

MACK T-10 EGR ENGINE OIL TEST

REPORT PACKET VERSION NO. T10 VERSION 20010102

CONDUCTED FOR

CC
CC

C	V = VALID; THE REFERENCE OIL/NON-REFERENCE OIL WAS EVALUATED IN ACCORDANCE WITH THE TEST PROCEDURE.
	I = INVALID; THE REFERENCE OIL/NON-REFERENCE OIL WAS NOT EVALUATED IN ACCORDANCE WITH THE TEST PROCEDURE.
	N = RESULTS CANNOT BE INTERPRETED AS REPRESENTATIVE OF OIL PERFORMANCE (NON-REFERENCE OIL) AND SHALL NOT BE USED IN DETERMINING AN AVERAGE TEST RESULT USING MULTIPLE TEST CRITERIA.

CC	NR = Non Reference Oil Test
	RO = Reference Oil Test

STAND: CCCCC	STAND RUN NO.: CCCC	ENGINE NO.: CCCCC	ENGINE HOURS: CCCCC
END OF TEST DATE: YYYYMMDD		END OF TEST TIME: HH:MM	
OIL CODE: CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC			
FORMULATION/STAND CODE: CC-CCCCCCCCCC-C-C-C-C-C-C-C-C-C-C			
ALTCODE1: CCCCCCCCC	ALTCODE2: CCCCCCCCC	ALTCODE3: CCCCCCCCC	

In my opinion this test CCCCCCCCbeen conducted in a valid manner in accordance with the Test Method Dxxx and the appropriate amendments through the information letter system. The remarks included in this report describe the anomalies associated with this test.

SUBMITTED BY CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC

Testing Laboratory

Signature Image

Signature

CC

Typed Name

CC

Title

**MACK T-10
EGR Engine Oil Test
Form 10
Liner Wear Summary**

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC -CCCC -CCCCCC -CCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		

POSITION	WEAR STEP (µm)					
	Cylinder Number					
	1	2	3	4	5	6
1:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
2:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
3:00 (Thrust)	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
4:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
5:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
6:00 (Rear)	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
7:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
8:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
9:00 (Anti-Thrust)	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
10:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
11:00	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
12:00 (Front)	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>
Average	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>	<i>S123.1</i>

Summary	As Measured	Outlier Screened ^A	Adjusted to X.XX% Soot ^A
Average, µm	<i>S123.1</i>	<i>S123.1</i>	<i>S12.12</i>
Std. Dev., µm	<i>S123.1</i>	<i>S123.1</i>	
Minimum, µm	<i>S123.1</i>	<i>S123.1</i>	
Maximum, µm	<i>S123.1</i>	<i>S123.1</i>	
Outlier Liners ^A	<i>CCCCC</i>		

^A Wear results are not currently outlier screened or adjusted for soot. Wear results may eventually be screened and/or adjusted pending the results of the T-10 test matrix.

FIG A1.10 - Liner Wear Summary

MACK T-10
EGR Engine Oil Test
Form 12
Test Fuel Analysis (Last Batch)

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC - CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC</i>		
Supplier <i>CCCCCCCCCCCCCCCCCCCC</i>		Batch Identifiers <i>CCCCCCCCCCCCCCCC</i>

Measurement	Specs.	Analysis		Test Method
		NEW	EOT	
Total Sulfur, % Weight	0.04 - 0.05	S1.12	S1.12	D 2622
Gravity, °API	34.5 - 36.5	S1.1	S1.1	D 287 or D 4052
Hydrocarbon Composition				
Aromatics % Vol.	28 - 33	S1.1		D 1319
Olefin	Report	S12.1		D 1319
Cetane Index	Report	S1.1		D 976 & D 4737
Cetane No.	42 - 48	S1.1		D 613
Copper Strip Corrosion	1 Maximum	S123		D 130
Flash Point, °C	54 Minimum	S123		D 93
Pour Point, °C	-18 Maximum	S123		D 97
Carbon Residue on 10% Residuum, %	0.35 Maximum	S1.12		D 524 (10% Bottoms)
Water & Sediment, % Vol	0.05 Maximum	S12.12		D 2709
Viscosity, cSt @ 40°C	2.4 - 5.0	S1.1		D 445
Total Acid Number	0.05 Maximum	S1.1		D 664
Strong Acid Number	0.00 Maximum	S1.1		D 664
Accelerated Stability	tbd	S1.1		D 2274
Distillation, °C				
IBP	Report	S1234		D 86
10%	Report	S1234		D 86
50%	Report	S1234		D 86
90%	282 - 338	S1234		D 86
EP	Report	S1234		D 86

FIG A1.12 - Test Fuel Analysis (Last Batch)

MACK T-10
EGR Engine Oil Test
Form 13
Characteristics of the Data Acquisition System

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC -CCCC -CCCCCC -CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCC-C-C-CCCCCCC-CC-CC-CCCC</i>		

PARAMETER (1)	SENSING DEVICE (2)	CALIBRATION FREQUENCY (3)	RECORD DEVICE (4)	OBSERVATION FREQUENCY (5)	RECORD FREQUENCY (6)	LOG FREQUENCY (7)	SYSTEM RESPONSE (8)
Temperatures							
Oil @ Filt.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Fuel In.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Intake Air	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Intake Man.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Pre-Turb.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Cool. Out	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Other							
Fuel Flow	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Engine RPM	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Load	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Inlet Restr.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Exh. Press.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>
Oil Gal. Press.	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>	<i>CCCCCCCC</i>

LEGEND:

- (1) 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 - Handlog Sheet
 DL - Automatic Data Logger
 SC - Strip Chart Recorder
 C/M - Computer, Using Manual Data Entry
 C/D - Computer, Using Direct I/O 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

**MACK T-10
EGR Engine Oil Test
Form 14
Build-up and Hardware Information**

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC - CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		

INJECTION TIMING

Timing Hours	Timing (Deg)
<i>S1</i>	S1.12
<i>S1</i>	Total Timing Changes

HARDWARE

Part	Part Number	Serial Number
Primary Turbocharger	<i>CCCCCCCCCCCCCCCCCCCC</i>	
Secondary Charger	<i>CCCCCCCCCCCCCCCCCCCC</i>	
Cylinder Head (front)	<i>CCCCCCCCCCCCCCCCCCCC</i>	<i>CCCCCCCCCCCCCCCCCCCC</i>
Cylinder Head (rear)	<i>CCCCCCCCCCCCCCCCCCCC</i>	<i>CCCCCCCCCCCCCCCCCCCC</i>
Pistons	<i>CCCCCCCCCCCCCCCCCCCC</i>	
Injection Nozzles	<i>CCCCCCCCCCCCCCCCCCCC</i>	
Rod Bearings	<i>CCCCCCCCCCCCCCCCCCCC</i>	
Liners	<i>CCCCCCCCCCCCCCCCCCCC</i>	
Ring Set	<i>CCCCCCCCCCCCCCCCCCCC</i>	

Cylinder Kit Location	CPD ID Number
Cylinder 1	<i>CCCCCCCCCCCCCCCCCCCC</i>
Cylinder 2	<i>CCCCCCCCCCCCCCCCCCCC</i>
Cylinder 3	<i>CCCCCCCCCCCCCCCCCCCC</i>
Cylinder 4	<i>CCCCCCCCCCCCCCCCCCCC</i>
Cylinder 5	<i>CCCCCCCCCCCCCCCCCCCC</i>
Cylinder 6	<i>CCCCCCCCCCCCCCCCCCCC</i>

FIG A1.14 - Build-up and Hardware Information

MACK T-10
EGR Engine Oil Test
Form 15
Rating Summary: Piston #1

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		
Date Rated <i>YYYYMMDD</i>	Rater Initials <i>CCC</i>	Verified By <i>CCC</i>

TOTAL PISTON RATINGS SUMMARY																						
	DEP. FACTOR	GROOVES								DEP. FACTOR	LANDS								OIL COOLING		UNDER CROWN	
		NO. 1		NO. 2		NO. 1		NO. 2			NO. 3		NO. 3		NO. 4		A,%	DEM.	A,%	DEM.		
		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		
C A R B O N	HC - 1.0	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	MC - 0.5	<i>S123</i>	<i>S123.12</i>								<i>S123</i>	<i>S123.12</i>										
	LC - .25	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
V A R N I S H	8 - 9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	7 - 7.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	6 - 6.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	5 - 5.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	4.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	4 - 4.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	3 - 3.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	2 - 2.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	1.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	1 - 1.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	>0 - 0.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0		
TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>				
RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>					
LOCATION FACTOR	2		3		1		3		20		20		60		0.5		1					
IND RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>					
WDP				TGC				TLC				UNWEIGHTED DEP.				T.L. FLAKED CARBON %						
<i>S1234.1</i>				<i>S12.12</i>				<i>S12.12</i>				<i>S1234.1</i>				<i>S123456</i>						

FIG A1.15 - Rating Summary: Piston #1

MACK T-10
EGR Engine Oil Test
Form 16
Rating Summary: Piston #2

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		
Date Rated <i>YYYYMMDD</i>	Rater Initials <i>CCC</i>	Verified By <i>CCC</i>

TOTAL PISTON RATINGS SUMMARY																						
	DEP. FACTOR	GROOVES				LANDS				DEP. FACTOR	GROOVE				LANDS				OIL COOLING		UNDER CROWN	
		NO. 1		NO. 2		NO. 1		NO. 2			NO. 3		NO. 3		NO. 4		A,%	DEM.	A,%	DEM.		
		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.								
C A R B O N	HC - 1.0	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>						
	MC - 0.5	<i>S123</i>	<i>S123.12</i>								<i>S123</i>	<i>S123.12</i>										
	LC - .25	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
	TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
V A R N I S H	8 - 9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	7 - 7.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	6 - 6.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	5 - 5.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	4.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	4 - 4.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	3 - 3.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	2 - 2.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	1 - 1.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	1.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	>0 - 0.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0		CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	
TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
LOCATION FACTOR	2		3		1		3		20		20		60		0.5		1					
IND RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
WDP				TGC				TLC				UNWEIGHTED DEP.				T.L. FLAKED CARBON %						
<i>S1234.1</i>				<i>S12.12</i>				<i>S12.12</i>				<i>S1234.1</i>				<i>S123456</i>						

FIG A1.16 - Rating Summary: Piston #2

MACK T-10
EGR Engine Oil Test
Form 17
Rating Summary: Piston #3

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		
Date Rated <i>YYYYMMDD</i>	Rater Initials <i>CCC</i>	Verified By <i>CCC</i>

TOTAL PISTON RATINGS SUMMARY																						
	DEP. FACTOR	GROOVES				LANDS				DEP. FACTOR	GROOVE				LANDS				OIL COOLING		UNDER CROWN	
		NO. 1		NO. 2		NO. 1		NO. 2			NO. 3		NO. 3		NO. 4		A,%	DEM.	A,%	DEM.		
		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.								
C A R B O N	HC - 1.0	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>						
	MC - 0.5	<i>S123</i>	<i>S123.12</i>								<i>S123</i>	<i>S123.12</i>										
	LC - .25	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
	TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
V A R N I S H	8 - 9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	7 - 7.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	6 - 6.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	5 - 5.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	4.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	4 - 4.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	3 - 3.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	2 - 2.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	1 - 1.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	1.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	>0 - 0.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0		CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	
TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
LOCATION FACTOR	2		3		1		3		20		20		60		0.5		1					
IND RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
WDP				TGC				TLC				UNWEIGHTED DEP.				T.L. FLAKED CARBON %						
<i>S1234.1</i>				<i>S12.12</i>				<i>S12.12</i>				<i>S1234.1</i>				<i>S123456</i>						

FIG A1.17 - Rating Summary: Piston #3

MACK T-10
EGR Engine Oil Test
Form 18
Rating Summary: Piston #4

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		
Date Rated <i>YYYYMMDD</i>	Rater Initials <i>CCC</i>	Verified By <i>CCC</i>

TOTAL PISTON RATINGS SUMMARY																						
	DEP. FACTOR	GROOVES				LANDS				DEP. FACTOR	GROOVE				LANDS				OIL COOLING		UNDER CROWN	
		NO. 1		NO. 2		NO. 1		NO. 2			NO. 3		NO. 3		NO. 4		A,%	DEM.	A,%	DEM.		
		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.								
C A R B O N	HC - 1.0	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>						
	MC - 0.5	<i>S123</i>	<i>S123.12</i>								<i>S123</i>	<i>S123.12</i>										
	LC - .25	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
	TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
V A R N I S H	8 - 9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	7 - 7.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	6 - 6.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	5 - 5.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	4.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	4 - 4.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	3 - 3.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	2 - 2.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	1 - 1.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	1.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	>0 - 0.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0		CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	
TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
LOCATION FACTOR	2		3		1		3		20		20		60		0.5		1					
IND RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
WDP			TGC				TLC				UNWEIGHTED DEP.				T.L. FLAKED CARBON %							
<i>S1234.1</i>			<i>S12.12</i>				<i>S12.12</i>				<i>S1234.1</i>				<i>S123456</i>							

FIG A1.18 - Rating Summary: Piston #4

MACK T-10
EGR Engine Oil Test
Form 19
Rating Summary: Piston #5

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		
Date Rated <i>YYYYMMDD</i>	Rater Initials <i>CCC</i>	Verified By <i>CCC</i>

TOTAL PISTON RATINGS SUMMARY																						
	DEP. FACTOR	GROOVES				LANDS				DEP. FACTOR	GROOVE				LANDS				OIL COOLING		UNDER CROWN	
		NO. 1		NO. 2		NO. 1		NO. 2			NO. 3		NO. 3		NO. 4		A,%	DEM.	A,%	DEM.		
		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.								
C A R B O N	HC - 1.0	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>						
	MC - 0.5	<i>S123</i>	<i>S123.12</i>								<i>S123</i>	<i>S123.12</i>										
	LC - .25	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
	TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
V A R N I S H	8 - 9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	7 - 7.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	6 - 6.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	5 - 5.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	4.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	4 - 4.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	3 - 3.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	2 - 2.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	1 - 1.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	1.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	>0 - 0.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0		CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	
TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
LOCATION FACTOR	2		3		1		3		20		20		60		0.5		1					
IND RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
WDP				TGC				TLC				UNWEIGHTED DEP.				T.L. FLAKED CARBON %						
<i>S1234.1</i>				<i>S12.12</i>				<i>S12.12</i>				<i>S1234.1</i>				<i>S123456</i>						

FIG A1.19 - Rating Summary: Piston #5

MACK T-10
EGR Engine Oil Test
Form 20
Rating Summary: Piston #6

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		
Date Rated <i>YYYYMMDD</i>	Rater Initials <i>CCC</i>	Verified By <i>CCC</i>

TOTAL PISTON RATINGS SUMMARY																						
	DEP. FACTOR	GROOVES				LANDS				DEP. FACTOR	GROOVE		LANDS				OIL COOLING		UNDER CROWN			
		NO. 1		NO. 2		NO. 1		NO. 2			NO. 3		NO. 3		NO. 4		A,%	DEM.	A,%	DEM.		
		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.	A,%	DEM.		
C A R B O N	HC - 1.0	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>						
	MC - 0.5	<i>S123</i>	<i>S123.12</i>								<i>S123</i>	<i>S123.12</i>										
	LC - .25	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>
V A R N I S H	8 - 9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	7.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	7 - 7.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	6 - 6.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	5 - 5.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	4.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	4 - 4.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	3 - 3.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	2 - 2.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	1 - 1.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	1.5	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	>0 - 0.9	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
	CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0		CLEAN	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	<i>S123</i>	0	
TOTAL	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>	<i>S123</i>	<i>S123.12</i>		
RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
LOCATION FACTOR	2		3		1		3		20		20		60		0.5		1					
IND RATING	<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>		<i>S123.12</i>			
WDP			TGC				TLC				UNWEIGHTED DEP.				T.L. FLAKED CARBON %							
<i>S1234.1</i>			<i>S12.12</i>				<i>S12.12</i>				<i>S1234.1</i>				<i>S123456</i>							

FIG A1.20 - Rating Summary: Piston #6

**MACK T-10
EGR ENGINE OIL TEST
FORM 4
TEST RESULTS SUMMARY**

Laboratory: <i>CC</i>	EOT Date: <i>YYYYMMDD</i>	EOT Time: <i>HH:MM</i>
Test Number: <i>CCCCC -CCCC -CCCCCC -CCCC</i>		
Oil Code: <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code: <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		

TEST RESULTS					
Date Test Started	<i>YYYYMMDD</i>	Start Time	<i>HH:MM</i>	Test Length	<i>S12</i>
TMC Oil Code ^A	<i>CCCCCC</i>	Laboratory Oil Code	<i>CCCCCCCCCCCC</i>	SAE Viscosity	<i>CCCCCC</i>
Average TGA Soot % at 75 h			<i>S123.1</i>		
Centrifugal Oil Filter Mass Gain, g			<i>S123.1</i>		
Oil Filter Delta P, kPa (138 maximum)			<i>S123</i>		
EOT TBN			<i>S123.1</i>		
	DELTA Pb @ EOT (ppm)	AVG. LINER WEAR (µm)	AVG. TOP RING WEIGHT LOSS (mg)	Oil Consumption (g/h)	IR Oxidation@EOT (abs/cm ²)
Original Result	<i>S123</i>	<i>S12.12</i>	<i>S123</i>	<i>S1.123</i>	
Transformed Result ^B	<i>S1.1234</i>	<i>S1.1234</i>	<i>S1.1234</i>		
Correction Factor ^B	<i>S1.1234</i>	<i>S12.12</i>	<i>S12.1234</i>		
Corrected Transformed Result ^B	<i>S1.1234</i>	<i>S12.12</i>	<i>S12.1234</i>		
Severity Adjustment ^B	<i>S1.1234</i>	<i>S12.12</i>	<i>S12.1234</i>		
Final Transformed Result ^B	<i>S1.1234</i>	<i>S12.12</i>	<i>S12.1234</i>		
Final Original Unit Result	<i>S123</i>	<i>S12.1</i>	<i>S123</i>		

LAST STAND REFERENCE RESULTS					
Test Number	<i>CCCCC -CCCC -CCCCCC -CCCC</i>	TMC Oil Code	<i>CCCCCC</i>	Test Length	<i>S12</i>
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>					
EOT Date	<i>YYYYMMDD</i>	EOT Time	<i>HH:MM</i>	Stand Calibration Expiration Date <i>YYYYMMDD</i>	
Average TGA Soot % at 75 h			<i>S123.1</i>		
	DELTA Pb @ EOT (ppm)	AVG. LINER WEAR (µm)	AVG. TOP RING WEIGHT LOSS (mg)	Oil Consumption (g/h)	IR Oxidation@EOT (abs/cm ²)
Original Result	<i>S123</i>	<i>S12.12</i>	<i>S123</i>		
Transformed Result ^B	<i>S1.1234</i>	<i>S1.1234</i>	<i>S1.1234</i>		
Correction Factor ^B	<i>S1.1234</i>	<i>S1.1234</i>	<i>S1.1234</i>		
Corrected Transformed Result ^B	<i>S1.1234</i>	<i>S1.1234</i>	<i>S1.1234</i>		
Final Transformed Result ^B	<i>S1.1234</i>	<i>S12.12</i>	<i>S12.1234</i>		
Final Original Unit Result	<i>S123</i>	<i>S12.1</i>	<i>S123</i>		

^A Reference Tests Only

^B Transformed Units

MACK T-10
Operational Summary
FORM 5

Laboratory <i>CC</i>	EOT Date	EOT Time
Test Number <i>CCCCC -CCCC -CCCCCC -CCCCC</i>	Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>	
Formulation/Stand Code: <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCCC</i>		

	Parameter	Units	QI Threshold	EOT QI ^A	Target		Average		Samples ^B	BQD ^C	Over/Under Range ^D
	Controlled Parameters	Speed	r/min	0.000	<i>S12.123</i>	1800	1200	<i>S12345</i>	<i>S12345</i>	<i>S1234</i>	<i>S1234</i>
Fuel Flow		kg/h	0.000	<i>S12.123</i>	59.2	63.5	<i>S12.12</i>	<i>S12.12</i>	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Inlet Manifold Temp.		°C	0.000	<i>S12.123</i>	70	66	<i>S1234</i>		<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Coolant Out Temp.		°C	0.000	<i>S12.123</i>	66	85	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Fuel In Temp.		°C	0.000	<i>S12.123</i>	40		<i>S1234</i>		<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Oil Gallery Temp.		°C	0.000	<i>S12.123</i>	88	104	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Intake Air Temp.		°C	0.000	<i>S12.123</i>	25		<i>S1234</i>		<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Inlet Air Restriction		kPa			3.5 - 4.0		<i>S12.12</i>		<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Inlet Man. Pressure		kPa			TBD	TBD	<i>S123</i>	<i>S123</i>	<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Exh. Back Pressure		kPa			2.7 - 3.5		<i>S1.1</i>		<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Crankcase Pressure		kPa			0.25 - 0.75		<i>S1.12</i>		<i>S1234</i>	<i>S1234</i>	<i>S1234</i>
Intake CO ₂		%			1.5±.05	0.2±.05					
	Parameter	Units	Typical Values		Average						
Non-controlled Parameters	Power	kW	TBD	TBD	<i>S12.1</i>		<i>S12.1</i>				
	Torque	Nm	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	Exhaust O ₂	%	8.1	6.1	<i>S12.1</i>		<i>S12.1</i>				
	Exhaust CO ₂	%	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	Pre-Turbine Temp. (L)	°C	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	Pre-Turbine Temp. (R)	°C	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	Tailpipe Temp.	°C	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	Oil Sump Temp.	°C	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	EGR Pre-Venturi Temp.	°C	TBD	TBD	<i>S1234</i>		<i>S1234</i>				
	Blowby	L/min	TBD	TBD	<i>S12.1</i>		<i>S12.1</i>				
Inlet Air Dew Point	°C	TBD	TBD	<i>S1234</i>		<i>S1234</i>					
Inlet Air Humidity	g/kg	TBD	TBD	<i>S1.1</i>		<i>S1.1</i>					
Main Gallery Oil Pressure	kPa	TBD	TBD	<i>S1234</i>		<i>S1234</i>					

A QI values above the threshold are acceptable by the Mack Surveillance Panel. QI values below the threshold may not be considered acceptable based on an engineering review. Refer to Annex A5.

B Total number of data points taken. Minimum acceptable value is 3000.

C Number of Bad Quality Data points not used in the calculation of the statistical measures.

D Number of points clipped by over/under range limits.

FIG A1.5 - Operational Summary

**MACK T-10
Operational Summary
FORM 5**

Laboratory <i>CC</i>	EOT Date <i>S1234</i>	EOT Time <i>S1234</i>
Test Number <i>CCCCC -CCCC -CCCCCC -CCCC</i>	Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>	
Formulation/Stand Code: <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		

	Parameter	Units	QI Threshold	EOT QI ^A	Target		Average		Samples ^B	BQD ^C	Over/Under Range ^D
	Controlled Parameters	Speed	r/min	0.000		1800	1200				
Fuel Flow		kg/h	0.000		59.2	63.5					
Inlet Manifold Temp.		°C	0.000		70	66					
Coolant Out Temp.		°C	0.000		66	85					
Fuel In Temp.		°C	0.000		40						
Oil Gallery Temp.		°C	0.000		88	104					
Intake Air Temp.		°C	0.000		25						
Inlet Air Restriction		kPa			3.5 - 4.0						
Inlet Man. Pressure		kPa			TBD	TBD					
Exh. Back Pressure		kPa			2.7 - 3.5						
Crankcase Pressure		kPa			0.25 - 0.75						
Intake CO ₂		%			1.5±.05	0.2±.05					
	Parameter	Units	Typical Values		Average						
Non-controlled Parameters	Power	kW	TBD	TBD							
	Torque	Nm	TBD	TBD							
	Exhaust O ₂	%	8.1	6.1							
	Exhaust CO ₂	%	TBD	TBD							
	Pre-Turbine Temp. (L)	°C	TBD	TBD							
	Pre-Turbine Temp. (R)	°C	TBD	TBD							
	Tailpipe Temp.	°C	TBD	TBD							
	Oil Sump Temp.	°C	TBD	TBD							
	EGR Pre-Venturi Temp.	°C	TBD	TBD							
	Blowby	L/min	TBD	TBD							
	Inlet Air Dew Point	°C	TBD	TBD							
Inlet Air Humidity	g/kg	TBD	TBD								
Main Gallery Oil Pressure	kPa	TBD	TBD								

^A QI values above the threshold are acceptable by the Mack Surveillance Panel. QI values below the threshold may not be considered acceptable based on an engineering review. Refer to Annex A5.

^B Total number of data points taken. Minimum acceptable value is 3000.

^C Number of Bad Quality Data points not used in the calculation of the statistical measures.

^D Number of points clipped by over/under range limits.

FIG A1.5 - Operational Summary

**MACK T-10
EGR Engine Oil Test
Form 6
Rod Bearing Weight Loss**

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC -CCCC -CCCCCC -CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		

Cylinder #	Location	SOT Weight, g	EOT Weight, g	Weight Change, mg
1	Upper	S12.1234	S12.1234	S123.1
2	Upper	S12.1234	S12.1234	S123.1
3	Upper	S12.1234	S12.1234	S123.1
4	Upper	S12.1234	S12.1234	S123.1
5	Upper	S12.1234	S12.1234	S123.1
6	Upper	S12.1234	S12.1234	S123.1

SUMMARY	As Measured	Outlier Screened
Upper Bearing Average Weight Loss, mg	S123.1	S123.1
Upper Bearing Weight Loss Std. Dev., mg	S123.1	S123.1
Upper Bearing Minimum Weight Loss, mg	S123.1	S123.1
Upper Bearing Maximum Weight Loss, mg	S123.1	S123.1
Outlier Upper Rod Bearing ^A	CCCCC	

^A Cylinder number

Cylinder #	Location	SOT Weight, g	EOT Weight, g	Weight Change, mg
1	Lower	S12.1234	S12.1234	S123.1
2	Lower	S12.1234	S12.1234	S123.1
3	Lower	S12.1234	S12.1234	S123.1
4	Lower	S12.1234	S12.1234	S123.1
5	Lower	S12.1234	S12.1234	S123.1
6	Lower	S12.1234	S12.1234	S123.1
Lower Bearing Average Weight Loss, mg				S123.1
Lower Bearing Weight Loss Std. Dev., mg				S123.1
Lower Bearing Minimum Weight Loss, mg				S123.1
Lower Bearing Maximum Weight Loss, mg				S123.1

FIG A1.6 - Rod Bearing Weight Loss

**MACK T-10
EGR Engine Oil Test
Form 7
Ring Weight Loss**

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC - CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC</i>		

Cylinder #	Top Ring SOT Weight, g	Top Ring EOT Weight, g	Weight Loss, mg
1	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
2	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
3	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
4	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
5	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
6	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>

Summary	As Measured ^A	Outlier Screened
Top Ring Average Weight Loss, mg	<i>S123</i>	<i>S123</i>
Top Ring Weight Loss Std. Dev., mg	<i>S123.1</i>	<i>S123.1</i>
Top Ring Minimum Weight Loss, mg	<i>S123.1</i>	<i>S123.1</i>
Top Ring Maximum Weight Loss, mg	<i>S123.1</i>	<i>S123.1</i>
Outlier Ring ^B	<i>CCCCC</i>	

^A Results calculated without rings with plasma flaking.
^B Ring number wear results are not currently outlier screened.

Cylinder #	2nd Ring SOT Weight, g	2nd Ring EOT Weight, g	Weight Loss, mg
1	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
2	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
3	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
4	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
5	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
6	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
	2nd Ring Average Weight Loss, mg		<i>S123.1</i>
	2nd Ring Weight Loss Std. Dev., mg		<i>S123.1</i>
	2nd Ring Min. Weight Loss, mg		<i>S123.1</i>
	2nd Ring Max. Weight Loss, mg		<i>S123.1</i>

Cylinder #	Oil Ring SOT Weight, g	Oil Ring EOT Weight, g	Weight Loss, mg
1	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
2	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
3	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
4	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
5	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
6	<i>S12.1234</i>	<i>S12.1234</i>	<i>S123.1</i>
	Oil Ring Average Weight Loss, mg		<i>S123.1</i>
	Oil Ring Weight Loss Std. Dev., mg		<i>S123.1</i>
	Oil Ring Minimum Weight Loss, mg		<i>S123.1</i>
	Oil Ring Maximum Weight Loss, mg		<i>S123.1</i>

FIG A1.7 - Ring Weight Loss

**MACK T-10
EGR Engine Oil Test
Form 8
Oil Analysis Summary**

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC - CCCC - CCCCC - CCCCC</i>	Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>	
Formulation/Stand Code: <i>CC-CCCCCCCCC-C-C-CCCCCC-CC-CC-CCCC</i>		

HOURS	SOOT Wt. % TGA	Viscosity at 100°C cSt	Viscosity Increase cSt	TBN	TAN	Integrated IR Oxidation	Metals in Parts per Millions							
							Elements							
							Fe	Pb	Cu	Cr	Al	Si	Sn	Na
CCCCC	S123.1	S123.12		S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
75 (2nd)	S123.1													
75 AVG.	S123.1													
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345
CCCCC	S123.1	S123.12	S12.12	S123.1	S123.1	S12	S12345	S12345	S12345	S12345	S12345	S12345	S12345	S12345

Summary	As Measured	Outlier Bearing Adjusted
Delta Pb @ EOT, ppm	S123	S123

FIG A1.8 - Oil Analysis Summary

MACK T-10
EGR Engine Oil Test
Liner Surface Roughness & Bore Diameter
Form 9

Laboratory <i>CC</i>	EOT Date <i>YYYYMMDD</i>	EOT Time <i>HH:MM</i>
Test Number <i>CCCCC - CCCC - CCCCCC - CCCCC</i>		
Oil Code <i>CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC</i>		
Formulation/Stand Code <i>CC-CCCCCCCCC-C-C-CCCCC-CC-CC-CCCC</i>		

LINER NO.	LOCATION	Ra (µm)	BORE DIAMETER (mm)		Ra (µm)	DIA. (mm)
1	Top Ring Travel @ 0°	<i>S1.12</i>	<i>S123.123</i>	AVG	<i>S1.12</i>	<i>S123.123</i>
	Top Ring Travel @ 90°	<i>S1.12</i>	<i>S123.123</i>	STD DEV	<i>S1.12</i>	
	Top Ring Travel @ 180°	<i>S1.12</i>		MIN	<i>S1.12</i>	
	Top Ring Travel @ 270°	<i>S1.12</i>		MAX	<i>S1.12</i>	

2	Top Ring Travel @ 0°	<i>S1.12</i>	<i>S123.123</i>	AVG	<i>S1.12</i>	<i>S123.123</i>
	Top Ring Travel @ 90°	<i>S1.12</i>	<i>S123.123</i>	STD DEV	<i>S1.12</i>	
	Top Ring Travel @ 180°	<i>S1.12</i>		MIN	<i>S1.12</i>	
	Top Ring Travel @ 270°	<i>S1.12</i>		MAX	<i>S1.12</i>	

3	Top Ring Travel @ 0°	<i>S1.12</i>	<i>S123.123</i>	AVG	<i>S1.12</i>	<i>S123.123</i>
	Top Ring Travel @ 90°	<i>S1.12</i>	<i>S123.123</i>	STD DEV	<i>S1.12</i>	
	Top Ring Travel @ 180°	<i>S1.12</i>		MIN	<i>S1.12</i>	
	Top Ring Travel @ 270°	<i>S1.12</i>		MAX	<i>S1.12</i>	

4	Top Ring Travel @ 0°	<i>S1.12</i>	<i>S123.123</i>	AVG	<i>S1.12</i>	<i>S123.123</i>
	Top Ring Travel @ 90°	<i>S1.12</i>	<i>S123.123</i>	STD DEV	<i>S1.12</i>	
	Top Ring Travel @ 180°	<i>S1.12</i>		MIN	<i>S1.12</i>	
	Top Ring Travel @ 270°	<i>S1.12</i>		MAX	<i>S1.12</i>	

5	Top Ring Travel @ 0°	<i>S1.12</i>	<i>S123.123</i>	AVG	<i>S1.12</i>	<i>S123.123</i>
	Top Ring Travel @ 90°	<i>S1.12</i>	<i>S123.123</i>	STD DEV	<i>S1.12</i>	
	Top Ring Travel @ 180°	<i>S1.12</i>		MIN	<i>S1.12</i>	
	Top Ring Travel @ 270°	<i>S1.12</i>		MAX	<i>S1.12</i>	

6	Top Ring Travel @ 0°	<i>S1.12</i>	<i>S123.123</i>	AVG	<i>S1.12</i>	<i>S123.123</i>
	Top Ring Travel @ 90°	<i>S1.12</i>	<i>S123.123</i>	STD DEV	<i>S1.12</i>	
	Top Ring Travel @ 180°	<i>S1.12</i>		MIN	<i>S1.12</i>	
	Top Ring Travel @ 270°	<i>S1.12</i>		MAX	<i>S1.12</i>	

	Ra (µm)	BORE DIAMETER (mm)
Average Surface Roughness & Bore Diameter	<i>S1.12</i>	<i>S123.123</i>
Standard Deviation Surface Roughness & Bore Diameter	<i>S1.12</i>	<i>S123.123</i>
Minimum Surface Roughness & Bore Diameter	<i>S1.12</i>	<i>S123.123</i>
Maximum Surface Roughness & Bore Diameter	<i>S1.12</i>	<i>S123.123</i>

FIG A1.9 - Liner Surface Roughness & Bore Diameter