

- Exceed EWMA industry chart limits for severity
 - TMC to notify test developer, surveillance panel chairman, and ACC Monitoring Agency.
- Exceed EWMA industry chart limits for precision
 - TMC to notify test developer, surveillance panel chairman, and ACC Monitoring Agency

5. Removal of Test Stands from the System

The laboratory must notify the TMC and the ACC Monitoring Agency when removing a stand from the system. No reference oil data shall be removed from the control charts from test stands that have been used for registered candidate oil testing. Reintroduction of a stand into the system requires completion of new stand acceptance requirements; however, previously calibrated stands that are removed from the system following a failed calibration test must generate two (2) operationally valid calibration tests, with no Shewhart severity alarms (all parameters). If a calibrated stand is removed from the system, or skipped in the laboratory stand rotation, and the laboratory wishes to bring the stand back into the system within 90 days of its removal, the surveillance panel shall be consulted. In all instances of stand removal, stand renumbering can occur only if the stand undergoes a significant rebuild, as agreed upon by the laboratory and the TMC.

6. Introduction of New Reference Oils

When a new reference oil is introduced, Severity Adjustments shall not be calculated using results on a new reference oil until the test targets are based on at least eight (8) data points.

8. Sequence VIB LTMS Requirements

The following are the specific Sequence VIB calibration test requirements.

A. Reference Oils and Critical Parameters

The critical parameters are Fuel Economy Improvement for oil at 16 hours of aging (FEI1) and Fuel Economy Improvement for aged oil at 96 hours (FEI2). The reference oils required for test stand/engine combination and test laboratory calibration are reference oils accepted by the ASTM Sequence VIB Surveillance Panel. The means and standard deviations for the current reference oils for the critical parameter are presented below.

FUEL ECONOMY IMPROVEMENT at 16 Hours
Unit of Measure: Percent FEI1

Reference Oil	Mean	Standard Deviation
538	1.89	0.22
538-1	2.02	0.22
539	0.91	0.22
1006	1.40	0.22
1008	1.88	0.22
1008-1	1.96	0.22

FUEL ECONOMY IMPROVEMENT at 96 Hours
Unit of Measure: Percent FEI2

Reference Oil	Mean	Standard Deviation
538	1.55	0.21
538-1	1.47	0.21
539	0.43	0.21
1006	0.50	0.21
1008	1.27	0.21
1008-1	1.30	0.21

B. Acceptance Criteria

1. New Test Stand/Engine

- A minimum of two (2) operationally valid calibration tests (uninterrupted by non-reference oil tests) with no stand/engine Shewhart severity alarms and no alarms after the last reference oil test prior to non-reference oil testing is required. These tests must be conducted on reference oil 538, 539, 1006, or 1008 or subsequent approved reblends. The first two tests must be run using different reference oils.

- The test stand must have been an ASTM TMC calibrated test stand prior to LTMS introduction or previously accepted into the system by meeting LTMS calibration requirements.
- A test stand must complete three (3) operationally valid calibration tests, with no stand Shewhart severity alarms, on reference oil 114, 115, 116, or subsequent approved reblends. All three tests must be completed on the same reference oil. In addition, every six months or fourth calibration sequence, an additional test must be conducted on reference oil 112 or subsequent approved reblends. Note that the end of test coast side pinion scoring value of reference oil 112 must be a minimum of twice the average value of the previous three (3) acceptable reference oil tests. If a second test on reference oil 112 is needed, this test, if acceptable, will count as one (1) of the 15 non-reference oil tests. In the event that both tests on reference oil 112 do not meet the above requirements, a complete new calibration sequence must be performed. The results from tests conducted on reference oil 112 are not charted.

3. Reference Oil Assignment

Once test stands have been accepted into the system, the TMC will assign reference oils for continuing calibration according to the following reference oil mix:

Gear Batch	Oil Assignments
P8L123	Assign either three 116, three 115, or three 114 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L119	Assign three 116 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112 or 113.
P8L205	Assign either three 116, three 115, or three 114 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L737	Assign either three 115 or three 114 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L327	Assign either three 116 or three 115 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L604	Assign either three 116 or three 115 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P4L806	Assign three 116 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.

Note: See Sections 1 & 2 above for more details on oil assignments.

4. Control Charts

In Section 1, the construction of the control charts that constitute the Lubricant Test Monitoring System is outlined. The constants used for the construction of the control charts for the L-42, and the response necessary in the case of control chart limit alarms, are depicted below.

LUBRICANT TEST MONITORING SYSTEM CONSTANTS

APPENDIX B
HISTORY OF INDUSTRY CORRECTION FACTORS
APPLICABLE TO LTMS DATA

Test Area	Effective Date	Description
IIIF	None	None
IIIG	None	None
IIIGA	None	None
IIIGB	July 24, 2009	Add 1.61 to PHOS
IVA	None	None
VG	July 1, 2005	For Fuel Batch TF2221LS20, Add 0.19 to AEV; Add 2.175 to AES and divide by 1.192 Add 0.54 to APV; Add 0.627 to RCS and divide by 1.041
VG	November 10, 2007	For Fuel Batch TF2221LS20, Add 0.12 to AEV; Add 0.42 to AES ; Add 0.39 to APV; Add 0.23 to RCS
VG	May 26, 2009	For Fuel Batch XC2721NX10, Add 3.011 to AEV and divide by 1.356; Add 1.325 to APV and divide by 1.207
VIB	None	None
VID	None	None
VIII	None	None
1M-PC	None	None
1K	None	None
1N	May 1, 2004	Add -1.135 to ln(TLHC+1)
1P	None	None
1R	None	None
C13	None	None
ISB	None	None
ISM	June 28, 2007	Add +1.7 to Crosshead Wear At 3.9% Soot Add +19.1 to Injector Adjusting Screw Wear At 3.9% Soot
T-8	None	None
T-8E	None	None
T-10A	None	None
T-11	September 14, 2005	Add -0.39% to Soot @ 12cSt Vis. Inc., Add 1274 cP to MRV Vis.
T-11	December 6, 2005	Add -0.36% to Soot @ 12cSt Vis. Inc., Add 713 cP to MRV Vis.
T-11	March 24, 2006	Add -0.35% to Soot @ 12cSt Vis. Inc., Add 956 cP to MRV Vis.
T-12	None	None
RFWT	None	None
EOAT	None	None
L-33-1	None	None
L-37	None	None
L-42	None	None
L-60-1	None	None
HTCT	None	None
OSCT	None	None