

Minutes of the Sequence VIF Task Force Teleconference Call

February 24, 2016 08:00 CST

The Sequence VIF Task Force was called to order by Chairman Dan Worcester at 08:00 CST. The meeting Agenda is included as Attachment 1. The meeting attendance is included as Attachment 2.

Chairman Worcester opened the meeting with a few general comments; that the Statistician Group review of the initial eight "Sense Check" tests had been completed and distributed prior to the meeting. He continued to comment that the goal of the meeting was to review that presentation and decide if the continuation of the VIF Matrix to the next step, Sense Check Stage 2, is warranted. The Industry Statistician's presentation is included as Attachment 3.

The minutes from the February 10, 2016 meeting were approved as written and are available on the ASTM-TMC web site. A motion for approval was made by David Glaenger, second by Dan Worcester.

<ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/VIFTaskForceMinutes20160210.pdf>

Mr. Todd Dvorak presented the VIF Stage 1 Data Review. Some questions relative to the Sequence VID data (application of Severity Adjustments and use of Engine Hour Correction Factor) were asked. The VID data had both SAs and CFs applied. Slide 13 summarizes the presentation as having met the criteria previously espoused for continuation of the matrix; the oils were ranked appropriately and the precision of the VIF data was as good as the VID data. After considerable discussion, a motion was offered by Mr. Bill Buscher III and seconded by Mr. Jim Linden.

Motion: Based on the statistical analysis of the Sequence VIF Sense Check # 1 matrix test results, the ability of the Sequence VIF to produce FEI1, FEI2 and FEISUM results in the similar direction as the Sequence VID and Sequence VIF calculated precision better than that of the Sequence VID, the Sequence VIF Task Force finds it acceptable to move forward and conduct Sequence VIF Sense Check # 2 matrix and then perform a similar statistical review of the Sequence VIF Sense Check # 2 matrix test results. Bill Buscher / Jim Linden

The motion was accepted unanimously with one waive vote.

Sense Check part 2 will start at SRI and IAR on two different stands utilizing fresh engines. Following the completion of the eight tests in Part 2, the Industry Statistician Group will again review data. SRI and IAR both indicated that they would keep Sense Check Part 1 engines on the stands and hold them for future testing. When appropriate, they will be brought back into the matrix.

Used oil samples from all eight Sense Check Part 1 tests have been analyzed at IAR. Adrian Alfonso will distribute results.

The next meeting of the group will be on March 09, 2016 at 08:00 CST.

Having no further business, the meeting was adjourned at 08:55 CST.

Respectfully submitted,

David L. Glaenzer, Afton Chemical Corporation

GF-6B Sequence VIF Task Force
02.24.2016

Toll-free dial-in number (U.S. and Canada):
(866) 588-1857
International dial-in number:
(678) 373-4882
Conference code:
1908975

Scope

The ASTM Sequence VI Surveillance Panel requested a Task Force be formed to determine if the Sequence VIE could be used for OW 16 oils. The TF will look at development of the VIF test using 100 °C oil temperature and 94 °C coolant temperature for stages 1, 3, 4, and 6.

Objective

Review the Toyota proposal and work on selection of reference oils, stands to support testing, and running the Sense Check and test matrices.

The agenda for this meeting is shown below.

- 1.0 Chairman's Comments
- 2.0 Roll Call
- 3.0 The minutes for 02.10.2016 are posted. They are:
<ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/VIFTaskForceMinutes20160210.pdf>
- 4.0 All reference oils are ready at the two test labs.
 - 4.1 Results for Stage 1 Sense Check at IAR:

IAR 1 (Lab G)			
	FEI 1	FEI 2	EOT hr
542-2	2.10	1.44	371
543	1.59	1.66	621
543	1.68	1.74	820
542-2	1.76	1.03	1236

- 5.0 The matrix for Stage 1 Sense Check is complete. IAR data is shown above. Stage 2 Sense Check will start after review of the first 8 tests is completed. All tests are posted on the TMC site, and the Stats Group will review the data.

- 5.1 Additional Chem for FEI 2 for the matrix
ICP D-5185
TAN D-664
TBN D-4739
FTIR IIIG METHOD E-168
VIS D-445
SwRI will send out data for the 8 tests.
- 6.0 Next meeting will be Conference Call on 03.02.2016.

Name	Affiliation
Adrian Alfonso	Intertek
Amol C Savant	Ashland
Andrew Ritchie	Infineum
Charlie Leverett	Intertek
Chris Castanien	Nesteoil
Cliff Salvensen	ExxonMobil
Cole Hudson	SwRI
Dan Worcester Jr.	Chairman, SwRI
David Glaenzer	Secretary, Afton Chemical
Denny Gaal	ExxonMobil
Doyle Boese	Infineum
Eric Liu	SwRI
Gordon Farnsworth	Infineum
Guy Stubs	SwRI
Jason Bowden	OH Technologies
Jim Linden	Toyota
Jo Martinez	Chevron
Kaustav Sinha	Chevron
Kevin OMalley	Lubrizol
Mark Adams	Tribology Testing
Mark Mosher	ExxonMobil
Martin Chadwick	Intertek
Matthew Bowden	OH Technologies
Michael Conrad	Lubrizol
Mike McMillan	Infineum
Nathaniel Moles	Lubrizol
Patrick Lang	SwRI
Ray Burn	ExxonMobil
Rich Grundza	ASTM Test Monitoring
Robert Stockwell	Oronite
Ron Romano	Ford Motor Company
Satoshi Hirano	Toyota
Teri Kowalski	Toyota
Timothy Cushing	General Motors
Todd Dvorak	Afton Chemical
Tracy King	Haltermann
Valerie Lieu	Chevron
William Buscher	Intertek
Bob Campbell	Afton
Mike Ragomo	ExxonMobil
Travis Kotan	SwRI
Thomas Hickl	GM Europe
Jonas Leber	GM Europe
Jerry Brys	Lubrizol
Christine Eickscade	SwRI

	01/27/16	02/10/16	02/24/16
	P	P	P
V	P	P	P
V	P		P
V			P
V	P	P	P
V	P	P	P
	P	P	P
V			P
V	P		P
	P	P	P
V	P		P
V	P		P
V	P		P
V	P		P
			P
	P	P	P
	P	P	P
V	P	P	P
V	P		P
V	P		P
	P		P
		P	
			P

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VIF Stage 1 Data Review

Industry Statistician Team – Data Review

Date: 02-23-16

Statistics Group - Team Members

- Art Andrews, Exxon Mobil
- Doyle Boese, Infineum
- Kevin O'Malley, Lubrizol
- Martin Chadwick, Intertek
- Travis Kostan, SwRI
- Todd Dvorak, Afton Chemical
- Jo Martinez, Chevron Oronite
- Richard Grundza, TMC

Agenda

- Review VIF Sense Check 1 Data (8 runs)
- Reach consensus on next steps

VIF Design

- Original Design (Approved at Taskforce Sept. 2nd)

Run	EOT Hour	Engine 11	Engine 21	Engine 12	Engine 22
1	350	Oil 400	TMC1011	TMC542-2	TMC1011
2	550	TMC542-2	TMC542-2	Oil 400	Oil 400
3	750	TMC542-2	TMC1011	Oil 400	TMC1011
4	950	Oil 400	Oil 400	TMC542-2	TMC542-2
5	1150	TMC1011	Oil 400	TMC1011	TMC542-2
6	1350	Oil 400	TMC1011	Oil 400	TMC1011
7	1550	TMC542-2	TMC542-2	TMC1011	Oil 400
8	1750	TMC1011		TMC542-2	

Stage 1 Sense Check Runs will be tested in 2 engines/2 labs

Stage 2 Sense Check Runs will be tested in other 2 engines/2 labs

Attachment 3
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Sense Check Evaluation

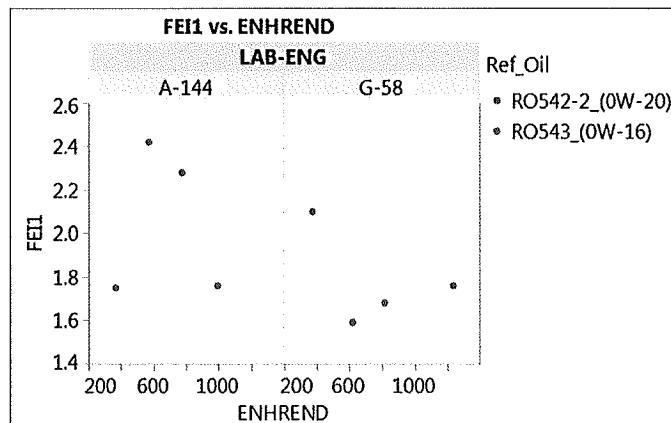
- REO Discrimination in Sense Check Runs:
 - Comparison between TMC542-2 and TMC543 (Oil 400)
 - Oil Ranking:
 - TMC543 (Oil 400) > TMC542-2
 - Precision
 - VID Prove Out Estimate of S_p
 - FEI1=0.22
 - FEI2=0.26

	TMC542-2 (0W-20)	TMC543 (Oil 400) (0W-16)
FEI1	1.49	1.36
FEI2	0.80	1.51
FEISUM	2.29	2.87
Source	LTMS (Aug-2015)	Avg of 4 Runs in Toyota VID Matrix

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Sense Check Evaluation

- Raw Plot of FEI1 data by Oil, Lab

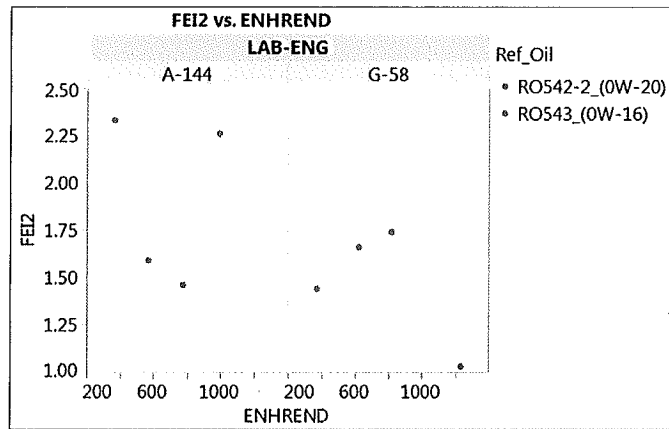


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Sense Check Evaluation

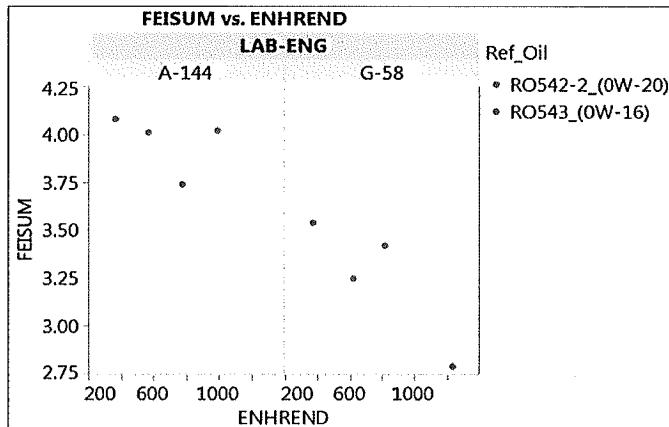
- Raw Plot of FEI2 data by Oil, Lab



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Sense Check Evaluation

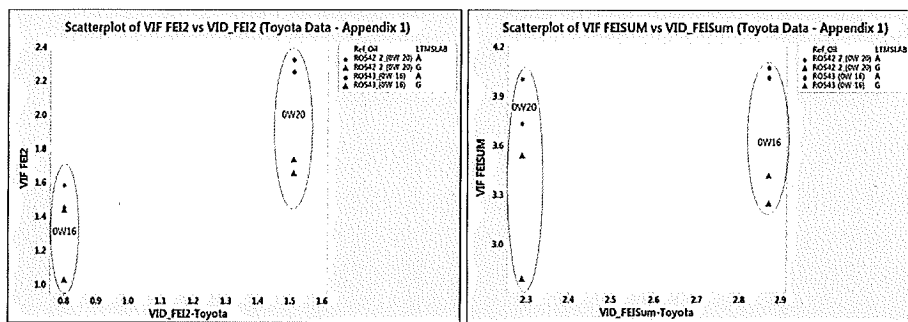
- Raw Plot of FEISUM data by Oil, Lab



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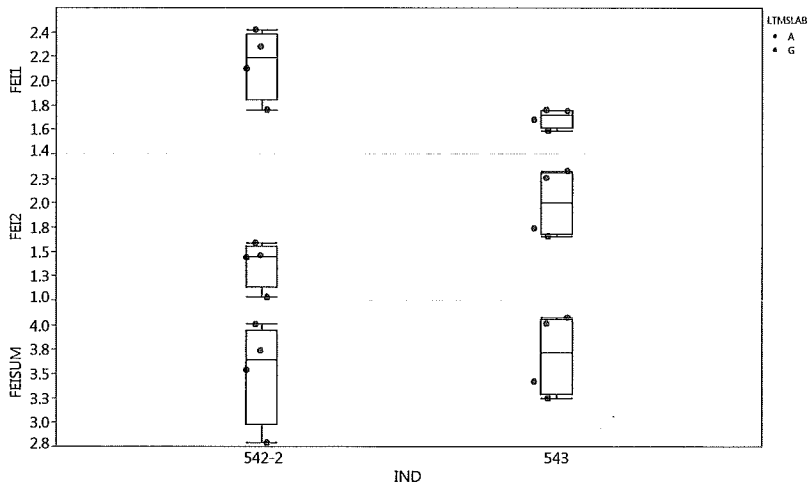
Sense Check Evaluation

- Plot of VIF & VID Data:



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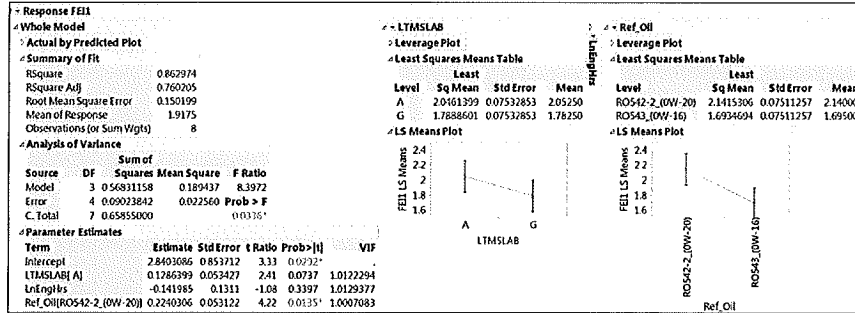
FEI by Oil, Lab



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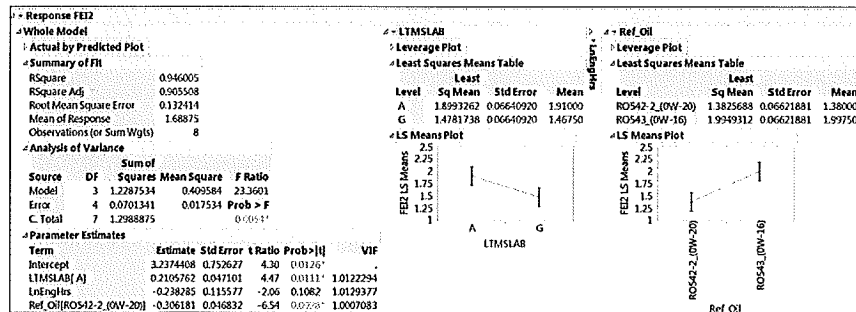
Sense Check Evaluation

- ANOVA Summary– FEI1
 - Oil 543 (0W-16) < RO542-2 (0W-20)



Sense Check Evaluation

- ANOVA Summary– FEI2
 - Oil 543 (0W-16) > RO542-2 (0W-20)



Sense Check Evaluation

- VID vs. VIF Summary Sense Check Summary

	VID		
	TMC542-2 (0W-20)	TMC543 (Oil 400) (0W-16)	S _p
FEI1	1.49	1.36	0.22
FEI2	0.80	1.51	0.26
FEISUM	2.29	2.87	NA

(VID) ROS43 - ROS42-2 FEISum Delta = 0.58

	VIF		
	TMC542-2 (0W-20)	TMC543 (Oil 400) (0W-16)	S _p
FEI1	2.14	1.69	0.15
FEI2	1.38	1.99	0.13
FEISUM	3.52	3.68	NA

(VIF) ROS43 - ROS42-2 FEISum Delta = 0.16

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Summary

- VIF Sense Check Highlights / Concerns:
 - The Toyota Study VID and VIF data test data have directionally similar test results for the FEI2 and FEISum parameters
 - The VIF prove out data has improved test precision as compared to the VID
 - The FEISum delta between the two reference oils is smaller with the Sequence VIF as compared to the VID.
 - * Reference Oil Technology may be a factor – could evaluate the same technology in a different viscosity grade to further investigate this concern.

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Appendix 1

Sequence VIF Test Development

TOYOTA

- Reference Info

	VID FEI Sum	VID FEI2	Source
TMC542 (OW-20)	2.29 (1.49 + 0.80)	0.80	LTMS (Aug-2015)
Oil 400 (OW-16)	2.87	1.51	Average of VID Matrix Data
Oil 401 (OW-20)	2.69	1.32	Average of VID Matrix Data
Oil 201 (OW-20)	2.60	0.96	Average of VID Matrix Data