



Test Monitoring Center

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D4485 Information Letter 20-6
Sequence Number 13
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 CK-4 Requirements

On May 28, 2020, the D4485 Surveillance Panel approved updates to the API Category CK-4 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

Frank M. Farber
Director
ASTM Test Monitoring Center

Attachment

c: http://www.astmtmc.cmu.edu/ftp/docs/d4485/IL_20-6_D4485.pdf

Distribution: Email

Revises D4485-19

[All changes are highlighted in yellow.]

TABLE 5 Diesel Engine Oil Category CK-4

Required Test Method	Engine Test Method	Rated or Measured Parameter	Primary Performance Criteria			
			One-test	Two-test ^A	Three-test ^A	
T-12 (D7422)	D7422	Top Ring Mass Loss, mg, max	105	105	105	
		Cylinder Liner Wear, μm , max	24.0	24.0	24.0	
T-13 (D8048)	D8048	IR Peak at EOT, Abs., cm^{-1}	125	130	133	
		Kinematic Viscosity Increase at 40 °C, % max	75	85	90	
		Avg. Oil Consumption, 48 h to 192 h, g/h, max	Report	Report	Report	
T-11 (D7156)	D7156	TGA % Soot at 4.0 mm^2/s increase, at 100 °C, min	3.5	3.4	3.3	
		TGA % Soot at 12.0 mm^2/s increase, at 100 °C, min	6.0	5.9	5.9	
		TGA % Soot at 15.0 mm^2/s increase, at 100 °C, min	6.7	6.6	6.5	
C13 (D7549)	D7549	Merit rating, ^A min	1000	1000	1000	
COAT (D8047)	D8047	Average Aeration, ^A 40 h to 50 h, %	11.8	11.8	11.8	
ISB (D7484)	D7484	Slider tappet mass loss, mg, average, max	100	108	112	
		Cam lobe wear, μm , average, max	55	59	61	
		Crosshead mass loss, mg, average	Report	Report	Report	
ISM (D7468)	D7468	Top Ring Mass Loss, mg, max	100	100	100	
		Merit Rating, ^A	1000	1000	1000	
1N (D6750)	D6750	Weighted demerits (WDN), max	286.2	311.7	323.0	
		Top groove fill (TGF), %, max	20	23	25	
		Top land heavy carbon (TLHC), %, max	3	4	5	
		Oil consumption	g/kWh, (0 h to 252 h), max	0.54	0.54	0.54
			g/MJ (0 h to 252 h), max	0.15	0.15	0.15
		Piston, ring, and liner scuffing	none	none	none	
Piston ring sticking	none	none	none			
RFWT (D5966)	D5966	Average pin wear,	mils, max	0.30	0.33	0.36
			μm , max	(7.6)	(8.4)	(9.1)

CK-4 Category Bench Tests					
Test Method	Measured Parameter		SAE xW-30	SAE xW-40	
D4683 or D4741 or D5481	High temperature/high shear viscosity at 150 °C, mPa·s	min	3.5	Meets SAE J300	
		max	N/A		
HTCBT, 135 °C (D6594)	Used Oil Elemental Concentration				
	Copper, mg/kg increase, max		20	20	
	Lead, mg/kg increase, max		120	120	
	Copper strip rating, ^B max		3	3	
Noack (D5800)	Evaporative loss at 250 °C, %, max		13	13	
Foam (D892)	Foaming/settling, ^C Sequence I, mL, max		10/0	10/0	
	Foaming/settling, ^C Sequence II, mL, max		20/0	20/0	
	Foaming/settling, ^C Sequence III, mL, max		10/0	10/0	
D7109 and HTHS Viscosity after 90 pass shearing (see above methods)	Kinematic viscosity after 90 pass shearing, mm^2/s at 100 °C, min		xW-30	0W-40	Other xW-40
	HTHS viscosity at 150 °C, mPa·s, min		9.3	12.5	12.8
Sooted Oil MRV TP-1 (D6896) (D7156 Engine test required)	Viscosity, 180h used oil from a T-11/T-11A test, tested at -20 °C, mPa·s, max		25 000	25 000	
	Yield stress of the 180 h used oil sample above, Pa max		≤35	≤35	

Chemical Limits (non-critical)				
Test Method	Measured Parameter		Primary Performance Criteria	
D874	Mass fraction sulfated ash, %, max		1.0	
D4951	Mass fraction phosphorus, %, max		0.12	
	Mass fraction sulfur, %, max		0.4	

D7216 (Elastomer Compatibility)

Note—These are the unadjusted specification limits for elastomer compatibility. Candidate oils shall, however, conform to the adjusted specification limits, the calculation of which is described in Annex A4.

Elastomer	Volume Change, %	Hardness Change, Points	Tensile Strength Change, %	Elongation at Break Change, %
Nitrile (NBR)	(+5, -3)	(+7, -5)	(+10, -TMC 1006)	(+10, -TMC 1006)
Silicone (VMQ)	(+TMC 1006, -3)	(+5, -TMC 1006)	(+10, -45)	(+20, -30)
Polyacrylate (ACM)	(+5, -3)	(+8, -5)	(+18, -15)	(+10, -35)
Fluoroelastomer (FKM)	(+5, -2)	(+7, -5)	(+10, -TMC 1006)	(+10, -TMC 1006)
Vamac G	(+TMC 1006, -3)	(+5, -TMC 1006)	(+10, -TMC 1006)	(+10, -TMC 1006)

Note—TMC 1006 is the designation for the reference oil used in this test method. This designation represents the original blend or subsequent approved re-blends of TMC 1006.

[Table 5 Footnotes]

^A See Annex A6 for additional information.

^B The rating system in Test Method D130 is used to rate the copper coupon in Test Method D6594.

^C Ten minutes for Sequence I, II, and III.