

To: API Lubricants Group  
 Cc: Lubricants Group Mailing List  
 API

**Ballot for API SP, Table G-6**

On April 4, 2019 the Lubricants Standards Group (LSG) reviewed “Table G-6—Requirements for API Service Category SP and API SP with Resource Conserving”.

Table G-6 is given below and in the Electronic Ballot Attachment 1.

<b>Table G-6—Requirements for API Service Category SP and API SP with Resource Conserving</b>			
	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
<b>Engine Test Requirements<sup>a</sup></b>			
ASTM D8111 (Sequence IIH)			
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 <sup>3</sup> , max	2.7	2.7	2.7
End of test iron, ppm, max	400	400	400
ASTM DXXXX (Sequence VH) <sup>b</sup>			
Average engine sludge, merits, min			
Average rocker cover sludge, merits, min	7.6	7.6	7.6
	7.7	7.7	7.7
Average engine varnish, merits, min	8.6	8.6	8.6
	7.6	7.6	7.6
Average piston skirt varnish, merits, min	Rate & report	Rate & report	Rate & report
	Rate & report	Rate & report	Rate & report
Oil screen sludge, % area	None	None	None
Oil screen debris, % area	Rate & report	Rate & report	Rate & report
Hot-stuck compression rings	Rate & report	Rate & report	Rate & report
Cold stuck rings			
Oil ring clogging, % area			
ASTM D8114 (Sequence VIE) <sup>c</sup>			
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 <sup>a</sup>			
Aged oil low-temperature viscosity			
ASTM D8111, (Sequence IIIHA), aged oil low-temperature viscosity <sup>d</sup>			
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 <sup>d</sup>			
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			
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 <sup>b</sup>	100	100	100

ASTM D5800, evaporation loss, 1 hour at 250°C, % max <sup>e</sup>	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 <sub>2</sub> O	50	50	50
with 1.0% H <sub>2</sub> O	50	50	50
with 2.0% H <sub>2</sub> O	50	50	50
with 3.0% H <sub>2</sub> O	50	50	50
ASTM D4951 or D5185, phosphorus % mass, max <sup>f</sup>	0.08 <sup>g</sup>	0.08 <sup>g</sup>	0.08 <sup>g</sup>
ASTM D4951 or D5185, phosphorus % mass, min <sup>f</sup>	0.06 <sup>g</sup>	0.06 <sup>g</sup>	0.06 <sup>g</sup>
ASTM D4951, D5185, or D2622, sulfur % mass, max <sup>f</sup>			
SAE 0W-16, 5W-16, 0W-20, 0W-30, 5W-20, and 5W-30	0.5 <sup>f</sup>	NR	0.5 <sup>f</sup>
SAE 10W-30	0.6 <sup>f</sup>	NR	0.6 <sup>f</sup>
All other viscosity grades	NR	NR	0.6 <sup>f</sup>
ASTM D892 (Option A and excluding paragraph 11), foaming tendency			
Sequence I, mL, max, tendency/stability	10/0 <sup>h</sup>	10/0 <sup>i</sup>	10/0 <sup>h</sup>
Sequence II, mL, max, tendency/stability	50/0 <sup>h</sup>	50/0 <sup>i</sup>	50/0 <sup>h</sup>
Sequence III, mL, max, tendency/stability	10/0 <sup>h</sup>	10/0 <sup>i</sup>	10/0 <sup>h</sup>
ASTM D6082 (Option A), high-temperature foaming mL, max, tendency/stability <sup>h</sup>	100/0	100/0	100/0
ASTM D6922, homogeneity and miscibility	j	j	j
ASTM D6709, (Sequence VIII) shear stability			
SAE XW-16	NR	NR	NR
All other viscosity grades	Stay in grade <sup>k</sup>	Stay in grade <sup>k</sup>	Stay in grade <sup>k</sup>
ASTM D6278, (Diesel Injector) shear stability, KV@100°C after 30 passes, min			
SAE XW-16	5.8	5.8	5.8
All other viscosity grades	NR	NR	NR
ASTM D5133, gelation index, max <sup>b</sup>	12 <sup>l</sup>	NR	12 <sup>l</sup>
ASTM D6335, TEOST 33C, 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
ASTM D7563, emulsion retention	NR	NR	no water separation
ASTM D7216 Annex A2, elastomer compatibility	Table G-7	Table G-7	Table G-7
Note: All oils must meet the requirements of the most recent edition of SAE J300; NR = Not required.			
<sup>a</sup> Tests are per ASTM requirements.			
<sup>b</sup> 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 DXXXX), Ball Rust (ASTM D6557), and Gelation Index (ASTM D5133) tests are not required.			
<sup>c</sup> Viscosity grades are limited to 0W, 5W and 10W multigrade oils.			
<sup>d</sup> Not required for monograde and 15W, 20W, and 25W multigrade oils.			

<sup>e</sup>Calculated conversions specified in ASTM D5800 are allowed.

<sup>f</sup>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 and sulfur 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.

<sup>g</sup>This is a non-critical specification as described in ASTM D3244.

<sup>h</sup>After 1-minute settling period.

<sup>i</sup>After 10-minute settling period.

<sup>j</sup>Shall remain homogenous and, when mixed with ASTM reference oils, shall remain miscible.

<sup>k</sup>Ten-hour stripped kinematic viscosity must remain in original SAE viscosity grade.

<sup>l</sup>To 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.

After review and discussion, the LSG agreed by voice vote to **Ballot Table G-6—Requirements for API Service Category SP and API SP with Resource Conserving**. The Motion to Ballot Table G-6 is given below and in the Ballot Attachment.

### **Motion**

Ballot Annex G Table G-6 (API SP) with First Licensing May 1, 2020.

- Motion by: Mike Alessi
- Second by: Bill O’Ryan
  - ✓ Affirmative: 16
  - ✓ Negative: 0
  - ✓ Abstain: 0

### **Motion Passed**

Lubricants Group Members should use the API Ballot System to cast their vote and make comments. The Ballot Link is: <http://Ballots.api.org>. The Lubricants Group Member votes will be counted, and all received comments reviewed and considered before the ballot results are final.

Non-Lubricants Group Members should comment on the Ballot Motion using the Ballot system. The Ballot Link is: <http://Ballots.api.org>. All comments on the Ballot Motion will be reviewed before the ballot results are final.

This Ballot will close on May 6, 2019. All Votes and/or Comments must be received by that date. If approved the balloted change will be effective as of April 4, 2019.

# Attachment 1

**Table G-6—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
<b>Engine Test Requirements<sup>a</sup></b>			
ASTM D8111 (Sequence IIH)			
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 <sup>3</sup> , max	2.7	2.7	2.7
End of test iron, ppm, max	400	400	400
ASTM DXXXX (Sequence VH) <sup>b</sup>			
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) <sup>c</sup>			
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

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Bench Test and Measured Parameter<sup>a</sup>

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Aged oil low-temperature viscosity

ASTM D8111, (Sequence IIIHA), aged oil low-temperature viscosity<sup>d</sup>

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<sup>d</sup>

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.

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 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.

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<sup>b</sup>

100

100

100

ASTM D5800, evaporation loss, 1 hour at 250°C, % max<sup>e</sup>

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<sub>2</sub>O

50

50

50

with 1.0% H<sub>2</sub>O

50

50

50

with 2.0% H<sub>2</sub>O

50

50

50

with 3.0% H<sub>2</sub>O

50

50

50

ASTM D4951 or D5185, phosphorus % mass, max<sup>f</sup>

0.08<sup>g</sup>

0.08<sup>g</sup>

0.08<sup>g</sup>

ASTM D4951 or D5185, phosphorus % mass, min<sup>f</sup>

0.06<sup>g</sup>

0.06<sup>g</sup>

0.06<sup>g</sup>

ASTM D4951, D5185, or D2622, sulfur % mass, max<sup>f</sup>

SAE 0W-16, 5W-16, 0W-20, 0W-30, 5W-20, and 5W-30

0.5<sup>f</sup>

NR

0.5<sup>f</sup>

SAE 10W-30

0.6<sup>f</sup>

NR

0.6<sup>f</sup>

All other viscosity grades

NR

NR

0.6<sup>f</sup>

ASTM D892 (Option A and excluding paragraph 11), foaming tendency			
Sequence I, mL, max, tendency/stability	10/0 <sup>h</sup>	10/0 <sup>i</sup>	10/0 <sup>h</sup>
Sequence II, mL, max, tendency/stability	50/0 <sup>h</sup>	50/0 <sup>i</sup>	50/0 <sup>h</sup>
Sequence III, mL, max, tendency/stability	10/0 <sup>h</sup>	10/0 <sup>i</sup>	10/0 <sup>h</sup>
ASTM D6082 (Option A), high-temperature foaming mL, max, tendency/stability <sup>h</sup>	100/0	100/0	100/0
ASTM D6922, homogeneity and miscibility	j	j	j
ASTM D6709, (Sequence VIII) shear stability			
SAE XW-16	NR	NR	NR
All other viscosity grades	Stay in grade <sup>k</sup>	Stay in grade <sup>k</sup>	Stay in grade <sup>k</sup>
ASTM D6278, (Diesel Injector) shear stability, KV@100°C after 30 passes, min			
SAE XW-16	5.8	5.8	5.8
All other viscosity grades	NR	NR	NR
ASTM D5133, gelation index, max <sup>b</sup>	12 <sup>l</sup>	NR	12 <sup>l</sup>
ASTM D6335, TEOST 33C, 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
ASTM D7563, emulsion retention	NR	NR	no water separation
ASTM D7216 Annex A2, elastomer compatibility	Table G-7	Table G-7	Table G-7

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

<sup>a</sup>Tests are per ASTM requirements.

<sup>b</sup>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 DXXXX), Ball Rust (ASTM D6557), and Gelation Index (ASTM D5133) tests are not required.

<sup>c</sup>Viscosity grades are limited to 0W, 5W and 10W multigrade oils.

<sup>d</sup>Not required for monograde and 15W, 20W, and 25W multigrade oils.

<sup>e</sup>Calculated conversions specified in ASTM D5800 are allowed.

<sup>f</sup>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 and sulfur 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.

<sup>g</sup>This is a non-critical specification as described in ASTM D3244.

<sup>h</sup>After 1-minute settling period.

<sup>i</sup>After 10-minute settling period.

<sup>j</sup>Shall remain homogenous and, when mixed with ASTM reference oils, shall remain miscible.

<sup>k</sup>Ten-hour stripped kinematic viscosity must remain in original SAE viscosity grade.

<sup>l</sup>To 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.

Motion for Table G-6—Requirements for API Service Category SP and  
API SP with Resource Conserving

Ballot Annex G Table G-6 (API SP) with First Licensing May 1, 2020.

Motion by: Mike Alessi

Second by: Bill O’Ryan

Affirmative: 16

Negative: 0

Abstain: 0



**Table G-7—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 herein				
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