



# Test Monitoring Center

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MEMORANDUM: 03-086  
DATE: October 1, 2003  
TO: Wim Van Dam, Chairman, Mack Test Surveillance Panel  
FROM: Jeff Clark  
SUBJECT: T-9 Calibration Testing for the October 2003 ASTM Report Period

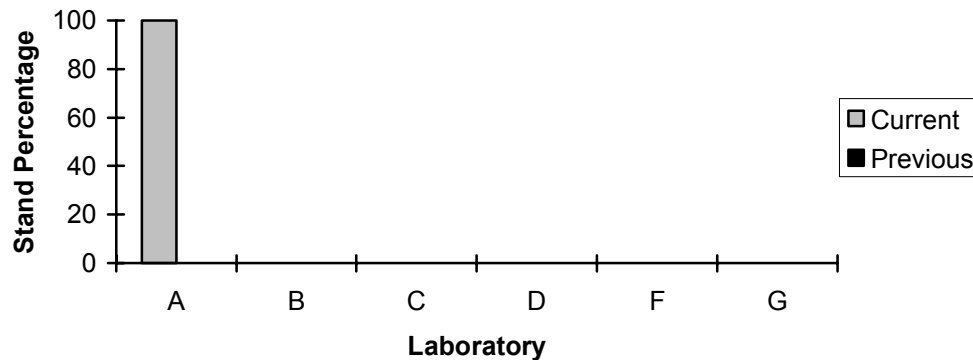
One T-9 reference oil test was completed during the October 2003 ASTM report period, which began on April 1, 2003 and ended on September 30, 2003.

### Lab / Stand Distribution:

	Reporting Data	Calibrated as of 9/30/03
Number of Laboratories	1	1
Number of Stands	1	1

The following chart shows the laboratory / stand distribution for tests completed this report period:

### Laboratory / Stand Distribution



The following summarizes the status of the reference oil tests completed this ASTM report period:

Test Status	TMC Validity Code	Number of Tests
Operationally and Statistically Acceptable	AC	1
Failed LTMS Acceptance Criteria	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		1

#### Severity and Precision:

Figures 1, 2, and 3 (attached) show the current industry EWMA severity, EWMA precision, and cusum charts for Adjusted Liner Wear (ALW), Delta Pb, and Top Ring Weight Loss (TRWL), respectively. Low-test activity makes it difficult to offer any meaningful commentary on severity trends. Nonetheless, Delta Pb appears to be in a mild trend dating back to early 2000.

The TMC has historically provided the pooled standard deviation as an estimate of precision, on a yearly basis. However, due to low-test activity, no estimate of precision is available beginning with 2000. The yearly precision estimates for all three parameters, prior to 2000, are shown in the table below. Note, the degrees of freedom (df) equals  $\sum(\text{number of observations per oil} - 1)$ .

**T-9 Pooled Precision By Year**

Parameter	1997	1998	1999
df	25	9	4
ALW	2.35	3.09	3.40
Delta Pb*	1.1535	1.3145	1.2391
TRWL	28.6	17.7	13.1

\*Transformed Units.

#### Reference Oils and Hardware:

The following table shows the current T-9 reference oil test targets:

Parameter	Oil	N	Mean (cSt)	s
ALW (microns)	1005	-	24.4700	2.3500
	1005-1	10	24.6400	2.9064
Delta Pb (trans. units)	1005	-	5.7970	1.2030
	1005-1	10	7.2980	1.1251
TRWL (mg)	1005	-	84.3400	29.2900
	1005-1	10	93.7000	16.7136

As previously reported, a correction factor for TRWL has been implemented due to a severity shift associated with a new top piston ring design that was introduced into the T-9 test in December 1998. The correction factor was introduced May 1, 1999 and was updated January 1, 2000, and again July 1, 2001. The correction factor applies to all tests, both candidate and calibration, run on the new top piston ring hardware. The correction factor history is shown in the table below:

Parameter	N	Correction Factor (mg)	Effective Date
TRWL	3	34.1769	19990501
TRWL	5	36.9000	20000101
TRWL	10	31.4000	20010701

Information Letters:

No information letters were issued this ASTM period.

Quality Index:

No Quality Index deviations were issued this ASTM period. For the history of the T-9 test, no Quality Index deviations have been issued.

TMC Laboratory Visits:

One TMC laboratory visit was conducted this ASTM period and two deficiencies were noted. These were a kinked blowby line and instrumentation calibration ranges not bracketing the test operating ranges.

Additional Information:

The T-9 database, as well as the T-9 industry alarm logs and timeline can be accessed from the TMC's web site at <http://www.astmtmc.cmu.edu>.

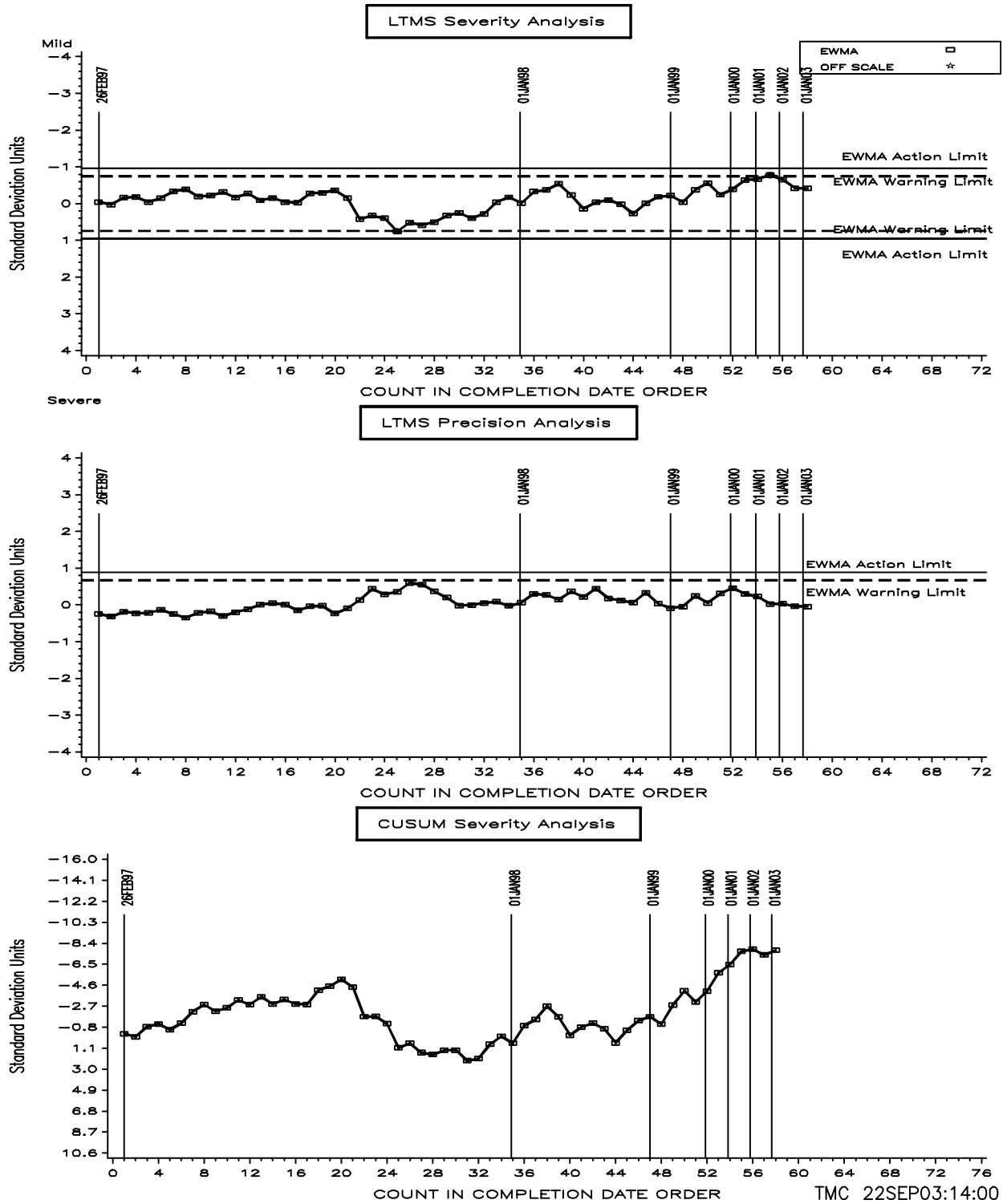
JAC/jac/mem03-086.jac.doc

Attachments

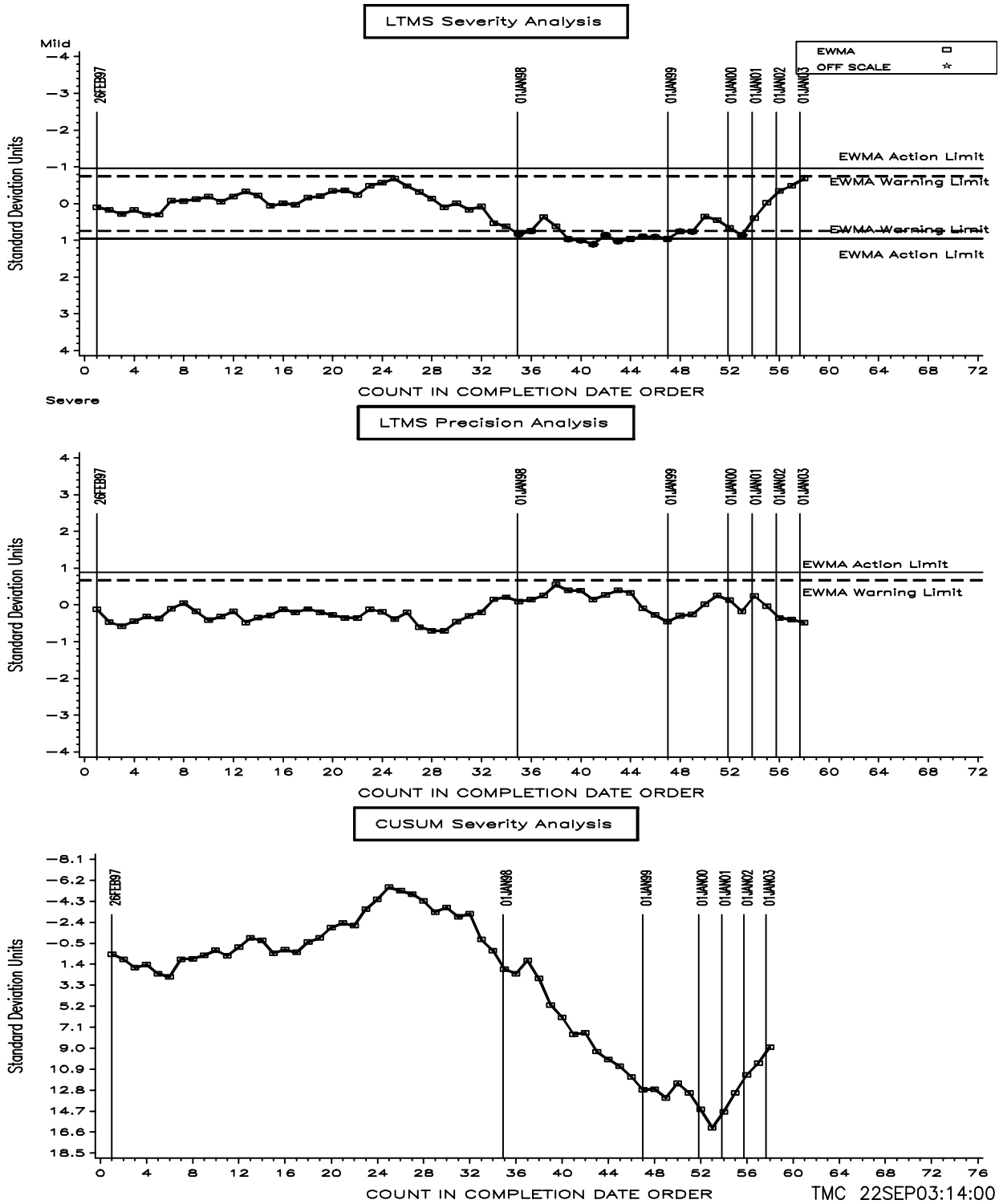
c: J.L. Zalar, TMC  
F.M. Farber, TMC  
Mack Surveillance Panel  
<ftp://ftp.astmtmc.cmu.edu/docs/diesel/mack/semiannualreports/T9-10-2003.pdf>

Distribution: Email

**FIGURE 1**  
T-9 INDUSTRY OPERATIONALLY VALID DATA  
ADJUSTED LINER WEAR



**FIGURE 2**  
T-9 INDUSTRY OPERATIONALLY VALID DATA  
DELTA PB



**FIGURE 3**  
 T-9 INDUSTRY OPERATIONALLY VALID DATA  
 AVERAGE TOP RING WEIGHT LOSS

