A Program of ASTM International

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T-13 Information Letter 21-1
Sequence No. 9
July 20, 2021

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

TO: Mack Surveillance Panel Mailing List

SUBJECT: Alternate Fuel Supplier Approval Procedure Addition

During the June 30, 2021 Mack/Volvo Surveillance Panel teleconference the panel voted to add a new procedure for the approval of new fuel suppliers as well as the steps necessary to introduce fuels supplied by approved suppliers. The fuel specification is unchanged.

The attached changes to Test Method D8048-21 are effective with the release of this information letter.

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Attachment
c: http://www.astmtmc.cmu.edu/ftp/docs/diesel/mack/procedure_and_ils/T-13/il21-01-T13.pdf

Distribution: Email

Ballot proposal for revision of 8048-21

Text added to the standard is shown in red and text deleted is shown in blue and with strikethrough.

Revise section 7.2 as follows:

7.2 *Test Fuel*—Obtain the ultra-low sulfur-PC-10 diesel test-fuel from ~~Chevron Phillips Chemical Company LP.~~[6] a surveillance panel approved supplier. The TMC maintains a list of approved fuel suppliers. The fuel shall have the properties and tolerances shown in the "PC-10 Fuel Specification" section of the "TMC-Monitored Test Fuel Specifications" document maintained by the TMC.[6]

Revise footnote 6 as follows:

[6] ~~The sole source of supply for test fuel known to the committee at this time is Ultra-Low Sulfur Diesel Fuel from Chevron Phillips Chemical Company LP, 10001 Six Pines Dr., Suite 4036B, The Woodlands, TX 77387-4910, Ph: 832-813-4859, Fax: 832-813-4907l, Email: fuels@cpchem.com. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,1 which you may attend.~~https://www.astmtmc.org/ftp/docs/fuel/tmc-monitored%20test%20fuel%20specifications.pdf

Add the following new Annex A13:

A13: T13 Fuel Requirements

A13.1 ***Fuel Requirements*** - The Volvo T-13 Test shall use a fuel meeting the PC-10 specification located on the TMC website, and that has been approved for use through the process defined by the Mack/Volvo Surveillance Panel (SP) for acceptance.
A13.1.1 For a fuel to be approved for the Volvo T-13 test, the fuel supplier shall demonstrate, through chemical analyses and engine testing, that the fuel provides the same performance as a currently approved fuel. The supplier shall provide a Certificate of Analysis (COA) documenting that the fuel meets the current PC-10 fuel specification, as well as conducting a prove-out program.
A13.1.2 The fuel supplier shall conduct a full COA analysis for each batch produced.
A13.1.3 An individual laboratory may not bring a new fuel supplier into use, even following the criteria noted in the approval process, without the notification and review of the SP.
A13.2 ***Prove-Out Program:***
A13.2.1 Run the prove-out program entirely on a single test stand in a single test laboratory. The chosen test stand shall have a history of at least three (3) successful calibration tests in the last four (4) years, the first LTMS appearance for the stand being over one year prior to the start of the prove-out program, and shall not have had a current lapse in calibration of greater than one calibration period.
A13.2.1.1 Run the prove-out program using reference oil 823 (or subsequent approved oil re-blends). The alternate fuel will be evaluated based on results of the FTIR peak height oxidation (IRPH) and percent increase in KV40 viscosity at 40 °C from 300 h to 360 h.
A13.2.1.2 On the stand used to conduct the prove-out testing, conduct a calibration test on reference oil 823 on currently approved fuel: the test shall meet all LTMS calibration acceptance criteria.
A13.2.1.3 Based on the results of the test, determine the new exponentially-weighted moving average, or Z_i value, of the stand for the IRPH and KV40 parameters. Z_i is as defined in the LTMS document[1]. The Z_i value calculated for each parameter immediately after the calibration test will be referred to as Z_{CAL} in the subsequent sections. Also, calculate the average tailpipe temperature and average torque.
A13.2.1.4 The same stand shall immediately conduct two (2) tests on reference oil 823 using the alternate fuel. Prior to running these two tests, notify the TMC if the results will be solely for prove-out or for stand calibration as well. It will be at the discretion of the test laboratory to determine if the stand's calibration status will be impacted by the prove-out program or not.
A13.2.1.5 For each test, calculate the difference between the standardized test result Y_i and the previously determined Z_{CAL} value for each parameter. This difference is the prediction error, or E_i value.

[1] https://www.astmtmc.org/ftp/docs/ltms/ltms.pdf

$$E_i = Y_i - Z_{CAL} \quad \text{(A13.1)}$$

Note that because of the use of Z_{CAL} instead of Z_{i-1}, this equation differs slightly from the definition of E_i in the LTMS document. Y_i is defined as in the LTMS document:

$$Y_i = \frac{R_i - M}{S} \quad \text{(A13.2)}$$

where:
Y_i = standardized test result at test order i,
R_i =actual reference oil test result at test order i,
M = reference oil target mean from LTMS, and
S = reference oil target standard deviation from LTMS.

A13.2.1.6 Similar to the calibration tests, calculate the average tailpipe temperature and average torque.

A13.3 ***Fuel Acceptance Criteria:***
A13.3.1 The results of the prove-out testing shall meet the following criteria (basis for operational uncontrolled parameter ranges found in Fig. A13.1):
A13.3.1.1 For IRPH and KV40, the calculated E_i value shall be within ±1.734 for both tests.
A13.3.1.2 The average tailpipe temperature for both tests shall be within ±15 °C of the calibration test.
A13.3.1.3 The average torque for each test shall be within ±35 N·m of the calibration test.
A13.3.1.4 Both alternate fuel tests shall be operationally valid with no negative Quality Index (QI) values.
A13.3.2 Fuel prove-out runs will count against the calibration interval and the stand can return to the existing calibration period on the previously approved fuel, after flushing the fuel lines, unless the SP agrees to an alternative plan prior to the start of the matrix.
A13.3.3 The SP will approve the fuel for use following confirmation of these results. If the supplier believes the fuel is providing equivalent performance to the current approved fuel without meeting the criteria listed above, they may petition the SP to conduct an additional review. At this point, the actions taken by the SP to accept or reject the fuel will vary depending on the results and judgement of the panel members.
A13.3.4 A list of approved fuel suppliers for the Volvo T-13 test is maintained on the TMC website.

A13.4 ***Introduction of a SP Approved Fuel*** – A laboratory may utilize any fuel that has been approved by the SP for use with the Volvo T-13 which has previously conducted a full "Prove-Out Program" and been approved at the SP.
A13.4.1 A new fuel for a lab is one that has never previously completed an acceptable calibration test in that laboratory. Notify the Test Monitoring Center when a calibration oil is requested that a new fuel supplier will be utilized.
A13.4.2 The first run on a new fuel in a stand shall meet level 2 E_i criteria. In the case that a level 2 E_i alarm is exceeded, a second test may be run and the stand considered calibrated as long as normal referencing criteria are met.
A13.4.3 Once a laboratory has successfully calibrated with the new fuel, laboratory severity adjustments shall be recalculated and applied to all candidate tests across all stands until the next calibration test.
A13.4.4 For a laboratory with multiple stands it is permissible for multiple fuels to be in use simultaneously until the old fuel is depleted. A fuel that has been approved for use by the SP and has successfully calibrated in one stand in a laboratory is automatically approved for candidate tests in any other laboratory/stand combinations within the laboratory.
A13.4.5 A particular laboratory/stand combination can only transition from the previously calibrated fuel to the most recently calibrated fuel, and not back to the previous fuel once the new fuel has been utilized until the next successful calibration test. The intent is to not alternate fuels within a reference interval for candidate tests.
A13.5 ***Transition Between Approved Fuels*** - Transitioning between two fuels that have previously been approved for use in a particular stand can occur with no additional requirements outside of those listed in the LTMS for the calibration of an existing stand.

A13.6 ***Fuel Supply Tanks*** - The fuel tank located at a laboratory and supplying fuel to the test stand shall be addressed in one of two ways prior to being loaded with a new fuel source:
A13.6.1 If the tank was previously filled with an unapproved fuel for the Volvo T-13 test, the tank shall be fully drained and cleaned.
A13.6.2 If an approved fuel was in the tank, the overall capacity of the tank shall be below 5 % prior to refilling with enough volume to complete a Volvo T-13 test which is approximately 29,900 liters (7,900 gallons), or up to its maximum safe capacity.
A13.6.3 Fuel shall also be flushed through all lines connecting the supply tank to the test cell. Due to variation in line volumes from laboratory/stand combinations, a set volume is not defined here. Enough fuel should be flushed to ensure that the entire line volume has been changed over to the new fuel.

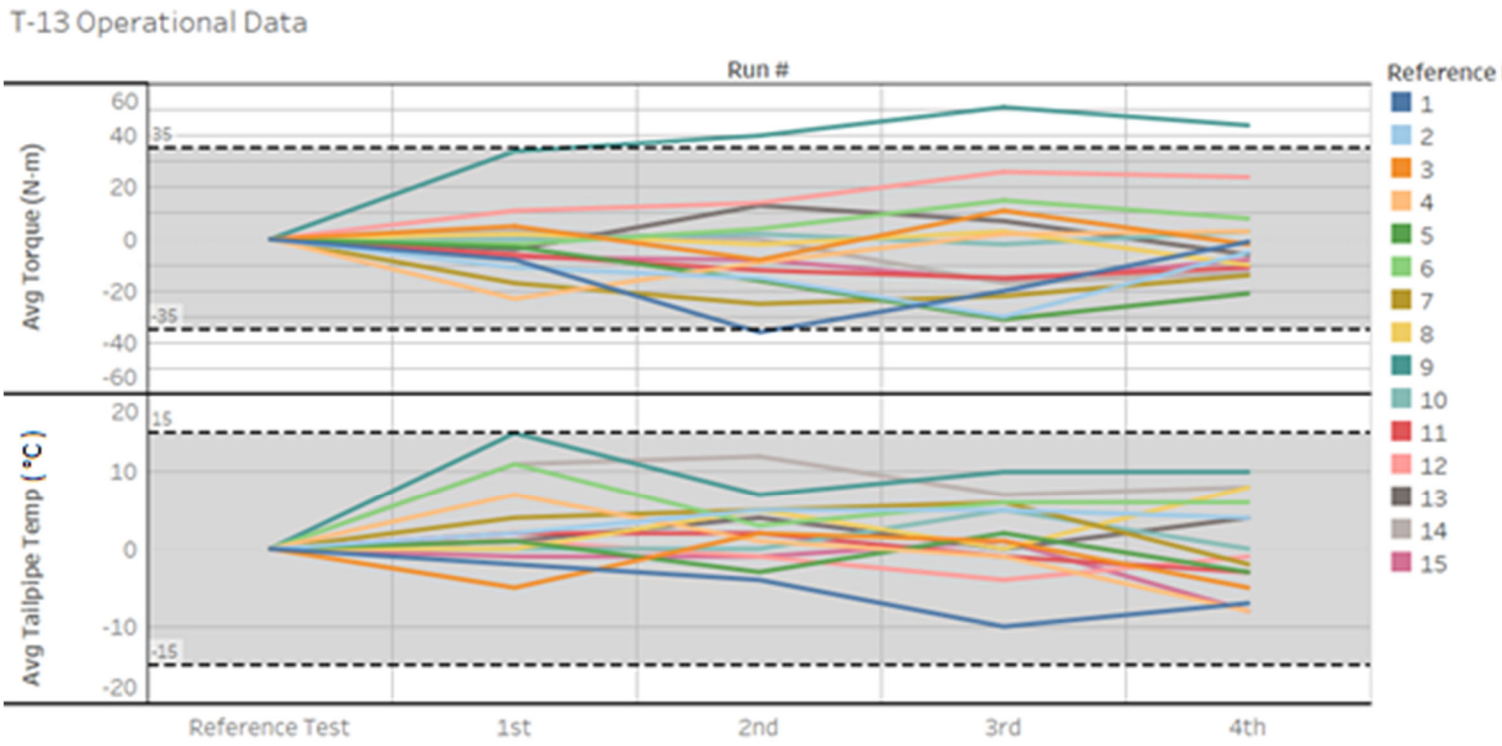

FIG. A13.1