Passenger Car Engine Test Category For API SM

Requirements	Test Method	Properties	Unit	Limits
				SM/EC GF-4
1. LABORATORY TESTS				
1.1 Viscosity Grades		All those that apply, typically SAE 0W-20, 0W-30, 5W-20, 5W-30 and 10W-30.		Manufacturer sets targets within SAE J300 specification
1.2 Foam Test	ASTM D892 (Option A) ASTM D6082	Sequence I Sequence II Sequence III Sequence IV	ml initial Foam/ml after settling	10/0 max 50/0 max 10/0 max 100/0 max
1.3 Phosphorus	ASTM D4951	Phosphorus content	%	0.06 min 0.08 max[1]
1.4 EOFT	ASTM D6795	0.6% Water-with dry ice-% reduction in flow	% reduction	50 max
1.5 EOWTT	ASTM D6794	with 0.6% Water with 1.0% Water with 2.0% Water with 3.0% Water	% reduction % reduction % reduction % reduction	50 max 50 max 50 max 50 max
1.6 TEOST (MHT4)	ASTM D7097	Total Deposits	mg	35 max[2]
1.7 Homogeneity & Miscibility	ASTM D6922	Oil Compatibilty		pass
1.8 Scanning Brookfield	ASTM D5133	Gelation Index		12 max
1.9 Volatility	ASTM D5800 ASTM D6417	Volatility (Noack) Volatility (GCD)	% off @ 250˚C % off @ 371˚C	15 max 10 max
1.10 BRT	ASTM D6557	Rust rating	Avg Gray Value	100 min
1.11 Sulfur	ASTM D4951 or ASTM D2622	Sulfur content of SAE 0W and 5W multigrades Sulfur content of SAE 10W multigrades	% %	0.5 max[3] 0.7 max
2. ENGINE TESTS FOR API SM				
2.1 Sequence IIIG	ASTM D7320	Viscosity increase at 100 hours Average weighted piston deposits Hot stuck rings Average cam plus lifter wear	% merits # microns	150 max 3.5 min none 60 max
2.2 Sequence IIIGA	ASTM D4684	Aged oil low temperature viscosity	Cp	Meet requirements of the original grade or the next higher grade[4]
2.3 Sequence IVA	ASTM D6891	Cam wear average	microns	90 max
2.4 Sequence VG	ASTM D6593	Average engine sludge Rocker arm cover sludge Average piston skirt varnish Average engine varnish Oil screen clogging Hot stuck rings Cold stuck rings Oil ring clogging Follower pin wear, cyl #8, avg Ring gap increase, cyl #1 & #8, avg Oil screen debris	merits merits merits merits % # # % microns microns % area	7.8 min 8.0 min 7.5 min 8.9 min 20 max none rate & report rate & report rate & report rate & report rate & report
2.5 Sequence VIII	ASTM D6709	Bearing weight loss 10 hr. stripped viscosity	mg cSt	26 max Stay in grade
2.6 Sequence VIB (Required for ILSAC GF-4 only)	ASTM D6837	SAE 0W-20 and 5W-20 viscosity grades SAE 0W-30 and 5W-30 viscosity grades SAE 10W-30 and all other viscosity grades	% FEI1/%FEI2 % FEI1/%FEI2 % FEI1/%FEI2	2.3 min / 2.0 min 1.8 min / 1.5 min 1.1 min / 0.8 min

Limits for SM Non-ILSAC GF-4 viscosity grades:

[1] 0.06 min, no max

[2] 45 max

[3] Not Req.

[4] Not Req.