

2.3.2.1 SN—2011 Gasoline Engine Warranty Maintenance Service

API Service Category SN was adopted for use in describing engine oils available in 2011. 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.

Engine oils that meet the API Service Category SN designation (see Appendix G, Table G-5) may be used where API Service Category SM and earlier S categories have been recommended.

Engine oils that meet the API Service Category SN 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 Appendices E and F).

Starting October 1, 2010, oils that have passed the tests for API Service Category SN at the limits shown in Table G-5 and are properly licensed by API may display API Service SN in the upper portion of the API Service Symbol. Before the October 1, 2010, introduction date, oil marketers may license API SN oils as API SM.

2.3.2.5.2 Resource Conserving in Conjunction with API Service Category SN

API Service SN 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 the Sequence VID test at the percentages listed in Table 1 when compared with a baseline oil (BL) used in the Sequence VID test. Additionally, these oils have demonstrated in the tests listed in Table 1 that they provide greater emission system protection, ensure compatibility with engine seals, and help protect engines when operating on ethanol-containing fuels up to E85.

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 SN focuses on fuel economy, emission system protection, seals compatibility, and compatibility with ethanol-containing fuel up to E85.

Starting October 1, 2010, 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 SN 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 October 1, 2010, introduction date, oil marketers may license oils meeting Resource Conserving in conjunction with API Service SN as Energy Conserving in conjunction with API Service SM.

**Table 1—Resource Conserving Primary Performance Criteria with
API Service Category SN**

Performance Test	Performance Criteria	
Sequence VID (ASTM D7589)		
Viscosity Grade	FEI2 minimum after 100 hours aging	FEI SUM minimum (FEI1 after 16 hours aging + FEI2)
XW-20	1.2%	2.6%
XW-30	0.9%	1.9%
10W-30 and all other viscosity grades not listed above	0.6%	1.5%
Sequence IIIGB (ASTM D7320)	79% phosphorus retention, min	
Emulsion Retention (ASTM D7563)	No water separation	
Elastomer Compatibility (ASTM D7216 Annex A2)	Pass in accordance with Table G-6	

**Table G-5—Requirements for API Service Category SN and
API SN with Resource Conserving**

Engine Test Requirements ^a (see Table Q-5)	SAE 0W-20, SAE 5W-20 SAE 0W-30, SAE 5W-30, SAE 10W-30	Other Viscosity Grades	API SN with Resource Conserving
ASTM D7320, (Sequence IIIG)	Pass	Pass	Pass
ASTM D6891, (Sequence IVA)	Pass	Pass	Pass
ASTM D6593, (Sequence VG) ^b	Pass	Pass	Pass
ASTM D7589, (Sequence VID)	NR	NR	Pass
ASTM D6709, (Sequence VIII)	Pass	Pass	Pass
Bench Test and Measured Parameter^a			
Aged oil low-temperature viscosity			
ASTM D4684, (Sequence IIIGA), aged oil low- temperature viscosity	Pass	NR	Pass
Or			
ASTM D7528, (ROBO Test), aged oil low- temperature viscosity	Pass	NR	Pass
ASTM D7320, (Sequence IIIGB) phosphorus volatility, % min	NR	NR	79
ASTM D6557 (Ball Rust Test), avg. gray value, min ^b	100	100	100
ASTM D5800, evaporation loss, 1 hour at 250°C, % max ^c	15	15	15
ASTM D6417, simulated distillation at 371°C, % max	10	10	10
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, phosphorus % mass, max ^d	0.08 ^e	NR	0.08 ^e
ASTM D4951, phosphorus % mass, min ^d	0.06 ^e	0.06 ^e	0.06 ^e
ASTM D4951, or D2622, sulfur % mass, max ^d			
SAE 0W-20, 0W-30, 5W-20, and 5W-30	0.5 ^e	NR	0.5 ^e
SAE 10W-30	0.6 ^e	NR	0.6 ^e
All other viscosity grades	NR	NR	0.6 ^e
ASTM D892 (Option A), foaming tendency			
Sequence I, ml, max, tendency/stability ^f	10/0	10/0	10/0
Sequence II, ml, max, tendency/stability ^f	50/0	50/0	50/0
Sequence III, ml, max, tendency/stability ^f	10/0	10/0	10/0
ASTM D6082 (Option A), high-temperature foaming ml, max, tendency/stability ^g	100/0	100/0	100/0

ASTM D6922, homogeneity and miscibility	h	h	h
ASTM D6709, (Sequence VIII) shear stability	i	i	i
ASTM D7097, TEOST MHT, high-temperature deposits, deposit wt, mg, max ^d	35	45	35
ASTM D5133, gelation index, max ^b	12 ^j	NR	12 ^j
ASTM D7563, emulsion retention	NR	NR	no water separation
Elastomer compatibility (ASTM D7216 Annex A2)	NR	NR	Table G-6

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 and/or CJ-4 categories precede the "S" category and there is no API Certification Mark, the Sequence VG (ASTM D6593), Ball Rust (ASTM D6557), and Gelation Index (ASTM D5133) tests are not required.

^cCalculated conversions specified in ASTM D5800 are allowed.

^dFor 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. 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.

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

^fAfter 10-minute settling period.

^gAfter 1-minute settling period.

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

^{ih}Ten-hour stripped kinematic viscosity at 100°C. Kinematic viscosity must remain in original viscosity grade.

^jTo 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 G-6—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