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OSCT Information Letter 06-1
Sequence No. 8
March 27, 2006

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

TO: OSCT Mailing List

SUBJECT: 1. Addition of a Calibration Procedure for the Tension Testing Machine
2. New Reference Oil Testing Section
3. Editorial Changes

1. At the February 7, 2006 OSCT Surveillance Panel meeting, the panel approved a motion to add a calibration procedure for the tension testing machine. A revised Section 6.1.2 and a new Annex A2 of Test Method D5662 are attached.

2. At the February 7, 2006 OSCT Surveillance Panel meeting, the panel approved a motion to add a new reference oil testing section to Test Method D5662. Old Section 9 has been deleted and a new Section 9 is attached.

3. At the February 7, 2006 OSCT Surveillance Panel meeting, the panel approved a motion to update Test Method D 5662 with several editorial changes. The editorial changes are attached.

These changes are effective the date of this information letter.

Don Bell
Acting Chairman
OSCT Surveillance Panel

John L. Zalar
Administrator
ASTM Test Monitoring Center

Attachment

c: ftp://ftp.astmtmc.cmu.edu/docs/gear/osct/procedure_and_ils/il06-1.pdf

Distribution: Email

(Revises Test Method D 5662-99 as amended by Information Letters 05-1 and 05-2)

1.3 The values stated are in SI units.

2.1 *ASTM Standards:* [3]
D 412 Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension
D 471 Test Method for Rubber Property—Effects of Liquids
D 2240 Test Method for Rubber Property—Durometer Hardness
D 5704 Test Method for Evaluation of the Thermal and Oxidative Stability of Lubricating Oils Used for Manual Transmissions and Final Drive Axles
D 5760 Specification for Performance of Manual Transmission Gear Lubricants
E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 *SAE Standard:* [4]
J2360 Lubricating Oil, Gear Multipurpose (Metric) Military Use

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[4] Available from the Society of Automotive Engineers Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

4.2 The duration of these tests is 240 h. The reference oils are available from the ASTM Test Monitoring Center (TMC).[5] The seal materials are available through a Central Parts Distributor (CPD).[6]

5.1 There are several major causes of automotive lubricant-related seal failures. This test method addresses only those failures caused by excessive elastomer hardening, elongation loss, and volume swell and attempts to determine the likelihood that an oil might cause premature sealing system failures in field use. This test method may be used as a requirement of a performance specification, such as Specification D 5760 and J2360.

Delete Table 1

6.1.2 *Tension Testing Machine*—See Test Method D 412. Set the testing machine rate of grip separation for the percent elongation change determinations at 8.5 ± 0.8 mm/s. Calibrate the tension testing machine as per Annex A2.

7.1 Specific reference test oils are maintained and distributed by the TMC.[3] To receive the test oils and seal materials, individual laboratories shall commit to furnishing the TMC with reference data developed using these reference materials.

7.3 Specific reference seal elastomers used are a nitrile (NI), a polyacrylate (PA), and a fluoroelastomer (FL). Notation of the numbering system is established by the TMC as follows:
[Type] Y

where:

Type	=	NI, PA, FL,
Y	=	Batch number of the particular formulation

8.2 Prior to cutting specimens and prior to performing elongation tests for initial properties, allow 3 h for the elastomer to warm to 23 ± 2°C, as required by Test Method D 412. Referring to the procedure in Test Method D 412, use Die C to cut a set of twelve dumbbell specimens out of the elastomer sheets as required for each reference and non-reference oil tested.

Delete Table 2
Delete Section 8.2.5
Renumber 8.2.6 to 8.2.5
Delete Section 8.2.7

8.2.6 Use the water displacement procedure in accordance with Test Method D 471 to determine the initial volume measurements. Weigh the coupon in air, M1, to the nearest 1 mg. For the weight in water, immerse the coupon in a 1.0 % wetting solution of aerosol OT, then place the coupon in distilled water, M2, at ambient temperature. Make sure no air bubbles are clinging to the coupon surface before recording the weight to the nearest 1 mg.

Renumber 8.2.8 to 8.2.7
Delete Section 8.3.1

8.4.3 Test the non-reference oil using one or more of the three different seal elastomers with the same batch of elastomers as being used for the reference oil.

8.6 Determine type A hardness testing, percent volume in air and water, and percent elongation as done in Sections 8.2.6 and 8.2.7. Testing shall be completed within 2 h of removal from the test oil.

8.7.3 For each data set, calculate the average value and the sample standard deviation using the equation:

$$\sigma = \sqrt{\frac{\sum\left(x_i - \overline{x}\right)^2}{n-1}} \qquad (1)$$

where:

σ	=	sample standard deviation,
n	=	number of data points in the set,
x_I	=	individual data set value, and
$\overline{x}$	=	mean of the data set.

$$\text{Change in volume, \%} = [(M3 - M4) - (M1 - M2)] / (M1 - M2) \times d \times 100 \qquad (2)$$

where:

M1	=	the original weight in air,
M2	=	the original weight in water,
M3	=	the end of test weight in air,
M4	=	the end of test weight in water, and
d	=	the density of the medium in which the specimen was weighed. In this case water is used, so the multiplication is by 1.

(Revises Test Method D 5662-99 as amended by Information Letters 05-1 and 05-2)

Delete Section 8.8
Delete Annex A2
Delete Annex A3

Delete All of the Old Section 9, New Section 9 Below

9. Reference Oil Testing

9.1 Test the TMC reference oils along with each batch of non-reference oil tests. Run the reference oils simultaneously with, and in the same bath as, the non-reference oils.

(Revises Test Method D 5662-99 as amended by Information Letters 05-1 and 05-2)

NOTE 1—Annex A1 discusses the involvement of the ASTM TMC with respect to the reference test-monitoring program.

9.1.1 Prior to requiring a reference oil test, procure a supply of reference oils directly from the TMC. These oils have been formulated or selected to represent specific chemistry types, or performance levels, or both. Each reference oil sample is identified using a unique set of identification codes on the container labels.

9.1.1.1 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 according to TMC guidelines.

NOTE 2—Policy for the Use and Analysis of ASTM Reference Oils is available from the TMC.

9.1.2 Request reference oil assignments from the TMC for this test method. The TMC will determine the specific reference oils to be tested by the laboratory. Assignments will be made by the unique identifying codes on the reference oil container labels. Provide the TMC with the bath identification number for each test.

9.1.3 Run the TMC reference oil tests according to the test method and in the same manner as the non-reference oil test(s).

9.1.4 *Reporting of Reference Oil Test Results*—For reference oil tests, the standardized report form set and data dictionary for reporting the test results and for summarizing the operational data are required. The report forms and data dictionary are available on the ASTM Test Monitoring Center Web Page at http://www.astmtmc.cmu.edu/ or can be obtained in hardcopy format from the TMC.

9.1.4.1 Report only the reference oil results to the TMC. Do not include any non-reference test data. Complete all of the required blank fields on the forms. Round test results according to Practice E 29.

9.1.4.2 When reporting reference oil test results to the TMC, transmit via the ASTM Data Communications Committee Test Report Transmission Model (see Section 2—Flat File Transmission Format) available from the ASTM TMC. Transmit the complete report form package and any other supporting information to the ASTM TMC within five days of test completion. A copy of the final test report shall be mailed within 30 days of test completion to the ASTM Test Monitoring Center, 6555 Penn Avenue Pittsburgh, PA 15206-4489.

9.1.5 *Evaluation of Reference Test Oil Results*—Upon receipt of the transmitted TMC reference oil test results, the TMC will review the tests for operational adherence to the published test method. If the tests are found to be operationally valid, the reference oil results will be evaluated using acceptance criteria established by the governing surveillance panel. The reference oil acceptance criteria are subject to change at the discretion of the surveillance panel.

9.1.5.1 If the transmitted tests are found to be both operationally valid and statistically acceptable, the testing laboratory will be notified of the acceptable status of the reference test.

9.1.5.2 In the event that a TMC reference oil test is found to be unacceptable, an explanation of the problem relating to the failure will be provided to the testing laboratory. If there is an obvious operational reason for the failed test, the problem shall be corrected before requesting additional TMC reference oil assignments. If the reason for the failure is not obvious, all test-related equipment shall be re-checked for compliance to the test method and good laboratory practice. Following this re-check, the TMC will assign the necessary TMC reference oils for testing.

9.1.5.3 Should a reference test be determined to be statistically or operationally invalid, repeat all testing on that particular oil/elastomer pair.

9.1.6 *Status of Non-reference Oil Tests Relative to TMC Reference Oil Tests*— The batch of non-reference oil tests, which accompany the reference oil tests, are considered valid only if the results of the reference oil tests are determined to be statistically and operationally valid.

9.2 *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 baths. The surveillance panel shall arrange an appropriate number of donated tests and ensure completion of the test program in a timely manner.

(Revises Test Method D 5662-99 as amended by Information Letters 05-1 and 05-2)

A2. Manual Extensometer Calibration Procedure

A2.1 Use this procedure to manually calibrate an Instron-type extensometer.

A2.1.1 Set the switch on the control panel to SI units.

A2.1.2 Press the IEEE 488 key to disconnect the unit from the computer. The light will go out.

A2.2 Extension Calibration

A2.2.1 Use the jog key to drive the crosshead to a gauge length of approximately 60 mm.

A2.2.2 Press the GL Reset key to enter the new gauge length into the system memory and reset the extension display to 0.00.

A2.3 Extensometer Grip Calibration

A2.3.1 Set the extensometer grip length using the calibrated Instron ruler.

A2.3.2 Swing the extensometer arms to the side of the pneumatic grips.

A2.3.3 Place the upper extensometer grip knife blade in the 0 mm groove and the lower extensometer grip knife blade in the 25 mm groove. Use the thumb screws to adjust the barrels behind the knife blade arms so that there is no gap between the barrels.

A2.4 Load Calibration

A2.4.1 Press the LOAD BAL key. The LOAD BAL indicator will light.

A2.4.2 Press the ENTER key. The load display will go blank and then show 0.00. The indicator light will also go out.

A2.4.3 Press the LOAD CAL key. The LOAD CAL indicator will light.

A2.4.4 Press the ENTER key. The load display will go blank and then show 0.00. The indicator light will also go out.

A2.5 Strain Calibration

A2.5.1 Verify the knife blades are still in the grooves at 25mm apart.

A2.5.2 Press the STRAIN BAL key. The STRAIN BAL indicator will light.

A2.5.3 Press the ENTER key. The strain display will go blank and then show 0.00. The indicator light will also go out.

A2.5.4 Press the STRAIN CAL key. The STRAIN CAL indicator will light.

A2.5.5 Type in 1000 and press the ENTER key.

A2.5.6 Move the upper extensometer grip knife blade to the 250 mm groove on the ruler, keeping the lower knife blade in the 25 mm groove. Do not make any adjustments to the barrels in back.

A2.5.7 Type in 1000 and press the ENTER key. The STRAIN CAL indicator light turns off and the strain display reads 1000.

A2.5.8 Remove the ruler from the extensometer grips and return the grips to the start position.

A2.5.9 Press the IEEE 488 Key to connect the unit to the computer. Calibration is complete.