A Program of ASTM International

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Sequence VIE Information Letter 20-6
Sequence Number 12
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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 VI Surveillance Panel

SUBJECT: Alternate Fuel Approval Process

During the December 7, 2020 Sequence VI Surveillance Panel Conference call, the panel agreed to allow for alternate fuel approval for the fuel used for Sequence VIE tests. As a result, footnote 19 has been updated to refer to new Annex A18, which delineates the testing requirements for a fuel to be considered as a candidate for an alternate. Reference Documents have also been updated to include API 1525 as a reference.

These revised text and or section(s) have been highlighted in red and are effective with the issuance of this letter.

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Attachment

c: http://www.astmtmc.org/ftp/docs/gas/sequencevi/procedure_and_ils/VIE/il20-6_vie.pdf
Distribution: Email

Revises D8114-20a as modified by Information Letters 20-3, 20-4 and 20-5

2.3 *API Standard* [7]*:*

API 1509 Engine Oil Licensing and Certification System[7]

API 1525 Bulk Oil Testing, Handling, and Storage Guidelines Documentation

[19]The sole source of supply of the fuel known to the committee at this time is Haltermann-Solutions. If you are aware of alternative suppliers, please provide the information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible committee,[1] which you may attend. Annex A19 provides testing and other requirements for being considered as an alternate by the Sequence VI Surveillance Panel.

A19 Alternate Fuel Approval Requirements

A19.1 For an alternate fuel to be approved for Sequence VI tests, the fuel supplier shall demonstrate, through chemical analyses and engine testing, that the fuel provides the same performance to the currently approved fuel. The supplier shall provide a Certificate of Analysis documenting that the fuel meets the current Sequence VI fuel specification, as well as conducting a prove-out program.

A19.2 *Prove-out Program*—Complete the prove-out program using the Sequence VIE test, which is to be performed on one test stand, using a minimum of two engines and a single reference oil, 1010-1 (or subsequent approved reblends). Testing shall utilize the first four runs of the engines' life and shall be alternated between the currently approved fuel and the alternate fuel candidate, as shown in Table A19.1.

Table A19.1 Testing Order

Engine	Break-in Fuel	Run #1	Run #2	Run #3	Run #4
Engines 1, 3,…	Current Fuel	Current Fuel	Alternate Fuel	Current Fuel	Alternate Fuel
Engines 2, 4,…	Alternate Fuel	Alternate Fuel	Current Fuel	Alternate Fuel	Current Fuel

A19.3 At the completion of each engine after Engine #2, construct two Analysis of Variance (ANOVA) models using the engine hour corrected results. The response variables shall be $FEI1Y_i$ and $FEI2Y_i$, which are the standardized results. Here Y_i is defined as:

$$Y_i = (R - M)/S \qquad \text{(A19.1)}$$

where:
Y_i = standardized test result at test order i
R = actual reference oil test result expressed as % *FEI,*
M = reference oil target mean expressed as % *FEI*, and
S = reference oil target standard deviation, expressed as % *FEI.*

Include in the ANOVA model factors "Engine", with levels Engine1, Engine2, …, EngineN, and "Fuel", with two levels (current and alternate) . For the proposed fuel to be qualified, the following shall be true of the ANOVA model results for both the $FEI1Y_i$ model and the $FEI2Y_i$ model:

A19.3.1 The absolute difference in the least squares mean for the current fuel and the least squares mean for the alternate fuel is less than 0.75.

A19.3.2 When forming a 95 % confidence interval on the least squares mean difference between fuels, the upper and lower limits of both confidence intervals are both less than 2.5 in absolute value.

A19.4 If the criteria in both A19.3.1 and A19.3.2 are not satisfied for both *FEI1* and *FEI2*, then conduct an additional four tests on another engine, followed by another ANOVA model. Continue this process until both criteria have been satisfied for both parameters.

A19.4.1 The Surveillance Panel 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 in A19.3.1 or 19.3.2 or both, they may petition the surveillance panel for acceptance.

A19.5 *Implementation of an Alternate Fuel*-- Each laboratory can choose which approved fuel to use for individual stands, provided candidate testing is conducted on the same fuel used to calibrate the stand. When switching from one fuel supplier to another, conduct a full Certificate of Analysis on a sample of fuel consisting of no more than 10 % of the current batch fuel from the current supplier from the purchasing laboratories take and at least 90 % of the new batch from the alternate supplier. Ensure that the Certificate of Analysis obtained from the blended sample meets the current Sequence VI Fuel Specifications.