



ASTM INTERNATIONAL
Helping our world work better

100 Barr Harbor Drive
PO Box C700
West Conshohocken, PA
19428-2959 USA

tell +1.610.832.9500
fax +1.610.832.9666
www.astm.org

COMMITTEE D02 on PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS

CHAIRMAN: Scott Fenwick, National Biodiesel Board, PO Box 104848, Jefferson City, MO 65110-4898, United States (800) 841-5849, Fax: (537) 635-7913, e-mail: sfenwick@biodiesel.org

FIRST VICE CHAIRMAN: Gregory C Miller, Tannas Co, 4800 James Savage Rd, Midland, MI 48642, United States (989) 496-2309, Fax: (989) 496-3438, e-mail: gmiiller@savantgroup.com

SECOND VICE CHAIRMAN: James J Simnick, Bp Global Fuels Technology, 150 Warrenville Rd, BP Technology Center Mail Stop 603-2W, Naperville, IL 60563, United States (331) 702-4071, Fax: (630) 420-4831, e-mail: simnicj@bp.com

MEMBERSHIP SECRETARY: Ian P Mylrea, Stanhope-Seta, 70 Bramley Drive, Hampshire, RG27 8ZF, United Kingdom (193) 2 5-4589, e-mail: im@stanhope-seta.co.uk

STAFF MANAGER: Alyson Fick, (610) 832-9710, e-mail: afick@astm.org

Issued: 05.15.2020
Reply to: Dan Worcester
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238
Phone: 210.522.2405
Email: dworcester@swri.org

These are the unapproved minutes of the 05.14.2020 Sequence VI Conference Call.

This document is not an ASTM standard; it is under consideration within an ASTM technical committee but has not received all approvals required to become an ASTM standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of ASTM committee activities except with the approval of the chairman of the committee having jurisdiction and the president of the society. Copyright ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

The meeting was called to order at 10:06 AM Central Time by Chair Andrew Stevens.

- 1.0 The Agenda is Attachment 1.
- 2.0 Roll Call. Attendance is Attachment 2. There were no member changes.

3.0 Old Business

MOTION: Approve minutes from the 05.07.2020 conference call.
Andrew, Robert second. Approval was unanimous.

The 05.07.2020 minutes are posted at:

<http://www.astmtmc.cmu.edu/ftp/docs/gas/sequencevi/minutes/VIMinutes20200507ConferenceCall.pdf>

4.0 New Business

4.1 There is an e-ballot for an alternate fuel supplier procedure.

4.2 This meeting was called to continue discussion of the points for GM presented on this ballot. See Attachment 3. The Information Letter is Attachment 4.

- For Item # 10, the discussion was focused on statistical analysis of the approval matrix data. There were questions on how many total VIE/VIF batches had been produced, and any analysis related to those batches. The contract for the current large batch does require additional analysis.

ACTION: Haltermann will review the contract and then provide the additional data.

- Discussion was about gathering more data. Sample analysis before and after a reference test was considered. The decision was made to move this discussion to the TGC Fuel Task Force.
- Related to this decision, the question was whether current data and procedures would be sufficient to support the ballot moving forward. The choice was made to cancel the Information Letter until more issues were resolved.

MOTION: Cancel Information Letter IL20-2

Ben, Andy second. 12 approve, 3 waives, the motion passe.

- Item #11 covered concerns by GM an alternate supplier would be added with insufficient verification. This led to the panel creating an Action List on steps to support moving forward.

ACTION LIST:

1. Andrew will attend the TGC Fuel Task Force meetings to help review issues to support Sequence VI with an alternate supplier procedure.
2. Todd recommended either the Stats Group or labs review existing data:
 - a. Review the C of A and compare response for FEI1.
 - b. Review the C of A and compare response for BLB1, 2, 3 and After.
 - c. This would also focus on the large batch with more data available over time.
3. Haltermann will supply records on the modifications to batches, primarily the RVP treatments. This would also focus on the current large batch as it would have more consistent data. These adjustments would be posted on the web site.
4. The Stat Group will provide a peer review when more fuel data is made available.

The meeting adjourned at 10:33 AM Central time.

**Sequence VI Surveillance Panel Call Meeting Agenda
May 14, 2020 @ 10:00-11:30 EST**

Webex Meeting Details Below Agenda

1. Roll Call (start 10:05 EST)

1.1. SP Membership changes and additions

2. Old Business

2.1	Approve meeting minutes from 5/7/20 call	Andrew Stevens
-----	--	----------------

3. New Business

3.1	GM Concerns with Alternative Fuel Supplier Proposal Conclude Resolution of Negatives Discussion	Panel
-----	--	-------

4. Next Meeting

4.1. SP Meeting: TBD

5. Meeting Adjourned

ASTM SEQUENCE VI

Name	Email	Company	Attend
------	-------	---------	--------

VOTING MEMBERS

Ben Maddock	Ben.Maddock@AftonChemical.com	Afton	ATTEND
Brianne Hockkeppel	Brianne.Hockkeppel@bp.com	BP	
Kevin Brodwater	KBrodwater@chevron.com	Chevron	ROBERT
Haiying Tang	HT146@Chrysler.com	Chrysler	
Tracey King	TKing@h-c-s-group.com	CS Group	ATTEND
Ron Romano	rromano@ford.com	Ford	ATTEND
Paul Rubas	paul.j.rubas@exxonmobil.com	ExxonMobil	ATTEND
Jim Carter	jcarter@gageproducts.com	Gage	ATTEND
Aleise Gauer	aleise.gauer@gm.com	GM	ATTEND
Prasad Tumati	ptumati@jhaltermann.com	Haltermann	ATTEND
Andy Ritchie	Andrew.Ritchie@infineum.com	Infineum	ATTEND
Adrian Alfonso	Adrian.Alfonso@intertek.com	Intertek	BILL
Andrew Stevens	andrew.stevens@Lubrizol.com	Lubrizol	ATTEND
Jason Bowden	jhbowden@ohtech.com	OHT	ATTEND
Jeff Hsu	j.hsu@shell.com	Shell	ERIC
Dan Worcester	Dan.Worcester@swri.org	SwRI	ATTEND
Dan Lanctot	dlanctot@tei-net.com	TEI	ATTEND
Rich Grundza	reg@astmtmc.cmu.edu	TMC	ATTEND
Teri Kowalski	Teri.Kowalski@tema.toyota.com	Toyota	
Amol Savant	acsavant@valvoline.com	Valvoline	

ASTM SEQUENCE VI

Name	Email	Company	Attend
Ed Altman	Ed.Altman@aftonchemical.com	Afton	
Bill Anderson	Bill.anderson@aftonchemical.com	Afton	
Brent Calcut	Brent.Calcut@aftonchemical.com	Afton	ATTEND
Bob Campbell	Bob.Campbell@aftonchemical.com	Afton	ATTEND
Lisa Dingwell	Lisa.Dingwell@AftonChemical.com	Afton	
Todd Dvorak	Todd.Dvorak@aftonchemical.com	Afton	ATTEND
Terry Hoffman	Terry.Hoffman@aftonchemical.com	Afton	
Christian Porter	Christian.Porter@aftonchemical.com	Afton	
Jeremy Styer	Jeremy.Styer@aftonchemical.com	Afton	
Clifford Salvesen	Clifford.R.Salvesen@exxonmobil.com	EM	
Jonathan VanScoyoc	VANSCJ@cpchem.com	CPCChem	ATTEND
Mike Deegan	mdeegan@ford.com	Ford	
Bob Patzelt	bpatzelt@gageproducts.com	Gage	ATTEND
Tim Cushing	timothy.cushing@gm.com	GM	
Meryn Hopp	Meryn.Hopp@GM.com	GM	
Michael Raney	Michael.P.Raney@gm.com	GM	ATTEND
Charles VanCamp	charles.vancamp@gm.com	GM	
Ed Hennessy	ehennessy@jhaltermann.com	Haltermann	
Indresh Mathur	imathur@jhaltermann.com	Haltermann	ATTEND
Doyle Boese	Doyle.Boese@infineum.com	Infineum	ATTEND
Charlie Leverett	Charlie.Leverett@yahoo.com	Infineum	
William Buscher	William.Buscher@intertek.com	Intertek	
Martin Chadwick	Martin.Chadwick@intertek.com	Intertek	
Al Lopez	Al.Lopez@intertek.com	Intertek	
Scott Rajala	srajala@ILAcop.com	Idemitsu	ATTEND
Dave Passmore	dpassmore@imtsind.com	IMTS	
Stuart Bartley	stuart.bartley@lubrizol.com	Lubrizol	
Jerry Brys	Jerome.Brys@lubrizol.com	Lubrizol	
Tony Jang	Tony.Jang@Lubrizol.com	Lubrizol	
Joe Gleason	Jog1@lubrizol.com	Lubrizol	
James Matasik	James.Matasik@lubrizol.com	Lubrizol	
Will O’Ryan	William.ORyan@Lubrizol.com	Lubrizol	
Chris Castanien	Chris.Castanien@neste.com	Neste	
Dwight Bowden	dhbowden@ohtech.com	OHT	
Matt Bowden	mjbowden@ohtech.com	OHT	
Ricardo Affinito	affinito@chevron.com	Oronite	
Ian Elliot	IanElliott@chevron.com	Oronite	
Jo Martinez	jogm@chevron.com	Oronite	
Robert Stockwell	rsto@chevron.com	Oronite	ATTEND

ASTM SEQUENCE VI

Name	Email	Company	Attend
Dan Engstrom	daniel.engstrom@swRI.org	SwRI	ATTEND
Travis Kostan	Travis.Kostan@swRI.org	SwRI	ATTEND
Patrick Lang	Patrick.Lang@swRI.org	SwRI	ATTEND
Michael Lochte	mlochte@swri.org	SwRI	
Karen Haumann	Karen.Haumann@shell.com	Shell	
Jeff Clark	jac@astmtmc.cmu.edu	TMC	
Hirano Satoshi	Satoshi_Hirano_aa@mail.toyota.co.jp	Toyota	
Mark Adams	mark@tribologytesting.com	Tribology Testing	
Timothy Caudill	Tlcaudill@valvoline.com	Valvoline	
Chris Taylor	Chris.Taylor@vpracingfuels.com	VP Racing Fuels	

MOTION:	Cancel Info Letter IL20-002			
Ben Maddock	APPROVE			
Brianne Hockkeppel				
Robert	APPROVE			
Haiying Tang				
Tracey King	WAIVE			
Ron Romano	APPROVE			
Paul Rubas	APPROVE			
Jim Carter	WAIVE			
Aleise Gauer	APPROVE			
Prasad Tumati	APPROVE			
Andy Ritchie	APPROVE			
Bill	APPROVE			
Andrew Stevens	APPROVE			
Jason Bowden	WAIVE			
Eric	APPROVE			
Dan Worcester	APPROVE			
Dan Lanctot				
Rich Grundza	APPROVE			
Teri Kowalski				
Amol Savant				

3 waive, 12 for, the motion passes

ASTM SEQUENCE VI

Name	Email	Company	Attend
------	-------	---------	--------

MOTION:				
Ben Maddock				
Brienne Hockkeppel				
Kevin Brodwater				
Haiying Tang				
Tracey King				
Ron Romano				
Clifford Salvesen				
Jim Carter				
Aleise Gauer				
Prasad Tumati				
Andy Ritchie				
Adrian Alfonso				
Andrew Stevens				
Jason Bowden				
Jeff Hsu				
Dan Worcester				
Dan Lanctot				
Rich Grundza				
Teri Kowalski				
Amol Savant				

April 30, 2020

30003 Fisher Brothers Road
Warren, MI 48093

1. If the test is run against reference and there is no prohibition or limitations on changing fuels from a reference run to a candidate run, then the precision matrices for the test should have incorporated this variable (two fuels at the ends of largest DHA fuel property spec range(s)). There is no way to know what impact changing fuel has without this analysis. There is no way to know how this potential change in fuels will impact stand severity either without data.
2. If a fuel parameter data collection process was instituted at the onset of the new Seq VI test, we would have the ability right now to utilize that information today to: 1.) better determine what parameters do/do not contribute to test variation, 2.) validate the fuel deliveries are meeting the requirements (trust but verify). In the highlighted section below: what were the findings of this? Was it blowby and response or was it fuel?

3.2 Seq. VIE Severity Task Force Update Dan Worcester

See Attachment 4. There was a lot of discussion on this presentation. FEI 2 has shifted severe, but Lab F is on target. There were slides on possible fuel factors. The two San Antonio labs use fuel from Nixon, Texas. All others are supplied by the Michigan facility. Todd provided and discussed several of the slides. There may also be blowby and viscosity response especially for 542-2. There will be further discussion in the Task Force. Travis had some slides that indicated FEI 2 severity shift took place at the end of the Precision Matrix. See Attachment 5.

Action Item #2 – Haltermann to report to the Sequence VI surveillance panel the process for building the Texas and Michigan Lube Cert EEE fuel batches and for additizing the SEQ VI-E + DCA fuel. Include details on component sourcing for the Texas and Michigan locations (i.e. are the components for both locations obtained from the same source and from the same component batches, etc.). Include details on the additizing process for the Texas and Michigan locations (i.e. are the additives for both locations obtained from the same source and from the same batches, when is the Lube Cert EEE additized, etc.).

3. VIE development suffered from fuel related deposits issues. Is there any data supporting deposit variation with current modified test fuel? Deposit control additive which was added to solve deposit issues has not been measured since VIE inception and needs to be understood before entertaining an alternate fuel. The unwashed gums test should be performed on the test fuel for a period of time in order to understand its stability in the test labs fuel storage systems. Previous studies of ASTM Sequence III piston deposit composition have indicated the test fuel as the major contributor. Industry standard deposit tests Sequence

III and GMOD should be conducted with Sequence VI altered fuels to assess the deposit forming tendencies of the current and proposed test fuels.

4. According to Annex A18.8, you can mix up to 10% of one fuel into another fuel. 90/10 was recently implemented and there is not any data on this blending practice. There should be statistical analysis performed before this blending ratio is implemented.
5. Test standard deviation in the VIE is higher than it is in VID. VID was based on 100s of hours of actual vehicle fuel efficiency analysis. Adding additional variation in fuel pushes the test even further away from its intent in vehicle correlation.
6. In section A18.4 of the latest ballot stating "A18.4 If the criteria in both A18.3.1 and A18.3.2 are not satisfied for both FE1 and FE2, 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." What was the criteria?
7. Section A18.7 of the ballot it states, "Each laboratory can choose which approved fuel to use for individual stands." What is the criteria for MTAC?
8. Section A18.5 of the ballot states "Run all tests on the same fuel used to calibrate the stand." Once a 90/10 mix of fuel is mixed there should be a calibration done with the mixture. Once that mixture runs out another calibration should be performed using the new batch of fuel.
9. Replicating the fuel economy (FE) performance of an internal combustion engine (ICE) measured in a given lab to any other lab equipped with another engine of the same design is as you know an incredibly difficult task. The many interactions of the engine hardware, state of the engine (tolerances, wear, metallurgy, etc...), combustion and crankcase ventilation gases, test fluids, lab operation and measurement variability, to name a few, all interact to impact the empirical measurements. Therefore, by definition, controlling as many of these variables is necessary for precise measurements. And while the proposed "A18 Alternate Fuel Approval Requirements" try to minimize the test measurement variability at the time of testing, adding additional approved test fuel sources will likely increase the test variation over time. Here are a couple practical issues with approving second sources of test fuels in D8114-2019b.
 - a. Test fuels inherently age over time and change their response in tests; they oxidize, they weather (lose volatile hydrocarbons), they change on the molecular level depending on how they are stored. What is approved today, will be different tomorrow. If anti-oxidants are added to control oxidation during storage stability, small differences in type and concentration from one formulation to another will impact the engine test differently.
 - b. Test fuels are purchased with a Certificate of Analysis to assure some level of blending repeatability, however unfortunately there is no known correlation between any known CofA test and the measurement of FE in an engine. There are many first order relationships, such as a fuel's energy content to ICE engine heat release that correlate to FE, but none of these have the precision necessary to qualify small lubricant formulation differences.
 - c. Seemingly small changes from one test fuel supplier recipe to the next can impact the lubricant response, potentially unintentionally biasing the result. This is true of basefuel hydrocarbon components, oxygenates, and additives. Even if two test fuels pass the proposed Fuel Approval Requirements, the interaction of the detailed lubricant chemistry with multiple fuel chemistries is

likely to be different. For example, one fuel chemistry may favor one type of lubricant oxidation inhibitor, while another test fuel would favor another type.

Test fuel batches made to the same blending recipe are known to potentially have different responses in test engines. For this reason and those outlined above keeping a single source of test fuel, common to all lubricant FE qualification tests, has been and shall be the best practice.

10. Upon completion of an alternate fuel supplier's successful prove out testing statistical data analysis, ASTM needs to provide documentation to support the ILSAC / EPA guidance letter.
11. GM disagrees with the proposal of adding an alternate fuel supplier without going through the necessary steps of verifying the fuel to see if it's suitable for VIE. We wouldn't have a choice but to take appropriate steps to protect ourselves if this proposal passes.



Test Monitoring Center

@ Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>
412-365-1000

Sequence VIE Information Letter 20-2
Sequence Number 7
April, 2020

TO: Sequence VI Surveillance Panel
SUBJECT: Alternate Fuel Approval Process

During the October 25, 2019 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.

Aleise Gauer
Materials Engineer – Fluids & Lubricants
GM Global Propulsion Systems

Frank M. Farber
Director
ASTM Test Monitoring Center

Attachment

c: http://www.astmtmc.cmu.edu/ftp/docs/gas/sequencevi/procedure_and_ils/VIE/il20-2_vie.pdf

Distribution: Email

Revises D8114-19a

2.3 API Standard:

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

¹⁹The sole source of supply of the fuel known to the committee at this time is Haltermann. 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 A18 provides testing and other requirements for being considered as an alternate by the Sequence VI Surveillance Panel.

A18 Alternate Fuel Approval Requirements

A18.1 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.

A18.2 *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 A18.1.

Table A18.1 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	Current Fuel

A18.3 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:

$$Y_i = (R - M)/S \quad (A18.1)$$

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 $FEI2 Y_i$ model:

A18.3.1 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.

A18.3.2 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.

A18.4 If the criteria in both A18.3.1 and A18.3.2 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.

A18.4.1 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 A18.3.1 or 18.3.2 or both, they may petition the surveillance panel for acceptance.

A18.5 *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.