



SERVICE BULLETIN

DIVISION OF ONAN CORPORATION
MINNEAPOLIS, MINNESOTA 55432

Eng
24

ENGINE CRANKCASE OIL RECOMMENDATIONS FOR ONAN EQUIPMENT

2-73

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LUBRICATING OIL SELECTION

Lubricating oils for spark-ignited and diesel engines are made in a variety of service classifications, each in several viscosities. Selection of an oil for a particular engine, considering its fuel and operating conditions, is based on these classifications.

OIL CLASSIFICATION

The classification of oil required depends on the kind of engine, the operating conditions, and the fuel (gaseous fueled engines may require special ash content detergent oils). A new system, jointly developed by the American Petroleum Institute (API), the Society of Automotive Engineers (SAE), and the American Society for Testing and Materials (ASTM) is now used to identify the classifications. A new classification - SE - has been added to cover oils with very high resistance to oil oxidation (or oil thickening) caused by high oil temperatures.

VISCOSITY

Viscosity is a measurement of resistance to flow. For oil, this resistance is affected by temperature. Multiple grade oils are made to provide starting capability when the oil is cold and also to provide engine protection at operating temperatures. Viscosity identification is by SAE number. SAE 30 oil has a viscosity which is specified and measured at 210° F. SAE 10W oil has a viscosity which is specified and measured at 0° F (the suffix W indicates a 0° F specification). Multigrade oils (such as 5W-30) must meet viscosity specifications at both 0° F and 210° F.

RECOMMENDED CLASSIFICATIONS AND VISCOSITIES

The API/SAE/ASTM classifications and SAE viscosities for ONAN equipment are given in Table I. The new SE classification has not been mentioned in previous ONAN publications. The oil recommendations listed herein for ONAN built engines supersede those given in previous ONAN publications. For ashless - ashless dispersant type oil or high ash oils, see Engine Manufacturer's Association (EMA) Form 1-12/70 (or later) columns "Natural Gas/LPG-Lo Ash" or "Natural Gas/LPG-Hi Ash" respectively and "Ash Content (Sulfated) % by Weight". If natural gas engine oil is not available, use MIL-L-2104A (S-1) oils.

TABLE I - OIL RECOMMENDATIONS

ENGINE	SERV CLASS (by FUEL)		STARTING TEMP (F) AND VISCOSITY (SAE)			
AJ, AK, BF, CCK	gasoline-SE,SE/CC gaseous ^{1/}	TEMP VISC	Below 0 ^o 5W-30	0 ^o to 32 ^o 10W-30, 5W-30	32 ^o to 90 ^o 30	Above 90 50
CCKA	gasoline-SE, SE/CC gaseous ^{1/}	TEMP VISC	Below 0 ^o 5W,5W-20	0 ^o to 32 ^o 10W	32 ^o to 90 ^o 30	Above 90 50
CCKB	gasoline-SE,SE/CC gaseous ^{1/}	TEMP VISC	Below 0 ^o 5W-30	0 ^o to 32 ^o 10W-30, 5W-30	32 ^o to 90 ^o 30	Above 90 50
DEF, DEG, DEH	CD, SE/CD	TEMP VISC	Below -10 ^o 5W-30	-10 ^o to 40 ^o 10W	40 ^o to 70 ^o 20	70 ^o to 100 30
DFP, DFM, DFT, DFU, DFV, DFW	CC/CD, SE/CD,	TEMP VISC	-10 ^o to 32 ^o 10W	32 ^o to 90 ^o 20	Above 90 ^o 30	
DJA, DJB, DJBA, DJC	CD/SE, CD/SD CC/SD ^{2/} , CC/SE ^{2/}	TEMP VISC	Below 0 ^o 5W-20 or 5W-30	0 ^o to 32 ^o 5W-20, 10W, 10W-30 or 5W-30	Above 32 ^o 30	
DLA	CD, SE/CD	TEMP VISC	Below 32 ^o 10W	32 ^o to 85 ^o 20/20W	Above 85 ^o 30	
DYA, DYB, DYC, DYD, DYG	CD/SE, SE/CD	TEMP VISC	Below 0 ^o 10W	0 ^o to 32 ^o 10W-30, 5W-30	Above 32 ^o 30	
EK, EM	gasoline-SE,SE/CC gaseous-SD/CC	TEMP VISC	Below -10 ^o 5W-30, 10W-40	-10 ^o to 32 ^o 20	32 ^o to 100 ^o 30	Above 100 40
FT	CC ^{3/}	TEMP VISC	-10 ^o to 32 ^o 10W	32 ^o to 90 ^o 20	Above 90 ^o 30	
JB, JC	gasoline-SE,SE/CC gaseous ^{1/}	TEMP VISC	Below 32 ^o 5W-20 or 5W-30	Above 32 ^o 30		
KB, KR	gasoline-SE,SE/CC gaseous - SD/CC	TEMP VISC	Below 32 ^o 10W	Above 32 ^o 30		
LK, LKB, MAJ, MCCK	gasoline-SE,SE/CC gaseous ^{1/}	TEMP VISC	Below -0 ^o 5W-30	0 ^o to 32 ^o 10W-40, 5W-30	32 ^o to 90 ^o 30	Above 90 ^o 50
MDEG, MDEH	CD,SE/CD	TEMP VISC	Below -10 ^o 5W-30	-10 ^o to 40 ^o 10W	40 ^o to 70 ^o 20	70 ^o to 100 30

MDJA, MDJB, MDJC MDJE, MDJF	CD/SE, CD/SD, CC/SE ^{2/} , CC/SD ^{2/}	TEMP VISC	Below 0° 5W-20 or 5W-30	0° to 32° 5W-20, 10W-30 10W, 5W-30	Above 32° 30	
MJC	SE, SE/CC	TEMP VISC	Below 32° 5W-20 or 5W-30	Above 32° 30		
NB, NH, NHA, NHB, NHC	gasoline-SE, SE/CC gaseous ^{1/}	TEMP VISC	Below 0° 5W-30	0° to 32° 10W-40, 5W-30	32° to 90° 30	Above 90° 50
PC	gasoline-SE, SE/CC gaseous-SD/CC	TEMP VISC	Below 40° 5W-30	Above 40° 30		
RDJC, RDJF	CD/SE, CD/SD, CC/SE ^{2/} , CC/SD ^{2/}	TEMP VISC	Below 0° 5W-20 or 5W-30	0° to 32° 5W-20, 10W-30, 10W, 5W-30	Above 32° 30	
RJC	gasoline-SE, SE/CC gaseous ^{1/}	TEMP VISC	Below 32° 5W-20 or 5W-30	Above 32° 30		
TD, TE, TF	SE, SE/CC	TEMP VISC	Below 32° 10W	Above 32° 30		

OIL OPERATING TEMPERATURE (F) AND VISCOSITY (SAE)

WA	any fuel - SE, SE/CC	TEMP VISC	130°-155° 20W	155°-190° 30	190°-230° 40	
WB, WC	gasoline-SE, SE/CC gaseous ^{4/}	TEMP VISC	140°-160° 20W	160°-180° 30	180°-200° 40	200°-220° 50
WE	gasoline-SE, SE/CC gaseous - see page 1	TEMP VISC	130°-155° 20	155°-190° 30	190°-230° 40	
WF, WK	^{4/}	TEMP VISC	150°-200° 30	200°-230° 40		

^{1/} Ashless or low-ash detergent oils specifically made for gaseous-fueled engines are also approved for LPG (butane, propane) or natural gas fuels.

^{2/} CC oils are acceptable only for ambient temp. below 32° F or during break-in.

^{3/} Oil with 0.03 to 0.85 percent by weight sulfated ash.

^{4/} Oil made for gaseous-fueled engines and containing 5000 PPM of barium, calcium, or both together with 0.03 percent by weight zinc. Also has sulfated ash level of 2.0 to 3.4 percent by weight. Lower ash oils may perform satisfactorily but high ash oils improve seat wear.

BASIS FOR RECOMMENDATIONS

The recommendations made in Table I are based upon knowledge required, the API/SAE/ASTM classifications, and shop testing. The classifications define the best oil for each operating condition as described in Table II.

TABLE II CLASSIFICATIONS AND OPERATING CONDITIONS

API/SAE/ASTM DESIGNATIONS		SERVICE AND OIL DESCRIPTIONS
NEW	OLD	
SA	ML	<u>Utility Gasoline Engine Service</u> Mildest operating conditions. No performance requirements. No additives except perhaps pour and/or foam depressants.
SB	MM	<u>Minimum Duty Gasoline Engine Service</u> Conditions so mild that only minimum compounding is required. Oil has some resistance to oil oxidation and bearing corrosion - also some antiscuff qualities.
SC	1964-1967 MS	<u>1964 Gasoline Engine Warranty Service</u> 1964 through 1967 automobile manufacturer gasoline engine operating conditions. Oil designed to control high and low temperature deposits, wear, and corrosion.
SD	1968-1971 MS	<u>1968 Gasoline Engine Warranty Service</u> 1968 automobile manufacturers gasoline engine operating conditions. Performance better than that of SC oils and may be used in their stead.
SE	--	<u>ASTM Engine Test Sequence</u> Oil designed to meet the 1972 requirements of the automobile manufacturers and to stand up under high operating temperatures caused by today's high speeds and heavy loads. Contains greater quantities of anti-oxidants which keep oil from turning into molasses-like sludge. Safeguards against bearing failure and total engine breakdown.
CA	DG	<u>Light Duty Diesel Engine Service</u> Oils intended for service in light to moderate duty normally aspirated diesel engines using high quality low sulfur fuel. Meets MIL-L-2104A (1954)
CB	DG	<u>Moderate Duty Diesel Engine Service</u> These oils are similar to CA oils except that they are capable of providing the protection when high sulfur fuels are used.
CC	DM	<u>Moderate Duty Diesel and Gasoline Engine Service</u> Oils meeting requirements of MIL-L-2104B (1964). Provides low temperature anti-sludge and anti-rust performance in lightly supercharged diesel engines.
CD	DS (Series 3)	<u>Severe Duty Diesel Engine Service</u> These oils are for service typical of supercharged diesel engines in high speed, high output duty requiring very effective wear/deposit control. Provide protection versus bearing corrosion and high temperature deposit formation in supercharged diesel units using wide quality range fuels. CD oils meet the Caterpillar Tractor Co. Series 3 Specification.