RAVENOL Extra Fuel Economy EFE SAE 0W-16
… is the first engine oil worldwide with the specification API SN and viscosity SAE 0W-16 to obtain licensed approval from API

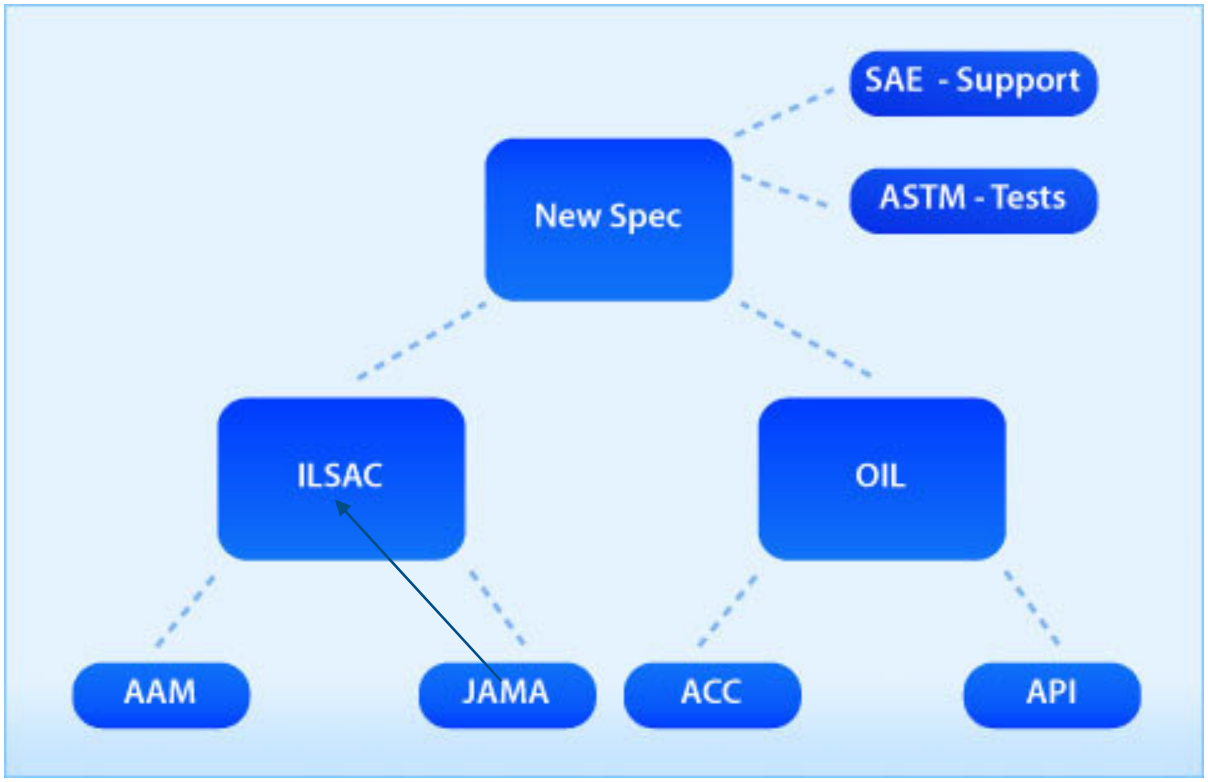

LET'S
TAKE A
LOOK
AT THE
CHANGES

SAE J300: 2013 version

The first change in 12 years was made to the international SAE J300 engine oil viscosity classification system in April 2013.

SAE J300: 2013 version

WHO WAS THE DRIVING FORCE BEHIND THE NEW STANDARD?



SAE J300: 2013 version

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

JAMA
JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION, INC.

DAIHATSU MOTOR CO., LTD.

Head Office:
1-1, Daihatsu-cho, Ikeda, Osaka 563-8651
Tel: +81-(72)-751-8811
Tokyo Branch Office:
19-15, Shinbashi 6-chome, Minato-ku, Tokyo 105-0004
Tel: (03) 6430-8854

FUJI HEAVY INDUSTRIES LTD.

Subaru Bldg., 7-2, Nishi-Shinjuku 1-chome, Shinjuku-ku, T
Tel: +81-(3)-3347-2111

HINO MOTORS, LTD.

Head Office:
1-1, Hinodai 3-chome, Hino, Tokyo 191-8660
Tel: +81-(42)-586-5111
Tokyo Branch Office:
11-3, Shiba 4-chome, Minato-ku, Tokyo 108-0014
Tel: +81-(3)-3456-8811

HONDA MOTOR CO., LTD.

1-1, Minami-Aoyama 2-chome, Minato-ku, Tokyo 107-8556
Tel: +81-(3)-3423-1111

ISUZU MOTORS LIMITED

26-1, Minami-Oi 6-chome, Shinagawa-ku, Tokyo 140-8722
Tel: +81-(3)-5471-1141

KAWASAKI HEAVY INDUSTRIES, LTD.

Tokyo Head Office:
World Trade Center Bldg., 4-1, Hamamatsu-cho 2-chome, Minato-ku, Tokyo
Tel: +81-(3)-3435-2111
Kobe Head Office:
Kobe Crystal Tower, 1-3, Higashi Kawasaki-cho 1-chome, Chuo-ku, Kobe, H
Tel: +81-(78)-371-9530

MAZDA MOTOR CORPORATION

Head Office:
3-1, Shinchi, Fuchu-cho, Aki-gun, Hiroshima 730-8670
Tel: +81-(82)-282-1111
Tokyo Head Office:
Yamato Seimei Bldg., 1-7, Uchisaiwai-cho 1-chome, Chiyoda-ku, Tokyo 100-
Tel: +81-(3)-3508-5031

MITSUBISHI MOTORS CORPORATION

33-8, Shiba 5-chome, Minato-ku, Tokyo 108-8410
Tel: +81-(3)-3456-1111

MITSUBISHI FUSO TRUCK & BUS CORPORATION

890-12, Kashimada, Saiwai-ku, Kawasaki, Kanagawa 212-0058
Tel: +81-(44)-330-7700

NISSAN MOTOR CO., LTD.

1-1, Takashima 1-chome, Nishi-ku,
Yokohama-shi, Kanagawa 220-8686
Tel: +81-(45)-523-5523

SUZUKI MOTOR CORPORATION

Head Office:
300, Takatsuka-cho, Minami-ku, Hamamatsu, Shizuoka 432-861
Tel: +81-(53)-440-2061
Tokyo Branch Office:
23-2 Daikyo-cho, Shinjuku-ku, Tokyo 160-0015
Tel: +81-(3)-3356-2501

TOYOTA MOTOR CORPORATION

Head Office:
1, Toyota-cho, Toyota, Aichi 471-8571
Tel: +81-(565)-28-2121
Tokyo Head Office:
1-4-18, Koraku, Bunkyo-ku, Tokyo 112-8701
Tel: +81-(3)-3817-7111

UD TRUCKS CORPORATION

1-1, Ageo, Saitama 362-8523
Tel: +81-(48)-781-2301

YAMAHA MOTOR CO., LTD.

Head Office:
2500, Shingai, Iwata, Shizuoka 438-8501
Tel: +81-(538)-32-1115
Tokyo Representative Office:
1-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-0005
Tel: +81-(3)-5220-7200

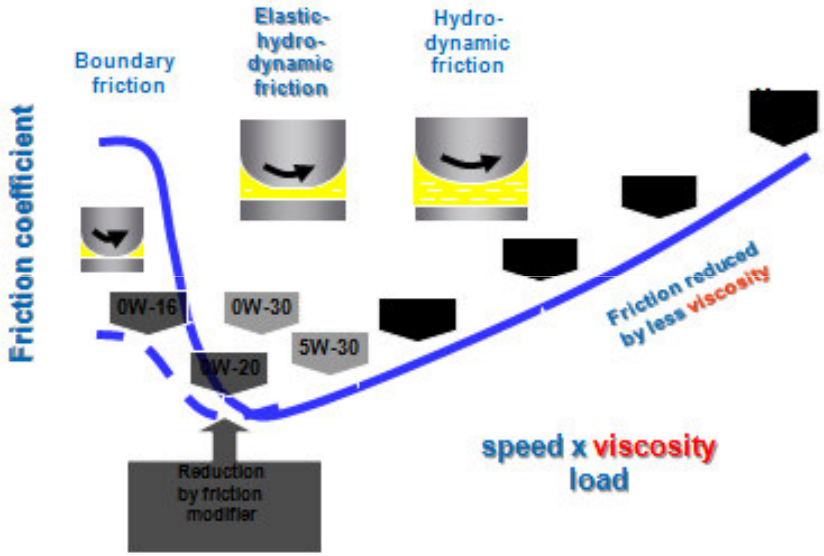
RAVENOL®

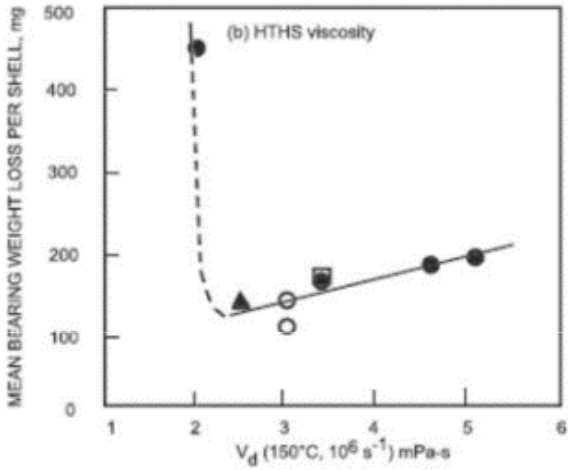
Extra Fuel Economy
EFE SAE 0W-16

Use of low-viscosity oils in modern engines for fuel economy

There are a considerable number of motor vehicles in Japan which effectively already use low-viscous oil with viscosity less than 0W-20.

Use engines for fuel economy





SAE J300 version (April 2013)

SAE low-viscosity classes	HTHS min	KV min	KV max
20	2.6	5.6→6,9	<9.3
16	2.3	6.1	<8.2

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

The proportion of oils up to 2020 which are earmarked for ecological engines in Germany, Japan, USA and other developed countries is 30%. The proportion of sales in developing countries will be considerably lower - approx. 5%.

The purpose of the updated standard is to assist motor-vehicle OEM in striving to increase fuel efficiency. Reducing fuel consumption is currently one of the key goals for OEM. Use of an updated standard will help improve fuel consumption in motor vehicles.

OEM

RAVENOL®

Extra Fuel Economy EFE SAE 0W-16

SAE J300 new version (2015)

Engine oil viscosity classification SAE J300 (01-2015)

SAE-grade	Cold Cranking (CCS)	Cold Pumping (MRV)	Kinematic Viscosity, 100°C		HTHS, 150 °C
	(cP @ T °C)	(cP @ T °C)	(cSt)	(cSt)	(cP)
	Maximum	Maximum	Minimum	Maximum	Minimum
0W	6200 @ -35	60000 @ -40	3,80	-	-
5W	6600 @ -30	60000 @ -35	3,80	-	-
10W	7000 @ -25	60000 @ -30	4,10	-	-
15W	7000 @ -20	60000 @ -25	5,60	-	-
20W	9500 @ -15	60000 @ -20	5,60	-	-
25W	13000 @ -10	60000 @ -15	9,30	-	-
8	-	-	4,00	<6,1	1,70
12	-	-	5,00	<7,1	2,00
16	-	-	6,10	<8,2	2,30
20	-	-	5,60	<9.3	2,60
30	-	-	9,30	<12,5	2,90
40	-	-	12,50	<16,3	2,9 (0W-40, 5W-40, 10W-40)
40	-	-	12,50	<16,3	3,7 (15W-40, 20W-40, 25W-40, 40)
50	-	-	16,30	<21,9	3,70
60	-	-	21,90	<26,1	3,70

SAE low-viscosity classes	HTHS min	KV min	KV max
20	2.6	5.6→6,9	<9.3
16	2.3	6.1	<8.2

SAE J300 new version

number 16 chosen to avoid confusion of oils for this viscosity and SAE 15W-X.

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

SAE Viscosity Grade	KV100		HTHS 150°C
	Min	Max	Min
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	3.5/3.7
50	16.3	21.9	3.7
60	21.9	26.1	3.7

SAE J300: 2013 version

For the first time in the history of the SAE standard engine oil classification system, oils cannot be identified as belonging to class SAE16 or SAE20 purely on the basis of kinematic viscosity at 100 C. For example, product with KV100 = 7.1 mm2/s.

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

ILSAC GF-6

The emergence of an unusual specification system simply could not leave the related classification systems of engine oils unaffected. The first to announce changes was ILSAC with its awaited ILSAC GF-6 standard in 2016.

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

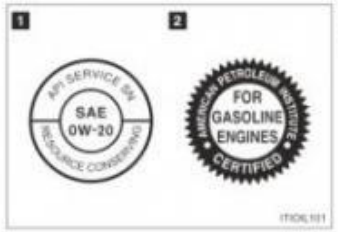
SAE 0W-16 on the engine oil market

6-1. 仕様一覧

Since 2009

■ 指定エンジンオイル

トヨタキヤッスルモーターオイル 0W-16 または、API 規格 SN/RC、SM/EC か、ILSAC 規格合格油をおすすめします。なお、ILSAC 規格合格油の缶には ILSAC CERTIFICATION（イルサックサーティフィケーション）マークが付いています。



1 API マーク
2 ILSAC CERTIFICATIONマーク

■ エンジンオイル推奨粘度

下記図に基づき、外気温に適した粘度のものをご使用ください。

※ 0W-16 は新車時に充填されており、上記図に示す中では、最も省燃費性に優れるオイルです。

オイル粘度について（例として 0W-16 で説明します）：

- 0W-16 の 0W は、低温時のエンジン始動特性を示しています。W の前の数値が小さいほど冬場や寒冷時のエンジン始動が容易になります。
- 0W-16 の 16 は、高温時の粘度特性を示しています。
  粘度の高い（数値が大きい）オイルは、高速または重負荷走行に適しています。

HONDA

The engine oil does not comply with any SAE, API or ILSAC standard. However, it was developed together with the engine and has undergone many tests.

"SAEの規格に適合しませんので、API/ILSACのマークはありませんが車両のエンジンとともに開発され、多岐にわたる性能試験を実施しておりますので機能上はまったく問題ありません»

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

SAE J300: 2013 version

Only Honda features SAE 16 as a priority oil for 2013 models. Honda's specialists maintain that the new standard oils have allowed fuel consumption to be reduced whilst maintaining the other parameters at SAE level.

HONDA

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

TRENDS IN IDENTIFYING VISCOSITY FOR SAE16 CLASS OILS

NON-EXISTENT VISCOSITY CLASSES

AS AN ALTERNATIVE AMONG EXISTING VISCOSITIES

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Low-viscosity oils for engine oil market
WITHOUT 0W-16 label

Part Nr. 08232P99S4LHE

Part Nr. 08232P99S1LHE

Part Nr. 08232P99D1LHE – HONDA Green Oil for Diesel

Part Nr. 08232P99D4LHE – HONDA Green Oil for Diesel

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Low-viscosity oils for engine oil market
WITHOUT 0W-16 label

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

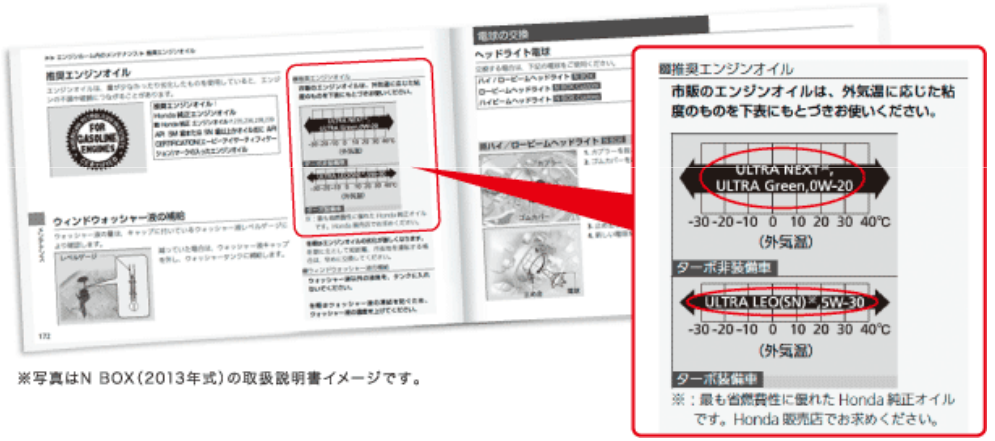
Low-viscosity oils for engine oil market
WITHOUT 0W-16 label

Part Nr. 08210-99904

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Part Nr. 08215-99974



※写真はN BOX(2013年式)の取扱説明書イメージです。

Low-viscosity oils for engine oil market
WITHOUT 0W-16 label

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Low-viscosity oils for engine oil market
WITHOUT 0W-16 label

Part Nr. 08215-99974

HONDA N-ONE

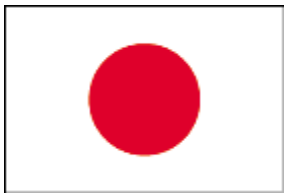
HONDA N-BOX

HONDA N-WGN

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Low-viscosity oils for engine oil market
WITHOUT 0W-16 label

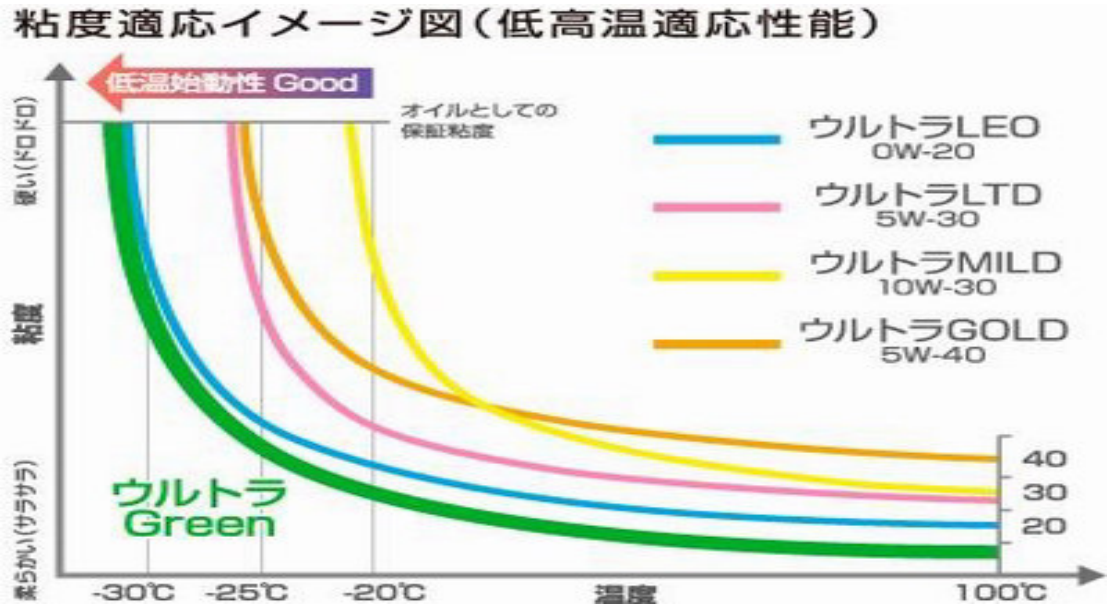


Part Nr. 08215-99974

HONDA N-WGN

Engine: Honda S07A Turbo (Earth Dreams).
PGM-FI (ProGraMmed-Fuel injection)
DOHC (Double OverHead Camshaft).
12 valves, VTC (variable timing control)
Engine displacement 656 cc or 0.7 litres.

DIFFERENCE OF HONDA GREEN OIL TO OILS OF OTHER VISCOSITY

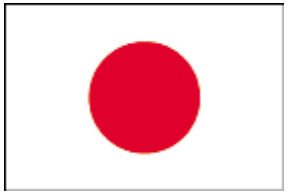


Low-viscosity oils for engine oil market WITHOUT 0W-16 label

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Low-viscosity oils for engine oil market WITHOUT 0W-16 label



Part Nr. MZ102662

Part Nr. MZ102661 – 4 L

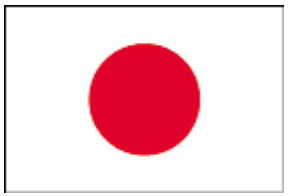
MITSUBISHI EK Wagon

Engine: 3B20
64 hp engine —
turbocharged 660 cc three-cylinder Mitsubishi-Nissan engine
Fuel consumption: 3.3 l/100 km
Characteristics: nickel–hydrogen battery

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Low-viscosity oils for engine oil market
WITHOUT 0W-16 label



Part. Nr. KLANM-01A04

NISSAN

NISSAN DAYZ

NISSAN DAYZ ROOX

Engine:
49 hp engine (with turbocharging 64 hp) —
660-cc motor

SAE 0W-16 on oil market

TOYOTA

AMERICAN PETROLEUM INSTITUTE
SAE
0W-16
CERTIFIED FOR
GASOLINE ENGINES

SAE 0W-16
label first introduced in 2014

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

SAE 0W-16 on oil market

TOYOTA

Part. Nr. 08880-11005

Part. Nr. 08880-11003

SAE 0W-16 on oil market

TOYOTA

SAE 0W-16 is given in the user's manual

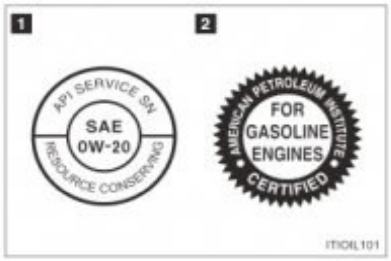
RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

6-1. 仕様一覧

■ 指定エンジンオイル

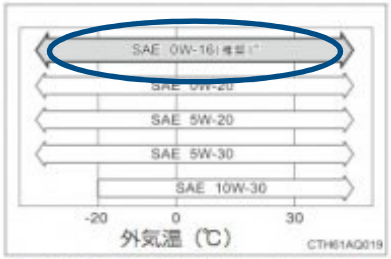
トヨタキヤッスルモーターオイル 0W-16 または、API 規格 SN/RC、SM/EC か、ILSAC 規格合格油をおすすめします。なお、ILSAC 規格合格油の缶には ILSAC CERTIFICATION（イルサックサーティフィケーション）マークが付いています。



1 API マーク
2 ILSAC CERTIFICATIONマーク

■ エンジンオイル推奨粘度

下記図に基づき、外気温に適した粘度のものをご使用ください。



※ 0W-16 は新車時に充填されており、上記図に示す中では、最も省燃費性に優れるオイルです。

オイル粘度について（例として 0W-16 で説明します）：

- 0W-16 の 0W は、低温時のエンジン始動特性を示しています。W の前の数値が小さいほど冬場や寒冷時のエンジン始動が容易になります。
- 0W-16 の 16 は、高温時の粘度特性を示しています。
  粘度の高い（数値が大きい）オイルは、高速または重負荷走行に適しています。

SAE 0W-16 on oil market

エンジンオイル

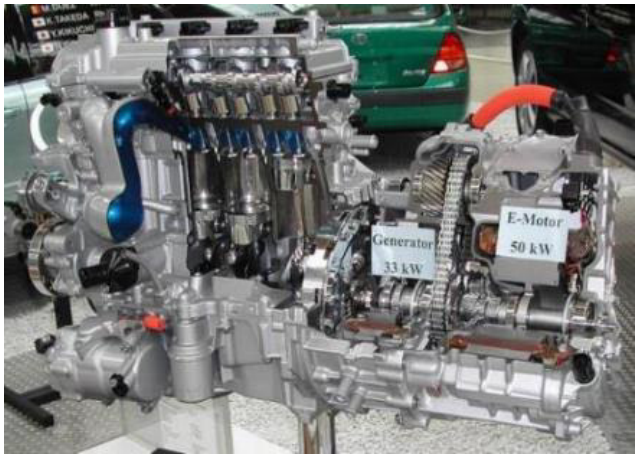
指定銘柄	エンジン	容量 [L]（参考値※1）	
		オイルのみ交換	オイルとオイルフィルター交換
トヨタキヤッスルモーターオイル 0W-16※2 —SAE 0W-16 トヨタキヤッスルモーターオイル SN 0W-20 —API SN/RC, ILSAC GF-5, SAE 0W-20 トヨタキヤッスルモーターオイル SN 5W-20 —API SN/RC, ILSAC GF-5, SAE 5W-20 トヨタキヤッスルモーターオイル SN 5W-30 —API SN/RC, ILSAC GF-5, SAE 5W-30 トヨタキヤッスルモーターオイル SN 10W-30 —API SN/RC, ILSAC GF-5, SAE 10W-30	1NZ-FXE	3.4	3.7

※1 エンジンオイルの容量は交換する際の目安です。オイル量の確認は、エンジンの暖機後にハイブリッドシステムを停止し、5 分以上経過してからレベルゲージで行ってください。

※2 0W-16 は上記表の指定銘柄の中では、最も省燃費性に優れるオイルです。

SAE 0W-16 on oil market

SAE 0W-16 for engine 1NZ-FXE



Petrol engine custom designed as part of a 'hybrid synergy drive' for 'Toyota Prius' motor vehicle. It runs on an Atkinson cycle with delayed intake valve closure and with a high compression ratio (13:1). The intake manifold is manufactured from aluminium alloy.

SAE 0W-16 on oil market

Technical characteristics
Fuel — petrol
Cooling — fluid
Number of cylinders — 4
Displacement — 1496 cm³
HP rating — depending on modification (NHW-10,11,20; NHW-11 has a rating of 72 HP).

SAE 0W-16 for engine 1NZ-FXE

RAVENOL®

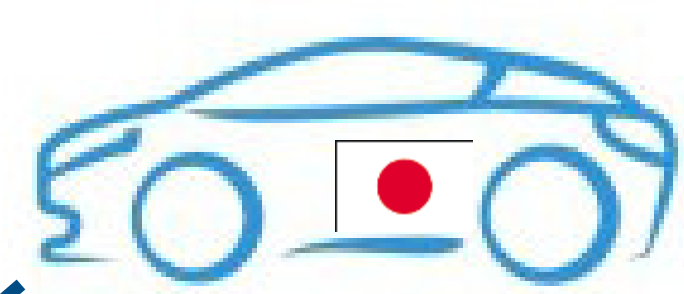
Extra Fuel Economy
EFE SAE 0W-16

WHICH CARS IS IT USED IN?

SAE 0W-16 on oil market

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16



Passenger cars (PC)

**Kei-car, K-car –
660 cubic cm,
length/width/height no more
than 3.4/1.48/2.0 m**

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

Rating of new car sales in Japan for the first half of 2014

Place	Mark and Model	Sales	Changes in relation
1	Toyota Aqua	123 637	93,4%
2	Honda Fit	121 764	168,7%
3	Toyota Prius	103 974	78,5%
4	Toyota Corolla	64 311	159,8%
5	Nissan Note	59 721	72,4%
6	Toyota Voxy	53 510	254%
7	Toyota Vitz	48 448	105,3%
8	Honda Vezel	46 679	Debut 2014
9	Nissan Serena	44 473	90,3%
10	Toyota Noah	34 813	204,4%

Toyota Aqua

Toyota Prius

Car Rating of Class SAE 0W-16

Rating of K-Cars in Japan for the first half of 2014

№	Model	Sales	Changes
1	Daihatsu Tanto	135 688	192,8
2	Nissan Dayz	98 789	806,7
3	Honda N BOX	96 478	81,6
4	Suzuki Wagon R	93 761	89,7
5	Honda N-WGN	87 442	—
6	Daihatsu Move	82 252	72,1
7	Daihatsu Mira	79 258	99,0
8	Suzuki Spacia	66 697	190,6
9	Suzuki Alto	58 040	96,8
10	Suzuki Hustler	40 291	—

Car Rating of Class SAE 0W-16

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

The German Lubricants Manufacturer is the first company to release an engine oil with the specification API-SN and the viscosity SAE 0W-16 on the market and as such positions itself once more as a world leader in the new era of advanced Lubrication Technology. RAVENOL Extra Fuel Economy EFE SAE 0W-16 is the first of the new generation of low viscosity engine oils in the world to be Approved and Licensed with the specification "API SN" by the American Petroleum Institute (API) with headquarters in Washington, D.C.

RAVENOL®

Extra Fuel Economy
EFE SAE 0W-16

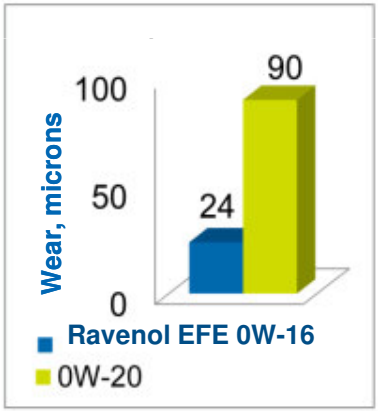
–0W-16
–API SN

Kin.vis. 100 cSt	ASTM D445	7,24
Kin.vis. 40 cSt	ASTM D445	38,36
Viscosity index	ASTM D2270	156
CCS -35C cP	ASTM D5293	4400
MRV -40C cP	ASTM D4684	10400
HTHS 150C	ASTM D4683	2,4
Noack volatility	ASTM D5800	8,2
Sulphated Ash		0,89
TBN		6,17
Zinc (ppm)	ICP	775
Phosphorus (ppm)	ICP	736
Calcium (ppm)	ICP	1670
Molybdenum (ppm)	ICP	133
Boron (ppm)	ICP	100
Sodium (ppm)	ICP	340
Sulphur (ppm)		

Extra Fuel Economy
EFE SAE 0W-16

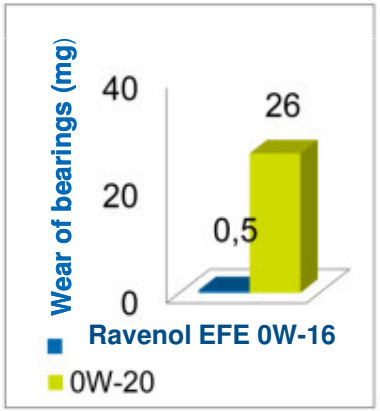
SAE Grade	0W-16	API SN 0W-20 Limits
Wear of bearings (mg)	0.5	26 max
Wear of cams (µm)	24	90 max

Seq IVA



the lower, the better

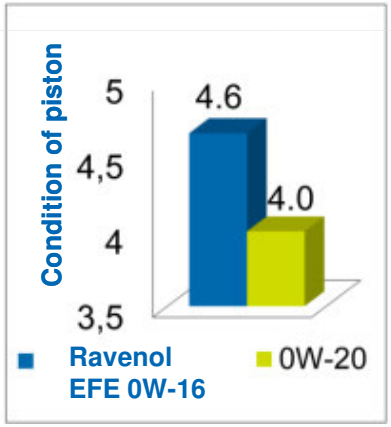
Seq VIII



Extra Fuel Economy
EFE SAE 0W-16

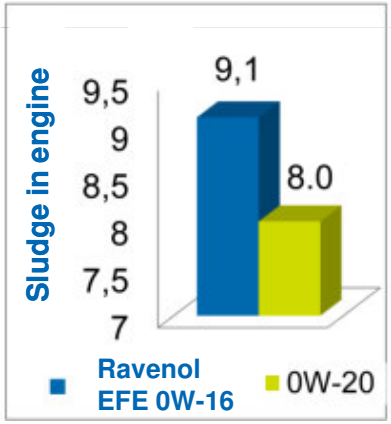
SAE Grade	0W-16	API SN 0W-20 Limits
Increase in viscosity	45	150 max
Deposit on piston	4.6	4.0 min
Sludge in engine	9.1	8.0 min

Seq IIIG



the higher, the better

Seq VG



THANK YOU FOR YOUR ATTENTION!

Ravensberger Schmierstoffvertrieb GmbH
Jöllenbecker Str. 2
33824 Werther
Tel.: +49 5203 9719-0
Fax +49 5203 9719 40
www.ravenol.de