Amman Chamber of Commerce

From: Jordan Chamber of Commerce (Diwan) <diwan@jocc.org.jo>
Sent: Monday, July 14, 2025 11:22 AM
To: Jordan Chamber of Commerce (Diwan)
Subject: زيوت التزييت محركات الاحتراق الداخلي
Attachments: 12849.pdf; مشروع التصويت- زيوت التزييت.pdf

السادة رؤساء الغرف التجارية الأردنية المحترمين
سعادة السيد ممثل قطاع السيارات والأليات الثقيلة ولوازمها المحترم

الجهة الوارد منها الكتاب: مؤسسة المواصفات والمقاييس الاردنية
موضوع الكتاب: زيوت التزييت محركات الاحتراق الداخلي

السلام عليكم ورحمة الله وبركاته،،،

أهدي سعادتكم أطيب التحيات، وارجو أن ارفق لكم نسخة عن الكتاب الوارد من مؤسسة المواصفات والمقاييس الاردنية رقم ج/عام/ 12849 تاريخ 2025/7/8 والمتضمن قرار عدم السماح باستيراد زيوت المحركات ذوات التصنيف (Obsolete) حسب الجدول (2,3,4) من المواصفة القياسية الاردنية رقم 392-/2023/1 زيوت التزييت – زيوت تزييت محركات الاحتراق الداخلي والمذكورة في الجدول ، وذلك اعتبارا من تاريخ 2025/10/1 ويمنع طرحها في الاسواق المحلية اعتبارا من 2026/7/1 .

أرجو سعادتكم التكرم بالاطلاع، والايعاز للتعميم على أعضائكم ومنتسبيكم ذوي الاختصاص .

وتفضلوا بقبول فائق الاحترام والتقدير ،،،

خليل محمد الحاج توفيق
رئيس مجلس الإدارة

غرفة تجارة عمان
AMMAN CHAMBER OF COMMERCE
التاريخ: ١٥ تموز ٢٠٢٥
3290
رقم الوارد:

غرفة تجارة الأردن
هاتف: 5902040 6 962+
فاكس: 5902051 6 962+

مؤسسة المواصفات والمقاييس الأردنية

الرقم: ----ج/عام/-12849----------

التاريخ: ---12-/-01-/-1447-هـ

الموافق: ---08-/-07-/-2025-م

سعادة رئيس غرفة تجارة الأردن

الموضوع: زيوت التزييت محركات الاحتراق الداخلي

تحية طيبة وبعد،،،

أرجو سعادتكم التكرم بالتعميم والتأكيد على جميع مستوردي وتجار الزيوت المعدنية بأنه تقرر عدم السماح باستيراد زيوت المحركات ذوات التصنيف (Obsolete) حسب الجداول رقم (٢، ٣، ٤) من القاعدة الفنية رقم ٢٠٢٣/١-٣٩٢ زيوت التزييت – زيوت تزييت محركات الاحتراق الداخلي والمذكورة في الجدول أدناه، وذلك اعتباراً من تاريخ ٢٠٢٥/١٠/١، وكما يمنع طرحها في الأسواق المحلية اعتباراً من ٢٠٢٦/٧/١.

Gasoline engines grades	Diesel Engines grades
SA	GF-1
SB	GF-2
SD	GF-3
SE	GF-4
SF	GF-5
SG	CA
SH	CB
	CC
	CD
	CD-II
	CE
	CF-2
	CF-4
	CG-4

وتفضلوا سعادتكم بقبول فائق الاحترام

المديـــر العـــام

م. عبير بركات الزهير

نسخة/ نقابة اصحاب شركات التخليص الأردنية
نسخة/ النقابة العامة لوكلاء السيارات وتجار قطع السيارات واوازمها
نسخة/ مساعد المدير العام للشؤون الرقابية
نسخة / مدير مديرية الرقابة الحدودية
نسخة / مدير فرع اقليم الجنوب
نسخة/ مكاتب المؤسسة في المراكز الحدودية.
نسخة/ د.محمد الشخاتية
م ش/ د ج
٢٠٢٥/٨/١٢

مؤسسة المواصفات والمقاييس الأردنية

الرقم: م / عام / 12727

التاريخ: 1445 / 01 / 14 هـ

الموافق: 2023 / 08 / 01 م

معالي .....

عطوفة .....

سعادة .....

تحية طيبة وبعد،

أرجو معاليكم/عطوفتكم/سعادتكم التكرم بالعلم بأن أسلوب العمل الفني المتبع في وضع المواصفات القياسية والقواعد الفنية الأردنية يقتضي تعميم مشروع التصويت على الجهات ذات العلاقة، وذلك لإبداء الرأي والتصويت عليه تمهيداً لعرضه على مجلس الإدارة لاعتماده كمواصفة قياسية أو قاعدة فنية أردنية.

لذا أرجو أن أرفق لكم طياً نسخة عن مشروع التصويت للمواصفة القياسية الأردنية ٣٩٢-١/٢٠٢٣ الخاص بزيوت التزييت – زيوت تزييت محركات الاحتراق الداخلي: الجزء ١: تصنيف معهد البترول الأمريكي (API)، الذي أعدته اللجنة الفنية الدائمة لزيوت التزييت (٤).

يرجى التكرم بعرض هذا المشروع على المختصين لديكم وموافاتنا بردكم عليه خلال شهرين من تاريخه، وذلك باستخدام بطاقة التصويت المرفقة، علماً بأن عدم الرد خلال المدة يعتبر موافقة من قبلكم على المشروع المذكور.

وتفضلوا بقبول فائق الاحترام

المديـــــر العـــام

م. عبير بركات الزهير

المرفقات:
- مشروع التصويت
- بطاقة التصويت

نسخة/ مدير مديرية التقييس
نسخة/ رئيس قسم فحص ومتابعة المواصفات
نسخة/ رئيس قسم المناهات الكيميائية
نسخة/ م. رحاب الراحلة
ربا-٢٠٢٣/٧/٢٥

المملكة الأردنية الهاشمية
هاتف: ٥٣٠١٢٢٥ ٦ ٦٢٢ ٦ ٦٢٢ + فاكس: ٥٣٠١٢٤٩ ٦ ٦٢٢ + ص.ب: ١٤١٢٨٧ عمان ١١١٩٤ الأردن، الموقع الإلكتروني www.jsmo.gov.jo

مؤسسة المواصفات والمقاييس الأردنية

الرقم: م / علم / 12727
التاريخ: 14 / 01 / 1445 هـ
الموافق: 01 / 08 / 2023 م

تعميم مشروع التصويت

عنوان المشـــــروع: زيوت التزييت ـ زيوت تزييت محركات الاحتراق الداخلي، الجزء ١: تصنيف معهد البترول الأمريكي (API)

سكرتير اللجـــنة الفنية: م. رحاب المراحلة

الرقم	الجهة	الرقم	الجهة
١	وزارة البيئة	١١	هيئة تنظيم قطاع الطاقة والمعادن
٢	وزارة الصحة/ مديرية صحة البيئة	١٢	غرفة صناعة الأردن
٣	نقابة المهندسين الأردنيين	١٣	غرفة تجارة الأردن
٤	وزارة الصناعة والتجارة والتموين	١٤	جامعة اليرموك
٥	الجمعية العلمية الملكية	١٥	غرفة صناعة عمان
٦	الجامعة الأردنية	١٦	غرفة تجارة عمان
٧	جامعة العلوم والتكنولوجيا	١٧	الجمعية الكيميائية الأردنية
٨	أمانة عمان الكبرى	١٨	القيادة العامة للقوات المسلحة الأردنية – الجيش العربي/المختبرات العسكرية لمراقبة الجودة
٩	شركة مصفاة البترول الأردنية المساهمة المحدودة	١٩	وزارة الأشغال العامة والإسكان
١٠	دائرة المشتريات الحكومية	٢٠	مؤسسة التدريب المهني

المديـــــر العـــام

م. عبير بركات الزهير

نسخة/ مدير مديرية التقييس
نسخة/ رئيس قسم فحص ومقايسة المواصفات
نسخة/ رئيس قسم المنتجات الكيميائية
نسخة/ م. رحاب المراحلة Eng. Rehab
ربا-٢٠٢٣/٧/٢٥

مؤسسة المواصفات والمقاييس الأردنية

بطاقة تصويت

رقم المشروع: ٢٠٢٣/٣٩٢	عنوان المشروع: زيوت التزييت ـ زيوت تزييت محركات الاحتراق الداخلي، الجزء ١: تصنيف معهد البترول الأمريكي (API)
اسم اللجنة الفنية: الدائمة لزيوت التزييت (٤)	أمين اللجنة الفنية: م. رحاب المراحلة
تاريخ التعميم: ٢٠٢٣/٠٧/٢٦	آخر موعد للرد: ٢٠٢٣/٠٩/٢٦

الرقم	نوع الملاحظة			الملاحظة *	التعديل المقترح	رأي اللجنة الفنية
	عامة	فنية	هيكلية وصياغية			

النتيجة النهائية للتصويت:

☐ موافقة (لا توجد ملاحظات).

☐ موافقة مع الملاحظات المرفقة ، والتي يمكن الأخذ بها أو تجاوزها حسب الاقتضاء.

☐ عدم موافقة للأسباب الفنية المرفقة، والتي عند زوالها ينقلب التصويت إلى موافقة.

* يرجى تزويدنا بالمراجع التي اعتمد عليها في حالة وجود ملاحظات.

الجهة القائمة بالتصويت:	التاريخ:
اسم الشخص المسؤول:	

DJS 392-1:2023
Fifth Edition

ع ت ٣٩٢-١/٢٠٢٣
الإصدار الخامس

مشروع تصويت

زيوت التزييت ـ زيوت تزييت محركات الاحتراق الداخلي

الجزء ١: تصنيف معهد البترول الأمريكي (API)

Lubricating oils – Lubricating oil for internal combustion engines
Part 1: API classifications

مؤسسة المواصفات والمقاييس
المملكة الأردنية الهاشمية

Contents

Tables

This Standard cancels and replaces the same standard issued in 2007.

Foreword

The Jordan Institution for Standards and Metrology is the national standardization body in Jordan. The work of preparing Jordanian standards is normally carried out by technical committees composed of the interested parties, which are involved in the scope of standard. All the interested bodies have the right to vote on the draft Jordanian Standard during the enquiry stage, taking into consideration the importance of harmonizing Jordanian standards with the International, regional or national standards (as much as possible) with the purpose of eliminating technical barriers to trade and facilitating International trade.

Jordanian Standards are drafted in accordance with the rules given in the Jordanian Directive 1-2:2005, part 2: Rules for the structure and drafting of Jordanian Standards related to standardization department*.

The permanent technical committee for Lubricating oils 4 has studied Jordanian Standard 392:2007 related to **"Lubricating oils – Lubricating oils for internal combustion engines"**, and the prepared project 392-1:2023 related to **"Lubricating oils – Lubricating oils for internal combustion engines, Part 1: API classifications"**, and has recommended to approve the amended project as a Jordanian Standard 392-1:2023 according to article (12) of Standards and Metrology Law No. (22) for the year 2000 and it's amendments.

This Jordanian Standard includes the following parts under the same general title, **"Lubricating oils – Lubricating oils for internal combustion engines"**:

– Part 1: API classifications.

– Part 2: ACEA European oil sequences for gasoline engines and diesel engines.

* under amendment

Lubricating oils – Lubricating oils for internal combustion engine
Part 1: API classifications

1- Scope

This Jordanian Standard is concerned with lubricating oils for internal combustion engines suitable for gasoline and diesel engine services (excluding marine application) according to API performance classifications.

2- Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ASTM D92, Standard test method for flash and fire points by cleveland open cup tester.
- ASTM D97, Standard test method for pour point of petroleum products.
- ASTM D130, Standard test method for corrosiveness to copper from petroleum products by copper strip test.
- ASTM D445, Standard test method for kinematic viscosity of transparent and opaque liquids (and calculation of dynamic viscosity).
- ASTM D892, Standard test method for foaming characteristics of lubricating oils.
- ASTM D2270, Standard practice for calculating viscosity index from kinematic viscosity at 40 °C and 100 °C.
- ASTM D2622, Standard test method for sulfur in petroleum products by wavelength dispersive X-ray fluorescence spectrometry.
- ASTM D2896, Standard test method for base number of petroleum products by potentiometric perchloric acid titration.
- ASTM D4057, Standard practice for manual sampling of petroleum and petroleum products.
- ASTM D4683, Standard test method for measuring viscosity of new and used engine oils at high shear rate and high temperature by tapered bearing simulator viscometer at 150 °C.
- ASTM D4684, Standard test method for determination of yield stress and apparent viscosity of engine oils at low temperature.
- ASTM D4741, Standard test method for measuring viscosity at high temperature and high shear rate by tapered-plug viscometer.
- ASTM D4951, Standard test method for determination of additive elements in lubricating oils by inductively coupled plasma atomic emission spectrometry.
- ASTM D5119, Standard test method for evaluation of automotive engine oils in the CRC L-38 spark-ignition engine.
- ASTM D5133, Standard test method for low temperature, low shear rate, viscosity/temperature dependence of lubricating oils using a temperature-scanning technique.
- ASTM D5185, Standard test method for multielement determination of used and unused lubricating oils and base Oils by inductively coupled plasma atomic emission spectrometry (ICP-AES).
- ASTM D5293, Standard test method for apparent viscosity of engine oils and base stocks between –10 °C and –35 °C using cold-cranking simulator.
- ASTM D5302, Standard test method for evaluation of automotive engine oils for inhibition of deposit formation and wear in a spark-ignition internal combustion engine fueled with gasoline and operated under low-temperature, light- duty conditions.

- ASTM D5480, Standard test method for engine oil volatility by gas chromatography.
- ASTM D5481, Standard test method for measuring apparent viscosity at high – temperature and high-shear rate by multicell capillary viscometer.
- ASTM D5533, Standard test method for evaluation of automotive engine oils in the sequence IIIE, spark-ignition engine.
- ASTM D5800, Standard test method for evaporation loss of lubricating oils by the noack method.
- ASTM D5844, Standard test method for evaluation of automotive engine oils for inhibition of rusting (Sequence IID).
- ASTM D5966, Standard test method for evaluation of engine oils for roller follower wear in light-duty diesel engine.
- ASTM D5967, Standard test method for evaluation of diesel engine oils in T-8 diesel engine.
- ASTM D6082, Standard test method for high temperature foaming characteristics of lubricating oils.
- ASTM D6278, Standard test method for shear stability of polymer containing fluids using a European diesel injector apparatus.
- ASTM D6335, Standard test method for determination of high temperature deposits by thermo – oxidation engine oil simulation test.
ASTM D6417, Standard test method for estimation of engine oil volatility by capillary gas chromatography.
- ASTM D6557, Standard test method for evaluation of rust preventive characteristics of automotive engine oils.
- ASTM D6593, Standard test method for evaluation of automotive engine oils for inhibition of deposit formation in a spark – ignition internal combustion engine fueled with gasoline and operated under low-temperature, light-duty conditions.
- ASTM D6681, Standard test method for evaluation of engine oils in a high speed, single-cylinder diesel engine-caterpillar 1P test procedure.
- ASTM D6709, Standard test method for evaluation of automotive engine oils in the sequence VIII spark-ignition engine (CLR oil test engine).
- ASTM D6750, Standard test methods for evaluation of engine oils in a high-speed, single – cylinder diesel engine – 1K procedure (0,4 % fuel sulfur) and 1N procedure (0,04 % fuel sulfur).
- ASTM D6794, Standard test method for measuring the effect on filterability of engine oils after treatment with various amounts of water and a long (6 h) heating time.
- ASTM D6795, Standard test method for measuring the effect on filterability of engine oils after treatment with water and dry ice and a short (30 min) heating time.
- ASTM D6838, Standard test method for cummins M11 high soot test.
- ASTM D6891 Standard test method for evaluation of automotive engine oils in the sequence IVA spark-ignition engine.
- ASTM D6894 Standard test method for evaluation of aeration resistance of engine oils in direct – injected turbocharged automotive diesel engine.
- ASTM D6896, Standard test method for determination of yield stress and apparent viscosity of used engine oils at low temperature.
- ASTM D6922, Standard test method for determination of homogeneity and miscibility in automotive engine oils.
- ASTM D6923, Standard test method for evaluation of engine oils in a high speed, single – cylinder diesel engine – caterpillar 1R test procedure.
- ASTM D6975, Standard test method for cummins M11 EGR test.
- ASTM D6984, Standard test method for evaluation of automotive engine oils in the sequence IIIF, spark – ignition engine.
- ASTM D6987/D6987M Standard test method for evaluation of diesel engine oils in T-10 exhaust gas recirculation diesel engine.

- ASTM D7042, Standard test method for dynamic viscosity and density of liquids by stabinger viscometer (and the calculation of kinematic viscosity).
- ASTM D7097 Standard test method for determination of moderately high temperature piston deposits by thermo – oxidation engine oil simulation test – TEOST MHT.
- ASTM D7109, Standard test method for shear stability of polymer – containing fluids using a European diesel injector apparatus at 30 cycles and 90 cycles.
- ASTM D7156, Standard test method for evaluation of diesel engine oils in the T-11 exhaust gas recirculation diesel engine.
- ASTM D7216, Standard test method for determining automotive engine oil compatibility with typical seal elastomers.
- ASTM D7320, Standard test method for evaluation of automotive engine oils in the sequence IIIG, spark – ignition engine.
- ASTM D7346 Standard test method for no flow point and pour point of petroleum products and liquid fuels.
- D7422 Standard test method for evaluation of diesel engine oils in T-12 exhaust gas recirculation diesel engine.
- ASTM D7468, Standard test method for cummins ISM test.
- ASTM D7484, Standard test method for evaluation of automotive engine oils for valve – train wear performance in cummins ISB medium-duty diesel engine.
- ASTM D7528, Standard test method for bench oxidation of engine oils by ROBO apparatus.
- ASTM D7549, Standard test method for evaluation of heavy-duty engine oils under high output conditions – caterpillar C13 test procedure.
- ASTM D7563, Standard test method for evaluation of the ability of engine oil to emulsify water and simulated Ed85 fuel.
- ASTM D7589, Standard test method for measurement of effects of automotive engine oils on fuel economy of passenger cars and light-duty trucks in sequence VID spark ignition engine.
- ASTM D8047, Standard test method for evaluation of engine oil aeration resistance in a caterpillar C13 direct-injected turbo- charged automotive diesel engine.
- ASTM D8048, Standard test method for evaluation of diesel engine oils in T-13 diesel engine.
- ASTM D8111, Standard test method for evaluation of automotive engine oils in the sequence IIIH, spark-ignition engine.
- ASTM D8114, Standard test method for measurement of effects of automotive engine oils on fuel economy of passenger cars and light – duty trucks in sequence VIE spark ignition.
- ASTM D8226, Standard test method for measurement of effects of automotive engine oils on fuel economy of passenger cars and light – duty trucks in sequence VIF spark ignition engine.
- ASTM D8256, Standard test method for evaluation of automotive engine oils for inhibition of deposit formation in the sequence VH spark – ignition engine fueled with gasoline and operated under low – temperature, light-duty conditions.
- ASTM D8279, Standard test method for determination of timing-chain wear in a turbocharged, direct-injection, spark – ignition, four – cylinder engine.
- ASTM D8291, Standard test method for evaluation of performance of automotive engine oils in the mitigation of low – speed, preignition in the sequence IX gasoline turbocharged direct – injection, spark – ignition engine.
- ASTM D8350, Standard test method for evaluation of automotive engine oils in the sequence IVB spark-ignition engine.

3- Terms and definitions

For the purposes of this Jordanian Standard, the following terms and definitions applies.

3-1

Base oil

Petroleum product produced after refining of crude oil or by other manufacturing process and used in manufacturing of lubricating oil and greases

3-2

Additives

Chemical materials designed to be added with lubricating oil to enhance its performance properties

3-3

Lubrication

The act of adding lubricating oil to reduce friction and wear between the moving parts, to control the increase in temperature rise caused by the friction, to minimize corrosion and to remove residues resulting from internal combustion

4- Classification

Lubricating oils are classified according to their viscosity and performance as follows:

4-1 Classification according to viscosity

Lubricating oils are classified according to viscosity based on SAE J300 classification (see Table 1).

4-2 Classification according to performance

Lubricating oils are classified according to performance based on API classification (see Table 2, Table 3 and Table 4).

Note: Product can be suitable for more than one viscosity or performance grades according API or SAE grades.

4-2-1 ILSAC Standard for passenger car engine oils

For automotive gasoline engines, the latest ILSAC standard includes the performance properties of each earlier category and can be used to service older engines where earlier category oils were recommended (see Table 4).

4-2-1-1 GF-6A

Introduced in May 2020, designed to provide protection against low-speed pre-ignition (LSPI).

4-2-1-2 GF-6B

Applies only to oils having an SAE viscosity grade of 0W-16. Introduced in May 2020, designed to provide protection against low-speed pre-ignition (LSPI).

4-2-2 Service categories for passenger car motor oils

The latest API service category includes the performance properties of each earlier category and can be used to service older engines where earlier category oils were recommended.

The lubricants covered by these categories are for gasoline passenger cars, some trucks and off-highway equipment (service category "S"). The letter following service category "S" indicates the performance category of the oils.

The letters "SI", "SK", and so have been omitted from the sequence of letter designations for API service categories because of their common association with other organizations or systems:

4-2-2-1 SP: 2020 gasoline engine service

Introduced in May 2020, designed to provide protection against low-speed pre-ignition (LSPI), timing chain wear protection, improved high temperature deposit protection for pistons and turbochargers, and more stringent sludge and varnish control. API SP with resource conserving matches ILSAC GF-6A by combining API SP performance with improved fuel economy, emission control system protection and protection of engines operating on ethanol-containing fuels up to E85.

4-2-2-2 SN: 2011 gasoline engine service
For 2011 and older automotive engines.
4-2-2-3 SM: 2005 gasoline engine service
For 2005 and older automotive engines.
4-2-2-4 SL: 2001 gasoline engine service
For 2001 and older automotive engines.
4-2-2-5 SJ: 1997 gasoline engine service
For 1997 and older automotive engines.
4-2-3 Service categories for diesel engine oils:
The lubricants covered by this category passenger (category "C") cover diesel engine trucks and diesel powered off-highway equipment (fleets, contractors, farmers, etc...). The letter following passenger category "C" indicates the performance category of the oil.
4-2-3-1 CK-4: For 2017 heavy-duty diesel engine service
API service category CK-4 describes oils for use in high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway and Tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. These oils are formulated for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm (0,05 % by weight).
4-2-3-2 FA-4: For 2017 heavy-duty diesel engine service (low Sulfur)
API service category FA-4 describes certain XW-30 oils specifically formulated for use in select high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway greenhouse gas (GHG) emission standards. These oils are formulated for use in on-highway applications with diesel fuel sulfur content up to 15 ppm (0,001 5 % by weight).
4-2-3-3 CJ-4: For 2010 severe-duty diesel engine service
For high-speed four-stroke cycle diesel engines designed to meet 2010 model year on- highway and tier 4 non-road exhaust emission standards as well as for previous modelyear diesel engines.
4-2-3-4 CI-4: For 2004 severe-duty diesel engine service
Introduced in 2002. For high-speed, four-stroke engines designed to meet 2004 exhaust emission standards implemented in 2002. Some CI-4 oils may also qualify for the CI-4PLUS designation.
4-2-3-5 CH-4: For 1998 severe-duty diesel engine service
Introduced in 1998. For high-speed, four-stroke engines designed to meet 1998 exhaust emission standards. CH-4 oils are specifically compounded for use with diesel fuels ranging in sulfur content up to 0,5 % weight. Can be used in place of CD, CE, CF-4, and CG-4 oils.

5- Characteristics

The engine lubricating oils shall fulfill the following characteristics:
5-1 Homogeneously mixed, bright and clear and have acceptable odor.
5-2 Free from water, sediments, dusts, abrasive matter and impurities
5-3 To contain some additives, which are added in specific percentage that was determined during the development and research process to achieve the requirements in tables 5,6 and 7, if they are completely dissolved and not separable during the product's shelf life. The following elements shall be tested (calcium, phosphorous, zinc, magnesium, molybdenum) as per the ASTM D4951 test method. Which the concentration of the elements can be used to verify the addition of all amounts of additives.
5-4 Physical properties according to Table 1.
5-5 The required bench tests in tables 5, 6 and 7 according to test method in tables 5, 6 and 7.
5-6 The bench tests and engine performance tests which are carried out by either of the product formula developer, or by manufacturers of lubricating oil additives, or by engine manufacturers are listed in Annex A and Annex B.

5-7 The test results of flash point and Pour point according to Table 8.

5-8 The mineral base oils to be used with the additives (clause 5-3) shall be paraffinic base oils with viscosity index V.I ≥ 90 and conforms to API classification of base oils given in table 9.

Note: Recycled base oils can be used in formulating these lubricants provided these base oils are produced by internationally recognized licensed processes and the base oil products have the same quality of virgin Base Oils and conform to the API classification of Base oil given in table 8.

5-9 The minimum test result values of TBN should be 6 (mg KOH/g) for gasoline and 8 (mg KOH/g) for diesel.

5-10 The maximum test result value of cupper corrosion should be 1b.

6- Sampling

Samples shall be drawn according to ASTM D4057.

7- Method of testing

The following tests shall be carried out according to the performance and application requirement and the representative sample taken in accordance with clause 6.

7-1 Physical and chemical tests

Physical and chemical tests shall be conducted, and test methods shall be determined according to clause 5, taking into account the exemption of some grades from some tests as indicated in the Tables.

7-1-1 Visual inspection.

7-1-2 Appearance: Homogeneously mixed, bright and clear and have acceptable odor. Free from water, sediments, dusts and impurities.

7-1-3 Kinematic viscosity test according to ASTM D445 or ASTM D7042 provided that ASTM D445 is the reference test method to resolve doubts or dispute.

7-1-4 Calculation of viscosity index.

7-1-5 Apparent viscosity test according to ASTM D5293.

7-1-6 Yield stress and apparent viscosity at low temperature according to ASTM D4684.

7-1-7 Measuring viscosity at high temperature and high shear rate according to ASTM D4683, ASTM D4741 or ASTM D5481.

7-1-8 Tests of elements (calcium, phosphorous, zinc, magnesium, molybdenum) according to ASTM D4951 test method.

7-1-9 Low and high temperature foam determination test using ASTM D892 and ASTM D6082 test methods.

7-1-10 Determination of homogeneity and miscibility according to ASTM D6922.

7-1-11 Low temperature, low shear rate, viscosity/temperature dependence of lubricating oils using a temperature scanning according to ASTM D5133.

7-1-12 Evaporation loss by the noack method according to ASTM D5800.

7-1-13 Shear stability of polymer containing fluids using a European diesel injector apparatus according to ASTM D6278.

7-1-14 Sulfur content test according to ASTM D4951, ASTM D5185 or ASTM D2622.

7-1-15 Flash point test according to ASTM D92.

7-1-16 Pour point test according to ASTM D97 or ASTM D7364 provided that ASTM D97 is the reference test method to resolve doubts or dispute.

7-1-17 TBN according to ASTM D2896.

7-1-18 Cupper corrosion according to ASTM D130.

7-2 Engine performance tests

Engine performance tests are carried out by the product formula developer, by manufacturers of lubricating oil additives, or by engine manufacturers.

It is required to be done only once when developing the lubricating oil formula. Clause 5-3 is enough to ensure that the required percentage of additives is added to meet the required performance.

8- Packing

Lubricating oils shall be packed in tightly closed and sealed containers preventing possibilities of oil leakage or oil contamination with any impurities; such containers neither shall affect nor be affected by the oil.

9- Labeling

The following information shall be legibly and indelibly marked in Arabic and/or English languages on each container of lubricating oils.

9-1 Net volume, in liters.

9-2 Producer's name or his registered trade mark.

9-3 Name of the country of origin.

9-4 The classification of oils according to SAE viscosity, and API performance (as in clause 4), and its intended use.

9-5 Date of production, barcode and the batch number.

9-6 Precaution: "Avoid Environmental Pollution.

9-7 Base Oil origin: virgin base oil or recycled.

Table 1 – SAE J300 viscosity grades for engine oils

SAE viscosity grade	Low-temperature (°C) cranking viscosity (mPa·s) max ASTM D5293	Low-temperature (°C) pumping viscosity (mPa·s) max with No Yield Stress ASTM D4684	Low-shear-rate kinematic viscosity (mm^2/s) at 100 °C min ASTM D445 or ASTM D7042	Low-shear-rate kinematic viscosity (mm^2/s) at 100 °C max ASTM D445 or ASTM D7042	High-shear-rate viscosity (mPa·s) at 150 °C min ASTM D4683, ASTM D4741 or ASTM D5481
0W	6 200 at -35	60 000 at -40	3,8	-	-
5W	6 600 at -30	60 000 at -35	3,8	-	-
10W	7 000 at -25	60 000 at -30	4,1	-	-
15W	7 000 at -20	60 000 at -25	5,6	-	-
20W	9 500 at -15	60 000 at -20	5,6	-	-
25W	13 000 at -10	60 000 at -15	9,3	-	-
8	-	-	4,0	< 6,1	1,7
12	-	-	5,0	< 7,1	2,0
16	-	-	6,1	< 8,2	2,3
20	-	-	6,9	< 9,3	2,6
30	-	-	9,3	< 12,5	2,9
40	-	-	12,5	< 16,3	3,5 (0W-40, 5W-40, and 10W-40 grades)
40	-	-	12,5	< 16,3	3,7 (15W-40, 20W-40, 25W-40, 40 grades)
50	-	-	16,3	< 21,9	3,7
60	-	-	21,9	< 26,1	3,7

Table 2 – Gasoline engines – The current and previous API grades

Category	Status	Service
SP	Current	Introduced in May 2020.
SN	Current	For 2020 and older automotive engines
SM	Current	For 2010 and older automotive engines.
SL	Current	For 2004 and older automotive engines.
SJ	Current	For 2001 and older automotive engines.
SH	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1996. May not provide adequate protection against build-up of engine sludge, oxidation, or wear.
SG	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1993. May not provide adequate protection against build-up of engine sludge, oxidation, or wear.
SF	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1988. May not provide adequate protection against build-up of engine sludge.
SE	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive enginesbuilt after 1979.
SD	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1971. Use in more modern engines may cause unsatisfactory performance or equipment harm.
SC	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1967. Use in more modern engines may cause unsatisfactory performance or equipment harm.
SB	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1951. Use in more modern engines may cause unsatisfactory performance or equipment harm.
SA	Obsolete	CAUTION: Contains no additives. Not suitable for use in most gasoline- powered automotive engines built after 1930. Use in modern engines maycause unsatisfactory performance or equipment harm.

Table 3 – Diesel Engines – The current and previous API grades

Category	Status	Service
FA-4	Current	API Service category FA-4 describes certain XW-30 oils specifically formulated for use in select high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway greenhouse gas (GHG) emission standards. These oils are formulated for use in on-highway applications with diesel fuel sulfur content up to 15 ppm (0,001 5 % by weight).
CK-4	Current	API Service category CK-4 describes oils for use in high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway and Tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. These oils are formulated for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm (0,05 % by weight).
CJ-4	Current	For high-speed four-stroke cycle diesel engines designed to meet 2010 model year on- highway and Tier 4 non-road exhaust emission standards as well as for previous model year diesel engines.
CI-4	Current	Introduced in 2002. For high-speed, four-stroke engines designed to meet 2004 exhaust emission standards implemented in 2002. Some CI-4 oils may also qualify for the CI-4PLUS designation.
CH-4	Current	Introduced in 1998. For high-speed, four-stroke engines designed to meet 1998 exhaust emission standards. CH-4 oils are specifically compounded for use with diesel fuels ranging in sulfur content up to 0,5 % weight. Can be used in place of CD, CE, CF-4, and CG-4 oils.
CG-4	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 2009.
CF-4	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 2009.
CF-2	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 2009.
CF	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 2009.
CE	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 1994.
CD-II	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 1994.
CD	Obsolete	CAUTION: Not suitable for use in most diesel-powered automotive engines built after 1994.
CC	Obsolete	CAUTION: Not suitable for use in most diesel-powered engines built after 1990.
CB	Obsolete	CAUTION: Not suitable for use in most diesel-powered engines built after 1961.
CA	Obsolete	CAUTION: Not suitable for use in most diesel-powered engines built after 1959.

Table 4 – ILSAC Standard for passenger car engine oils

Name	Status	Service
GF-6A	Current	Introduced in May 2020, designed to provide protection against low-speedpre-ignition (LSPI).
GF-6B	Current	Applies only to oils having an SAE viscosity grade of 0W-16. Introduced inMay 2020, designed to provide protection against low-speed pre-ignition (LSPI).
GF-5	Obsolete	Use GF-6A where GF-5 is recommended.
GF-4	Obsolete	Use GF-5 where GF-4 is recommended.
GF-3	Obsolete	Use GF-5 where GF-3 is recommended.
GF-2	Obsolete	Use GF-5 where GF-2 is recommended.
GF-1	Obsolete	Use GF-5 where GF-1 is recommended.

Table 5 – Bench tests for gasoline engines categories

Requirements	ASTM Test method	Viscosity grades											
		API SP		API SP-RC	API SN		API SN-RC	API SM/GF-4		API SL		API SJ	
		0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades	0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades	0W-20 5W-20 0W-30 5W-30 10W-30	All others [a]	0W-20 5W-20 5W-30 10W-30	All others	0W-20 5W-20 5W-30 10W-30	All others
High temperature/high shear viscosity at 150 °C, mPa.s, min	D4683, D4741, D5481	2,3	2,3	2,3	2,3	2,6	2,3	NR	2,6	[b]	2,6	[b]	2,6
Volatility loss at 250 °C, % max	D5800	15,0 [c]	15,0 [c]	15,0 [c]	15,0 [c]	15,0 [c]	15,0 [c]	15,0 [c]	15,0 [c]	15,0	15,0	22 [d]	20 [d], [e]
Volatility loss at 371 °C, % max	D6417	-	-	-	-	-	-	10,0	10,0	10,0	10,0	17 [d]	15 [d], [e]
Volatility loss at 371 °C, % max	D5480	-	-	-	-	-	-	-	-	-	-	17 [d]	15 [d], [e]
Mass fraction phosphorus, %, max **Mass fraction phosphorus**, %, min	D4951 D5185	0,08 [f] 0,06 [f]	NR 0,06 [f]	0,08 [f] 0,06 [f]	0,08 [f] 0,06 [f]	NR 0,06	0,08 0,06	0,08 [g] 0,06 [g]	NR 0,06 [g]	0,10 0,06	NR 0,06	0,10 0,06	NR 0,06
Sulfur SAE 0W-16, 5W-16, 0W-20, 0W-30, 5W-20, and 5W-30	D4951, D5185, D2622	0,5 [f]	NR	0,5 [f]	0,5 [f]	NR	0,5 [f]	-		-	-	-	-
SAE 0W-20, 0W-30, 5W-20, and 5W-30		-	-	-	-	-	-	0,5 [g]	NR	-	-	-	-
SAE 10W-30		0,6 [f]	NR	0,6 [f]	0,6 [f]	NR	0,6 [f]	0,7 [g]	NR	-	-	-	-
All other viscosity grades		NR	NR	0,6 [f]	NR	NR	0,6 [f]	-	-	-	-	-	-
Shear stability	D6278	5,8	5,8	5,8	-	-	-	-	-	-	-	-	-
Gelation index, max	D5133	12 [L]	NR	12 [L]	12 [L]	NR	12 [L]	NR	NR	12 [m], [n]	NR	12	NR
Homogeneity and miscibility	D6922	[o]	[o]	[o]	[o]	[o]	[o]	[o]	[o]	[o]	[o]	[o]	[o]

Table 5 – Bench tests for gasoline engines categories (continued)

Requirements		ASTM Test method	Viscosity grades											
			API SP	API SP	API SP-RC	API SN	API SN	API SN-RC	API SM/GF-4		API SL		API SJ	
			0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades	0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades	0W-20 5W-20 0W-30 5W-30 10W-30	All others [a]	0W-20 5W-20 5W-30 10W-30	All others	0W-20 5W-20 5W-30 10W-30	All others
Foaming tendency	foaming/settling, ml, max Sequence I	D892 [j]	10/0 [i]	10/0 [j]	10/0 [i]	10/0 [i]	10/0 [j]	10/0 [i]	10/0 [j]	10/0 [j]	10/0 [j]	10/0 [j]	10/0 [j]	10/0 [j]
	Sequence II		50/0 [i]	50/0 [j]	50/0 [i]	50/0 [i]	50/0 [j]	50/0 [i]	50/0 [j]	50/0 [j]	50/0 [j]	50/0 [j]	50/0 [j]	50/0 [j]
	Sequence III		10/0 [i]	10/0 [j]	10/0 [i]	10/0 [i]	10/0 [j]	10/0 [i]	10/0 [k]	10/0 [j]	10/0 [j]	10/0 [j]	10/0 [j]	10/0 [j]
Static foam	tendency/stability, ml, max	D6082	-	-	-	-	-	-	100/0 [i]	100/0 [i]	100/0 [i]	100/0 [i]	200/50 [i]	200/50

[a] Does not include SAE 0W-16 and SAE 5W-16.
[b] Minimum high temperature/high shear viscosity at 150 °C for these viscosity grades as defined in SAE J300.
[c] Calculated conversions specified in ASTM D5800 are allowed.
[d] Meet the volatility requirement in either ASTM test method ASTM D5800, ASTM D5480, or ASTM D6417.
[e] Passing volatility loss only required for SAE 15W-40.
[f] For all viscosity grades: If CH-4, CI-4 and/or CJ-4 categories precede the (S) category and there is no API Certification Mark, the (S) category limits for phosphorus, sulfur, and the TEOST MHT do not apply. However, the CJ-4 limits for phosphorus and sulfur do apply for CJ-4 oils. This footnote cannot be applied if CK-4 or FA-4 is also claimed. Note that these (C) category oils have been formulated primarily for diesel engines and may not provide all of the performance requirements consistent with vehicle manufacturers' recommendations for gasoline-fueled engines.
[g] For all viscosity grades: If CF-4, CG-4, and/or CI-4 categories precede the (S) category and there is no API Certification Mark, the limits for phosphorus, sulfur, and the TEOST MHT do not apply. However, the CJ-4 limits for phosphorous and sulfur do apply for CJ-4 oils. This footnote cannot be applied if CK-4 or FA-4 is also claimed. Note that these oils have been formulated primarily for diesel engines and may not provide all of the performance requirements consistent with vehicle manufacturers' recommendations for gasoline-fueled engines.

Table 5 – Bench tests for gasoline engines categories (continued)

h) Option A allowed and excluding paragraph 11 for SP.
i) After 1 minute settling period.
j) After 10 minutes settling period.
k) If CI-4, CJ-4, CK-4 and/or FA-4 categories precede the (S) category and there is no API Certification Mark, the Sequence VH (ASTM D8256), or VG (ASTM D6593), Ball Rust (ASTM D6557), and Gelation Index (ASTM D5133) tests are not required.
l) To be evaluated from –5 °C to temperature at which 40,000 cP is attained or –40°C, or 2 °C below the appropriate MRV TP-1 temperature (defined by SAE J300 (Table 1), whichever occurs first.
m) Requirement applies only to SAE 0W-20, 5W-20, 0W-30, 5W-30, and 10W-30 viscosity grades.
n) For gelation temperatures at or above the W grade pumpability temperature as defined in SAE J300.
o) Shall remain homogenous and, when mixed with ASTM reference oils, shall remain miscible.

Table 6 – Bench tests for diesel engine oil categories

Requirements			ASTM Test method	Viscosity grades							
				API FA-4	API CK-4		API CJ-4		API CI-4 and CI-4 PLUS	API CH-4	
Viscosity grades				xW-30	xW-30	xW-40					
High temperature/high shear viscosity at 150 °C, mPa.s		min	D4683, D4741, D5481	2,9	3,5	Meet SAE J300	3,5		3,5 [a]		
		max		3,2	NA		-		-		
							< > 10W-30	10W-30		10W-30	15W-40
Volatility loss at 250 °C, % max			D5800	13,0	13,0		13,0	15,0	15,0	20	18
Volatility loss at 371 °C, % max			D6417	-	-		-	-	-	17	15
Foaming tendency	foaming/settling, [b] ml, max		D892 [c]								
	Sequence I			10/0	10/0		10/0		10/0	10/0	
	Sequence II			20/0	20/0		20/0		20/0	20/0	
	Sequence III			10/0	10/0		10/0		10/0	10/0	
Chemical limits	Mass fraction phosphorus, %, max		D4951	0,12	0,12		0,12		-	-	
	Mass fraction sulfur, %, max		D4951	0,4	0,4		0,4		-	-	
	Mass fraction sulfated ash, %, max		D874	1,0	1,0		1,0		-	-	

[a] Noncritical specification as defined by ASTM D3244; may be superseded only by applicable higher limits set by SAE J300.
[b] Ten minutes for Sequence I, II, and III.
[c] Option A allowed except for SAE CH-4 and CI-4.

Table 7 – Bench tests for ILSAC engine oil categories

Requirements		ASTM Test method	Criterion	
			Oils shall meet all requirements of SAE J300. Viscosity grades are limited to SAE 0W-20, 0W-30, 5W-20, 5W-30 and 10W-30 multi-grade oils	Oils shall meet all requirements of SAE J300. Viscosity grades are limited to SAE 0W-16 multi-grade oils
			GF-6A	GF-6B
Volatility loss at 250 °C, % max		D5800	15,0	15,0
Mass fraction phosphorus, %, max		D4951 or	0,08	0,08
Mass fraction phosphorus, %, min		D5185	0,06	0,06
Sulfur	0W and 5W multigrades, %, max	D4951, D5185, or D2622	0,5	0,5
	10W-30, %, max		0,6	-
Foaming tendency	foaming/settling, ml, max	D892 (Option A and excluding paragraph 11)		
	Sequence I		10/0	10/0
	Sequence II		50/0	50/0
	Sequence III		10/0	10/0
	tendency/stability, ml, max	D6082 (Option A)	100/0	100/0
Shear stability, min		D6278	stay in grade	5,8

Table 8 – Pour point and flash point of engine oils

Oil grades	Pour point °C (max)	Flash point °C (min)
0 W	-39	185
5 W	-36	195
10 W	-33	205
15 W	-27	210
20 W	-24	215
25 W	-24	220
20	-21	215
30	-18	220
40	-15	230
50	-9	235
60	-9	240

Table 9 – API base oil classification

Group	Saturates (%)		Sulfur (%)	Viscosity Index	Other
I	< 90	and/or	> 0,03	≥80 - < 120	-
II	≥ 90	and	≤ 0,03	≥80 - < 120	-
III	≥ 90	and	≤ 0,03	≥ 120	-
IV					PAO (poly Alpha Olefins)
V					All other Base Oils not included in I, II, III or IV

Note 1: Companies also use their own marketing phrases: "Group 1-1/2" and "Group 2+"
Note 2: "Group III" can be legally labeled "Synthetic"
Note 3: The word "Synthetic" is not part of the API Classify
Note 4: "**Synthetic**" is a marketing term, not a technical term

Annex A
(Normative)
Gasoline engine oil categories

Table A – 1 – API SP and SP-RC/GF-6 categories

Requirements	ASTM Test method	Properties	API SP	API SP	SP-RC/GF-6
			0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades
Bench Tests					
Sequence IIIHB	D8111	phosphorus retention, % min	NR	NR	81
EOFT	D6795	% flow reduction, max	50		
EOWTT	D6794	% flow reduction, max - with 0,6 % H2O - with 1,0 % H2O - with 2,0 % H2O - with 3,0 % H2O	50 50 50 50		

Table A – 1 – API SP and SP-RC/GF-6 categories (continued)

Requirements	ASTM Test method	Properties	API SP	API SP	SP-RC/GF-6
			0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades
Aged oil low-temperature viscosity	D4684 or D7528	MRV TP-1 Apparent Viscosity and Yield Stress, cP	<60,000 cP with no yield stress		
TEOST 33C	D6335	high-temperature deposits, total deposit weight, mg, max XW-16	NR	NR	NR
		0W-20	NR	NR	NR
		All other viscosity grades	NR	NR	30
Emulsion retention	D7563	oil mixed with 10 % water and 10 % E85,0 °C and 25 °C at 24 hours	NR	NR	no water separation
Ball Rust Test	D6557	average gray value, min	100		
Elastomer Compatibility	ASTM-D7216		Volume Change, %	Hardness, points	Tensile strength change, %
		Polyacrylate Rubber (ACM)	-5, 9	-10, 10	-40, 40
		Hydrogenated Nitrile (HNBR)	-5, 10	-10, 5	-20, 15
		Silicone Rubber (VMQ)	-5, 40	-30, 10	-50, 5
		Fluorocarbon Rubber (FKM)	-2, 3	-6, 6	-65, 10
		Ethylene Acrylic Rubber (AEM)	-5, 30	-20, 10	-30, 30

Table A – 1 – API SP and SP-RC/GF-6 categories (continued)

Requirements	ASTM Test method	Properties	API SP 0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	API SP other viscosity grades	SP-RC/GF-6 All viscosity grades
Engine test requirements					
Sequence IIIH	D8111	Kinematic viscosity increase at 40°C, %, max	100		
		Average weighted piston deposits, merits, min	4,2		
		Hot stuck rings	none		
Sequence IVB	D8350	Average intake lifter volume loss (8 position average), mm3, max	2,7		
		End of test iron, ppm, max	400		
Sequence VH	D8256	Average engine sludge, merits, min	7,6		
		Average rocker cover sludge, merits, min	7,7		
		Average engine varnish, merits, min	8,6		
		Average piston skirt varnish, merits, min	7,6		
		Oil screen sludge, % area	Rate and report		
		Oil screen debris, % area	Rate and report		
		Hot-stuck compression rings	None		
		Cold stuck rings	Rate and report		
		Oil screen clogging, % area	Rate and report		

Table A – 1 – API SP and SP-RC/GF-6 categories (continued)

Requirements	ASTM Test method	Properties	API SP 0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	API SP other viscosity grades	SP-RC/GF-6 All viscosity grades
Sequence VIE	D8114	SAE XW-20 viscosity grade - FEI SUM, % min			3,8
		- FEI 2, % min after 125 hours aging			1,8
		SAE XW-30 viscosity grade - FEI SUM, % min			3,1
		- FEI 2, % min after 125 hours aging			1,5
		SAE 10W-30 and all other viscosity grades not listed above - FEI SUM, % min			2,8
		- FEI 2, % min after 125 hours aging			1,3
Sequence VIF	D8226	SAE XW-16 only - FEI SUM, % min			4,1
		- FEI 2, % min after 125 hours aging			1,9
Sequence VIII	D6709	Bearing weight loss, mg, max XW-16	NR		
		All other viscosity grades	26		
Sequence IX	D8291	Average number of events for 4 iterations, max	5		
		Number of events per iteration, max	8		
Sequence X	D8279	EOT elongation, % increase, max	0,085		

Table A – 2 – API SN and SN-RC/GF-5 categories

Requirements	ASTM Test method	Properties	API SN	API SN	SN-RC/GF-5
			0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades
Bench Tests					
EOFT	D6795	% flow reduction, max	50		
EOWTT	D6794	% flow reduction, max - with 0,6 % H2O - with 1,0 % H2O - with 2,0 % H2O - with 3,0 % H2O	50 50 50 50		
TEOST MHT	D7097	High temperature deposits, deposit wt, mg, max	35	45	35
Aged oil low-temperature viscosity	D4684 or D7528	MRV TP-1 Apparent Viscosity and Yield Stress, cP	<60,000 cP with no yield stress		

Table A – 2 – API SN and SN-RC/GF-5 categories (continued)

Requirements	ASTM Test method	Properties	API SN	API SN	SN-RC/GF-5
			0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	**other viscosity grades**	**All viscosity grades**
TEOST 33C	D6335	high-temperature deposits, total deposit weight, mg, max SAE XW-16	NR	NR	NR
		SAE 0W-20	NR	NR	NR
		All other viscosity grades	NR	NR	30
Emulsion retention	D7563	oil mixed with 10 % water and 10 % E85, 0 °C and 25 °C at 24 hours	NR	NR	no water separation
Ball Rust Test	D6557	average gray value, min	100		
Elastomer Compatibility	D7216		Volume Change, %	Hardness, points	Tensile strength change, %
		Polyacrylate Rubber (ACM)	-5, 9	-10, 10	-40, 40
		Hydrogenated Nitrile (HNBR)	-5, 10	-10, 5	-20, 15
		Silicone Rubber (VMQ)	-5, 40	-30, 10	-50, 5
		Fluorocarbon Rubber (FKM)	-2, 3	-6, 6	-65, 10
		Ethylene Acrylic Rubber (AEM)	-5, 30	-20, 10	-30, 30
Engine test requirements					
Sequence IIIG	D7320	Kinematic viscosity increase at 40 °C, %, max	150		
		Average weighted piston deposits, merits, min	4,0		
		Hot stuck rings	none		
		Average cam plus lifter wear, µm, max	60		

Table A – 2 – API SN and SN-RC/GF-5 categories (continued)

Requirements	ASTM Test method	Properties	API SN 0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	API SN other viscosity grades	SN-RC/GF-5 All viscosity grades
Or					
Sequence IIIH	D8111	Kinematic viscosity increase, %, max	150		
		Average weighted piston deposits, metric, min	3,7		
		Hot stuck rings	none		
Sequence IVA	D6891	Average cam wear (7 position average), µm, max	90		
Sequence VG	D6593	Average engine sludge, metric, min	8,0		
		Average rocker cover sludge, metric, min	8,3		
		Average engine varnish, metric, min	8,9		
		Average piston skirt varnish, metric, min	7,5		
		Oil screen sludge, % area, max	15		
		Oil screen debris, % area	rate and report		
		Hot-stuck compression rings	none		
		Cold stuck rings	rate and report		
		Oil ring clogging, % area	rate and report		

Table A – 2 – API SN and SN-RC/GF-5 categories (continued)

Requirements	ASTM Test method	Properties	API SN 0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	API SN other viscosity grades	SN-RC/GF-5 All viscosity grades
Or					
Sequence VH	D8256	Average engine sludge, merits, min		7,6	
		Average rocker cover sludge, merits, min		7,7	
		Average engine varnish, merits, min		8,6	
		Average piston skirt varnish, merits, min		7,6	
		Oil screen clogging, % area		rate and report	
		Hot stuck compression rings		none	
Sequence VID	D7589	SAE XW-16 viscosity grade - FEI SUM , % min	NR	NR	2,8
		- FEI 2 , min after 100 hours aging			1,3
		SAE XW-20 viscosity grade - FEI SUM , % min			2,6
		- FEI 2 , % min after 100 hours aging			1,2
		SAE XW-30 viscosity grade - FEI SUM , % min			1,9
		- FEI 2 , % min after 100 hours aging			0,9
		SAE 10W-30 and all other viscosity grades not listed above - FEI SUM , % min			1,5
		- FEI 2 , % min after 100 hours aging			0,6
Or					

Table A – 2 – API SN and SN-RC/GF-5 categories (continued)

Requirements	ASTM Test method	Properties	API SN	API SN	SN-RC/GF-5
			0W-16 5W-16 0W-20 5W-20 0W-30 5W-30 10W-30	other viscosity grades	All viscosity grades
Sequence VIE	D8114	SAE XW-20 viscosity grade - FEI SUM % min			3,2
		- FEI 2 % min after 100 hours aging			1,5
		SAE XW-30 viscosity grade - FEI SUM % min			2,5
		- FEI 2 % min after 100 hours aging			1,2
		SAE 10W-30 and all other viscosity grades not listed above - FEI SUM % min			2,2
		- FEI 2 % min			1,0
Sequence VIF	D8226	SAE XW-16 viscosity grade - FEI SUM 3,7 % min			3,7
		- FEI 2 1,8 % min after 100 hours aging			1,8
Sequence VIII	D6709	Bearing weight loss, mg	26		
Sequence IX	D8291	Average number of events, max	5		

Table A – 3 – API SM/GF-4 categories

Requirements	ASTM Test method	Properties	SM/GF-4	
			0W-20 5W-20 0W-30 5W-30 10W-30	All others
Bench Tests				
EOFT	D6795	% flow reduction, max	50	
EOWTT	D6794	% flow reduction, max - with 0,6 % H2O - with 1,0 % H2O - with 2,0 % H2O - with 3,0 % H2O	 50 50 50 50	
TEOST (MHT)	D7097	High temperature deposits, deposit wt, mg, max	35	45
Engine performance tests				
Sequence IIIG	D7320	Kinematic viscosity increase at 40 °C, % max	150	
		Average weighted piston deposits, merits, min	3,5	
		Hot stuck rings	none	
		Average cam plus lifter wear, µm, max	60	

Table A – 3 – API SM/GF-4 categories (continued)

Requirements	ASTM Test method	Properties	SM/GF-4	
			0W-20 5W-20 0W-30 5W-30 10W-30	All others
Or				
Sequence IIIH	D8111	Kinematic viscosity increase at 40 °C, % max	150	
		Average weighted piston deposits, merits, min	3,2	
		Hot stuck rings	none	
Sequence IVA	D6891	Average cam wear (7 position average) µm, max	90	
Sequence VG	D6593	Average engine sludge, merits, min	7,8	
		Average rocker cover sludge, merits, min	8,0	
		Average engine varnish, merits, min	8,9	
		Average piston skirt varnish, merits, max	7,5	
		Oil screen sludge, % area	20	
		Oil screen debris, % area	rate and report	
		Hot-stuck compression rings	none	
		Cold stuck rings	rate and report	
		Oil ring clogging, % area	rate and report	
		Follower pin wear, cyl #8, average,	rate and report	
		Ring gap increase, cyl #1 and #8, average, µm	rate and report	

Table A – 3 – API SM/GF-4 categories (continued)

Requirements	ASTM Test method	Properties	SM/GF-4	
			0W-20 5W-20 0W-30 5W-30 10W-30	All others
Or				
Sequence VH	D8256	Average engine sludge, merits		7,4
		Average rocker cover sludge, merits		7,4
		Average engine varnish, merits		8,6
		Average piston skirt varnish, merits		7,6
		Oil screen clogging, % area		rate and report
		Hot stuck compression rings		none
Sequence VIII	D6709	Bearing weight loss, mg, max		26

Table A – 4 – API SL category

Requirements	ASTM Test method	Properties	Primary Performance Criteria
Bench Tests			
EOFT	D6795	% flow reduction, max	50
EOWTT	D6794	% flow reduction, max with 0,6 % H2O with 1,0 % H2O with 2,0 % H2O with 3,0 % H2O	 50 50 50 50
TEOST MHT-4	D7097	high temperature deposits, deposit mass, mg, max	45
Engine performance tests			
Sequence IIIF	D6984	Kinematic viscosity, % increase at 40 °C, max	275
		Average piston skirt varnish rating, min	9,0
		Weighted piston deposit rating, min	4,0
		Screened average cam-plus-lifter wear, µm, max	20
		Hot stuck rings	none
		Low temperature viscosity performance	report
Or			
Sequence IIIG	D7320	Kinematic viscosity, % increase at 40 °C, max	150
		Weighted piston deposit rating, min	3,5
		Cam-plus-lifter wear average, µm, max	60
		Hot stuck rings	none
		Low temperature viscosity performance	report

Table A – 4 – API SL category (continued)

Requirements	ASTM Test method	Properties	Primary Performance Criteria
Or			
Sequence IIIH 70-hour guideline	D8111	70 h kinematic viscosity, % increase at 40 °C, max	181
		70 h average weighted piston deposits, merits, min	3,3
		70 h average piston skirt varnish, merits, min	7,9
Sequence IVA	D6891	Cam wear average, µm, max	120
Sequence VE	D5302	Cam wear average, µm, max	127
		Cam wear max, µm, max	380
Sequence VG [29)]	D6593	Average engine sludge rating, min	7,8
		Rocker arm cover sludge rating, min	8,0
		Average piston skirt varnish rating, min	7,5
		Average engine varnish rating, min	8,9
		Oil screen clogging, %, max	20
		Hot stuck Compression rings	none
		Cold stuck rings	report
		Oil screen debris, %	report
		Oil ring clogging, %	report
Or			
Sequence VH	D8256	Average engine sludge, merits, min	7,4
		Average rocker cover sludge, merits, min	7,4
		Average engine varnish, merits, min	8,6
		Average piston skirt varnish, merits, min	7,4
		Oil screen clogging, % area	rate and report
		Hot stuck compression rings	none
Sequence VIII	D6709	Bearing weight loss, mg, max Shear stability	26,4 stay in grade

Table A – 5 – API SJ category

Requirements	ASTM Test method	Properties		Primary Performance Criteria
Bench Tests				
EOFT	D6795	% flow reduction, max		50
EOWTT	D6794	% flow reduction, max - with 0,6 % H2O - with 1,0 % H2O - with 2,0 % H2O - with 3,0 % H2O		 report report report report
TEOST 33	D6335	High temperature deposits, deposit mass, mg, max		60
Engine performance tests				
Sequence IID	D5844	Average engine rust rating, min		8,5
		Number stuck lifters		none
	D6557	Average gray value, min		100
Sequence IIIE	D5533	Hours to 375 % kinematic viscosity increase at 40 °C, min		64
		Average engine sludge rating, min		9,2
		Average piston skirt varnish rating, min		8,9
		Average oil ring land deposit rating, min		3,5
		Lifter sticking		none
		Scuffing and wear - Cam or lifter scuffing		none
		Cam plus lifter wear, µm	Average, max	30
			Maximum, max	64
		Ring sticking (oil-related)		none

Table A – 5 – API SJ category (continued)

Requirements	ASTM Test method	Properties		Primary performance criteria
Or				
Sequence IIIF	D6984	Kinematic viscosity, % increase at 40 °C, max		325
		Average piston skirt varnish rating, min		8,5
		Weighted piston deposit rating, min		3,2
		Screened average cam-plus – lifter wear, µm, max		20
		Hot stuck rings		none
Or				
Sequence IIIG	D7320	Kinematic viscosity, % increase at 40 °C, max		150
		Weighted piston deposit rating,K min		3,5
		Cam-plus-lifter wear average, µm, max		60
		Hot stuck rings		none
Or				
Sequence IIIH 60/70-hour guideline	D8111	60 h kinematic viscosity, % increase at 40 °C, max		307
		70 h average weighted piston deposits, merits, min		2,5
		70 h average piston skirt varnish, merits, min		7,5
Sequence VE	D5302	Average engine sludge rating, min		9,0
		Rocker arm cover sludge rating, min		7,0
		Average piston skirt varnish rating, min		6,5
		Average engine varnish rating, min		5,0
		Oil ring clogging, %		report
		Oil screen clogging, %, max		20,0
		Compression ring sticking (hot stuck)		none
		Cam wear, µm	Average, max	127
			Maximum, max	380

Table A – 5 – API SJ category (continued)

Requirements	ASTM Test method	Properties	Primary performance criteria
Sequence IVA plus Sequence VG	D6891	Average cam wear, µm	120
	D6593	Average engine sludge rating, min	7,8
		Rocker arm cover sludge rating, min	8,0
		Average piston skirt varnish rating, min	7,5
		Average engine varnish rating, min	8,9
		Oil screen clogging, %, max	20
		Hot stuck compression rings	none
Sequence VH	D8256	Average engine sludge, merits, min	7,4
		Average rocker cover sludge, merits, min	7,4
		Average engine varnish, merits, min	8,6
		Average piston skirt varnish, merits, min	7,4
		Oil screen clogging, % area	rate and report
		Hot stuck compression rings	none
L-38	D5119	Bearing weight loss, mg, max	40
		Shear stability	Stay in grade
Sequence VIII	D6709	Bearing weight loss, mg, max	26,4
		Shear stability	Stay in grade

Annex B
(Normative)
Diesel engine oil categories

Table B – 1 – API CK-4 and FA-4 categories

Requirements	ASTM Test method	Properties	CK-4			FA-4
Bench Tests						
			xW-30	0W-40	Other xW-40	xW-30
Shear Stability	D7109	Kinematic viscosity after 90 pass, shearing, mm^2/s at 100 °C, min	9,3	12,5	12,8	9,3
		HTHS viscosity at 150 °C, mPa·s, min	3,4	NA	NA	2,8
HTCBT	D6594		xW-30	xW-40		
		Copper, mg/kg increase, max	20			20
		Lead, mg/kg increase, max	120			120
		Copper strip rating, max	3			3
Elastomer Compatibility	D7216		Volume Change, %	Hardness, points	Tensile strength, %	Elongation, %
		Nitrile (NBR)	+5, -3	+7, -5	+10, -TMC 1006	+10, -TMC 1006
		Silicone (VMQ)	+TMC 1006, -3	+5, -TMC 1006	+10, -45	+20, -30
		Polyacrylate (ACM)	+5, -3	+8, -5	+18, -15	+10, -35
		Fluoroelastomer (FKM)	+5, -2	+7, -5	+10, -TMC 1006	+10, -TMC 1006
		Vamac G)	+TMC 1006, -3	+5, -TMC 1006	+10, -TMC 1006	+10, -TMC 1006

Table B – 1 – API CK-4 and FA-4 categories (continued)

Requirements	ASTM Test method	Properties		CK-4		FA-4
Engine performance tests						
				Primary performance criteria		
				1 test	**2 tests**	**3 tests**
T-12	D7422	Top Ring Mass Loss, mg, max		105		
		Cylinder Liner Wear, µm, max		24,0		
T-13	D8048	IR Peak at EOT, Abs., cm^{-1}		125	130	13 3
		Kinematic Viscosity Increase at 40 °C, % max		75	85	90
		Average. Oil Consumption, 48 h to 192 h, g/h, max		report	report	report
T-11	D7156	TGA % Soot at 4.0 mm^2/s increase, at 100 °C, min		3,5	3,4	3,3
		TGA % Soot at 12.0 mm^2/s increase, at 100 °C, min		6,0	5,9	5,9
		TGA % Soot at 15.0 mm^2/s increase, at 100 °C, min		6,7	6,6	6,5
C13	D7549	Merit rating, min		1 000		
Coat	D8047	Average Aeration, 40 h to 50h, %		11,8		
ISB	D7484	Slider tappet mass loss, mg, average, max		100	108	112
		Cam lobe wear, µm, average, max		55	59	61
		Crosshead mass loss, mg, average		report	report	report
ISM	D7468	Top Ring Mass Loss,	mg, max	100		
			Merit Rating	1 000		

Table B – 1 – API CK-4 and FA-4 categories (continued)

Requirements	ASTM Test method	Properties		CK-4	FA-4	
				Primary performance criteria		
				1 test	2 tests	3 tests
1N	D6750	Weighted demerits (WDN), max		286,2	311,7	323,0
		Top groove fill (TGF), %, max		20	23	25
		Top land heavy carbon (TLHC), %, max		3	4	5
		Oil consumption	g/kWh, (0 h to 252 h), max	0,54	0,54	0,54
			g/MJ, (0 h to 252 h), max	0,15	0,15	0,15
		Piston, ring, and liner scuffing no		none	none	none
		Piston ring sticking		none	none	none
RFWT	D5966	Average pin wear	mils, max	0,3	0,33	0,36
			(µm) max	(7,6)	(8,4)	(9,1)

Table B – 2 – API CJ-4 category

Requirements	ASTM Test method	Properties	Primary Performance Criteria			
Bench Tests						
Shear Stability	D7109	Kinematic viscosity after 90 pass shearing, mm^2/s at 100 °, min	**XW-30** 9,3		**XW-40** 12,5	
			Volume Change, %	Hardness, points	Tensile strength, %	Elongation, %
Elastomer Compatibility	D7216	Nitrile (NBR)	+5, -3	+7, -5	+10, -TMC 1006	+10, -TMC 1006
		Silicone (VMQ)	+TMC 1006, -3	+5, -TMC 1006	+10, -45	+20, -30
		Polyacrylate (ACM)	+5, -3	+8, -5	+18, -15	+10, -35
		Fluoroelastomer (FKM)	+5, -2	+7, -5	+10, -TMC 1006	+10, -TMC 1006
		Vamac G)	+TMC 1006, -3	+5, -TMC 1006	+10, -TMC 1006	+10, -TMC 1006
Engine performance tests						
			Primary performance criteria			
			1 test	**2 tests**	**3 tests**	
T-12	D7422	Merit rating, min	1 000			
ISM	D7468	Merit rating, min	1 000			
		Top ring mass loss, mg, max	100			
CI3	D7549	Merit rating, min	1 000			
		Hot-stuck piston ring	none			
T-11	D7156	TGA % Soot at 4,0 mm^2/s increase, at 100 °C, min	3,5	3,4	3,3	
		TGA % Soot at 12,0 mm^2/s increase, at 100 °C, min	6,0	5,9	5,9	
		TGA % Soot at 15,0 mm^2/s increase, at 100 °C, min	6,7	6,6	6,5	
ISB	D7484	Slider tappet mass loss, mg, average, max	100	108	112	
		Cam lobe wear, µm, average, max	55	59	61	
		Crosshead mass loss, mg, average	report	report	report	

Table B – 2 – API CJ-4 categories (continued)

Requirements	ASTM Test method	Properties		Primary performance criteria		
				1 test	2 tests	3 tests
1N	D6750	Weighted demerits (WDN), max		286,2	311,7	323 ,0
		Top groove fill (TGF), %, max		20	23	25
		Top land heavy carbon (TLHC), %, max		3	4	5
		Average oil consumption,		0,54	0,54	0,5-4
		Piston, ring, and liner scuffing	g/kWh (0 h – 252 h), max	0,15	0,15	0,1.5
			g/MJ (0 h – 252 h), max	none	none	none
		Piston ring sticking		none	none	none
RFWT	D5966	Average pin wear	mils, max	0,3	0,33	0,36
			µm, max	7,6	8,4	9,1
Sequence IIIF or Sequence IIIG or Sequence IIIH or Sequence IIIH70	D6984 D7320 D8111 D8111	Kinematic viscosity (at 40 °C), % increase, max		275	275 (MTAC)	275 (MTAC)
		Kinematic viscosity (at 40 °C), % increase, max (MTAC)		150	150(MTAC)	150 (MTAC)
		60 – 80 h Kinematic viscosity, % increase at 40 °C max		370	370 (MTAC)	370 (MTAC)
		70 h Kinematic viscosity, % increase at 40 °C max		181	181 (MTAC)	181 (MTAC)
EOAT	D6894	Aeration, volume, %, max		8	8 (MTAC)	8 (MTAC)

Table B – 3 – API CI-4 and CI-4 PLUS categories

Requirements	ASTM Test method	Properties	Primary Performance Criteria			
Bench Test						
Shear Stability	D6278	Kinematic viscosity after shearing, mm^2/s at 100 °C, min	XW-30		XW-40	
			9,3		12,5	
HTCBT	D6594	Copper, mg/kg increase, max	20			
		Lead, mg/kg increase, max	120			
		Tin, mg/kg increase	report			
		Copper strip rating, max	3			
MRV-TP-1	D4684	Viscosity of 75 h used oil sample from T-10 test (or T-10A test), or 100 h used oil sample from T-12 test (or T-12A test, tested at –20 °C, mPa.s, max	25 000			
		yield stress, Pa	< 35			
Elastomer Compatibility	ASTM-D7216		Volume Change, %	Hardness, points	Tensile strength, %	Elongation, %
		Nitrile (NBR)	+5, -3	+7, -5	+10, -TMC 1006	+10, -TMC 1006
		Silicone (VMQ)	+TMC 1006, -3	+5, -TMC 1006	+10, -45	+20, -30
		Polyacrylate (ACM)	+5, -3	+8, -5	+18, -15	+10, -35
		Fluoroelastomer (FKM)	+5, -2	+7, -5	+10, -TMC 1006	+10, -TMC 1006

Table B – 3 – API CI-4 and CI-4 PLUS categories (continued)

Requirements	ASTM Test method	Properties	Primary Performance Criteria		
Engine performance tests					
			1 test	**2 tests**	**3 tests**
1R or 1P	D6923	Weighted demerits (WDR), max	382	396	402
		Top groove carbon (TGC), demerits, max	52	57	59
		Top land carbon (TLC), demerits, max	31	35	36
		Initial oil consumption (IOC), (0 h – 252 h), g/h, average	13,1	13,1	13,1
		Final oil consumption, (432 h – 504 h), g/h, average, max	IOC + 1,8	IOC + 1,8	IOC + 1,8
		Piston, ring, and liner distress	none	none	none
		Ring sticking	none	none	none
	D6681	Weighted demerits (WDP), max	350	378	390
		Top groove carbon (TGC), demerits, max	36	39	41
		Top land carbon (TLC), demerits, max	40	46	49
		Average oil consumption, g/h (0 h – 360 h), max	12,4	12,4	12,4
		Final oil consumption, g/h (312 h – 360 h), max	14,6	14,6	14,6
		Piston, ring, and liner scuffing	none	none	none
T-10 or T-12	D6987/D6987M	Merit rating, min	1 000		
	D7422	Merit rating, min	1 000		

Table B – 3 – API CI-4 and CI-4 PLUS categories (continued)

Requirements	ASTM Test method	Properties		Primary Performance Criteria		
				1 test	2 tests	3 tests
M11 or ISM	D6975	Average crosshead mass. loss, mg, max		20,0	21,8	22,6
		Average top ring mass loss, mg		report	report	report
		Oil filter differential pressure at 250 h, kPa, max		275	320	341
		Average engine sludge, CRC merits at EOT, min		7,8	7,6	7,5
	D7468	Crosshead wear, mg, max		7,5	7,8	7,9
		Oil filter Δ pressure at 150 h, kPa, max		55	67	74
		Sludge rating, CRC Merits, min		8,1	8,0	8,0
Ext. T-8E	D5967	Relative viscosity at 4,8 % soot		1,8	1,9	2,0
Sequence IIIF Or Sequence IIIG Or Sequence IIIH Or Sequence IIIH70	D6984	Kinematic viscosity (at 40 °C), percent increase, max		275	275 (MTAC)	275 (MTAC)
	D7320	Kinematic viscosity, percent increase at 40 °C max		150	150 (MTAC)	150 (MTAC)
	D8111	60 – 80 h Kinematic viscosity, % increase at 40 °C max		370	370 (MTAC)	370 (MTAC)
	D8111	70 h Kinematic viscosity, % increase at 40 °C max		181	181 (MTAC)	181 (MTAC)
1K	D6750	Weighted demerits (WDK), max		332	347	353
		Top groove fill (TGF), %, max		24	27	29
		Top land heavy carbon (TLHC), %, max		4	5	5
		Average oil consumption	g/kWh (0 h – 252 h), max	0,54	0,54	0,54
			g/MJ (0 h – 252 h), max	0,15	0,15	0,15
		Piston, ring, and liner scuffing		none	none	none
RFWT	D5966	Average pin wear	mils, max	0,3	0,33	0,36
			µm, max	7,6	8,4	9,1
EOAT	D6894	Aeration, volume percent, max		8,0	8,0 (MTAC)	8,0 (MTAC)

Table B – 4 – API CH-4 category

Requirements	ASTM Test method	Properties		Primary Performance Criteria		
Bench Tests						
HTCBT, 135 °C	D6594	Copper, mg/kg increase, max Lead, mg/kg increase, max Tin, mg/kg increaset Copper strip rating, max		20 120 report 3		
				XW-30	**XW-40**	
Shear Stability	D6278	Kinematic Viscosity after shearing, mm^2/s at 100 °C, min		9,3	12,5	
Engine performance tests						
				Primary Performance Criteria		
				1 test	**2 test**	**3 test**
1P	D6681	Weighted demerits (WDP), max		350	378	390
		Top groove carbon (TGC), demerits, max		36	39	41
		Top land carbon (TLC), demerits, max		40	46	49
		Average Oil Consumption, g/h (0 h – 360 h), max		12,4	12,4	12,4
		Final Oil Consumption, g/h (312 h – 360 h), max		14,6	14,6	14,6
		Piston, ring, and liner scuffing		none	none	none
1K	D6750	Weighted demerits (WDK), %, max		332	347	353
		Top groove fill (TGF), %, max		24	27	29
		Top land heavy carbon (TLHC), %, max		4	5	5
		Average Oil Consumption		0,54	0,54	0,54
		Piston, ring, and liner scuffing	g/kWh (0 h – 252 h), max	0,15	0,15	0,15
			g/MJ (0 h – 252 h), max	none	none	none

Table B – 4 – API CH-4 category (continued)

Requirements	ASTM Test method	Properties		Primary Performance Criteria		
				1 test	2 test	3 test
T-9 or T-10 or T-12	D6483	Average Liner Wear, normalized to 1,75 % soot, µm max		25,4	26,6	27,1
		Average Top Ring Mass Loss, mg max		120	136	144
		EOT Used Oil Lead Content less New Oil Lead Content, mg/kg, max		25	32	36
	D6987/D6987M	Liner wear, µm, max		32	34	35
		Ring wear, mg, max		150	159	163
		Lead content at EOT, mg/kg, max		50	56	59
	D7422	Liner wear, µm, max		30,0	30,8	31,1
		Top Ring Mass Loss, mg, max		120	132	137
		Lead content at EOT, mg/kg, max		65	75	79
RFWT	D5966	Average Pin Wear	mils, max	0,3	0,33	0,36
			(µm) max	7,6	8,4	9,1
M-11 0r ISM	D6838	Rocker Pad Average Mass Loss, normalized to 4.5 % soot, mg max		6,5	7,5	8,0
		Oil Filter Differential Pressure at EOT, kPa max		79	93	100
		Average Engine Sludge, CRC Merits at EOT, min		8,7	8,6	8,5
	D7468	Crosshead wear, mg, max		7,5	7,8	7,9
		Oil filter delta pressure, at 150 h, kPa, max		79	95	103
		Sludge rating, CRC merits, min		8,1	8,0	8,0
Ext. T-8E	D5967	Relative Viscosity at 4,8 % Soot by TGA, max		2,1	2,2	2,3
		Viscosity increase at 3,8 % Soot by TGA, mm^2/s, max		11,5	12,5	13,0
Sequence IIIF or Sequence IIIG or Sequence IIIH	D6984	60 h Viscosity at 40 °C, increase from 10 min sample, % max		295	295 (MTAC)	295 (MTAC)
	D7320	Kinematic viscosity, % increase at 40 °C max		150	150 (MTAC)	150 (MTAC)
	D8111	60 h Kinematic viscosity, % increase at 40 °C max		249	249 (MTAC)	249 (MTAC)
EOAT	D6894	Aeration, volume, % max		8,0	8,0 (MTAC)	8,0 (MTAC)

References

- ASTM D 4485:2022, Standard Specification for performance of active API service category engine oils.
- SAE J300:2021, Engine oil classification.
- SASO 19-2022, Lubricating oils for internal combustion engines API classifications.