



Test Monitoring Center

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D4485 Information Letter 19-6
Sequence Number 6
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ASTM consensus has not been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.

TO: D4485 Mailing List
SUBJECT: Addition of API SP Category

On July 9, 2019 the D4485 Surveillance Panel approved the addition of the API SP Category to ASTM Specification D4485. The following additions to the specification were made.

1. Section X2.7 SP—2020 Gasoline Engine Warranty Maintenance Service
2. Section X2.8 Resource Conserving in Conjunction with API Service Category SP
3. Table X9.1 Requirements for API Service Category SP and API SP with Resource Conserving
4. Table X9.2 Resource Conserving Primary Performance Criterion with Service Category SP

The text of the revisions is shown in the attachment. These changes are effective with the issuance of this information letter.

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Attachment

c: http://www.astmtmc.cmu.edu/ftp/docs/d4485/IL_19-6_D4485.pdf

Distribution: Email

X2.7 SP—2020 Gasoline Engine Warranty Maintenance Service

See Table X9.1

X2.7.1 API Service Category SP was adopted for use in describing engine oils available in 2020. These oils are for use in service typical of gasoline engines in current and earlier passenger cars, sport utility vehicles, vans, and light-duty trucks operating under vehicle manufacturers' recommended maintenance procedures. Vehicle owners and operators should follow their vehicle manufacturer's recommendations on engine oil viscosity and performance standard.

X2.7.2 Engine oils that meet the API Service Category SP designation may be used where API Service Category SN and earlier S categories have been recommended.

X2.7.3 Engine oils that meet the API Service Category SP designation have been tested in accordance with the ACC Code and may use the API Base Oil Interchangeability Guidelines and the API Guidelines for SAE Viscosity-Grade Engine Testing (see Annexes E and F, API Publication 1509).

X2.7.4 Engine oils that meet these requirements may display API Service Category SP in the upper portion of the API Service Symbol beginning May 1, 2020.

X2.8 Resource Conserving in Conjunction with API Service Category SP

See Table X9.2

X2.8.1 API Service SP engine oils designated as Resource Conserving are formulated to help improve fuel economy and protect vehicle emission system components in passenger cars, sport utility vehicles, vans, and light-duty trucks powered by gasoline engines. These oils have demonstrated a fuel economy improvement (FEI) in a specific sequence test at the percentages listed in Table X9.2 when compared with a baseline oil (BL). Additionally, these oils have demonstrated in other tests listed in Table X9.2 that they provide greater emission system and turbocharger protection and help protect engines when operating on ethanol-containing fuels up to E85.

X2.8.2 Many previous S Categories made reference to "Energy Conserving," but this reflected an emphasis on fuel-economy performance alone. Resource Conserving in conjunction with API SP focuses on fuel economy, emission system and turbocharger protection, and compatibility with ethanol-containing fuel up to E85.

X2.8.3 Starting May 1, 2020, oils that have passed the tests at the limits shown in Table 1 and are properly licensed by API may display "Resource Conserving" in the lower portion of the API Service Symbol in conjunction with API Service SP in the upper portion. The fuel economy and other resource conserving benefits obtained by individual vehicle operators using engine oils labeled Resource Conserving may differ because of many factors, including the type of vehicle and engine, engine manufacturing variables, the mechanical condition and maintenance of the engine, oil that has been previously used, operating conditions, and driving habits. Before the May 1, 2020, introduction date, oil marketers may license oils meeting Resource Conserving in conjunction with API Service SP as Resource Conserving in conjunction with API Service SN.

Table X9.1 Requirements for API Service Category SP and API SP with Resource Conserving

	API SP	API SP	API SP with Resource Conserving
	SAE 0W-16, SAE 5W-16, SAE 0W-20, SAE 5W-20, SAE 0W-30, SAE 5W-30, SAE 10W-30	Other Viscosity Grades	All Viscosity Grades
Engine Test Requirements^a			
ASTM D8111 (Sequence IIIH)			
Kinematic viscosity increase @ 40°C, %, max	100	100	100
Average weighted piston deposits, merits, min	4.2	4.2	4.2
Hot stuck rings	None	None	None
ASTM DXXXX (Sequence IVB)			
Average intake lifter volume loss (8 position avg), mm ³ , max	2.7	2.7	2.7
End of test iron, ppm, max	400	400	400
ASTM DXXXX (Sequence VH) ^b			
Average engine sludge, merits, min	7.6	7.6	7.6
Average rocker cover sludge, merits, min	7.7	7.7	7.7
Average engine varnish, merits, min	8.6	8.6	8.6
Average piston skirt varnish, merits, min	7.6	7.6	7.6
Oil screen sludge, % area	Rate & report	Rate & report	Rate & report
Oil screen debris, % area	Rate & report	Rate & report	Rate & report
Hot-stuck compression rings	None	None	None
Cold stuck rings	Rate & report	Rate & report	Rate & report
Oil ring clogging, % area	Rate & report	Rate & report	Rate & report
ASTM D8114 (Sequence VI) ^c			
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
ASTM D8226 (Sequence VIF)			
SAE XW-16 viscosity grade			
FEI SUM, % min			4.1
FEI 2, % min after 125 hours aging			1.9
ASTM D6709 (Sequence VIII)			
Bearing weight loss, mg, max			
SAE XW-16	NR	NR	NR
All other viscosity grades	26	26	26
ASTM DXXXX (Sequence IX)			
Average number of events for four iterations, max	5	5	5
Number of events per iteration, max	8	8	8
ASTM DXXXX (Sequence X)			
% increase, max	0.085	0.085	0.085

Bench Test and Measured Parameter^a

Aged oil low-temperature viscosity

ASTM D8111, (Sequence IIIHA), aged oil low-temperature viscosity^d

Measure aged oil low temperature viscosity on final formulation (pursuant to existing read across described in Annex F)—this includes base oil and additive combination being licensed—for each viscosity grade by either IIIHA or ROBO

Measure CCS viscosity of EOT IIIHA or ROBO sample at CCS temperature corresponding to original viscosity grade

Or

ASTM D7528, (ROBO Test), aged oil low-temperature viscosity^d

Measure aged oil low temperature viscosity on final formulation (pursuant to existing read across described in Annex F)—this includes base oil and additive combination being licensed—for each viscosity grade by either IIIHA or ROBO

Measure CCS viscosity of EOT IIIHA or ROBO sample at CCS temperature corresponding to original viscosity grade

a) If CCS viscosity measured is less than or equal to maximum CCS viscosity specified for original viscosity grade, run ASTM D4684 (MRV TP-1) at MRV temperature specified in SAE J300 for original viscosity grade.

b) If CCS viscosity measured is higher than maximum viscosity specified for the original viscosity grade in J300, run ASTM D4684 (MRV TP-1) at 5°C higher temperature (i.e., at MRV temperature specified in SAE J300 for next higher viscosity grade).

c) EOT ROBO sample must show no yield stress in D4684 test and its D4684 viscosity must be below maximum specified in SAE J300 for original viscosity grade or next higher viscosity grade, depending on CCS viscosity grade, as outlined in a) or b) above.

d) If CCS viscosity measured is less than or equal to maximum CCS viscosity specified for original viscosity grade, run ASTM D4684 (MRV TP-1) at MRV temperature specified in SAE J300 for original viscosity grade.

e) If CCS viscosity measured is higher than maximum viscosity specified for original viscosity grade in J300, run ASTM D4684 (MRV TP-1) at 5°C higher temperature (i.e., at MRV temperature specified in SAE J300 for next higher viscosity grade).

f) EOT ROBO sample must show no yield stress in D4684 test and its D4684 viscosity must be below maximum specified in SAE J300 for original viscosity grade or next higher viscosity grade, depending on CCS viscosity grade, as outlined in a) or b) above.

ASTM D8111, (Sequence IIIHB) phosphorus retention, % min	NR	NR	81
ASTM D4683, D4741, or D5481, High Temp./High Shear Viscosity @ 150°C, mPa·s, min	2.3	2.3	2.3
ASTM D6557 (Ball Rust Test), avg. gray value, min ^b	100	100	100
ASTM D5800, evaporation loss, 1 hour at 250°C, % max ^e	15.0	15.0	15.0
ASTM D6795, EOFT, % flow reduction, max	50	50	50
ASTM D6794, EOWTT, % flow reduction, max			
with 0.6% H ₂ O	50	50	50
with 1.0% H ₂ O	50	50	50
with 2.0% H ₂ O	50	50	50
with 3.0% H ₂ O	50	50	50
ASTM D4951 or D5185, phosphorus % mass, max ^f	0.08 ^g	NR	0.08 ^g
ASTM D4951 or D5185, phosphorus % mass, min ^f	0.06 ^g	0.06 ^g	0.06 ^g
ASTM D4951, D5185, or D2622, sulfur % mass, max ^f			
SAE 0W-16, 5W-16, 0W-20, 0W-30, 5W-20, and 5W-30	0.5 ^f	NR	0.5 ^f
SAE 10W-30	0.6 ^f	NR	0.6 ^f
All other viscosity grades	NR	NR	0.6 ^f
ASTM D892 (Option A and excluding paragraph 11), foaming tendency			
Sequence I, mL, max, tendency/stability	10/0 ^h	10/0 ⁱ	10/0 ^h
Sequence II, mL, max, tendency/stability	50/0 ^h	50/0 ⁱ	50/0 ^h
Sequence III, mL, max, tendency/stability	10/0 ^h	10/0 ⁱ	10/0 ^h

D6082 (Option A), high-temperature foaming mL, max, tendency/stability^h

100/0

100/0

100/0

ASTM D6922, homogeneity and miscibility

j

j

j

ASTM D6709, (Sequence VIII) shear stability

SAE XW-16

All other viscosity grades

NR

Stay in grade^k

NR

Stay in grade^k

NR

Stay in grade^k

ASTM D6278, (Diesel Injector) shear stability, KV@100°C

after 30 passes, min

SAE XW-16

All other viscosity grades

5.8

NR

5.8

NR

5.8

NR

ASTM D5133, gelation index, max^b

12^l

NR

12^l

ASTM D6335, TEOST 33C, high-temperature deposits, total

deposit weight, mg, max

SAE XW-16

SAE 0W-20

All other viscosity grades

NR

NR

NR

NR

NR

NR

NR

NR

30

ASTM D7563, emulsion retention

NR

NR

no water separation

ASTM D7216 Annex A2, elastomer compatibility

Candidate oil testing for elastomer compatibility shall be performed using the five Standard Reference Elastomers (SREs) referenced herein and defined in SAE J2643. Candidate oil testing shall be performed according to ASTM D7216 Annex A2. The post-candidate-oil-immersion elastomers shall conform to the specification limits detailed below:

Elastomer Material (SAE J2643)	Test Procedure	Material Property	Units	Limits
Polyacrylate Rubber (ACM-1)	ASTM D471	Volume	% Δ	-5, 9
	ASTM D2240	Hardness	pts.	-10, 10
	ASTM D412	Tensile Strength	% Δ	-40, 40
Hydrogenated Nitrile Rubber (HNBR-1)	ASTM D471	Volume	% Δ	-5, 10
	ASTM D2240	Hardness	pts.	-10, 5
	ASTM D412	Tensile Strength	% Δ	-20, 15
Silicone Rubber (VMQ-1)	ASTM D471	Volume	% Δ	-5, 40
	ASTM D2240	Hardness	pts.	-30, 10
	ASTM D412	Tensile Strength	% Δ	-50, 5
Fluorocarbon Rubber (FKM-1)	ASTM D471	Volume	% Δ	-2, 3
	ASTM D2240	Hardness	pts.	-6, 6
	ASTM D412	Tensile Strength	% Δ	-65, 10
Ethylene Acrylic Rubber (AEM-1)	ASTM D471	Volume	% Δ	-5, 30
	ASTM D2240	Hardness	pts.	-20, 10
	ASTM D412	Tensile Strength	% Δ	-30, 30

Note: All oils must meet the requirements of the most recent edition of SAE J300; NR = Not required.

^aTests are per ASTM requirements.

^bIf 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 DXXXX), Ball Rust (ASTM D6557), and Gelation Index (ASTM D5133) tests are not required.

^cViscosity grades are limited to 0W, 5W and 10W multi-grade oils.

^dNot required for monograde and 15W, 20W, and 25W multi-grade oils.

^eCalculated conversions specified in ASTM D5800 are allowed.

^fFor 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 and sulfur do not apply. However, the CJ-4 limits for phosphorus and sulfur do apply for CJ-4 oils, and the SP with Resource Conserving limits for phosphorus apply when CK-4 or FA-4 is 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.

^gThis is a non-critical specification as described in ASTM D3244.

^hAfter 1-minute settling period.

ⁱAfter 10-minute settling period.

^jShall remain homogenous and, when mixed with ASTM reference oils, shall remain miscible.

^kTen-hour stripped kinematic viscosity must remain in original SAE viscosity grade.

^lTo be evaluated from -5°C to temperature at which 40,000 cP is attained or -40°C, or 2 Celsius degrees below the appropriate MRV TP-1 temperature (defined by SAE J300), whichever occurs first.

Table X9.2 Resource Conserving Primary Performance Criteria with API Service Category SP

Performance Test	Performance Criteria	
	FEI SUM	FEI2 minimum after 125 hours aging
Sequence VIE (ASTM D8114) ^a		
Viscosity Grade		
XW-20	3.8%	1.8%
XW-30	3.1%	1.5%
10W-30 and all other viscosity grades not listed above	2.8%	1.3%
Sequence VIF (ASTM D8226) ^a		
Viscosity Grade		
XW-16	4.1%	1.9%
Sequence IIIHB (ASTM D8111)	81% phosphorus retention min	
Emulsion Retention (ASTM D7563)	No water separation	
High Temperature Deposits, TEOST 33C (ASTM D6335), Total Deposit Weight, mg		
SAE XW-16, 0W-20	Not Required	
All other viscosity grades	30 max	

^aViscosity grades are limited to 0W, 5W and 10W multigrade oils.