



Test Monitoring Center

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D4485 Information Letter 19-2
Sequence Number 2
August 15, 2019

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: 1. Editorial Changes to D4485 – 18a Table 3 Diesel Engine Oil Category CI-4
2. Editorial Changes to D4485 – 18a Table 4 Diesel Engine Oil Category CJ-4

On July 9, 2019 the D4485 Surveillance Panel approved editorial changes to ASTM Specification D4485 – 18a Diesel Engine Oil Category Tables 3 and Table 4 for the CI-4 and CJ-4 categories respectively. These revisions are detailed below.

1. Diesel Engine Oil Category CI-4 Table 3 Editorial Changes;

MRV-TP-1 (D4684) Move descriptive comment to inside measured parameter block

Add line above wording "Foaming/settling" to show descriptive wording belongs to D892 not D6278 (Both CI-4 & CJ-4)

Remove redundant column title wording "Primary Performance Criterion" from D892 information blocks (Both CI-4 & CJ-4)

2. Diesel Engine Oil Category CJ-4 Table 4 Editorial Changes;

Blank space added above the wording "Chemical Limits (Non-Critical)" for better descriptive differentiation in table

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

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_19-2_D4485.pdf

Distribution: Email

Revises D4485-18a

TABLE 3 Diesel Engine Oil Category CI-4

Required Test Method	Engine Test Method	Rated or Measured Parameter	Primary Performance Criteria			
			One-test	Two-test ^A	Three-test ^A	
1R (D6923) or 1P (D6681)	D6923	Weighted demerits (WDR), max	382	396	402	
		Top groove carbon (TGC), demerits, max	52	57	59	
		Top land carbon (TLC), demerits, max	31	35	36	
		Initial oil consumption (IOC), (0 h – 252 h), g/h, average	13.1	13.1	13.1	
		Final oil consumption, (432 h – 504 h), g/h, average, max	IOC + 1.8	IOC + 1.8	IOC + 1.8	
		Piston, ring, and liner distress	none	none	none	
		Ring sticking	none	none	none	
	D6681	Weighted demerits (WDP), max	350	378	390	
		Top groove carbon (TGC), demerits, max	36	39	41	
		Top land carbon (TLC), demerits, max	40	46	49	
		Average oil consumption, g/h (0 h – 360 h), max	12.4	12.4	12.4	
		Final oil consumption, g/h (312 h – 360 h), max	14.6	14.6	14.6	
		Piston, ring, and liner scuffing	none	none	none	
	T-10 (D6987/D6987M) or T-12 (D7422)	D6987/D6987M	Merit rating, ^A min	1000	1000	1000
D7422		Merit rating, ^A min	1000	1000	1000	
M11 EGR (D6975) or ISM (D7468)	D6975	Average crosshead mass. loss, mg, max	20.0	21.8	22.6	
		Average top ring mass loss, mg	report	report	report	
		Oil filter differential pressure at 250 h, kPa, max	275	320	341	
		Average engine sludge, CRC merits at EOT, min	7.8	7.6	7.5	
	D7468	Crosshead wear, mg, max	7.5	7.8	7.9	
		Oil filter Δ pressure at 150 h, kPa, max	55	67	74	
Ext. T-8E (D5967) ^B	D5967	Relative viscosity at 4.8 % soot ^C	1.8	1.9	2.0	
	D6984	Kinematic viscosity (at 40 °C), percent increase, max	275	275 (MTAC)	275 (MTAC)	
		D7320	Kinematic viscosity, percent increase at 40 °C max	150	150 (MTAC)	150 (MTAC)
Sequence IIIG (D7320) ^E or Sequence IIIH (D8111)	D8111	70 h ^F Kinematic viscosity, % increase at 40 °C max	370	370 (MTAC)	370 (MTAC)	
1K (D6750) ^G	D6750	Weighted demerits (WDK), max	332	347	353	
		Top groove fill (TGF), %, max	24	27	29	
		Top land heavy carbon (TLHC), %, max	4	5	5	
		Average oil consumption	g/kWh (0 h – 252 h), max	0.54	0.54	0.54
			g/MJ (0 h – 252 h), max	0.15	0.15	0.15
		Piston, ring, and liner scuffing	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	
EOAT (D6894) ^H	D6894	Aeration, volume percent, max	8.0	8.0 (MTAC) ^I	8.0 (MTAC) ^I	

CI-4 Bench Tests	Measured Parameter	Primary Performance Criteria	
D4683 (High temperature/High shear) or D4741 or D5481 ^J	Viscosity after shear, ^K min	3.5 mPa-s	
MRV-TP-1 (D4684)	The following limits are applied to SAE viscosity grades 0W, 5W, 10W, and 15W: Viscosity of 75 h used oil sample from T-10 test (or T-10A ^L test), or 100 h used oil sample from T-12 test (or T-12A ^M test, tested at -20 °C, mPa-s, max	25 000	
	If yield stress is detected, use modified D4684 ^N (external preheat), then mPa-s, max	25 000	
	and yield stress, Pa	<35	
Noack (D5800)	Evaporative loss at 250 °C, %, max	15	
135 °C HTCBT (D6594)	Copper, mg/kg increase, max	20	
	Lead, mg/kg increase, max	120	
	Tin, mg/kg increase	report	
	Copper strip rating, ^O max	3	
D6278	Kinematic viscosity after shearing mm ² /s, min	SAE XW-30	SAE XW-40
		9.3	12.5
D892 (Option A not allowed)	Foaming/settling, ^P mL, max		
	Sequence I	10/0	
	Sequence II	20/0	
	Sequence III	10/0	

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)

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.

^A See **Annex A6** for additional information.

^B A passing T-11 (TGA % soot at 12.0 mm²/s increase, at 100 °C, min)—6.00 (first test), 5.89 (second test), and 5.85 (third test)—can be used in place of a T-8E in the applicable categories. This is not intended to indicate equivalence.

^C Relative Viscosity (RV) = viscosity at 4.8 % soot/viscosity of new oil sheared in Test Method **D6278**.

^D Refer to RR:D02-1391.

^E The Sequence IIIG limits shown are more restrictive than the corresponding limits in Sequence IIIF, and are not intended to indicate equivalence. Results meeting the Sequence IIIG criteria stated can be used in lieu of Sequence IIIF.

$$PVIS@70\text{ h} = \left(\frac{\sqrt{PVIS@60\text{ h}} + \sqrt{PVIS@80\text{ h}}}{2} \right)^2, \text{ where } PVIS@60\text{ h is percent viscosity increase at 60 h and } PVIS@80\text{ h is percent viscosity increase at 80 h.}$$

^F 70 h value is interpolated according to the equation

^G Refer to RR:D02-1273. Alternatively, Test Method **D6750** (1N) can be used; if this test method is used, the measured parameters and primary performance criteria are the same as those shown for Test Method **D6750** (1N) in the CJ-4 category.

^H Refer to RR:D02-1379.

^I See **Annex A1**; use method without transformations.

^J Tests as allowed in SAE J300.

^K Noncritical specification as defined by Practice **D3244**; may be superseded only by applicable higher limits set by SAE J300.

^L The T-10A test is the name given to a T-10 test run for 75 h to generate the sample for measurement by Test Method **D4684**.

^M The T-12A test is the name given to a T-12 test run for 100 h to generate the sample for measurement by Test Method **D4684**.

^N Refer to RR:D02-1517.

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

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

TABLE 4 Diesel Engine Oil Category CJ-4

Required Test Method	Engine Test Method	Rated or Measured Parameter	Primary Performance Criteria			
			One-test	Two-test	Three-test	
T-12 (D7422)	D7422	Merit rating, ^A min	1000	1000	1000	
ISM (D7468)	D7468	Merit rating, ^A min	1000	1000	1000	
		Top ring mass loss, mg, max	100	100	100	
C13 (D7549)	D7549	Merit rating, ^A min	1000	1000	1000	
		Hot-stuck piston ring	none	none	none	
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	
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	
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 – 252 h), max	0.54	0.54	0.54
			g/MJ (0 h – 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)
Sequence IIIF (D6984) or Sequence IIIG (D7320) ^B or Sequence IIHH (D8111)	D6984	Kinematic viscosity (at 40 °C), % increase, max	275	275 (MTAC)	275 (MTAC)	
	D7320	Kinematic viscosity (at 40 °C), % increase, max	150	150 (MTAC)	150 (MTAC)	
	D8111	70 h ^C Kinematic viscosity, % increase at 40 °C max	370	370 (MTAC)	370 (MTAC)	
EOAT (D6894)	D6894	Aeration, volume, %, max	8.0	8.0 (MTAC)	8.0 (MTAC)	

Bench Test Methods	Measured Parameter	Primary Performance Criteria	
D4683 (High temperature/High shear) or D4171 or D5481	Viscosity at 150 °C, mPa-s, min	3.5	
HTCBT, 135 °C (D6594)	Copper, mg/kg increase, max	20	
	Lead, mg/kg increase, max	120	
	Copper strip rating, ^D max	3	
D7109	Kinematic viscosity after 90 pass shearing, mm ² /s at 100 °C, min	SAE XW-30	SAE XW-40
		9.3	12.5
Noack (D5800)	Evaporative loss at 250 °C, %, max	SAE < > 10W-30	SAE 10W-30
		13	15
Foam (D892)	Foaming/settling, ^E mL, max		
	Sequence I	10/0	
	Sequence II	20/0	
	Sequence III	10/0	
MRV TP-1 (D6896)	Viscosity of the 180 h used oil drain sample from a T-11 test, tested at -20 °C, mPa-s, max	25 000	
	If yield stress is detected, use the modified test method (external preheat), then measure the viscosity, mPa-s, max	25 000	
	Measure the yield stress, Pa	<35	

Chemical Limits (non-critical)

Bench Test Methods	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)

^A See [Annex A5](#) for additional information.

^B The Sequence IIIG limits shown are more restrictive than the corresponding limits in Sequence IIIF, and are not intended to indicate equivalence. Results meeting the Sequence IIIG criteria stated can be used in lieu of Sequence IIIF.

$$PVIS@70\text{ h} = \left(\frac{\sqrt{PVIS@60\text{ h}} + \sqrt{PVIS@80\text{ h}}}{2} \right)^2$$

^C 70 h value is interpolated according to the equation increase at 60 h and PVIS@80 h is percent viscosity increase at 80 h. , where PVIS@60 h is percent viscosity

^D The rating system in Test Method [D130](#) is used to rate the copper coupon in Test Method [D6594](#).

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