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L-60-1 Information Letter 16-1
Sequence Number 49
May 26, 2016

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-60-1 Surveillance Panel

SUBJECT: Several editorial changes to clarify how test results are to be reported.

In revising the L-60-1 test procedure (D5704) to add the Carbon Varnish correction factor and alter how data transformations were used, Section A11 was overlooked. Revised wording for section A11 is attached.

Also, during its February 10, 2016 meeting, the L-60-1 Surveillance Panel approved additional wording that will round the final, corrected and severity adjusted reported value for any test result above or below the scale used for the parameter. Sections 14.3 and A11 have been revised accordingly.

These changes are effective immediately.

Brad Bubonic
Chairman
L-60-1 Surveillance Panel

Frank M. Farber
Director
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Attachments

cc: ftp://ftp.astmtmc.cmu.edu/docs/gear/l601/procedure_and_ils/il16-1_L601.pdf

Distribution: Email

(Revises Test Method D 5704-16)

A11. CONTROL CHART TECHNIQUE FOR SEVERITY ADJUSTMENT (SA)

A11.1 *Viscosity Increase SA*—Apply an exponentially weighted moving average (EWMA) technique to standardized calibration test Viscosity Increase results. Standardize transformed values using delta/s ((result – target)/standard deviation). The targets and standard deviations for current reference oils are published by the ASTM TMC.

A11.1.1 Include all operationally valid reference tests in a stand control chart. Chart tests in order of completion date and time. A minimum of two tests is required to initialize a control chart. Calculate EWMA values using Eq A11.1.

$$Z_i = 0.2(Y_i) + 0.8(Z_{i-1}) \qquad (A11.1)$$

where:

Z_0 = 0 and Y_i = standardized test result, and

Z_i = EWMA of the standardized test result at test order i.

If the absolute value of the EWMA, rounded to three places after the decimal, exceeds 0.653, then apply an SA to subsequent non-reference oil results.

A11.1.2 The following example illustrates the application of Eq A11.1 for determining the application of Viscosity Increase SA.

$$Z_i = 0.694 \text{ and } Y_2 = 1.247 \qquad (A11.2)$$

$$EWMA = 0.2(1.247) + 0.8(0.694) = 0.805$$

A11.1.2.1 Since $|0.805| > 0.653$, apply an SA to subsequent non-reference oil tests. Multiply 0.805 by 7.659. This value (7.659) is the viscosity increase pooled standard deviation of oils 148-1 and 151-2. Multiply this result by –1 and round to a whole number. Record this value on the Test Results Summary of the test report in the space for Viscosity Increase SA. Add this value to the corrected non-reference oil Viscosity Increase result and record this value in the Final Original Unit Viscosity Increase result space on the Test Results Summary. An SA will remain in effect until the next reference test. At that time, calculate a new EWMA.

A11.2 *Pentane Insolubles SA*—Apply an EWMA technique to standardized calibration test Pentane Insolubles results. Standardize transformed values using delta/s ((result – target)/standard deviation). The targets and standard deviations for current reference oils are published by the ASTM TMC.

A11.2.1 Include all operationally valid reference tests in a stand control chart. Chart tests in order of completion date and time. A minimum of two tests is required to initialize a control chart. Calculate EWMA values using Eq A11.1. If the absolute value of the EWMA (rounded to three places after the decimal) exceeds 0.653, then apply an SA to subsequent non-reference oil results.

A11.2.2 The following example illustrates the use of Eq A11.1 for determining the application of a Pentane Insolubles SA.

$$Z_1 = 0.570 \text{ and } Y_2 = 1.195 \qquad (A11.3)$$

$$EWMA = 0.2(1.195) + 0.8(0.570) = 0.695$$

A11.2.2.1 Since $|0.695| > 0.653$, apply an SA to subsequent non-reference oil tests. Multiply 0.695 by 0.413. This value (0.413) is the pentane pooled standard deviation of oils 148-1 and 151-2. Multiply this

result by –1 and round to one decimal place. Record this value on the Test Results Summary page of the test report in the space for Pentane Insolubles SA. Add this value to the corrected non-reference oil Pentane Insolubles result and enter this value in the space for the Final Original Unit Pentane Insolubles result. If this value is less than 0, report 0. An SA will remain in effect until the next reference test. At that time, calculate a new EWMA.

A11.3 *Toluene Insolubles SA*—Apply an EWMA technique to standardized calibration test Toluene Insolubles results. Standardize transformed values using delta/s ((result – target)/standard deviation). The targets and standard deviations for current reference oils are published by the ASTM TMC.

A11.3.1 Include all operationally valid reference tests in a stand control chart. Chart tests in order of completion date and time. A minimum of two tests is required to initialize a control chart. Calculate EWMA values using Eq A11.1. If the absolute value of the EWMA (rounded to three places after the decimal) exceeds 0.653, then apply an SA to subsequent non-reference oil results.

A11.3.2 The following example illustrates the use of Eq A11.1 for determining the application of a Toluene Insolubles SA.

$$Z_1 = -0.572 \text{ and } Y_2 = -1.469 \qquad (A11.4)$$

$$EWMA = 0.2(-1.469) + 0.8(-0.572) = -0.751$$

A11.3.2.1 Since $|-0.751| > 0.653$, apply an SA to subsequent non-reference oil tests. Multiply – 0.751 by 0.249. This value (0.249) is the toluene pooled standard deviation of oils 148-1 and 151-2. Multiply this result by –1 and round to one decimal place. Record this value on the Test Results Summary of the test report in the space for Toluene Insolubles SA. Add this value to the corrected non-reference oil result and enter this value in the space for the Final Original Unit toluene result. If this value is less than 0, report 0. An SA will remain in effect until the next reference test. At that time, calculate a new EWMA.

A11.4 *Average Carbon Varnish SA*—Apply an EWMA technique to standardized calibration test Carbon/Varnish results. Standardize transformed values using delta/s ((result – target)/standard deviation). The targets and standard deviations for current reference oils are published by the ASTM TMC.

A11.4.1 Include all operationally valid reference tests in a stand control chart. Chart tests in order of completion date and time. A minimum of two tests is required to initialize a control chart. Calculate EWMA values using Eq A11.1. If the absolute value of the EWMA (rounded to three places after the decimal) exceeds 0.653, then apply an SA to subsequent non-reference oil results.

A11.4.2 The following example illustrates the use of Eq A11.1 for determining the application of a Carbon/Varnish SA.

$$Z_1 = 0.667 \text{ and } Y_2 = -1.062 \qquad (A11.5)$$

$$EWMA = 0.2(1.062) + 0.8(0.667) = 0.746$$

A11.4.2.1 Since $|0.746| > 0.653$, apply an SA to subsequent non-reference oil tests. Multiply 0.746 by 0.511. This value (0.511) is the average carbon varnish pooled standard deviation of oils 148-1 and 151-2. Multiply this result by –1 and round to one decimal place. Record this value on the Test Results Summary of the test report in the space for Carbon/Varnish SA. Add this value to the corrected non-reference oil result and record this value as the Final Original Unit average carbon varnish result. If this value is greater than 10, report 10; if it is less than 0, report 0. An SA will remain in effect until the next reference test. At that time, calculate a new EWMA.

A11.5 *Average Sludge SA*—Apply an EWMA technique to standardized calibration test Average Sludge results. Standardize transformed values using delta/s ((result – target)/standard deviation). The targets and standard deviations for current reference oils are published by the ASTM TMC.

A11.5.1 Include all operationally valid reference tests in a stand control chart. Chart tests in order of completion date and time. A minimum of two tests is required to initialize a control chart. Calculate EWMA values using Eq A11.1. If the absolute value of the EWMA (rounded to three places after the decimal) exceeds 0.653, then apply an SA to subsequent non-reference oil results.

A11.5.2 The following example illustrates the use of Eq A11.1 for determining the application of an Average Sludge SA.

$$Z_1 = -0.541 \text{ and } Y_2 = -1.197 \qquad (A11.6)$$

$$EWMA = 0.2(-1.197) + 0.8(-0.541) = -0.672$$

A11.5.2.1 Since $|0.672| > 0.653$, apply an SA to subsequent non-reference oil tests. Multiply – 0.672 by 0.106. This value (0.106) is the average sludge pooled standard deviation of oils 148-1 and 151-2.. Multiply this result by –1 and round to four places after the decimal. Record this value on the Test Results Summary of the test report in the space for Average Sludge SA. Add this value to the corrected non-reference oil result and record this value in the space for the Final Original Unit result. If this value is greater than 10, report 10; if it is less than 0, report 0. An SA will remain in effect until the next reference test. At that time, calculate a new EWMA.

Replace the text of section 14.3 with the following:

14.3 An industry-wide average carbon varnish severity shift began sometime in the year 2000. No cause for this shift has been determined. To compensate for this shift, correct the average carbon varnish result for all tests by adding 0.6 merits to the rated average carbon varnish. If the result is greater than 10, record 10.