



## Test Monitoring Center

@ Carnegie Mellon University  
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>  
412-365-1000

L-42 Information Letter 15-2  
Sequence Number 34  
July 9, 2015

*ASTM consensus has not been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.*

TO: L-42 Surveillance Panel

SUBJECT: 

1. Revision to stand referencing requirements
2. Clarification regarding when stand calibration expires
3. Standardized wording describing the role of the TMC

During a June 25, 2015 teleconference, the L-42 Surveillance Panel approved a revision to stand referencing requirements and added wording clarifying when a non-reference may be considered to have been run on a calibrated test stand. The wording of Section 9 of D 7452 is extensively altered by these changes. Revised wording is shown in the attachment.

Also, at a June 23, 2014 meeting, ASTM Section D02.B0.10 on Standards Acceleration approved standardized wording describing the role of the Test Monitoring Center. Subcommittee B has requested that the TMC incorporate this wording into all test methods through the information letter system. D7452 has been revised to incorporate this wording.

The text of the revisions is shown in the attachment. These changes are effective immediately.

Thomas Gottwald  
Chairman  
L-42 Surveillance Panel

Frank Farber  
Director  
ASTM Test Monitoring Center

Attachment

cc: [ftp://ftp.astmtmc.cmu.edu/docs/gear/142/procedure\\_and\\_ils/il15-2.pdf](ftp://ftp.astmtmc.cmu.edu/docs/gear/142/procedure_and_ils/il15-2.pdf)

Distribution: Email

*Add new section titled "Introduction" before current Section 1, "Scope":*

## INTRODUCTION

Portions of this test method are written for use by laboratories that make use of ASTM Test Monitoring Center (TMC)<sup>2</sup> services (see Annex A4).

The TMC provides reference oils, and engineering and statistical services to laboratories that desire to produce test results that are statistically similar to those produced by laboratories previously calibrated by the TMC.

In general, the Test Purchaser decides if a calibrated test stand is to be used. Organizations such as the American Chemistry Council require that a laboratory use the TMC services as part of their test registration process. In addition, the American Petroleum Institute and the Gear Lubricant Review Committee of the Lubricant Review Institute (SAE International) require that a laboratory use the TMC services in seeking qualification of oils against their specifications.

The advantage of using the TMC services to calibrate test stands is that the test laboratory (and hence the Test Purchaser) has an assurance that the test stand was operating at the proper level of test severity. It should also be borne in mind that results obtained in a non-calibrated test stand may not be the same as those obtained in a test stand participating in the ASTM TMC services process.

Laboratories that choose not to use the TMC services may simply disregard these portions.

*Replace the entirety of Section 9 text with the following:*

### 9. Calibration and Standardization

9.1 Annex A5 describes general calibration procedures using TMC reference oils, including their storage and conditions of use, and the conduct and reporting of reference oil test results.

9.2 Annex A6 describes TMC maintenance activities including special reference oil tests, special use of the reference oil calibration system, donated reference oil test programs, introduction of new reference oils, and issuance of TMC information letters and memoranda.

9.3 Annex A7 provides information regarding how new laboratories can become part of the TMC Monitoring System, and the role of the TMC in determining precision of monitored test methods.

9.4 *Test Stand Calibration*—Calibration is established upon satisfactory completion of a reference oil test sequence that meets established reference oil targets.

9.4.1 Each calibration sequence consists of three operationally valid and statistically acceptable reference oil tests.

9.4.2 When a calibration is being performed after the twentieth non-reference oil test on a previously calibrated test stand, or after three months since the last satisfactory reference oil test, perform a single operationally valid and statistically acceptable reference oil test.

9.4.2.1 The calibration sequence consists of the new test and the last two calibration tests performed.

9.4.3 Each operationally valid test is considered statistically acceptable if the end of test pinion coast side scoring meets the Shewhart limits as published by the Test Monitoring Center. Specific Shewhart limits are defined for each gear batch and reference oil combination.

9.4.3.1 Repeat any operationally valid calibration test in the calibration sequence with an end-of-test pinion coast side scoring value exceeding the Shewhart limits until acceptable pinion scoring results are achieved.

9.5 *New Test Stand Calibration*—A new test stand is considered calibrated upon completion of satisfactory reference oil tests (assigned by the TMC) that meet established reference oil targets.

9.5.1 New test stand inspection by the TMC is also required to complete the calibration.

9.6 *In-Service Stand Calibration*—Calibrate previously referenced test stands according to instructions provided in 9.4; i.e., after every twentieth non-reference oil test, or after three months since the last acceptable reference oil test sequence.

9.6.1 Also, if any of the special circumstances described below are involved, calibrate with a new three reference oil test calibration sequence:

9.6.1.1 After a test stand is moved, or

9.6.1.2 After changing axle batches, or

9.6.1.3 After changing throttle settings, or

9.6.1.4 After changing torque settings, or

9.6.1.5 After major computer changes, or

9.6.1.6 After a test not conforming to this test method was run in the stand since the last acceptable reference test, or

9.6.1.7 After 6 months since the last valid L42 calibration test, or

9.6.1.8 After two reference oil calibration attempts are made resulting in the end-of-test pinion coast side scoring not meeting the Shewhart limits as published by the Test Monitoring Center, or the tests are statistically unacceptable or operationally invalid.

9.6.2 If a new three reference oil test calibration sequence is being attempted, there shall not be more than five attempts between the first and last run numbers.

9.6.2.1 If the discrimination oil test (see 9.7) is also required, there shall not be more than eight attempts between the first and last run numbers.

9.7 Discrimination Oil Testing - Conduct a discrimination oil test on the test stand every six months from the completion of the last test in the calibration sequence or after four calibration sequences.

9.7.1 Discrimination Oils approved by the L-42 Surveillance Panel are oils that demonstrate lower-performance levels compared to that of regular TMC reference oils.

9.7.2 The end-of-test pinion coast side scoring value of the discrimination oil test shall be a minimum of twice the average value of the three acceptable reference oil tests for the discrimination test to be considered acceptable. The discrimination oil test may be conducted at any time during the calibration sequence. If the discrimination oil test is conducted at the end of the calibration sequence and a second discrimination oil test is needed, this second discrimination oil test, if acceptable, will count as 1 of the 20 non-reference oil tests. Repeat the complete calibration sequence (the three reference oil tests and the discrimination oil test) if both discrimination oil tests do not meet the above requirements.

9.8 Correction Factor—When using TMC Reference Oil 117 for stand calibration, add 6% to the pinion scoring result and add 4% to the ring scoring result. Report both the rated scoring and the corrected scoring in the space provided in the test report.

9.9 For all reference oil tests, the end-of-test coast side pinion scoring shall be equal to or greater than the end-of-test ring coast side scoring for the test to be acceptable.

**9.10 Reference Test Frequency** – The test stand calibration period is defined as three months or 20 tests, whichever occurs first. It begins on the completion date of an operationally and statistically acceptable reference oil test series as determined by the TMC. Any test started on or before the stand calibration expiration date is defined to have been run on a calibrated stand.

9.10.1 When a test stand is out of calibration for a period of six months or longer, renumber the stand, and follow LTMS guidelines for new stand introduction.

9.10.2 Report modification of test stand apparatus or completion of any nonstandard test on a calibrated test stand to the TMC immediately.

9.11 Assign a sequential test run number to every test start on any test stand before testing begins. All tests, including aborted starts and operationally invalid tests, shall retain their test number.

9.12 *Instrument Calibration*—Calibrate the wheel and pinion speed measuring systems and axle oil temperature control system at least every six months or 60 non-reference oil tests, whichever occurs first. Perform an instrument calibration against a known standard traceable to either the National Institute of Standards and Technology (NIST) or to a physical constant.

9.12.1 Prior to each reference oil test sequence, calibrate the pinion torque measuring device using a dead weight calibration. Perform the calibration on both the positive (drive) and negative (coast) side of zero.

9.12.2 *Engine Throttle Body Calibration*—Calibrate prior to every calibration sequence.

9.12.2.1 Warm the engine up until the coolant temperature is greater than 150°F (65.6 °C).

9.12.2.2 Connect a voltmeter to the throttle position sensor (TPS) to measure the TPS voltage sent to the engine ECM.

9.12.2.3 Adjust the Foxboro/Jordon zero potentiometer to close the throttle until engine idle speed is at 675 r/min ± 75 r/min. Record the TPS voltage.

9.12.2.4 Set the throttle controller at 100% output. Adjust the Foxboro/Jordon "span" potentiometer until the observed TPS voltage is 1.3 V ± 0.1 V higher than the voltage recorded in 9.12.2.3.

*Replace the current Section 13 with the text below. Retain TABLE 2 Reference Oil Statistics.*

### **13. Report**

**15.1** For reference oil results, use the standardized report form set available from the ASTM TMC.

NOTE 4—Report the non-reference oil test results on these same forms if the results are intended to be submitted as candidate oil results against a specification.

**13.1.1** Fill out the report forms according to the formats shown in the data dictionary.

**13.1.2** Transmit results to the TMC within 5 working days of test completion.

**13.1.3** Transmit the results electronically as described in the ASTM Data Communications Committee Test Report Transmission Model (Section 2 – Flat File Transmission Format) available from the ASTM TMC. Upload files via the TMC's website.

- 13.2** Report all reference oil test results, whether aborted, invalidated, or successfully completed, to the TMC.
- 13.3** *Deviations from Test Operational Limits*—Report all deviations from specified test operational limits.
- 13.4** *Precision of Reported Units*—Use the Practice E29 rounding off method for critical pass/fail test result data. Report the data to the same precision as indicated in data dictionary.
- 13.5** In the space provided, note the time, date, test hour, and duration of any shutdown or off-test condition. Document the outcome of all prior reference oil tests from the current calibration sequence that were operationally or statistically invalid.
- 13.6** If a calibration period is extended beyond the normal calibration period length, make a note in the comment section and attach a written confirmation of the granted extension from the TMC to the test report. List the outcomes of previous runs that may need to be considered as part of the extension in the comment section.
- 13.7 When reporting the stand set-up version, use the L-42 data dictionary format of *yyyymmdd-x*; where: (1) *yyyymmdd* is the date the calibration sequence is started, and (2) *x* is a number that starts with one and is incremented each time a change is made that requires that calibration sequence to be started over.
- 13.7.1 Changing the torque settings is an example of a change that would require the calibration sequence to start over.

*Replace the current Annex A4 with the text for A4, A5, A6, and A7 below.*

#### **A4. ASTM TEST MONITORING CENTER ORGANIZATION**

**A4.1** *Nature and Functions of the ASTM Test Monitoring Center (TMC)*—The TMC is a non profit organization located in Pittsburgh, Pennsylvania and is staffed to: administer engineering studies; conduct laboratory inspections; perform statistical analyses of reference oil test data; blend, store, and ship reference oils; and provide the associated administrative functions to maintain the referencing calibration program for various lubricant tests as directed by ASTM Subcommittee D02.B0 and the TMC Executive Committee. The TMC coordinates its activities with the test sponsors, the test developers, the surveillance panels, and the testing laboratories. Contact TMC through the TMC Director at:

ASTM Test Monitoring Center  
6555 Penn Avenue  
Pittsburgh, PA 15206-4489  
[www.astmtmc.cmu.edu](http://www.astmtmc.cmu.edu)

**A4.2** *Rules of Operation of the ASTM TMC*—The TMC operates in accordance with the ASTM Charter, the ASTM Bylaws, the Regulations Governing ASTM Technical Committees, the Bylaws Governing ASTM Committee D02, and the Rules and Regulations Governing the ASTM Test Monitoring System.

**A4.3** Management of the ASTM TMC—The management of the Test Monitoring System is vested in the Executive Committee elected by Subcommittee D02.B0. The Executive Committee selects the TMC Director who is responsible for directing the activities of the TMC.

**A4.4** Operating Income of the ASTM TMC—The TMC operating income is obtained from fees levied on the reference oils supplied and on the calibration tests conducted. Fee schedules are established by the Executive Committee and reviewed by Subcommittee D02.B0.

#### **A5. ASTM TEST MONITORING CENTER: CALIBRATION PROCEDURES**

**A5.1** *Reference Oils*—These oils are formulated or selected to represent specific chemical, or performance levels, or both. They are usually supplied directly to a testing laboratory under code numbers to ensure that the laboratory is not influenced by prior knowledge of acceptable results in assessing test results. The TMC determines the specific reference oil the laboratory shall test.

**A5.1.1** *Reference Oil Data Reporting* - Test laboratories that receive reference oils for stand calibration shall submit data to the TMC on every sample of reference oil they receive. If a shipment contains any missing or damaged samples, the laboratory shall notify the TMC immediately.

**A5.2** *Calibration Testing:*

**A5.2.1** Full scale calibration testing shall be conducted at regular intervals. These full scale tests are conducted using coded reference oils supplied by the TMC. It is a laboratory's responsibility to keep the onsite reference oil inventory at or above the minimum level specified by the TMC test engineers.

**A5.2.2** *Test Stands Used for Non Standard Tests*—If a non-standard test is conducted on a previously calibrated test stand, the laboratory shall conduct a reference oil test on that stand to demonstrate that it continues to be calibrated, prior to running standard tests.

**A5.3** *Reference Oil Storage*—Store reference oils under cover in locations where the ambient temperature is between -10 °C and +50 °C.

**A5.4** *Analysis of Reference Oil*—Unless specifically authorized by the TMC, do not analyze TMC reference oils, either physically or chemically. Do not resell ASTM reference oils or supply them to other laboratories without the approval of the TMC. The reference oils are supplied only for the intended purpose of obtaining calibration under the ASTM Test Monitoring System. Any unauthorized use is strictly forbidden. The testing laboratory tacitly agrees to use the TMC reference oils exclusively in accordance with the TMC's published Policies for Use and Analysis of ASTM Reference Oils, and to run and report the reference oil test results according to TMC guidelines.

Additional policies for the use and analysis of ASTM Reference Oils are available from the TMC.

**A5.5** *Conducting a Reference Oil Test*—When laboratory personnel are ready to run a reference calibration test, they shall request an oil code via the TMC website.

**A5.6** *Reporting Reference Oil Test Results*—Upon completion of the reference oil test, the test laboratory transmits the data electronically to the TMC, as described in Section 13. The TMC reviews the data and contacts the laboratory engineer to report the laboratory's calibration status. All reference oil test results, whether aborted, invalidated, or successfully completed, shall be reported to the TMC.

**A5.6.1** All deviations from the specified test method shall be reported to the TMC.

#### **A6. ASTM TEST MONITORING CENTER: MAINTENANCE ACTIVITIES**

**A6.1** *Special Reference Oil Tests*—To ensure continuous severity and precision monitoring, calibration tests are conducted periodically throughout the year. Occasionally, the majority or even all of the industry's test stands will conduct calibration tests at roughly the same time. This could result in an unacceptably large time frame when very few calibration tests are conducted. The TMC can shorten or extend calibration periods as needed to provide a consistent flow of reference oil test data. Adjustments to calibration periods are made such that laboratories incur no net loss or gain in calibration status.

**A6.2** *Special Use of the Reference Oil Calibration System*—The surveillance panel has the option to use the reference oil system to evaluate changes that have potential impact on test severity and precision. This option is only taken when a program of donated tests is not feasible. The surveillance panel and the TMC shall develop a detailed plan for the test program. This plan requires all reference oil tests in the program to be completed as close to the same time as possible, so that no laboratory/stand calibration status is left pending for an excessive length of time. In order to maintain the integrity of the reference oil monitoring system, each reference oil test is conducted so as to be interpretable for stand calibration. To facilitate the required test scheduling, the surveillance panel may direct the TMC to lengthen and shorten reference oil calibration periods within laboratories such that the laboratories incur no net loss or gain in calibration status. To ensure accurate stand, or laboratory, or both severity assessments, conduct non reference oil tests the same as reference oil tests.

**A6.3** *Donated Reference Oil Test Programs*—The surveillance panel is charged with maintaining effective reference oil test severity and precision monitoring. During times of new parts introductions, new or re-blended reference oil additions, and procedural revisions, it may be necessary to evaluate the possible effects on severity and precision levels. The surveillance panel may choose to conduct a program of donated



reference oil tests in those laboratories participating in the monitoring system, in order to quantify the effect of a particular change on severity and precision. Typically, the surveillance panel requests its panel members to volunteer enough reference oil test results to create a robust data set. Broad laboratory participation is needed to provide a representative sampling of the industry. To ensure the quality of the data obtained, donated tests are conducted on calibrated test stands. The surveillance panel shall arrange an appropriate number of donated tests and ensure completion of the test program in a timely manner.

**A6.4** *Intervals Between Reference Oil Tests*—Under special circumstances, such as extended downtime caused by industry wide parts or fuel shortages, the TMC may extend the intervals between reference oil tests. ~~Such extensions shall not exceed one regular calibration period.~~

**A6.5** *Introducing New Reference Oils*—Reference oils produce various results. When new reference oils are selected, participating laboratories will be requested to conduct their share of tests to enable the TMC to recommend industry test targets. ASTM surveillance panels require a minimum number of tests to establish the industry test targets for new reference oils.

**A6.6** *TMC Information Letters*—Occasionally it is necessary to revise the test method, and notify the test laboratories of the change, prior to consideration of the revision by Subcommittee D02.B0. In such a case, the TMC issues an Information Letter. Information Letters are balloted semi-annually by Subcommittee D02.B0, and subsequently by D02. By this means, the Society due process procedures are applied to these Information Letters.

**A6.6.1** *Issuing Authority*—The authority to issue an Information Letter differs according to its nature. In the case of an Information Letter concerning a part number change which does not affect test results, the TMC is authorized to issue such a letter. Long-term studies by the surveillance panel to improve the test procedure through improved operation and hardware control may result in the issuance of an Information Letter. If obvious procedural items affecting test results need immediate attention, the test sponsor and the TMC issue an Information Letter and present the background and data supporting that action to the surveillance panel for approval prior to the semiannual Subcommittee D02.B0 meeting.

**A6.7** *TMC Memoranda*—In addition to the Information Letters, supplementary memoranda are issued. These are developed by the TMC and distributed to the appropriate surveillance panel and participating laboratories. They convey such information as batch approvals for test parts or materials, clarification of the test procedure, notes and suggestions of the collection and analysis of special data that the TMC may request, or for any other pertinent matters having no direct effect on the test performance, results, or precision and bias.

## **A7. ASTM TEST MONITORING CENTER: RELATED INFORMATION**

**A7.1** *New Laboratories*—Laboratories wishing to become part of the ASTM Test Monitoring System will be requested to conduct reference oil tests to ensure that the laboratory is using the proper testing techniques. Information concerning fees, laboratory inspection, reagents, testing practices, appropriate committee membership, and rater training can be obtained by contacting the TMC Director.

**A7.2** *Information Letters: COTCO Approval*—Authority for the issuance of Information Letters was given by the committee on Technical Committee Operations in 1984, as follows: "COTCO recognizes that D02 has a unique and complex situation. The use of Information Letters is approved providing each letter contains a disclaimer to the affect that such has not obtained ASTM consensus. These Information Letters should be moved to such consensus as rapidly as possible."

**A7.3** *Precision Data*—The TMC determines the precision of test methods by analyzing results of calibration tests conducted on reference oils. Precision data are updated regularly. Current precision data can be obtained from the TMC.

*Renumber existing Annexes A5 and A6 accordingly.*