Sequence III Surveillance Panel Meeting Minutes

May 26, 2016
11:00 – 12:30 EDT

1.0) Attendance

The attendance is shown in **Attachment 1.**

2.0) Chairman Comments

Membership Change

- Michael Raney replaces Bruce Matthews as voting member for GM. The SP wishes to thank Bruce for his contributions over the last few years.

3.0) Approval of minutes

The minutes of April 13, 2016 were approved without objection.

4.0) Action Item Review

4.1) Review change implemented to IIIG LTMS at March 09, 2016 meeting. Review after four months. Due 07/23/2016. **David Glaenzer**

4.2) Review Sequence IIIH data for honing and cylinder size parameters that were temporarily suspended at 03/29/2016 meeting. Due approximately 11/01/2016.

5.0) Old Business

5.1) Request by PCEOCP for Sequence III SP to endorse 4000 as the correct number of engines for FCA to produce for IIIH testing. **All**

After discussion, there was general agreement to request 5000 engines with the intent to last 6 – 7 years. Haiying Tang will communicate this to Mopar.

5.2) Reuse of OHT3F-014-1 Pin, Wrist, Seq. IIIF/G. **Addison Schweitzer, Attachment 2.**

Addison Schweitzer reviewed the presentation. Following his presentation, Addison made the following motion, Pat Lang seconded:

IAR recommends the Sequence III Surveillance Panel to approve that any wrist pin (OHT3F-014-1) that meets the diameter specification of 21.9950 –22.0000 mm (0.8659 – 0.8661 in) and has been polished with Mylar strip polishing cloth (Q135 Metalite 3µ 1½ wide roll) and cleaned following the ultrasonic cleaning guidelines outlined in section 9.5 of the IIIF/G test procedure and be allowed for reuse in the Sequence IIIF/G test type with the effective date of 5/26/2016.

The motion was approved with 14 affirmative, 0 negative, and 1 waive (TEI). Robert Stockwell commented that the Mylar strip polishing should be followed by the ultrasonic cleaning and this comment was ultimately incorporated into the motion above.

The TMC will issue an Information Letter accordingly.

6.0) New Business

6.1) IIIF Equivalent Limit in IIIH. CLOG group will test RO 433-1 and 1006-2 in IIIH.

Once the results are available, the Seq. III panel will be asked to assess the results.

6.2) Request by Mr. Richard Grundza for clarification of Sequence IIIHA/IIIHB calibration requirements. Information sent to SP 05/19/2016 @ 12:28. **Richard Grundza**

The TMC noted that by letter-of-the-law wording, the IIIHA and IIIHB approved LTMS' may not actually be what the panel intended; the IIIHA and IIIHB, as worded, have 'stand alone' calibration requirements for each test type. This is a break from how the IIIGA and IIIGB tests were handled. After lengthy discussion, the panel decided to leave all three LTMS' unchanged and will review this situation, if necessary, at a later date.

It was noted that this issue will be difficult for the panel to settle until the use of the IIIH test is better understood. As such, the panel will ask AOAP to clarify what the use of the IIIH/A/B is expected to be. Ron Romano took the action item to raise the discussion within AOAP.

6.3) Update on ACC Appendix K for Sequence IIIH. **Jo Martinez**

Jo Martinez reviewed the progress of the IIIH according to Appendix K (**Attachment 3**).

7.0) Work Remaining

7.1) Publish Research Report **Haumann**

The procedure is close to completion. The research report will follow with the timing unspecified.

8.0) New Business

Amol Savant noted recently obtained IIIH oil coolers from dealers are different previous ones. Sid Clark agreed to help Amol work the issue.

Addison Schweitzer raised a concern over the number of decimals used for the IIIHA MRV SA. After quick discussion, Addison took an action item:

ACTION ITEM: Addison Schweitzer will generate a presentation regarding the motion to report the IIIHA MRV SA to 6 decimal places versus the 2 decimal places currently used due to this being a natural log transformed value.

9.0) Meeting Adjourned

The meeting adjourned at 12:20 pm.

WEBEX CONF. CALL

ATTACHMENT 1

ASTM Sequence III Surveillance Panel (22 Voting members) date: 05/26/16

Name/Address	Phone/Fax/Email	Signature
Ed Altman	ed.altman@aftonchemical.com	Voting Member A Present ✓
Jeff Betz	jeff.betz@fcagroup.com	Voting Member Present
Jason Bowden	jhbowden@ohtech.com	Voting Member A Present ✓
Timothy L. Caudill	tlcaudill@ashland.com	Voting Member A Present ✓ AMOL
Richard Grundza	reg@astmtmc.cmu.edu	Voting Member A Present ✓
Jeff Hsu, PE	j.hsu@shell.com	Voting Member A Present ✓
Teri Kowalski	teri.kowalski@tema.toyota.com	Voting Member Present
Dan Lanctot	dlanctot@tei-net.com	Voting Member W Present ✓
Patrick Lang	plang@swri.org	Voting Member A Present ✓
Mark Overaker	mhoveraker@jhaltermann.com	Voting Member Present
Michael Raney	michael.p.raney@gm.com	Voting Member Present
Andrew Ritchie	andrew.ritchie@infineum.com	Voting Member A Present ✓ Mike Mcmillan
Ron Romano	rromano@ford.com	Voting Member A Present ✓
Cliff Salvesen	clifford.r.salvesen@exxonmobil.com	Voting Member A Present ✓
Addison Schweitzer	addison.schweitzer@intertek.com	Voting Member A Present ✓
Greg Shank	greg.shank@volvo.com	Voting Member Present
Kaustav Sinha, Ph.D.	LFNQ@chevron.com	Voting Member A Present ✓
Thomas Smith	trsmith@ashland.com	Voting Member Present
Scott Stap	scott.stap@tgidirect.com	Voting Member Present
George Szappanos	george.szappanos@lubrizol.com	Voting Member A Present ✓
Haiying Tang	HT146@chrysler.com	Voting Member A Present ✓
David Tsui	david.tsui@bp.com	Voting Member A Present ✓

14.0-1

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ASTM Sequence III Surveillance Panel (22 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Ricardo Affinito	affinito@chevron.com	N-V Member	Present_____
Art Andrews	arthur.t.andrews@exxonmobil.com	N-V Member	Present_____
Robert Bacchi	robert.bacchi@basf.com	N-V Member	Present_____
Terry Bates	batesterryw@aol.com	N-V Member	Present_____
Doyle Boese	doyle.boese@infineum.com	N-V Member	Present ✓
Adam Bowden	adbowden@ohtech.com	N-V Member	Present_____
Dwight H. Bowden	dhbowden@ohtech.com	N-V Member	Present_____
Matt Bowden	mjbowden@ohtech.com	N-V Member	Present_____
Jerome A. Brys	jerome.brys@lubrizol.com	N-V Member	Present_____
Jessica Buchanan	jessica.buchanan@lubrizol.com	N-V Member	Present_____
Bill Buscher III	william.buscher@intertek.com	N-V Member	Present_____
Bob Campbell	bob.campbell@aftonchemical.com	N-V Member	Present_____
Jim Carter	jcarter@gageproducts.com	N-V Member	Present_____
Chris Castanien	chris.castanien@nesteoil.com	N-V Member	Present ✓
Martin Chadwick	martin.chadwick@intertek.com	N-V Member	Present_____
Ankit Chaudhry	ankit.chaudhry@swri.org	N-V Member	Present ✓
Jeff Clark	jac@astmtmc.cmu.edu	N-V Member	Present ✓
Sid Clark	sidney.clark@swri.org	N-V Member	Present ✓
Tim Cushing	timothy.cushing@gm.com	N-V Member	Present_____
Phil Davies	daviesjp@bp.com	N-V Member	Present_____
Todd Dvorak	todd.dvorak@aftonchemical.com	N-V Member	Present_____
Frank Farber	fmf@astmtmc.cmu.edu	N-V Member	Present_____
Joe Franklin	joe.franklin@intertek.com	N-V Member	Present_____
Gordon Farnsworth	gordon.farnsworth@infineum.com	N-V Member	Present_____
David L. Glaenzer	dave.glaenzer@aftonchemical.com	N-V Member	Present ✓
Karin E. Haumann	karin.haumann@shell.com	N-V Member	Present ✓
Martin Heimrich	martin.heimrich@swri.org	N-V Member	Present_____
Jason Holmes	jason.holmes@basf.com	N-V Member	Present_____

ASTM Sequence III Surveillance Panel (22 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Walter Lerche	walt.lerche@gm.com	N-V Member	Present_____
Jim Linden	lindenjim@jlindenconsulting.com	N-V Member	Present_____
Scott Lindholm	scott.lindholm@shell.com	N-V Member	Present_____
Jo Martinez	jogm@chevrontexaco.com	N-V Member	Present_____
James Matasic	james.matasic@lubrizol.com	N-V Member	Present_____
Mike McMillan	mmcmillan123@comcast.net	N-V Member	Present_____
Bob Olree	olree@netzero.net	N-V Member	Present_____
Kevin O'Malley	kevin.omalley@lubrizol.com	N-V Member	Present_____
Dave Passmore	dpassmore@imtsind.com	N-V Member	Present_____
Christian Porter	christian.porter@aftonchemical.com	N-V Member	Present_____
Phil Rabbat	phil.rabbit@basf.com	N-V Member	Present_____
Allison Rajakumar	allison.rajakumar@lubrizol.com	N-V Member	Present_____
Scott Rajala	srajala@ilacorp.com	N-V Member	Present_____
Jim Rutherford	jaru@chevrontexaco.com	N-V Member	Present_____
Bob Salgueiro	bob.salgueiro@infineum.net	N-V Member	Present_____
Elisa Santos	elisa.santos@infineum.com	N-V Member	Present_____
Hirano Satoshi	satoshi_hirano_aa@mail.toyota.co.jp	N-V Member	Present_____
Amol Savant	acsavant@ashland.com	N-V Member	Present_____
Philip R. Scinto	prs@lubrizol.com	N-V Member	Present_____
Robert Stockwell	robert.stockwell@chevron.com	N-V Member	Present ✓
Chris Taylor	chris.taylor@vpracingfuels.com	N-V Member	Present ✓
Ben Weber	bweber1@sat.rr.com	N-V Member	Present_____
Angela Willis	angela.p.willis@gm.com	N-V Member	Present_____
Tom Wingfield	wingftm@cpchem.com	N-V Member	Present_____

Charlie Leverett

ATTACHMENT 2

Sequence IIIF/G Wrist Pin

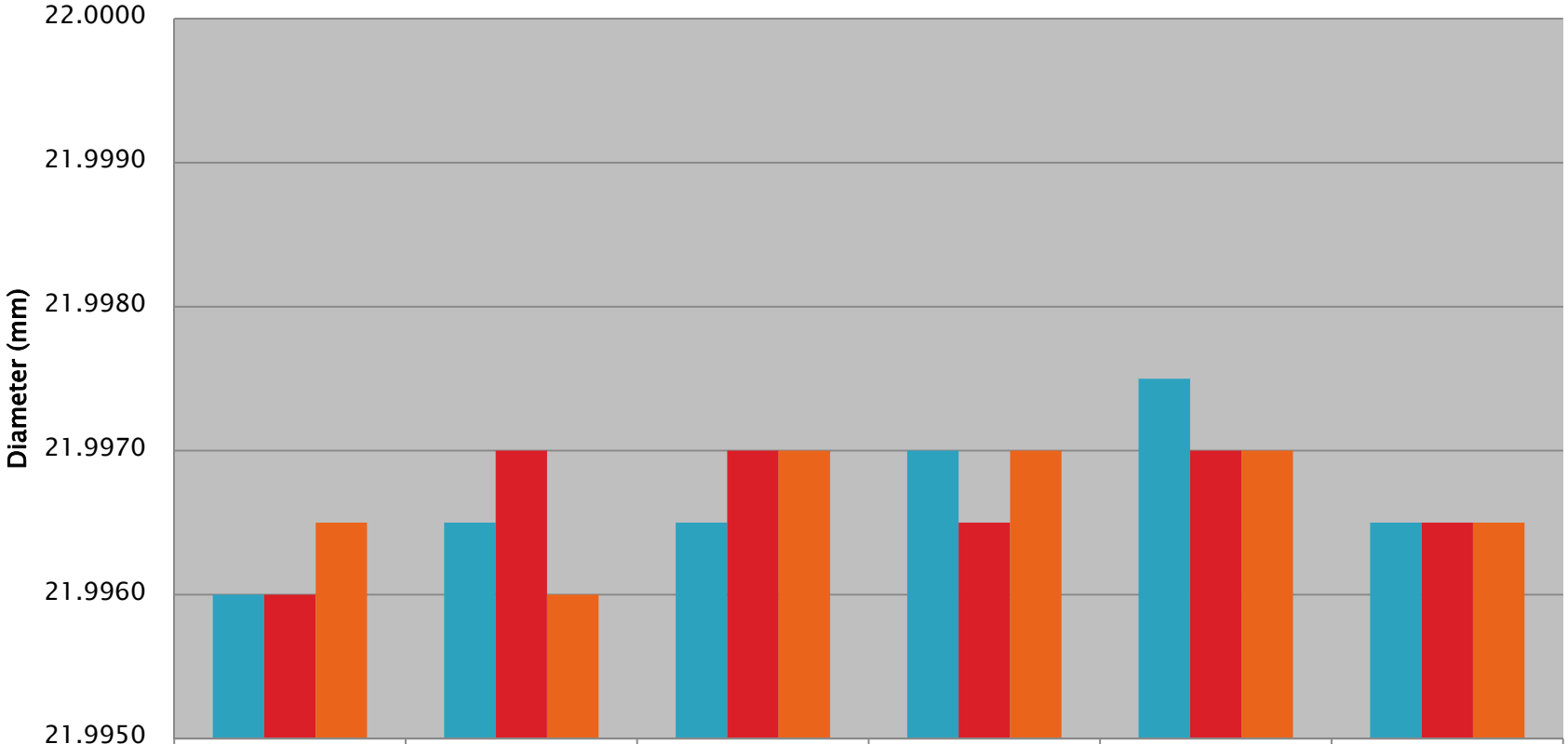
- Part Number: OHT3F-014-1

Overview

- Seq. III OHT3F-014-1 has become unavailable and the current inventory needs to be utilized through the end of the life of the Seq. IIIF/G.
- A mechanical specification and cleaning procedure was suggested to prolong the usage of the current inventory of wrist pins.
- Mechanical Specification:
  - Diameter: 21.9950 – 22.0000 mm (0.8659 – 0.8661 in)
- Experimental Cleaning Methods:
  - Ensolv
  - Ultrasonic Cleaned
  - Ultrasonic Cleaned, B12, and Scuffing Pad
  - Ultrasonic Cleaned, and Mylar Strip Polishing Cloth
- Results

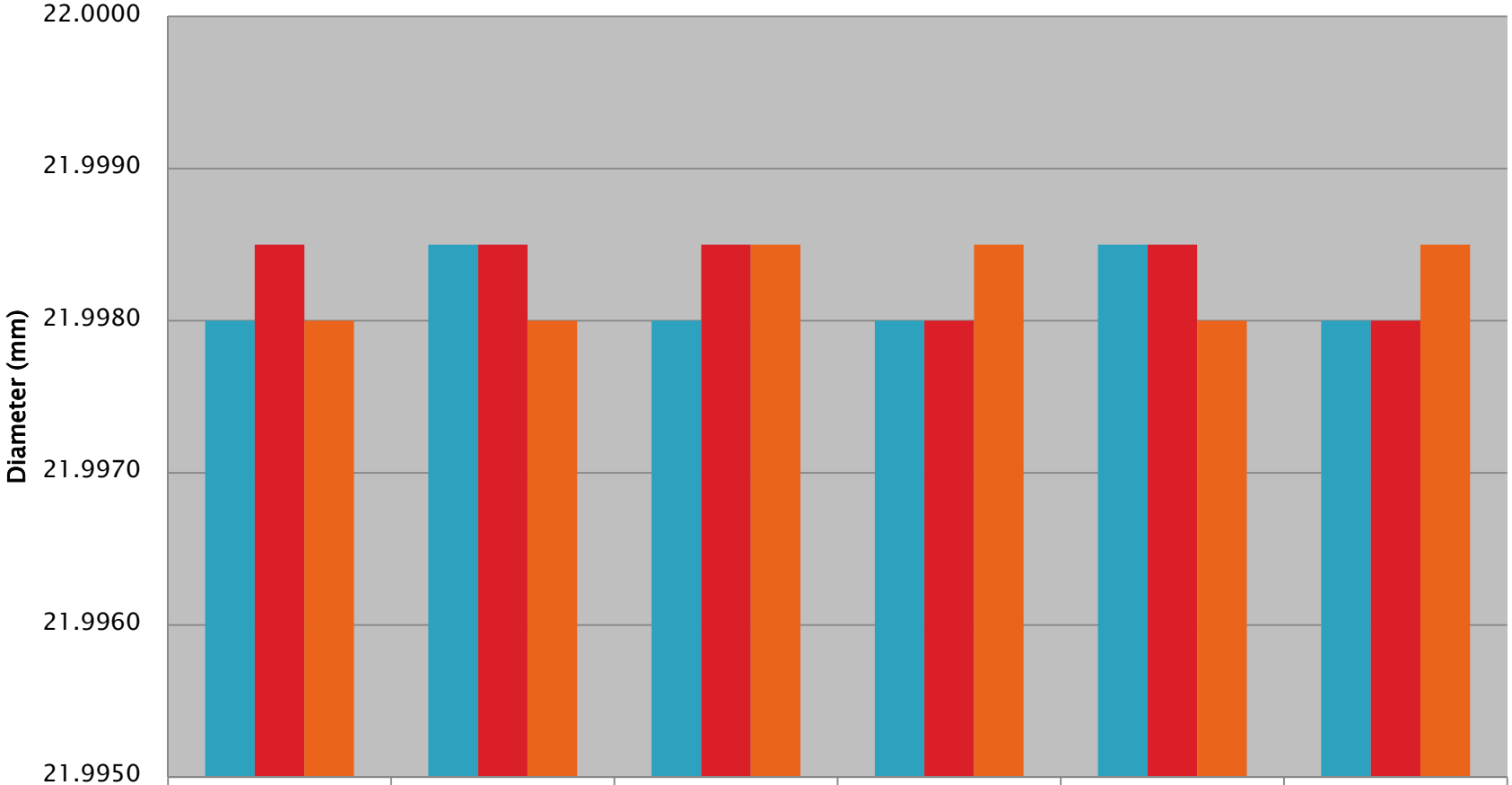
New

OHT3F-014-1 PIN, WRIST, SEQ. IIIF/G



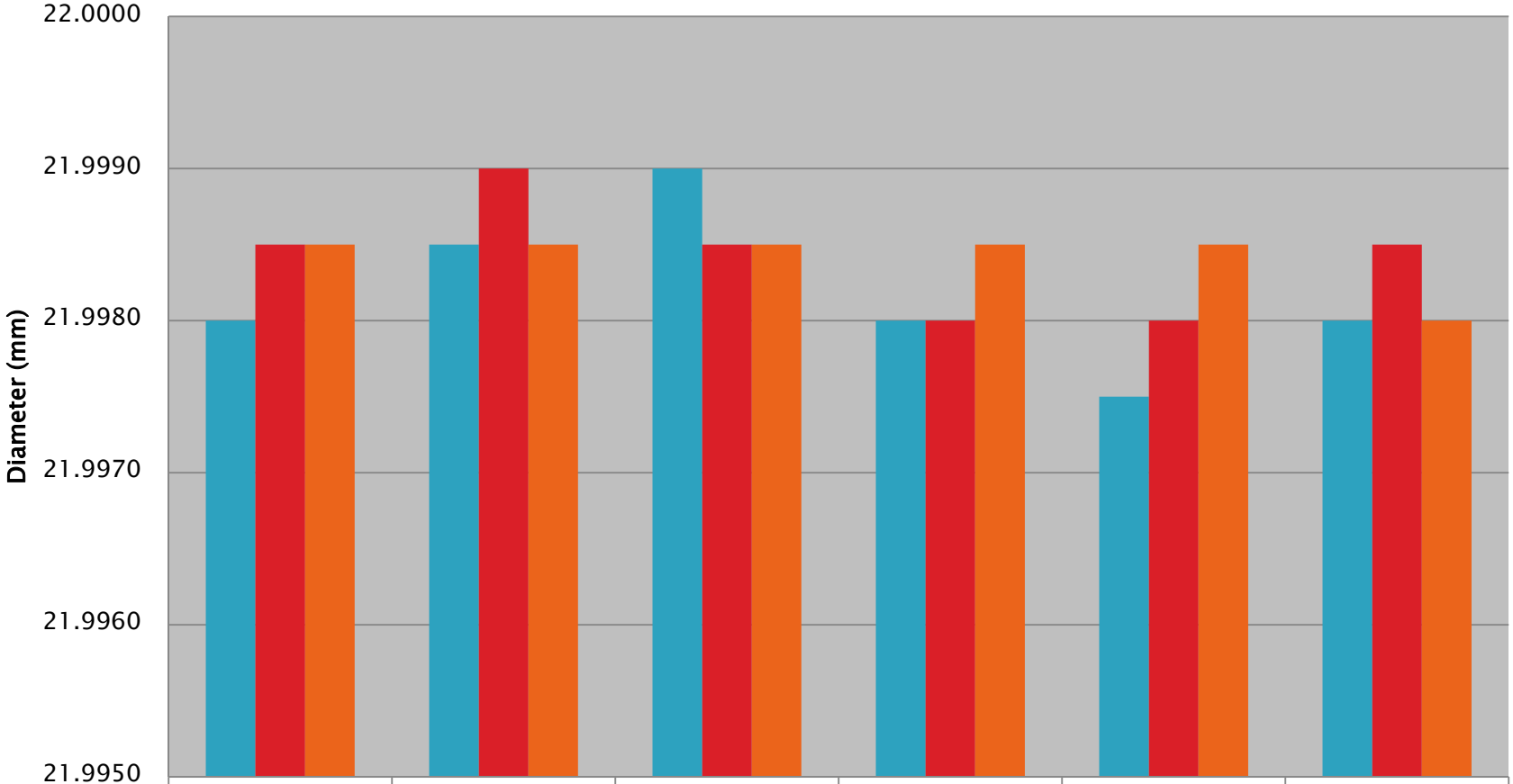
	1	2	3	4	5	6
Top	21.9960	21.9965	21.9965	21.9970	21.9975	21.9965
Mid	21.9960	21.9970	21.9970	21.9965	21.9970	21.9965
Bottom	21.9965	21.9960	21.9970	21.9970	21.9970	21.9965

IIIG Reference EOT Ensolv Cleaned
OHT3F-014-1 PIN, WRIST, SEQ. IIIF/G



	1	2	3	4	5	6
Top	21.9980	21.9985	21.9980	21.9980	21.9985	21.9980
Mid	21.9985	21.9985	21.9985	21.9980	21.9985	21.9980
Bottom	21.9980	21.9980	21.9985	21.9985	21.9980	21.9985

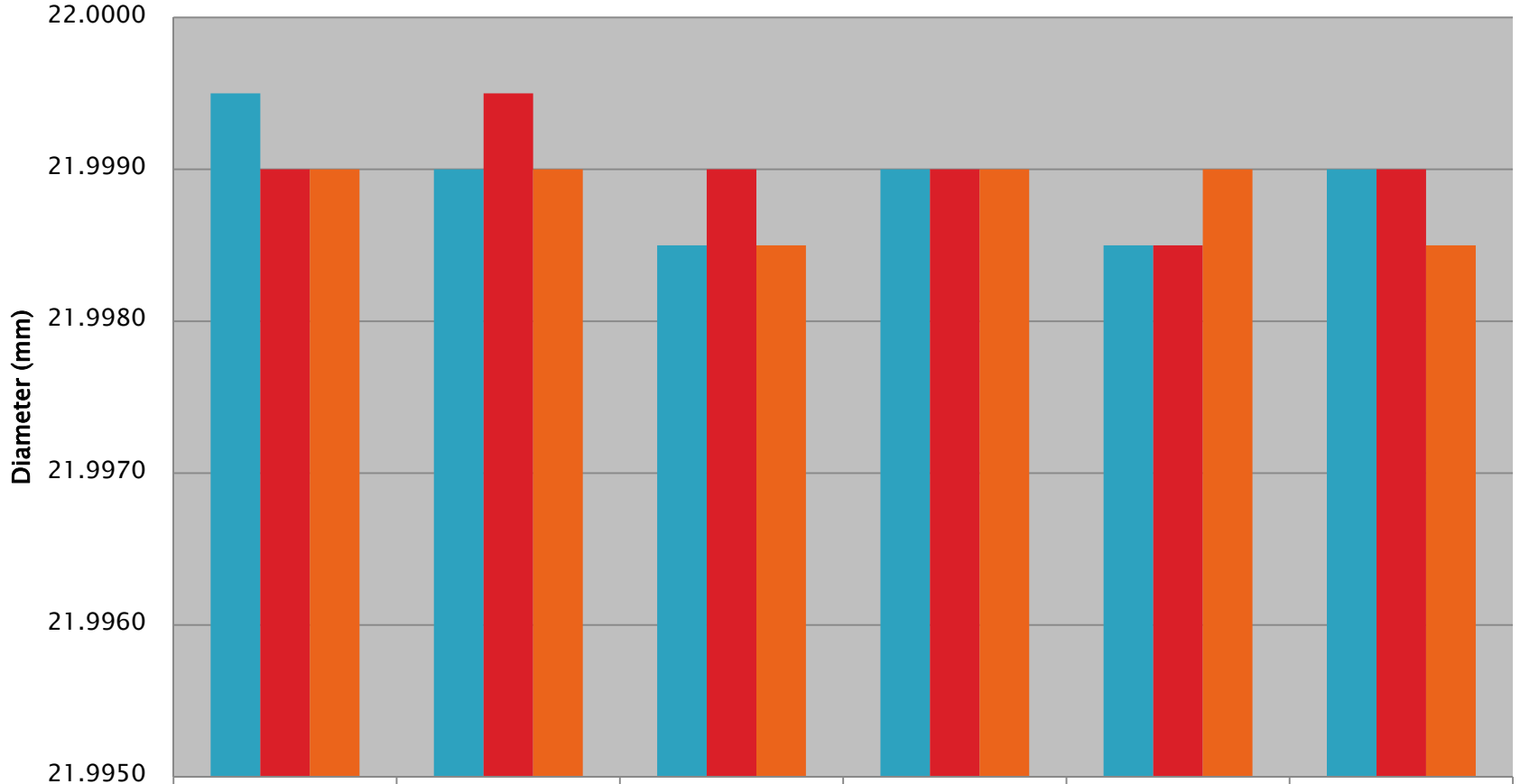
IIIF Reference EOT Ensolv Cleaned
OHT3F-014-1 PIN, WRIST, SEQ. IIIF/G



	1	2	3	4	5	6
Top	21.9980	21.9985	21.9990	21.9980	21.9975	21.9980
Mid	21.9985	21.9990	21.9985	21.9980	21.9980	21.9985
Bottom	21.9985	21.9985	21.9985	21.9985	21.9985	21.9980

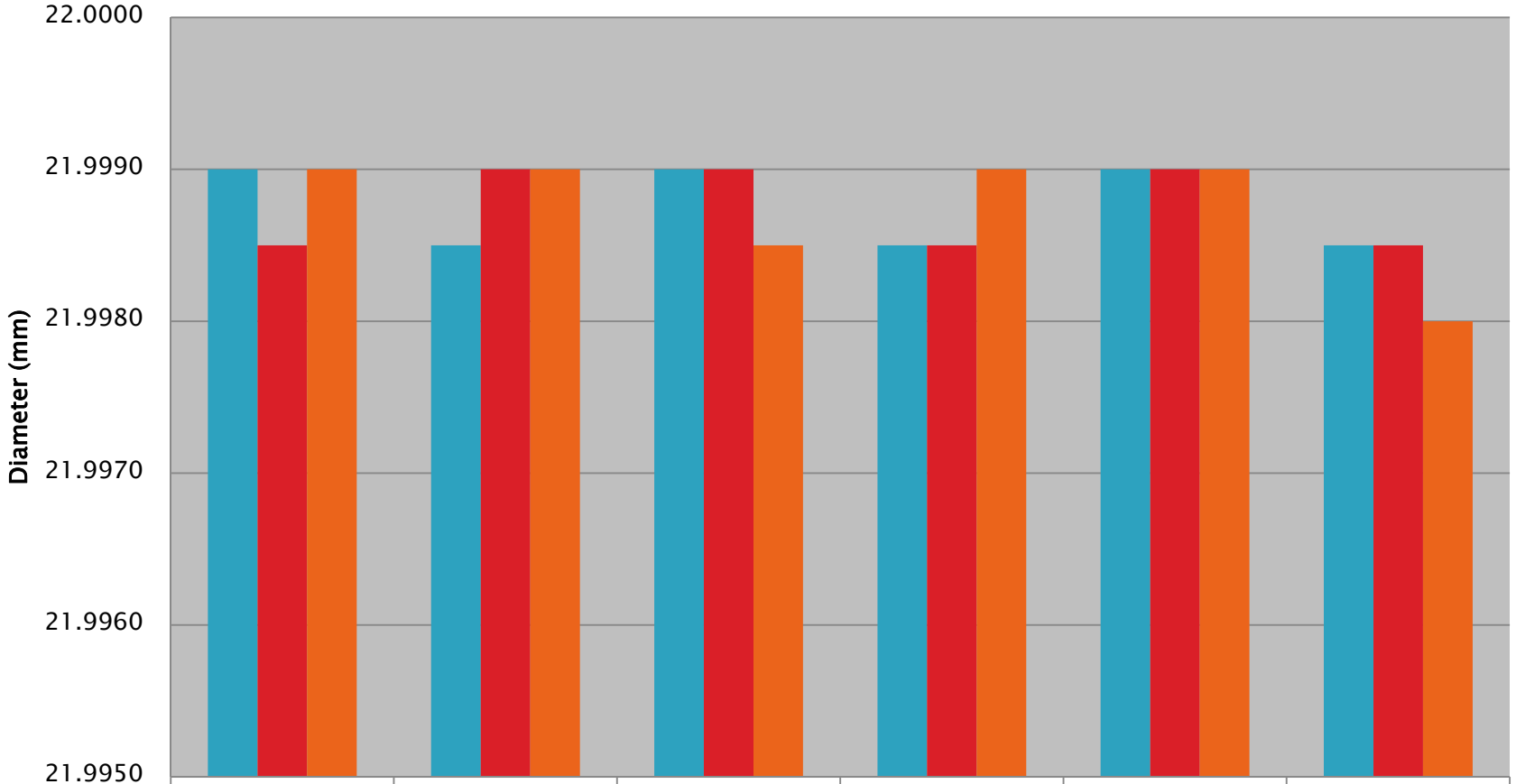
Ultrasonic Cleaned

OHT3F-014-1 PIN, WRIST, SEQ. IIIF/G



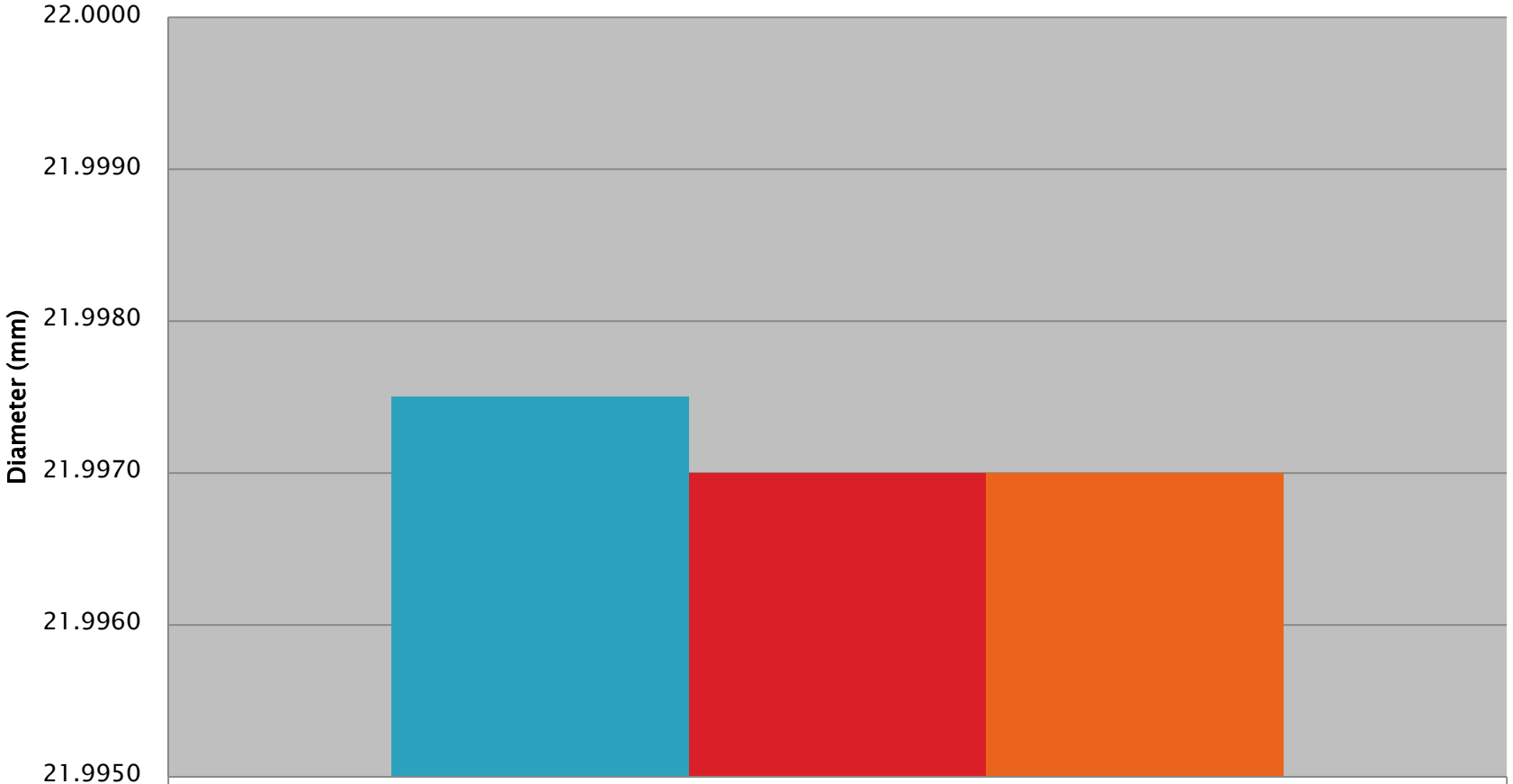
	1	2	3	4	5	6
Top	21.9995	21.9990	21.9985	21.9990	21.9985	21.9990
Mid	21.9990	21.9995	21.9990	21.9990	21.9985	21.9990
Bottom	21.9990	21.9990	21.9985	21.9990	21.9990	21.9985

Ultrasonic Cleaned, B12, and Scotch Brite 7447
OHT3F-014-1 PIN, WRIST, SEQ. IIIF/G



	1	2	3	4	5	6
Top	21.9990	21.9985	21.9990	21.9985	21.9990	21.9985
Mid	21.9985	21.9990	21.9990	21.9985	21.9990	21.9985
Bottom	21.9990	21.9990	21.9985	21.9990	21.9990	21.9980

Ultrasonic Cleaned and Mylar Strip Polishing Cloth
OHT3F-014-1 PIN, WRIST, SEQ. IIIF/G



	1
Top	21.9975
Mid	21.9970
Bottom	21.9970

Wristpin Cleaning Results

Ultrasonic Cleaned Only

Ultrasonic Cleaned, B12, and Scotch Brite 7447

Ultrasonic Cleaned and Mylar Strip Polishing Cloth

Proposed Seq. III Wrist Pin Re-Use Procedure

- Any wrist pin (OHT3F-014-1) that meets the diameter specification of 21.9950 – 22.0000 mm (0.8659 – 0.8661 in) and has been cleaned following the ultrasonic cleaning guidelines outlined in section 9.5 of the IIIF/G test procedure and Mylar strip polishing cloth (Q135 Metalite 3µ 1½ wide roll) is acceptable for re-use in the Sequence IIIF/G test type.

Motion to Seq. III SP

- MOTION:
  - IAR recommends the Sequence III Surveillance Panel to approve that any wrist pin (OHT3F-014-1) that meets the diameter specification of 21.9950 – 22.0000 mm (0.8659 – 0.8661 in) and has been cleaned following the ultrasonic cleaning guidelines outlined in section 9.5 of the IIIF/G test procedure and Mylar strip polishing cloth (Q135 Metalite 3µ 1½ wide roll) be allowed for reuse in the Sequence IIIF/G test type with the effective date of 5/26/2016.

ATTACHMENT 3

ADDENDUM K1

TEMPLATE CHECKLIST

Purpose

The Checklist for Comparing Tests to the Template is used to assess progress in new engine test development against the Code Acceptance Criteria and Action Plans. The checklist is updated periodically during the course of test development and is provided to, and discussed with, the appropriate ASTM test development task force.

The rating scale for comparing test development to the Template is as follows:
A - Completed
B - In Progress
C - Planned
D - No Action

Summary: Precision Matrix has been completed and data has been analyzed and discussed in industry groups. The Sequence IIIH has been voted as suitable to measure PVIS, WPD, MRV and Phos Retention. The test shows oil discrimination and good precision.

A. **Precision and Discrimination** – PM analysis complete, need d_p from MAD Survey
B. **Severity and Precision Control Charting** – Will be included in the next TMC LTMS update.
C. **Interpretation of Multiple Tests** – SP agreed to use MTAC
D1. **Reference Oils –** 436, 434-2 and 438-1 were chosen as matrix oils and reference oils. Oil 436 is blended to 1100 gallons.
D2. **Test Parts** - Engines, cylinder heads, pistons and rings are the critical parts. The plan is to supply 5000 complete engines and have them preserved and stored by the end of 2016. Engines are also currently available through dealer network by simply ordering the engine at the dealer. OHT will supply the pistons and rings, IMTS will supply the heads and Mopar will supply the engines. Heads and engines are serialized. Pistons and rings are batch controlled. All will be reported in the test forms.
D3. **Test Fuel** - HF003 EEE will be used and supplied by Haltermann. There are no special fuel requirements.
D4. **Test Procedure** – Oil 436 field correlation has been established and test development report is being finalized. Procedure is in draft form and in the editing process with an ASTM facilitator. All labs participated in an engine build workshop in August 2015 and Feb. 2016.
D5. **Rating and Reporting Results** – PVIS, WPD, MRV and Phos Retention are pass/fail parameters.
D. D6. **Calibration, Monitoring and Surveillance –** Will be included in the next TMC LTMS update.

Test Name Sequence IIIH Assessment Date May 26, 2016

Appendix K - Template for Acceptance of New Tests

Checklist for Comparing Tests to the Template

A. Precision and Discrimination

A.1 Precision

$E_p = d_p/Spp$, $E_p \geq 1.0$ for all pass/fail parameters
d_p = Smallest difference of practical importance
Spp = Pooled standard deviation at target level of performance

Parameter	dp	Spp	Ep	Ep≥1.0
LnPVIS		0.4641		
WPD		0.47		
LnMRV		0.4725		
PHOS		1.53		

Comments:

A.2 Discrimination

Oil 436 has significantly better LnPVIS, WPD and Phos Retention than 438-1.
Oil 436 has significantly better LnPVIS, LnMRV and Phos Retention than 434-2.
Oil 438-1 has significantly better LnPVIS and LnMRV than 434-2.
The direction of the difference is in accordance to expectation.

Parameter: LnPVIS

			p-value for t-test of equal means (Tukey)		
Oil	Least-Square Mean	95% Confidence Interval for Mean	Vs 434-2	Vs 436	vs 438-1
434-2	4.7191	4.4041 to 5.0340		0.00	0.01
436	3.3289	2.9933 to 3.6645	0.00		0.03
438-1	3.9754	3.6317 to 4.3192	0.01	0.03	

Parameter: WPD

			p-value for t-test of equal means (Tukey)		
Oil	Least-Square Mean	95% Confidence Interval for Mean	Vs 434-2	Vs 436	vs 438-1
434-2	4.16	3.84 to 4.48		0.12	0.09
436	4.63	4.28 to 4.97	0.12		0.00
438-1	3.66	3.31 to 4.01	0.09	0.00	

Parameter: LnMRV

Oil	Least-Square Mean	95% Confidence Interval for Mean	p-value for t-test of equal means (Tukey) Vs 434-2	Vs 436	vs 438-1
434-2	11.1107	10.7900 to 11.4313		0.00	0.00
436	9.7854	9.4437 to 10.1270	0.00		0.36
438-1	9.8189	9.4690 to 10.1689	0.00	0.36	

Parameter: Phosphorus Retention

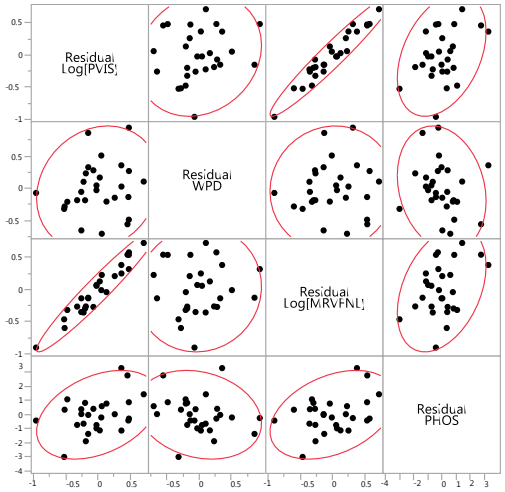
Oil	Least-Square Mean	95% Confidence Interval for Mean	p-value for t-test of equal means (Tukey) Vs 434-2	Vs 436	vs 438-1
434-2	79.95	78.91 to 80.99		0.00	0.35
436	94.15	93.04 to 95.26	0.00		0.00
438-1	78.92	77.78 to 80.05	0.35	0.00	

Comments:

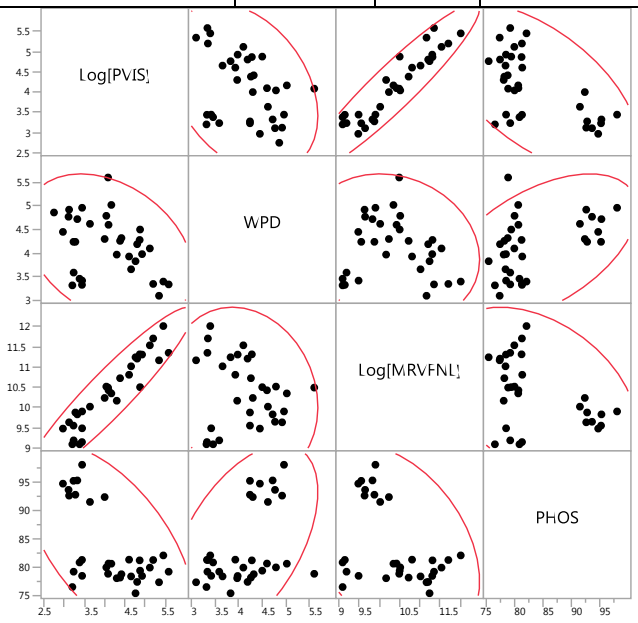
A.3 Parameter Redundancy

There's a high positive correlation between LnPVIS and LnMRV with correlation coefficient of 0.97. Parameter redundancy is concluded if a correlation coefficient is 0.85 or greater.

Correlation Coefficients	Residual Log[PVIS]	Residual WPD	Residual Log[MRVFNL]	Residual PHOS
Residual Log[PVIS]	1	0.16	0.97	0.38
Residual WPD	0.16	1	0.05	-0.20
Residual Log[MRVFNL]	0.97	0.05	1	0.38
Residual PHOS	0.38	-0.20	0.38	1



Correlation Coefficients	Log[PVIS]	WPD	Log[MRVFNL]	PHOS
Log[PVIS]	1	-0.33	0.94	-0.59
WPD	-0.33	1	-0.15	0.52
Log[MRVFNL]	0.94	-0.15	1	-0.38
PHOS	-0.59	0.52	-0.38	1



B. Severity and Precision Control Charting

Requirements

B.1 Is an LTMS for reference oil tests in place which is consistent with the ACC Code Appendix A? __B___

B.2 Are appropriate data transforms applied to test results? __A___

Comments: SP agreed on details of LTMS. TMC to draft LTMS document and should be balloted for implementation after two-week waiting period.

C. Interpretation of Multiple Tests

Requirements

C.1 Is a suitable system in place to handle repeat tests on a candidate oil? __A___

Type: MTAC Tiered Limits Other

C.2 Has a method for the determination and handling of outlier results been defined? __A___

A. **Comments:** SP agreed to use MTAC

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.Action Plan

D.1 Reference Oils

Do the majority of reference oils represent current technology? __A___

Are the majority of reference oils of passing or borderline pass/fail performance? __A___

Recommended Approaches

D.1.1 Is reference oil supply and distribution handled through an independent organization? __A___

D.1.2 Is a quality control plan defined and in place? __A___

D.1.3 Is a turnover plan defined/in place to ensure uninterrupted supply of reference oil and an orderly transition to reblends? __A___

D.1.4 Is a process for introducing replacement reference oils defined and in place? __A___

D.1.5 Are oils blended in a homogeneous quantity to last 5 years? __A___

Comments: 436, 434-2 and 438-1 were chosen as matrix oils and reference oils. Oil 436 is blended to 1100 gallons. TMC and Seq III SP handle all of the above.

D.2 Test Parts

Are all critical parts identified? __A___

Is a system defined/in place to maintain uniform hardware? __A___

Is there a system for engineering support and test parts supply? __A___

Recommended Approaches

D.2.1 Are critical parts distributed through a Central Parts Distributor (CPD)? __A___

D.2.2 Are critical parts serialized, and their use documented in test report? __A___

D.2.3 Are all parts used on a first in/first out basis? __A___

D.2.4 Are all rejected critical parts accounted for and returned to the CPD? __A___

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.2.5 Does the CPD make status reports to the test surveillance body at least semi-annually? __C___

D.2.6 Is there a quality control and turnover plan in place for critical test parts, including identification and measurement of key part attributes, a system for parts quality accountability, a turnover plan in place for simultaneous industry-wide use of new parts or supply sources? __A___

D.2.7 Is the CPD active in industry surveillance panel/group, and in industry sponsored test matrices? __A___

Comments: Engines, cylinder heads, pistons and rings are the critical parts. The plan is to supply 3800 complete engines and have them preserved and stored by the end of 2016. Engines are also currently available through dealer network by simply ordering the engine at the dealer. OHT will supply the pistons and rings, IMTS will supply the heads and Mopar will supply the engines. Heads and engines are serialized. Pistons and rings are batch controlled. All will be reported in the test forms.

D.3 Test Fuel

Recommended Approaches

D.3.1 Is the fuel specified and the supplier(s) identified? __A___

Is a process in place to monitor fuel stability over time? __A___

Are approval guidelines in place for fuel certification? __A___

D.3.2 If the test fuel is treated as a critical part of the test procedure: Is an approval plan and severity monitoring plan for each fuel batch in place? __A___

Is a quality control plan defined and in place to assure long term quality of the fuel? __A___

Is a turnover plan defined, in place and demonstrated to ensure uninterrupted supply of fuel? __A___

Comments: HF003 EEE will be used and supplied by Haltermann. There are no special fuel requirements.

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.4 Test Procedure

Recommended Approaches

D.4.1 Is a technical report published documenting, per ASTM Flow Plan:
Test precision for reference oils? __C___

Field correlation? __A___

Test development history? __C___

D.4.2 Are test preparation and operation clearly documented in a standard format, e.g., ASTM, CEC? __B___

D.4.3 Are test stand configuration requirements documented and standardized? __A___

D.4.4 Are milestones for precision improvements established? __C___

D.4.5 Are routine engine builder workshops planned/conducted? __A___

Comments: Oil 436 field correlation has been established. Test development report is planned. Procedure is in draft form and in the editing process with an ASTM facilitator. All labs participated in an engine build workshop in August 2015 and Feb. 2016.

D.5 Rating and Reporting of Results

Recommended Approaches

D.5.1 Are the reported ratings from single raters (i.e. not averages from various raters)? __A___

D.5.2 Is a suitable severity adjustment system in place? __B___

D.5.3 Is each pass/fail parameter unique and have a significant purpose for judging engine oil performance? __A___

D.5.4 Do all rate and report parameters judge operational validity, help in test interpretation or judge engine oil performance? __A___

D.5.5 Are routine rater workshops conducted/planned? __A___

Comments: PVIS, WPD, MRV and Phos Retention are pass/fail parameters.

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.6 Calibration, Monitoring and Surveillance

Recommended Approaches

D.6.1 Is a process in place for independent monitoring of severity and precision with an action plan for maintaining calibration of all laboratories? __A___

D.6.2 Are stand, lab, and industry reference oil control charts of all pass/fail criteria parameters used to judge calibration status? __B___

D.6.3 Does the specified calibration test interval allow no more than 15 non-reference oil tests between successful calibration tests? __A___

D.6.4 Is an industry surveillance panel in place? __A___

Comments: TMC will monitor and SP has defined the details of LTMS, TMC to draft document and will be balloted for implementation

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action