A Program of ASTM International

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D4485 Information Letter 20-2
Sequence Number 9
June 9, 2020

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: Update API Category SL Requirements

On May 28, 2020, the D4485 Surveillance Panel approved updates to the API Category SL requirements in ASTM Specification D4485, to bring it in line with the most recent edition of API 1509.

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

Joe Franklin
Chairman
ASTM Subcommittee B

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Director
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Attachment
c: http://www.astmtmc.cmu.edu/ftp/docs/d4485/IL_20-2_D4485.pdf
Distribution: Email

[*All changes are highlighted in yellow.*]
[*Table 1 – only API SL Category section shown; API SJ Category section of table not changed by this Information Letter.*]

TABLE 1 S Engine Oil Categories

API SL Category			
Required Test Method	Engine Test Method	Rated or Measured Parameter	Primary Performance Criteria
Sequence IIIF (D6984) or Sequence IIIG (D7320[J]) or Sequence IIIH (D8111[AE] using Appendix X5 IIIH70 hour guideline)	D6984	Kinematic viscosity, % increase at 40 °C, max	275
		Average piston skirt varnish rating,[C] min	9.0
		Weighted piston deposit rating, [H] min	4.0
		Screened average cam-plus-lifter wear, µm, max	20[I]
		Hot Stuck Rings	none
		Low temperature viscosity performance[Z]	report
	D7320	Kinematic viscosity, % increase at 40 °C, max	150
		Weighted piston deposit rating,[K] min	3.5
		Cam-plus-lifter wear avg, µm, max	60
		Hot stuck rings	none
		Low temperature viscosity performance[AA]	report
	D8111 (Using Appendix X5 IIIH70 hour guideline)	70 h kinematic viscosity, % increase at 40 °C max	181
		70h average weighted piston deposits, merits min	3.3
		70h average piston skirt varnish,[C] merits min	7.9
Sequence IVA (D6891)	D6891	Cam wear average, µm,[M] max	120
Sequence VE (D5302[AB,J,L])	D5302	Cam wear average, µm, max	127
		Cam wear max, µm, max	380
Sequence VG (D6593) or Sequence VH (D8256)	D6593	Average engine sludge rating,[C] min	7.8
		Rocker arm cover sludge rating,[C] min	8.0
		Average piston skirt varnish rating,[C] min	7.5
		Average engine varnish rating,[N] min	8.9
		Oil screen clogging, %, max	20
		Hot stuck Compression rings	none
		Cold stuck rings	report
		Oil screen debris, %	report
		Oil ring clogging, %	report
	D8256	Average engine sludge, merits min	7.4
		Average rocker cover sludge, merits min	7.4
		Average engine varnish, merits min	8.6
		Average piston skirt varnish, merits min	7.4
		Oil screen clogging, % area	Rate & Report
		Hot stuck compression rings	None
Sequence VIII (D6709)	D6709	Bearing weight loss, mg, max	26.4
		Shear stability	[P]

Bench Test and Measured Parameter		Viscosity Grade Performance Criteria	
		SAE 0W-20 SAE 5W-20 SAE 5W-30 SAE 10W-30	All Others
Test Method D4683, D4741, or D5481, high temperature/high shear viscosity @ 150 °C, mPa·s, min		[Q]	2.6
Test Method D6557 (Ball Rust Test), average gray value, min		100	100
Test Method D5800 volatility loss, % max		15	15
Test Method D6417 volatility loss at 371 °C, % max		10	10
D6795 (EOFT), % flow reduction, max		50	50
D6794 (EOWTT), % flow reduction, max	With 0.6 % H_2O	50	50
	With 1.0 % H_2O	50	50
	With 2.0 % H_2O	50	50
	With 3.0 % H_2O	50	50
Test Method D4951 or D5185, mass fraction phosphorus %, max		0.10[T]	NR[U]
Test Method D4951 or D5185, mass fraction phosphorus %, min (unless valid passing Test Method D5302 results are obtained)[J]		0.06	0.06
Test Method D892 foaming tendency (Option A)	Sequence I, max, foaming/settling[W]	10/0	10/0
	Sequence II, max, foaming/settling[W]	50/0	50/0
	Sequence III, max, foaming/settling[W]	10/0	10/0
Test Method D6082 (optional blending required) static foam max, tendency/stability		100/0[X]	100/0[X]
Test Method D6922 homogeneity and miscibility		[Y]	[Y]
Test Method D7097 high temperature deposits (TEOST MHT-4), deposit mass, mg, max		45	45
Test Method D5133 (Gelation Index), max[AC]		12[AD]	12[AD]

[*Table 1 Footnotes*]

[A] Demonstrate passing performance in either Test Method D5844 or D6557.

[B] Monitoring of this test method was discontinued in June 20, 2001. Valid test results shall predate the end of the last calibration period for the test stand in which this test method was conducted.

[C] ASTM Deposit Rating Manual 20, available from ASTM Customer Relations, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

[D] Demonstrate passing performance in either Test Method D5533 or D6984. However, an oil passing Test Method D6984 and containing less than 0.08 % mass phosphorus in the form of ZDDP shall also pass the wear limits in Test Method D5302 (see also footnote [J]).

[E] An oil-related stuck ring occurs on a piston with an individual oil ring land deposit rating <2.6.

[F] Determine at 60 h.

[G] Determine at 80 h.

[H] Determine weighted piston deposits by rating the following piston areas and applying the corresponding weightings: undercrown, 10 %; second land, 15 %; third land, 30 %; piston skirt, 10 %; first groove, 5 %; second groove, 10 %; and third groove, 20 %. Use ASTM Deposit Rating Manual 20 for all ratings.

[I] Calculate by eliminating the highest and lowest cam-plus-lifter wear results and then calculating an average based on the remaining ten rating positions.

[J] For oils containing at least 0.06 % mass phosphorus in the form of ZDDP, demonstrating passing performance in the Sequence IIIG test obviates the need to also conduct Test Method D5302 (Sequence VE), which was previously required for oils with less than 0.08 % mass phosphorus.

[K] Unlike the Sequence IIIF test, piston skirt varnish rating is not required in the Sequence IIIG test.

[L] Demonstrate passing performance in Test Method D5302, or alternatively, in both Test Method D6891 and Test Method D6593, or alternatively, in both Test Method D6891 and Test Method D8256.

[M] Determine cam wear according to Test Method D6891. Seven wear measurements are made on each cam lobe and the seven measured values are added to obtain an individual cam lobe wear result. The overall cam wear value is the average of the twelve individual cam lobe wear results.

[N] Determine the average engine varnish rating by averaging the piston skirt, right rocker arm cover, and left rocker arm cover varnish ratings. Use ASTM Deposit Rating Manual 20 for all ratings.

[O] Demonstrate passing performance in either Test Method D5119 or D6709.

[P] Ten-hour stripped kinematic viscosity (oil shall remain in original viscosity grade).

[Q] Minimum high temperature/high shear viscosity @ 150 °C for these viscosity grades as defined in SAE J300.

[R] Meet the volatility requirement in either Test Method D5800, D5480, or D6417.

[S] Passing volatility loss only required for SAE 15W-40 oils.

[T] This is a noncritical specification as described in Practice D3244.

[U] NR stands for Not Required.

[V] Meet either Test Methods D92, D93, or D7094 flash point requirement.

[W] Determine settling volume, in mL, at 10 min.

[X] Determine settling volume, in mL, at 1 min.

[Y] Homogeneous with SAE reference oils.

[Z] Evaluate the 80 h test oil sample by Test Method D4684 at the temperature indicated by the low temperature grade of oil as determined on the 80 h sample by Test Method D5293.

[AA] Measure the viscosity of the EOT oil sample by Test Method D4684. The measured viscosity shall meet the requirements of the original grade or the next higher grade. The EOT sample can be either from a Sequence IIIG or a Sequence IIIGA test. (A Sequence IIIGA test is identical to a Sequence IIIG test, except only low temperature viscosity performance is measured.) Additional details are provided in the Sequence IIIG test method, in Section 13.6.

[AB] Not required for oils containing a minimum of 0.08 % mass phosphorus in the form of ZDDP.

[AC] Requirement applies only to SAE 0W-20, 5W-20, 0W-30, 5W-30, and 10W-30 viscosity grades.

[AD] For gelation temperatures at or above the W grade pumpability temperature as defined in SAE J300.

[AE] Alternatively, Test Method D8111 (Sequence IIIH) at 90 hours, passing at the API SM level of performance can be used to meet this requirement.