A Program of ASTM International

Test Monitoring Center

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Sequence IIIF Information Letter 14-3
Sequence Number 40
December 1, 2014

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

TO: Sequence III Mailing List

SUBJECT: Standardized wording describing the role of the TMC

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.

These changes are effective with the issuance of this letter.

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Engine Oil Test Development and Support
GM Powertrain Materials Engineering

Frank. M. Farber
Director
ASTM Test Monitoring Center

Attachment

c: ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceiii/procedure_and_ils/IIIF/IL14-3.pdf

Distribution: Email

Revises Test Method D 6984-14a as modified by Information Letter 14-2

The following Table summarizes the renumbering of Annexes.

Current Annex Description	Current Annex Number	New Annex Number
Sequence IIIF Test Parts Replacement Guidelines	Annex A2	Annex A5
Sequence IIIF Determination Volume of Engine Oil Pan	Annex A3	Annex A6
Sequence IIIF Test Fuel Analysis	Annex A4	Annex A7
Sequence IIIF Test Reporting	Annex A5	Annex A8
Sequence IIIF Test Air-to-Fuel Ratio Control Flow Chart	Annex A6	Annex A9
Sequence IIIF Test Set Points and Control States	Annex A7	Annex A10
Sequence IIIF Quality Index Upper and Lower Values	Annex A8	Annex A11
Sequence IIIF Engine Oil Level Worksheet	Annex A9	Annex A12
Blowby Flow Rate Determination	Annex A10	Annex A13
Safety Hazards	Annex A11	Annex A14
Sequence IIIF Blueprint Listing	Annex A12	Annex A15
Fluid Condition Module components	Annex A13	Annex A16
Engine Build Worksheets	Annex A14	Annex A17
Engine Oil Cooling System Schematic	Annex A15	Annex A18
Guidelines For Hardware Subject To First In – First Out Criteria	Annex A16	Annex A19

Revised introduction section to address additional TMC description items

INTRODUCTION

This test method is written for use by laboratories that utilize the portions of the test method that refer to ASTM Test Monitoring Center (TMC) services (see Annex A1). Laboratories that choose not to use the TMC services may simply disregard these portions.

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. An organization such as the American Chemistry Council requires that a laboratory use the TMC services as part of their test registration process. In addition, the American Petroleum Institute requires that a laboratory utilize the TMC services in seeking qualification of oil against its specifications.

Added new note one

Note 1--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.

The following Sections have been revised to update references to Annexes, Notes or Figures in Annexes whose designation has changed.

NOTE 2—Companion test methods used to evaluate engine oil performance for specification requirements are discussed in SAE J304.

6.2 *Drawings*—Obtain the equipment drawings referenced in Annex A15 of this test method from the TMC. Because the drawings may not be to scale or may not contain dimensions, when using them to fabricate special parts, do not use a dimensionless drawing as a pattern. Drawings supplied with dimensions are considered to be correct when the temperature of the equipment is (22 ± 3) °C, unless otherwise specified.

NOTE 3—For operator safety and the protection of test components, the use of shielding and insulation on the exhaust system may be incorporated downstream of the oxygen sensor elbow.

NOTE 4—Complete test engines are not available for purchase. Test engines can be rebuilt using parts and test kits. See *Sequence IIIF Engine Assembly Manual*.[110] See Annex A5 and Annex A15 for listings of parts and related equipment.

6.4.1.4 Use the components listed in Annex A19 on a First in - First out basis. Specific guidelines are also listed in Annex A19.

6.6 *Fluid Conditioning Module*[121 ,132] —To control the following parameters: engine coolant, condenser coolant, oil cooler coolant, exhaust manifold coolant, and the test fuel supply. The system incorporates the following features: pumps, flow meters, flow control and three-way control valves, external heating and cooling systems, pressure regulator and low-point drains. The system integrates with the test stand data acquisition and control computer for process control. If a test laboratory wishes to build it's own fluid conditioning module, a list of suitable equipment can be found in Annex A16.

6.9 *Condenser Cooling System*—This system, contained in the Fluid Conditioning Module, supplies non-pressurized coolant at a flow rate of (10 ± 2) L/min and temperature controlled at 40 °C (see Annex A11) at the condenser outlet. The system incorporates the following features: condenser heat exchanger, BX-212-1 or OHT3F-075-1:[12 ,144] condenser adapter fitting, pump, magnetic-type flow meter, flow control and three-way control valves, external heating and cooling systems, and low-point drains. The system integrates with the test stand data acquisition and control computer for process control and maintains the specified coolant temperature and flow.

6.10 *Engine Oil-Cooling System*—The system consists of an oil filter adapter, engine-mounted oil cooler, and gaskets as specified in the Engine Assembly Manual, Section 8 Sheet 3 & 3a and a shell-and-tube heat exchanger. The engine oil-cooling system uses engine coolant pumped from the Fluid Conditioning Module through a three-way control valve to the oil cooler circuit which contains a heat exchanger prior to the engine-mounted oil cooler. To maintain the specified oil temperature of 150 °C at the oil filter adapter, the three-way control valve varies the coolant flow as necessary through the oil cooler circuit. The heat exchanger in the oil cooler coolant circuit is a tube-and-shell style and uses process water as the cooling media (see Fig. A18.1). When testing high-oxidation sensitive oils, the oil cooling system may go into a bypass mode, causing the engine-mounted oil cooler to be bypassed. In this condition, the TMC may allow engineering judgment for the oil temperature Quality Index on reference oil tests.

6.12 *Induction Air Supply Humidity, Temperature, and Pressure*—Maintain the throttle body intake air at a moisture content of (11.4 ± 0.7) g/kg of dry air, a dry bulb temperature of (35 ± 2) °C, and a static pressure of 0.050 kPa (see Annex A10). Measure temperature and pressure at the inlet air adapter.

6.14 *Air-to-Fuel Ratio Determination*—Determine the engine air-to-fuel ratio (AFR) by measuring the CO, CO_2, and O_2 components of the exhaust gas sample with electronic exhaust gas analysis equipment. When using electronic exhaust gas analyzers, take particular care to dry the exhaust gas sample prior to introducing it into the analyzer. Take the exhaust gas samples from the exhaust manifold exit flanges. See Annex A9. (See Sequence IIIF Engine Assembly Manual, Section 8 Sheet 1.)

7.1 *Test Fuel*—Use only EEE unleaded fuel[12 ,155] (**Warning**—Flammable. Health Hazard.) (see Annex A7,Table A7.1), observing the following:

7.5 *Pre-Test Cleaning Materials*—Use the cleaning materials (**Warning**—See appropriate MSDS.) specified in the following list for cleaning of parts to be used in the test. Do not use unapproved substitutes (see Note 5).

NOTE 5—Only these specific materials and sources have been found satisfactory. If chemicals other than these are proposed for use, equivalency shall be proven and approval obtained from the TMC.

NOTE 6—If permitted by the hazardous materials disposal practices in a laboratory, sodium carbonate can be used to neutralize the oxalic acid in used Sequence IIIF Test component cleaner.

NOTE 7—A Sequence IIIF Test can be conducted with a sample of test oil as little as 10 L, provided that no spillage or leakage occur during test preparation. The greater quantity is specified to accommodate minor spillage and leakage.

9.7.3 *Hardware Information*—Complete Form 12, Hardware Information, in standardized report form set (see Annex A8).

9.8.1 Install the new parts listed in Annex A5, Table A5.1 for each test.

9.8.2 Install the new parts listed in Annex A5, Table A5.2, only if the used part is no longer suitable for test purposes.

9.10.1.3 Record the top and bottom ring gaps on Form 12, Hardware Information, in the standardized report form set (see Annex A8). Record and report ring gaps in millimeters.

NOTE 8—Camshafts should not sit dry inside the engine block waiting for final assembly more than 24 h.

NOTE 9—To make the balancer a slip-fit, remove the rolled edge on the inside diameter of the balancer until the balancer slips easily over the crankshaft.

NOTE 10—Ensure the cut out area of the windage tray/oil pan gasket does not interfere with the oil dipstick and modify if necessary.

9.47.8 Stop the circulation pump, open the engine block petcocks, and drain the contents of the engine and flushing tank into a suitable container (see Note 11).
NOTE 11—Before disposal, the drained material should be neutralized according to applicable local and federal hazardous material

10.1 *Laboratory and Engine Test Stand Calibration*—To maintain testing laboratory and engine test stand calibration status for Sequence IIIF engine oil testing, follow the procedures given in Section 12.13 and Annexes A1-A4.

NOTE 12—Paragraph 12.13 and Annexes A1-A4 describe the involvement of the TMC in respect to calibration procedures and acceptance criteria for a testing laboratory and a test stand, and the issuance of Information Letters and memoranda affecting the test method.

10.2 *Testing of Reference Oils*—Periodically conduct tests on reference oils according to the following:
10.2.1 Conduct reference oil tests on each calibrated test stand within a laboratory according to ASTM Test Monitoring Center[268] guidelines.

10.2.2 Obtain reference oils directly from the TMC. These oils are formulated or selected to represent specific chemical types 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 the test results. The TMC will determine which specific reference oil the laboratory shall test.

Deleted existing 10.2.3 and renumbered 10.2.4 as 10.2.3

10.2.3 Assign a stand test number to each Sequence IIIF test. The number shall include the stand number, the number of Sequence IIIF tests conducted on the stand since the last reference oil test was conducted (0 to 15), and a sequential laboratory test number based on the starting date of the test. For example, 60-03-785 defines a Sequence IIIF test on stand number 60, which is the third non-reference oil test run on stand 60 since successful completion of a reference oil test, and was the 785th Sequence IIIF test in the laboratory. The only exception to this format is that the sequential laboratory test number shall have the letter A appended for the first rerun, B for the second, and so forth, for invalid or unacceptable reference oil tests. The laboratory test number shall still be increased on tests receiving a letter suffix on the lab run number. For example, if test number 60-0-100 was aborted and the next sequential laboratory run number at the time the rerun is started is 108, the test number for this rerun would be 60-0-108A.

Delete Section 10.4 and renumber remaining sections accordingly.

10.8.9.2 See Annex A11 for maximum allowable system time responses for the data acquisition system.

10.8.10.1 The upper and lower values used for QI calculations for the required parameters are listed in Annex A11.

10.8.11 Calibrate the stand instrumentation used for data acquisition and control, on all controlled and non-controlled parameters (see Annex A10), every six months.

NOTE 13—A stand can be IIIF calibrated in accordance with this test method and IIIG calibrated in accordance with Test Method D7320. A stand that was IIIF or IIIG calibrated within the previous year can be calibrated as both a IIIF and IIIG stand. If the stand was not IIIF or IIIG calibrated within the past year, follow the LTMS guidelines for new stand requirements to obtain IIIF or IIIG calibration.

11.3 *Engine Start-up and Shutdown Procedures*—Start and stop Sequence IIIF engines according to the following procedures and the test states and set points listed in Annex A10.

11.8.4 Determine the oil level after the 15 min period, in millimetres, using the calibrated dipstick (see Annex A9).

11.8.5 Following the initial run, record the oil level on Fig. A12.1, according to 11.8.6. Use this level as the full mark for the test. Enter zero millilitres as the computed oil level on Fig. A12.1.

11.8.7 After each 20 h of the 100 h test, except at the end of test, add oil to the crankcase from the leveling sample of 472 mL to bring the oil level, as nearly as possible, back to that following the initial run. At the end of test, return the entire 472 mL purge sample to the engine. Discard any excess leveling sample. Record the results on Fig. A12.1.

11.9 *Air-to-Fuel Ratio Measurement and Control*—Measure the air-to-fuel ratio using the lambda sensors throughout the test. Control the air-to-fuel ratio using the lambda sensor output as feedback for the Powertrain Control Module. See Annex A9.

11.10.2 Enter either Fig. A9.2 or Fig. A9.3, constructed for the Sequence IIIF fuel, with the CO_2, CO, and O_2 values to determine the air-to-fuel ratio.

11.10.3.3 In either Fig. A9.2 or Fig. A9.3, enter the corrected O_2 and CO_2 values to determine the air-to-fuel ratios for the two gases, that shall agree within 0.5 air-to-fuel ratio.

NOTE 14—Temperature stabilization is necessary to reduce condensation precipitation of the blowby gases. The moisture content of blowby gases is generally between 17 g/kg and 20 g/kg. Correction factors are based on this and other average gas-analysis data of the blowby gases. Therefore, it is important that the blowby gases being measured at the orifice plate be as close in molecular composition and temperature as possible to the blowby gases exiting the condenser.

11.11.13 Record the uncorrected blowby flow rate in litres per minute and correct it for an atmospheric pressure of 100 kPa and a temperature of 37.8 °C, using the correction factors given in Table A14.1.

11.11.14 Alternatively, use the following equation, on which Table A10.1 is based, to correct the blowby flow rate:

11.13 *Data Recording*—Record data for all parameters listed in Fig. A10.1 at a minimum of every 2 min.

11.14.8 Follow 11.7 and 11.8 to determine the oil level after drain-down, in mm; record the value on Fig. A12.1. Use this level as the full mark for the test.

11.15.4 Operate the engine under the test conditions listed in Annex A10.

11.15.5 For each 20 h segment of the engine oil quality testing period of 100 h, test time is counted from the moment when all the test conditions listed in Annex A10 are reached and stabilized. Start calculating QI values when temperatures are stable or when test state warm up times are exceeded. See Annex A10. If engine is shut down for any reason except oil leveling, start counting down time. Maximum allowable down time for the IIIF test is 24 h.

11.15.6 Every 20 h, conduct the oil sampling and oil leveling according to 11.5 and 11.6. See Fig. A12.1. Record the time when the final leveling is completed at 100 h; be aware that completion of most of the engine disassembly takes place within 12 h of this time. See 12.2.1.

12.3.1.1 Determine which rings are hot-stuck or cold-stuck (see 3.1.12 and 3.1.5, respectively, for definitions of hot-stuck and cold-stuck rings) and record the piston number and ring identification (for example, piston No. 3, top ring) for such rings on Form 8, Summary of Oil Ring Land Deposit Rating, in standardized report form set (see Annex A8). Record the total number of hot-stuck rings on Form 4, Test Result Summary, in the standardized report form set (see Annex A8).

12.4.2.2 Report any unusual deposits observed in the comments section of Form 9 in standardized report form set (see Annex A8).

12.4.5 Calculate the average of the six oil ring land (land three) ratings and record this as the average oil ring land deposits on Form 8 and on Form 4 in standardized report form set (see Annex A8).

12.5.9 Calculate the cam-plus-lifter wear by adding the values obtained in 12.5.8. Record the results on Form 7, Valve Lifter and Camshaft Wear Results, in standardized report form set (see Annex A8). Store the cam and lifters; the method and length of time for storage are left up to the laboratory.

12.5.10 Determine the maximum, minimum, and average camshaft-lobe, valve-lifter, and cam-plus-lifter wear. Record the values on Form 7 in standardized report form set (see Annex A8).

12.5.11 Calculate the screened average cam-plus-lifter wear by determining which positions in the engine have the maximum and minimum cam-plus-lifter wear results. Exclude these two positions from the calculation and then calculate the screened average cam-plus-lifter wear based on the remaining ten positions in the engine. Record these results on Forms 4 and 7 in the standard report form set (see Annex A8).

12.6.1 Run a cold-cranking simulator (CCS) test (Test Method D5293) on the end-of-test (80 h) drain at successively higher temperatures until you obtain a passing result using the table shown in SAE J300. Consider the W-grade corresponding to the temperature required for a passing result as the used oil, passing viscosity grade. One grade less than the new oil viscosity grade is suggested as a starting point. Report the results on Form 6 in the standardized report form set (see Annex A8).

12.6.2.2 If a yield stress exceeding 35 Pa is not obtained at the designated temperature, report the yield stress <35 to indicate that the yield stress did not exceed 35 Pa. Record the apparent viscosity in pascal seconds. Report the results on Form 6 in the standardized report form set (see Annex A8).

12.6.3 If the percent viscosity increase for the kinematic viscosity at EOT is higher than 500 % (see 12.7), the cold-cranking simulator and mini rotary viscometer tests are not required. A notation is required in the Other Comments and Outliers section of Form 13 (see Annex A8) indicating that the CCS and MRV were not run, and enter not measured (NM) in the standardized report form set (see Annex A8).

12.6.4 If the test oil is a straight-grade oil, the cold-cranking simulator and mini rotary viscometer tests are not required. A notation is required in the Other Comments and Outliers section of Form 13 (see Annex A8) indicating that the CCS and MRV were not run, and enter not measured (NM) in the standardized report form set (see Annex A8).

12.6.5 Record the results (see Annex A8).

12.7.7 Calculate the change in viscosity in mm^2/s, from the value for the initial sample, for the last five samples. Record the changes on Form 6, Used Oil Analysis Results, in standardized report form set (see Annex A8). Record the final percent viscosity increase on Form 4, Test Result Summary, in standardized report form set (see Annex A8).

12.7.8.1 Instructions for calculating and reporting results if the Final Original Units Result on Form 4 (see Annex A8) for percent viscosity increase is zero or negative.

12.7.8.2 The minimum result that will be considered for the percent viscosity increase is 0.1 %. Substitute 0.1 % for the original unit result and complete the calculations on Form 4 (see Annex A8). A notation is required in the Other Comments & Outliers Section of Form 13 (see) indicating that the Original Units Result has been modified for a special case.

12.7.8.3 Instructions for calculating and reporting results of the Viscosity Result on Form 6 (see Annex A8) for Viscosity Increase Data is Too Viscous to Measure (TVTM).

12.7.8.4 The maximum kinematic viscosity result reported will be 8000 mm^2/s using either equipment noted in 12.7.3, use a tube size of 500 or less. If the measured viscosity is 8000 mm^2/s using tube size 500, this will be considered the maximum reportable viscosity. Report 8000 mm^2/s on Form 6 (see Annex A8) for entry in the column listed as Viscosity and use this value for the calculating Change and Percent. (This will provide consistent TVTM data for reporting purposes and it also expands the maximum viscosity to fill the space allowed by the Data Dictionary.)

12.7.8.5 Complete the calculations on Form 4 (see Annex A8) for percent viscosity increase using the percent value for the final drain from Form 6 except that the Severity Adjustment (SA) displayed and used for percent viscosity increase calculations will be set to zero (0). A notation is required in the Other Comments & Outliers Section of Form 13 (see Annex A8) indicating that the Severity Adjustment has been modified for a special case.

12.7.9 For the calculations listed in the following sections12.7.10, 12.7.10.1, 12.7.10.2, 12.7.10.3, 12.7.10.4, and 12.7.10.5, the minimum result that will be considered for the percent viscosity increase is 0.1 %. When negative or zero percent viscosity increase results are encountered, substitute 0.1 % for the original unit result and complete the calculations. A notation is required in the Other Comments and Outliers section of Form 13 (see Annex A8) indicating that the percent viscosity result used for interpolation has been modified for a special case.

12.8 *Testing Oil Samples for Wear Metals*—Use Test Method D5185 to perform Inductively Coupled Plasma Optical Emission Spectrometry (ICP) Analysis on the initial and all 10 h oil samples for iron, copper, and lead concentrations in the oil. Report the results of the ICP Analysis on these three metals on Form 6 (see Annex A8).

12.9 *Blowby Flow Rate Measurements*—Plot blowby flow rate measurements on Form 10, Blowby Results & Plot, in standardized report form set (see Annex A8).

12.10.1 See note 1 of Fig. A12.1 for the oil-consumption calculation equation.

12.10.2 Determine the total fresh oil added to the engine during the initial oil leveling run and 10 h test periods in of Fig. A12.1. Enter the total in the End-Of-Test Total column on Fig. A12.1 in position *a*.

12.10.3 Determine the total amount of oil discarded during the 80 h test periods in Fig. A12.1. Enter

the total in the end-of-test total column on Fig. A12.1 in position *b*.

12.10.4 Determine the computed oil level in millilitres at the end of the test in Fig. A12.1. The computed oil level is found by subtracting 708 mL from the oil level as measured on the dipstick, to account for samples not returned (236 mL oil sample and 472 mL of new oil) to the engine as in previous shutdowns. Enter the number in the end-of-test total column on Fig. A12.1 in position *c*.

12.10.5 Add the values determined in 12.10.2 and 12.10.4, and subtract the value determined in 12.10.3. Subtract 236 mL (the final oil sample, which is not replaced with new oil) from the value computed above and enter the remainder, which is the amount of oil consumed in the test, in the blank for total oil consumption in the Fig. A12.1.

12.13 *Severity Adjustments*—Calculate severity adjustments (SA) for results of non-reference engine oil tests. Use the control chart technique (see 12.13.1) for determining the laboratory bias for percent viscosity increase, piston skirt varnish, and weighted piston deposits. Enter the adjustments on Form 4, Test Result Summary, in standardized report form set (see Annex A8).

12.14.2 Inspect the test records for instances of downtime (excluding the initial oil level run of the test), and record any such instances on Form 13, Downtime and Outlier Report Form, in standardized report form set (see Annex A8). When performing each 20 h oil level adjustment, identify as downtime any time in excess of 55 min from the time when the engine ramps down until the test is back on test operating conditions. Enter the total downtime on Form 13, Downtime and Outlier Report Form, in standardized report form set (see Annex A8). If the total downtime exceeds 24 h, note on Form 1, in standardized report form set (see Annex A8) that the test is invalid.

13.1 For reference oil results, use the standardized report form set available from the ASTM TMC and data dictionary for reporting test results and for summarizing operational data.

NOTE 15—The non-reference oil test results should also be reported 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.

NOTE 16—"Intermediate precision" is the appropriate term for this test method, rather than "repeatability," which defines more rigorous within-laboratory conditions.

ANNEXES
(Mandatory Information)

A1.1 *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 ASTM 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

A1.2 *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.

A1.3 *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.

A1.4 *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.

A2. ASTM TEST MONITORING CENTER: CALIBRATION PROCEDURES

A2.1 *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.

A2.1.1 *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.

A2.2 *Calibration Testing:*

A2.2.1 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 on-site reference oil inventory at or above the minimum level specified by the TMC test engineers.

A2.2.2 *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.

A2.3 *Reference Oil Storage*—Store reference oils under cover in locations where the ambient temperature is between -10 °C and +50 °C.

A2.4 *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.

A2.5 *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.

A2.6 *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 15. 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.

A2.6.1 All deviations from the specified test method shall be reported.

A3. ASTM TEST MONITORING CENTER: MAINTENANCE ACTIVITIES

A3.1 *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.

A3.2 *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.

A3.3 *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.

A3.4 *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.

A3.5 *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.

A3.6 *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.

A3.6.1 *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.

A3.7 *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.

A4. ASTM TEST MONITORING CENTER: RELATED INFORMATION

A4.1 *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.

A4.2 *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."

A4.3 *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

CURRENT ANNEXES A2 THROUGH A16 HAVE BEEN RENUMBERED A5 THROUGH A19.
REVISE NUMBERING ACCORDINGLY.
DELETE CURRENT ANNEX A1 AND REPLACE WITH ANNEXES A1 THROUGH A4.