Test Method D5967 Mack T-8

Version

Method:

Conducted For

T-8A:	V = Valid	The Reference Oil/Non-Reference Oil was evaluated in accordance with the test procedure.
T-8:	I = Invalid	The Reference Oil/Non-Reference was not evaluated in accordance with the test procedure
T-8E:	N = Not Interpretable	The Non-Reference Oil results cannot be interpreted and shall not be used in determining an average test result using multiple test criteria.

Stand:	Stand Run No.:	Engine No.:	Engine Hours:			
End Of Test Date:		End Of Test Time:				
Oil Code/C	Oil Code/CMIR: A					
T-8 Formu	T-8 Formulation/Stand Code:					
T-8E Formulation/Stand Code:						
Alternate (Codes:					

A CMIF

	r Non-Reference Oil Code
	Submitted By:
Testing Laboratory	•
Signature	
Typed Name	
Title	

Test Method D5967 - Mack T-8 Form 1 **Test Result Summary**

T -8E Formulation/Stand Code:					Test Length: A					
Reference Oil Test					Non-Reference Oil Test					
CMIR No.:						Oil Code:				
TMC Oil No.	Test Lab	Test Stand No.	Test Stand Run No.	Engine Block Serial No.	Rebuild Block Hours	Test Lab	Test Stand No.	Test Stand Run No.	Engine Block Serial NO.	Engine Block Hours
Date Test St	tarted:	Date Test C	ompleted:	EOT Tim	ie:	Date Test S	tarted:	Date Test C	ompleted:	EOT Time:
Laboratory Oil Code:				Laboratory Code:	Oil	I				
SAE Viscosi	ity:					SAE Viscosi	ity:			
Viscosity Slope 100 - 150 h, cSt/h			Viscosity Slope 100 - 150 h, cSt/h							
Viscosity Increase At 3.8% TGA, cSt				Viscosity Increase At 3.8% TGA, cSt						
Correction Factor, Vis. Inc. at 3.8% TGA				Correction Factor, Vis. Inc. at 3.8% TGA						
						Severity Adjus	stment For Vi	scosity Inc. At 3.	.8% TGA, cSt	

Correction Factor, Vis. Inc. at 3.8% TGA	Correction Factor, Vis. Inc. at 3.8% TGA
	Severity Adjustment For Viscosity Inc. At 3.8% TGA, cSt
Final Viscosity Increase At 3.8% TGA, cSt	Final Viscosity Increase At 3.8% TGA, cSt
Relative Viscosity At 4.8%, TGA (50% Loss) ^B	Relative Viscosity At 4.8%, TGA (50% Loss) ^B
Correction Factor, Relative Vis. (50% Loss)	Correction Factor, Relative Vis. (50% Loss)
	Severity Adjustment For Relative Viscosity
Final Relative Viscosity (50% Loss)	Final Relative Viscosity (50% Loss)
Relative Viscosity At 4.8%, TGA (100% Loss) ^B	Relative Viscosity At 4.8%, TGA (100% Loss) ^B
Correction Factor, Relative Vis. (100% Loss)	Correction Factor, Relative Vis. (100% Loss)
	Severity Adjustment For Relative Viscosity
Final Relative Viscosity (100% Loss)	Final Relative Viscosity (100% Loss)
TGA Soot % At 250 h	TGA Soot % At 250 h
TGA Soot % At 300 h	TGA Soot % At 300 h
Average Oil Consumption At 250 h (g/kW-h)	Average Oil Consumption At 250 h (g/kW-h)
Oil Filter Delta At 250 h, kPa	Oil Filter Delta At 250 h, kPA

^A Test length is discussed in sections 1.2, 4.1 A8.3.1 and A9.3.1 ^B Relative viscosities are calculated using shear loss determined by D6278

TEST METHOD D5967 FORM 2 OPERATIONAL SUMMARY A

Laboratory	Start Date
Test Number ^B	
Oil Code	
T-8 Formulation/Stand Code:	
T-8E Formulation/Stand Code:	

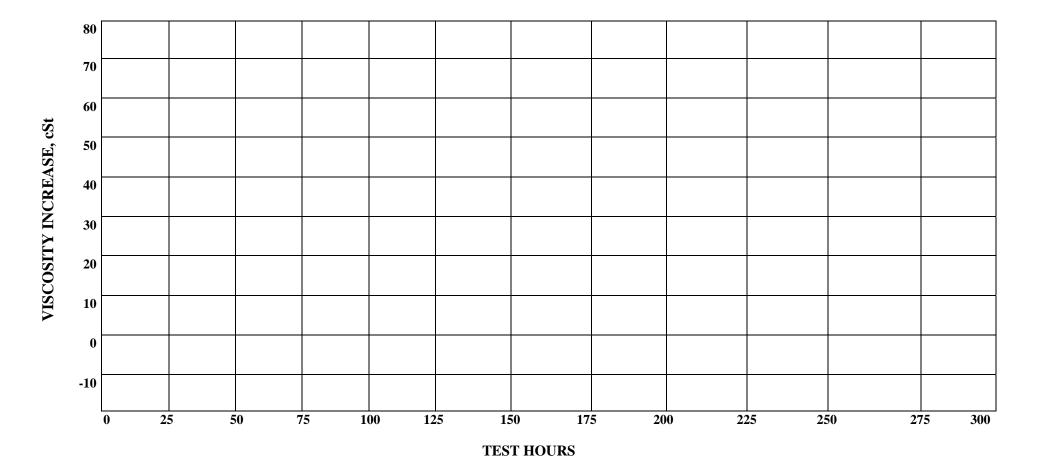
TECT DADAMETER	CDE CIEI CA TION	AVEDACE	CED DEM		
TEST PARAMETER	SPECIFICATION	AVERAGE	STD. DEV.	MINIMUM	MAXIMUM
Engine Speed, r/min	1800 <u>+</u> 5				
Torque, N-m	1369 – 1398				
Fuel Flow, kg/h	63.28 <u>+</u> 0.63				
Humiditv, g/kg	Report				
Blowby, L/min	Report				
TEMPERATURES	SPECIFICATION	AVERAGE	STD. DEV	MINIMUM	MAXIMUM
Coolant Out, °C	85 <u>+</u> 3				
Coolant In. °C	Report Only				
Oil, °C	100 - 107				
Fuel In, °C	40 <u>+</u> 1				
Intake Air, °C	25 <u>+</u> 3				
Intake Manifold, °C	43 <u>+</u> 3				
Pre- Turb. (F), °C	602 - 632				
Pre-Turbo (R), °C	602 - 632				
TailPipe, °C	455 - 474				
PRESSURES	SPECIFICATION	AVERAGE	STD.DEV	MINIMUM	MAXIMUM
Oil Gallery, kPa	372 -441				
Crankcase, kPa	0.50 <u>+</u> 0.25				
Exhaust, kPa	3.1 <u>+</u> 0.4				
Oil Filter Delta, kPa	138 Max.				
Inlet Air Res., kPa	2.5 ± 0.25				
Intake Manifold, kPa	186 - 199				
Compressor Discharge, kPa	Report				
Intercooler Delta, kPa	13.6 Maximum				

A ALL DATA VALUES SHOWN ARE BASED ON TEST LENGTH REPORTED ON FORM1 B TEST NUMBER IS: STAND – STAND RUN NO. – ENGINE SERIAL NO. – ENGINE HOURS

TEST METHOD D5967 FORM 3

VISCOSITY INCREASE VERSUS TIME

Laboratory	S	Start Date
Test Number ^B	Oil Code	,
T-8 Formulation/Stand Code:		
T-8E Formulation/Stand Code		



TEST METHOD D5967 FORM 4 OIL ANALYSIS SUMMARY

Laboratory	Start Date
Test Number B	
Oil Code	
T-8 Formulation/Stand Code:	
T-8E Formulation/Stand Code:	

Hours	Soot TGA%	Viscosity (cSt)	Viscosity Increase From Minimum (cSt)
250 (2nd)			
250 (Average)			

Viscosity Increase @ 3.8% TGA Soot Level	
D6278 Un sheared Viscosity (cSt), Vu	
D6278 Sheared Viscosity (cSt), Vs	
Relative Viscosity @, 4.8% TGA Soot Level (50% Loss) A	
Relative Viscosity @, 4.8% TGA Soot Level (100% Loss) A	

	Parts per million (ppm) at Test Hour				
ELEMENT					
Fe					
Pb					
Cu					
Cr					
Al					
Si					
Na					

	Pre-Test	Post-Test	Mass Gain
Centrifugal Oil Filter mass: grams			

^ARelative viscosities are calculated using shear loss determined by D5278.

TEST METHOD D5967 FORM 5 TEST FUEL ANALYSIS (LAST BATCH)

Laboratory	Start Date
Test Number B	
Oil Code	
T-8 Formulation/Stand Code:	
T-8E Formulation/Stand Code:	

Supplier:

Batch Identifiers:

Measurement	Specs.	Specs. Analysis		Test Method
	_	NEW	EOT	
Total Sulfur, % wt	0.03 - 0.05			D 129
Gravity, °API	32-36			D 287 or D 4052
Hydrocarbon Composition				
Aromatics % vol	28 - 35			D 1319
Olefin	Report			D 1319
Saturates	Report			D 1319
Cetane Index	Report			D 4737
Cetane No.	42 - 48			D 613
Copper Strip Corrosion	3 max			D 130
Flash Point, °C	54 min			D 93
Cloud Point °C	-12 max			D 2500
Pour Point °C	-18 max			D97
				D 524
Carbon Residue on 10% Residium, %	0.35 max			(10 % Bottoms)
Water & Sediment, % Vol	0.05 max			D 2709
Ash, % wt	0.01 max			D482
Viscosity, cSt @ 40 °C	2.0 - 3.2			D445
Distillation °C				
IBP	177 - 199			D 86
10%	210 - 232			D 86
50%	249 - 277			D 86
90%	299 - 327			D 86
EP	327 - 360			D 86

TEST METHOD D5967 FORM 6 DOWN TIME AND COMMENTS

Laboratory			Start Date
Fest Number ^I	3		
Oil Code			
	on/Stand Code:		
Γ-8F Formula:	tion/Stand Code:		
1-0L 1 omiuia	tion/Stand Code.	·	
	Downtime Occurre	ences	
Test	Date	Downtime	Reasons
Hours	2 u.c	2011111111	TO BOOK OF THE PROPERTY OF THE
			Total Downtime
	er Comments		
Number of	Comment Lines		

TEST METHOD D5967 FORM 6A DOWN TIME AND COMMENTS

boratory			Start Date
est Number B			Start Date
l Code			
	n/Stand Code:		
	on/Stand Code.		
oL i ominian	on/Stand Cod	<u>. </u>	
Number of D	owntime Occur	rrences	
Test			
Hours	Date	Downtime	Reasons
		+	
			m. ID.
			Total Downtime
Other	Comments		
Number of C	Comment Lines		

TEST METHOD D5967 FORM 6B DOWN TIME AND COMMENTS

boratory			Start Date
st Number B			Start Date
l Code			
	n/Stand Code		
	ion/Stand Cod		
Number of D	Oowntime Occur	rrences	
Test	Date	Downtime	Reasons
Hours			
		 	
		<u> </u>	
		 	
	_	+ + -	
			T. 15
			Total Downtime
	Comments		
Number of C	Comment Lines		

TEST METHOD D5967 FORM 7 CHARACTERISTICS OF THE DATA ACQUISTION SYSTEM

Laboratory	Start Date
Test Number ^B	
Oil Code	
T-8 Formulation/Stand Code:	
T-8E Formulation/Stand Code:	

PARAMETER	SENSING DEVICE	CALIBRATION FREQUENCY	RECORD DEVICE	OBSERVATION FREQUENCY	RECORD FREQUENCY	LOG FREQUENCY	SYSTEM RESPONSE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Temperatures							
OIL@ FILT.							
FUEL IN.							
INTAKE AIR							
INTAKE MAN							
PRE- TURB.							
COOL. OUT							
Other							
FUEL FLOW							
ENGINE RPM							
LOAD							
INLET RESTR							
EXH. PRESS.							
OIL GAL PRES							

LEUEND:

- (I) OPERATING PARAMETER
- (2) THE TYPE OF DEVICE USED TO MEASURE TEMPERATURE, PRESSURE OR FLOW
- (3) FREQUENCY AT WHICH THE MEASUREMENT SYSTEM IS CALIBRATED
- (4) THE TYPE OF DEVICE WHERE DATA IS RECORDED

LG-HANDLOGSHEET

DL -AUTOMATIC DATA LOGGER

SC-STRIPCHARTRECORDER

C/M -COMPUTER, USING MANUAL DATA ENTRY

 $\mbox{C/D}$ -COMPUTER, USING DIRECT $\mbox{\it VO}$ ENTRY

- (5) DATA ARE OBSERVED BUT ONLY IF RECORDED OFF SPEC.
- (6) DATA ARE RECORDED BUT ARE NOT RETAINED AT EOT
- (7) DATA ARE LOGGED AS PERMANENT RECORD, NOTE SPECIFY IF:

SS -SNAPSHOT TAKEN AT SPECIFIED FREQUENCY

AG/X AVERAGE OF X DATA POINTS AT SPECIFIED FREQUENCY

(8) TIME FOR THE OUTPUT TO REACH 63.2% OF FINAL VALUE FOR STEP CHANGE AT INPUT

TEST METHOD D5967 FORM 8 BUILD-UP AND HARDWARE INFORMATION

Laboratory	Start Date
Test Number ^B	
Oil Code	
T-8 Formulation/Stand Code:	
T-8E Formulation/Stand Code:	

TIMING

Lite/HPC Offset (deg)	
Piston Travel to TDC (deg)	
Timing (deg)	

PARTS

Part	Part Number	Serial Number
Injection Pump		
Turbo Charger		
Cylinder Head (front)		
Cylinder Head (rear)		
Pistons		
Injection Nozzles		

TEST METHOD D5967 FORM 9 OPERATIONAL DATA

Laboratory	Start Date
Test Number ^B	
Oil Code	
7-8 Formulation/Stand Code: 7-8E Formulation/Stand Code:	
-or romananon/stand code.	
	ENGINE SPEED (R/MIN) PLOT
	TORQUE (N-M) PLOT
	FUEL FLOW (KG/H) PLOT
	AVERAGE PRE-TURBINE TEMPERATURE (°C) PLOT
	TAILPIPE TEMPERATURE (°C) PLOT

TEST METHOD D5967 FORM 10 OPERATIONAL DATA

aboratory	Start Date	
Test Number ^B Dil Code		
7-8 Formulation/Stand Code:		
C-8E Formulation/Stand Code:		
	COOLANT IN TEMPERATURE (°C) PLOT	
	COOLANT OUT TEMPERATURE (°C) PLOT	
	OIL TEMPERATURE (°C) PLOT	
	FUEL IN TEMPERATURE (°C) PLOT	

TEST METHOD D5967 FORM 11 OPERATIONAL DATA

aboratory	Start Date
Cest Number B	
Oil Code	
'-8 Formulation/Stand Code:	
-8E Formulation/Stand Code:	
	INTAKE AIR TEMPERATURE (°C) PLOT
	INTAKE MANIFOLD TEMPERATURE (°C) PLOT
	OIL GALLERY PRESSURE (KPA) PLOT
	OIL FILTER PRESSURE (KPA) PLOT

TEST METHOD D5967 FORM 12 OPERATIONAL DATA

aboratory	Start Date	
est Number ^B		
il Code		
-8 Formulation/Stand Code:		
-8E Formulation/Stand Code:		
		
	OD ANIZOA GE DDEGGLIDE (ZDA) DLOT	
	CRANKCASE PRESSURE (KPA) PLOT	
		$\overline{}$
	EXHAUST PRESSURE (KPA) PLOT	
		
	INLET AIR RESTRICTION (KPA) PLOT	
	INTAKE MANIFOLD PRESSURE (KPA) PLOT	
	INTAKE WANIFOLD FRESSURE (RFA) FLOT	

TEST METHOD D5967

Form 13 American Chemistry Council Code of Practice Test Laboratory Conformance Statement

Test Labo	oratory			
Test Spor	isor			
T8E Forn	nulation / Stand Code			
Test Num	ber			
Start Date		Start Time	Time Zone	
	1		-	-
		Declara	tions	
No. 1	All requirements of	f the ACC Code of Pract	tice for which the test lab	oratory is responsible were
	*		No	• •
No. 2				ural requirements; and all
		=		ole test procedure (ASTM or
			rganization responsible fo	or the test, were met.
	Yes	No*		
	If the manner of 6 to	ois Declaration is "No"	do on the took on almost on a	aidan tha darriations from
	*		<u> </u>	nsider the deviations from
	Yes*	<u> </u>	rred to be beyond the con	troi of the laboratory?
	105	110		
No. 3	A deviation occurr	ed for one of the test par	ameters identified by the	organization responsible for
		special case. Yes		(This currently applies only
	_	=	M Information Letter Syst	
		Check The Appropr	riate Conclusion	
		спеск Тпе Арргорг	tale Conclusion	
	Operat	ional review of this test	indicates that the results	should be included in the
		le Test Acceptance Crite		
				should not be included in
	the Mu	Iltiple Test Acceptance (Criteria calculations.	
N . C		· 1.0 11	. 1	1
Note: Suppo	rting comments are re	equirea for all responses Comm	s identified with an asteris	SK.
		Commo	cnts	
<u> </u>				
Signature				Date
Typed Name)			Title

TEST METHOD D5967

Form 13A American Chemistry Council Code of Practice Test Laboratory Conformance Statement

Test Labor	atory				
Test Spons	or				
T8 Formul	ation / Stand Code				
Test Numb	er				
Start Date		Start Time		Time Zone	
		D	eclarations		
No. 1	All requirements of met in the conduct of				ratory is responsible were
No. 2		requirements of updates issued b	the latest version	n of the applicabl	ral requirements; and all le test procedure (ASTM or the test, were met.
	-	requirements that		_	sider the deviations from rol of the laboratory?
No. 3		pecial case. Yes_	*	No(organization responsible for (This currently applies only m)
		Check The A	ppropriate Cond	clusion	
	Multiple	e Test Acceptan	ce Criteria calcu	lations.	hould be included in the
			this test indicate stance Criteria ca		should not be included in
Note: Support	ting comments are red			d with an asterisk	k.
			Comments		
Signature					Date
Typed Name					 Title