则进行 VMI（粘度改性剂交换）相关操作；
按照 ATC 或 ACC 守则中的指南进行性能添加剂包修改相关操作。

EELQMS 的认证流程和标准
EELQMS 为开发高质量润滑油提供了全面的指导方针，并支持润滑油营销商在市场上进行性能宣称。其认证流程包括：
1、需求设计：保证润滑油在开发阶段能够满足特定的性能要求。
2、生产审计：利用内部和外部审计来确保生产过程符合规定。
3、测试认证：开展所有相关的测试实验，确保润滑油达到预定的性能标准。
EELQMS 与其他机油标准的对比
EELQMS 和其他常见的机油标准（如 SAE、API、ACEA）有所不同。SAE 是粘度标准，用于说明机油在高温和低温环境下的性能；API 是美国石油协会的标准，用于描述机油的质量等级；ACEA 是欧洲汽车制造商协会的标准，兼顾发动机性能和环保要求。EELQMS 通过独立的评估和考核机制，保障润滑油的质量和性能，从而支持其在市场上的性能宣称。
EELQMS 的应用场景和重要性
EELQMS 主要应用于汽车发动机润滑油的研发、生产和营销环节。其重要性在于为润滑油市场提供独立的评估和考核机制，确保润滑油的质量和性能符合预期标准。通过 EELQMS 认证的润滑油可以更有底气地在市场上宣传其性能优势。

The European Engine Lubricant Quality Management System (EELQMS) was jointly developed by the European Automobile Manufacturers Association, the Technical Committee of European Petroleum Additive Manufacturers (ATC), and the European Lubricants Industry Technical Association (ATIEL), with its headquarters located in Brussels, Belgium.
EELQMS is a spontaneous quality management system for automotive engine lubricants. Its purpose is to assist lubricant marketers in ensuring that the quality and performance of lubricants claimed in the market are guaranteed.
EELQMS defines the detailed requirements that members should follow during the design, development, production, or marketing of engine lubricants. By integrating all these elements, EELQMS provides comprehensive guidelines for the development of high - quality lubricants to effectively support claims regarding automotive performance. It is the responsibility of each EELQMS lubricant marketing member to meet these requirements.
This system aims to promote the improvement and development of customized

Establish the EELQMS quality management system.

Ensure an independent evaluation and assessment mechanism. Supervise the development and manufacturing processes through internal and/or external auditors, and clearly specify the reporting objects to achieve supervision and accountability.

Based on meeting the requirements of the criteria defined by ATC or ACC, carry out all engine test and certification experiments and implement all relevant codes, especially:

EELQMS Certification Process and Standards

EELQMS provides comprehensive guidelines for the development of high - quality lubricants and supports lubricant marketers in making performance claims in the market. Its certification process includes:

Requirement Design: Ensure that lubricants can meet specific performance requirements during the development stage.

Production Audit: Use internal and external audits to ensure that the production process complies with regulations.

Test Certification: Conduct all relevant test experiments to ensure that lubricants meet the predetermined performance standards.

Comparison between EELQMS and Other Oil Standards

EELQMS is different from other common oil standards such as SAE, API, and ACEA. SAE is a viscosity standard used to describe the performance of oil in high - and low - temperature environments. API is a standard of the American Petroleum Institute used to describe the quality grade of oil. ACEA is a standard of the European Automobile Manufacturers Association, taking into account both engine performance and environmental protection requirements. EELQMS guarantees the quality and performance of lubricants through an independent evaluation and assessment mechanism, thus supporting its performance claims in the market.

Application Scenarios and Importance of EELQMS

EELQMS is mainly applied in the research, development, production, and marketing of automotive engine lubricants. Its importance lies in providing an independent evaluation and assessment mechanism for the lubricant market, ensuring that the quality and performance of lubricants meet the expected standards. Lubricants certified by EELQMS can more confidently promote their performance advantages in the market.

特点

混合比例要求：二冲程机油需要按照特定的比例与汽油混合。这个比例因发动机类型、工作条件等因素而异，常见的混合比例有 1:25（机油：汽油）、1:30、1:40 等。例如，一些小型二冲程摩托车发动机可能使用 1:30 的混合比例，而某些高性能的二冲程舷外机可能需要更精确的 1:25 混合比例。

燃烧特性：由于二冲程机油会进入燃烧室参与燃烧，所以它必须具有良好的燃烧性能。优质的二冲程机油能够在燃烧过程中充分燃烧，减少积碳和沉积物的形成。如果机油燃烧不完全，会导致火花塞堵塞、排气口积碳等问题，影响发动机的性能和使用寿命。

润滑性能：二冲程机油需要在高温、高速的工况下为发动机部件提供可靠的润滑。它要能够在运动部件表面形成稳定的油膜，防止金属之间的直接接触。例如，在二冲程摩托车发动机的高速运转中，活塞与气缸壁之间的润滑就依赖于二冲程机油的良好性能。

清洁和散热性能：它可以清洁发动机内部，带走燃烧产生的污垢和杂质，并且能够有效地吸收和散发发动机产生的热量，防止发动机过热。

分类

矿物油：价格相对较低，基础油来自石油提炼。其润滑性能和清洁性能一般，适用于一些对性能要求不高的小型二冲程发动机，如普通的小型割草机、小型摩托车等。

半合成油：是矿物油和合成油的混合产品。它结合了矿物油的经济性和合成油的部分优点，在润滑和清洁性能上比矿物油有所提升，适用于中等性能要求的二冲程发动机。

全合成油：通过化学合成方法制备，具有优异的润滑、清洁和散热性能。能够适应高温、高转速等极端工况，常用于高性能的二冲程发动机，如高性能摩托车、竞赛用舷外机等。

应用场景

摩托车领域：许多小型二冲程摩托车依靠二冲程机油与汽油混合来润滑发动机。这些摩托车在城市通勤、越野等场景中广泛使用。

舷外机领域：用于小型船只的二冲程舷外机也需要二冲程机油。在水上航行时，舷外机的二冲程发动机通过二冲程机油来保证可靠的运行，为船只提供动力。

园林工具领域：像割草机、油锯等园林工具中的二冲程发动机也使用二冲程机油。这些工具在户外园林维护工作中发挥着重要作用，二冲程机油能确保它们在工作过程中的稳定性和可靠性。

二冲程机油是一种专门用于二冲程发动机的润滑油。二冲程发动机是一种在两个冲程（曲轴旋转一圈）内完成一个工作循环（包括进气、压缩、做功和排气）的内燃机。与四冲程发动机不同，二冲程发动机的结构相对简单紧凑，但润滑方式较为特殊，需要二冲程机油来进行润滑、冷却和清洁等多种功能。

工作原理

在二冲程发动机工作过程中，机油与燃油按一定比例混合后进入发动机。当燃油 - 机油混合气进入曲轴箱时，部分机油会附着在曲轴、连杆等运动部件表面，起到润滑作用，减少部件之间的摩擦和磨损。随着混合气的燃烧和排气过程，机油还能帮助冷却燃烧室内的高温部件，防止过热。同时，它可以带走燃烧产生的一些杂质和积碳，起到清洁作

Two - stroke oil is a type of lubricating oil specifically designed for two - stroke engines. A two - stroke engine is an internal combustion engine that completes one working cycle (including intake, compression, power, and exhaust) within two strokes (one revolution of the crankshaft). Different from four - stroke engines, two - stroke engines have a relatively simple and compact structure, but their lubrication method is rather special. They require two - stroke oil to perform multiple functions such as lubrication, cooling, and cleaning.

Working Principle

During the operation of a two - stroke engine, the oil is mixed with fuel in a certain proportion and then enters the engine. When the fuel - oil mixture enters the crankcase, part of the oil adheres to the surfaces of moving parts such as the crankshaft and connecting rod, playing a lubricating role and reducing friction and wear between components. As the mixture burns and is exhausted, the oil also helps to cool the high - temperature components in the combustion chamber, preventing overheating. At the same time, it can carry away some impurities and carbon deposits generated during combustion, performing a cleaning function.

Characteristics

Mixing Ratio Requirements: Two - stroke oil needs to be mixed with gasoline in a specific proportion. This proportion varies depending on factors such as engine type and working conditions. Common mixing ratios include 1:25 (oil: gasoline), 1:30, 1:40, etc. For example, some small two - stroke motorcycle engines may use a 1:30 mixing ratio, while certain high - performance two - stroke outboard engines may require a more precise 1:25 mixing ratio.

Combustion Characteristics: Since two - stroke oil enters the combustion chamber and participates in combustion, it must have good combustion performance. High - quality two - stroke oil can burn fully during the combustion process, reducing the formation of carbon deposits and sediments. If the oil does not burn completely, it can cause problems such as spark plug fouling and carbon deposits at the exhaust port, affecting the engine's performance and service life.

Lubrication Performance: Two - stroke oil needs to provide reliable lubrication for engine components under high - temperature and high - speed operating conditions. It should be able to form a stable oil film on the surfaces of moving parts to prevent direct contact between metals. For example, during the high - speed operation of a two - stroke motorcycle engine, the lubrication between the piston and the cylinder wall depends on the good performance of two - stroke oil.

Cleaning and Heat Dissipation Performance: It can clean the inside of the engine, carry away dirt and impurities generated by combustion, and effectively absorb and dissipate the heat generated by the engine, preventing the engine from overheating.

Classification

Mineral Oil: It has a relatively low price, and its base oil is derived from petroleum refining. Its lubrication and cleaning performance are average, making it suitable for some small two - stroke engines with low - performance requirements, such as ordinary small lawn mowers and small motorcycles.

Semi - synthetic Oil: It is a mixed product of mineral oil and synthetic oil. It combines the economy of mineral oil and some advantages of synthetic oil, and has improved lubrication and cleaning performance compared to mineral oil, making it suitable for two - stroke engines with medium - performance requirements.

Fully Synthetic Oil: Prepared through chemical synthesis methods, it has excellent lubrication, cleaning, and heat dissipation performance. It can adapt to extreme conditions such as high temperatures and high speeds, and is commonly used in high - performance two - stroke engines, such as high - performance motorcycles and racing outboard engines.

Application Scenarios

Motorcycle Field: Many small two - stroke motorcycles rely on the mixture of two - stroke oil and gasoline to lubricate the engine. These motorcycles are widely used in scenarios such as urban commuting and off - road riding.

Outboard Engine Field: Two - stroke outboard engines for small boats also require two - stroke oil. During water navigation, the two - stroke engines of outboard motors ensure reliable operation through two - stroke oil, providing power for the boats.

Garden Tool Field: Two - stroke engines in garden tools such as lawn mowers and chainsaws also use two - stroke oil. These tools play an important role in outdoor garden maintenance work, and two - stroke oil ensures their stability and reliability during the working process.

选择适合二冲程发动机的机油，需要综合考虑以下几个方面：

高性能发动机：如果是高性能的二冲程发动机，如竞赛用摩托车、高性能舷外机等，最好选择全合成机油。因为全合成机油通过化学合成方法制备，具有优异的润滑、清洁和散热性能，能够适应高温、高转速等极端工况，可确保发动机在高负荷运转下得到良好的保护。

中等性能发动机：对于中等性能要求的发动机，像普通的中型二冲程摩托车、部分园林工具发动机，半合成油是比较合适的选择。半合成油是矿物油和合成油的混合产品，结合了矿物油的经济性和合成油的部分优点，在润滑和清洁性能上比矿物油有所提升。

低性能发动机：对于一些对性能要求不高的小型二冲程发动机，如普通的小型割草机、小型摩托车，矿物油就可以满足基本需求。矿物油价格相对较低，其基础油来自石油提炼，虽然润滑和清洁性能一般，但对于简单的小型发动机足够。

To select the appropriate oil for a two - stroke engine, the following aspects need to be considered comprehensively:

- **High - performance engines**: For high - performance two - stroke engines, such as racing motorcycles and high - performance outboard motors, it is best to choose fully synthetic oil. Because fully synthetic oil is prepared through chemical synthesis methods and has excellent lubrication, cleaning, and heat dissipation performance. It can adapt to extreme working conditions such as high temperatures and high speeds, ensuring that the engine is well - protected under high - load operation.
- **Medium - performance engines**: For engines with medium - performance requirements, like ordinary medium - sized two - stroke motorcycles and some garden tool engines, semi - synthetic oil is a more suitable choice. Semi - synthetic oil is a mixed product of mineral oil and synthetic oil. It combines the economy of mineral oil and some advantages of synthetic oil, and has improved lubrication and cleaning performance compared to mineral oil.
- **Low - performance engines**: For some small two - stroke engines with low - performance requirements, such as ordinary small lawn mowers and small motorcycles, mineral oil can meet the basic needs. Mineral oil has a relatively low price, and its base oil is derived from petroleum refining. Although its lubrication and cleaning performance are average, it is sufficient for simple small engines.

各种级别机油的适用范围如下：
FA级（相当于TA级）适用于在缓和条件下工作的50ml小型二冲程汽油发动机；
FB级（相当于TB级）适用于在中等条件下工作的小型二冲程汽油发动机；
FC和FD级（相当于TC级及TC＋级）适用于苛刻条件下中小型二冲程汽油发动机。
括号内的规格标准指美国API / NMMA。

二冲程机油简介
Introduction to Two - stroke Engine Oil