Minutes
Sequence III Surveillance Panel
Conference Call
May 20, 2014
14:00 EDT

1.0) Attendance

The attendance is shown as **Attachment 1**; the meeting agenda is shown as **Attachment 2**.

2.0) Approval of minutes

The minutes of the January 29, 2014 and March 18, 2014 conference calls were approved without objection.

3.0) Action Item Review

3.1) Batch 10 Rings for Sequence IIIG test. Motion at 11/19/2013 meeting for labs to donate test; OHT to provide kit. R. Grundza

Rich Grundza provide a summary of the data available to date (**Attachment 3**). Four of five labs have donated tests; three were operationally valid, two of which passed. After a brief discussion about the data set, ***it was moved (Leverett, Bowden) to accept Batch 10 rings for Seq. IIIG testing, effective 5-20-14***. During discussion, concerns were expressed that the decision was being made with less data than was originally expected and also that not all parties have donated data as previously agreed. It was commented that this could be avoided in future situations by crafting the motion to compel all parties to provide data. At the conclusion of the discussion, ***the motion passed 12-0-3***.

3.2) Sequence IIIF PVIS correction factor 6 month review. J. Buchanan

Jessica Buchanan provided the review (**Attachment 4**). The recommendation is that the correction factor is working as intended and that it should be reviewed yearly or when requested by the panel.

4.0) Old Business

4.1) RO 433-2 re-blend concerns.

Rich Grundza provided a review (**Attachment 5**) of IIIF results on RO 433-2. HRS appears to be severe and new oil viscosity is about 6 - 8 cSt lower than 433-1. Charlie Leverett asked if this could potentially impact the HRS CF and results and felt it may be a good idea to have the stats group review the situation. After discussion, Dave Glaenzer agreed to request another review from the stats group.

Action Item - request the stats group to review of IIIF in regards to 433-2 results. Dave Glaenzer.

4.2) RO 434-2 ready for distribution. Grundza

RO 434-2 is ready for distribution for the IIIG test. The previous blend's targets will be used.

4.3) Remaining cylinder heads at Chevrolet Performance that were rejected for some reason. How can we determine if any are usable? S. Stap

Previously rejected heads will be examined to see if they can be salvaged for use. Typically these heads were rejected for light scratches.

4.4) Sequence IIIG Severity Task Force. G. Szappanos

The task force has been de-activated.

4.5) Review of Sequence IIIG EOT used oil copper levels. M. Chadwick

Martin Chadwick provided an analysis shown in **Attachment 6**. Addison Schweitzer reviewed it for the group in Martin's absence. The analysis shows that the copper at 100 hours for Stellite head runs are within the range of past reference runs.

5.0) New Business

5.1) Use of Ultrasonic cleaner for Sequence IIIF & IIIG tests. C. Leverett

Charlie Leverett has provided proposed wording for using an Ultrasonic cleaner for both Seq. IIIF and IIIG tests as an acceptable alternate cleaning method (**Attachment 7**). ***Charlie Leverett moved, Pat Lang seconded, to allow labs to use***

the ultrasonic cleaning method as an acceptable alternate method, provided the cleaning method is first brought in (at the lab level) with an acceptable reference test. This motion passed unanimously (15-0-0).

Action Item - TMC to issue information letters for both IIIF and IIIG.

5.2) Review of requirement to calibrate Sunnen honing machine on a yearly basis. What does historic data tell us? R. Grundza

Some labs have had difficulty getting Sunnen to calibrate the machines. It may be possible for labs to do this on their own and it has been noted that Sunnen technicians make minimal, if any, adjustments to the machines. Rich Grundza provided a summary (**Attachment 8**). It was noted that the procedure does not require the calibration to be performed by Sunnen, but the build manual does. After discussion, Charlie Leverett volunteered to craft a solution to the dilemma.

Action Item - Charlie Leverett to lead the effort to draft a proposed solution.

5.3) Formation of Sequence IIIH Task Force.

Dave Glaenzer noted that test development is approaching the stage where a task force should be formed. Dave will contact the test developer and development lab about the formation of the TF.

Action Item - Dave Glaenzer will start the task force formation process.

5.4) Test Monitoring Center Semi-Annual report. R. Grundza

The TMC Semi-Annual report has been distributed and is available from the TMC web site.

5.5) Remaining critical hardware availability. D. Glaenzer

Dave Glaenzer stated that he is working on a report that he will distribute in the near future. Current estimated need is 800 tests to end of life. At this point in time it looks like cylinder blocks are the limiting component. There appear to be less than half the necessary runs available. Labs have been saving blocks. There are 7 and 8 run rings and pistons available and the time has come to consider additional runs on the blocks. After discussion, there was general agreement to form a task force to craft a comprehensive solution to this issue. It should consider the necessary changes to the build manual, test procedure, and an acceptable method of introduction. Jason Bowden will lead the task force.

For cylinder heads, there shouldn't be a life-of-test supply problem if each head can provide three runs.

Jason Bowden reported that the manufacturer is behind schedule for IIIF camshafts with delivery now out to August. Jason was asked if regrinding was a possibility and he commented that it may be considered in the future. Jason will advise as events develop.

Action Items:

- Test Labs to provide parts counts to Dave Glaenzer
- Dave Glaenzer to issue report
- Jason Bowden to lead a task force to resolve the additional (runs 7 and 8) block runs issue

6.0) Review Scope and Objectives

These will be reviewed at a future meeting.

7.0) Next Meeting

The next meeting will be at the call of the chair, once a proposal is available for the 7 and 8 runs on blocks.

8.0) Meeting Adjourned

The meeting adjourned around 3:55 pm.

ATTACHMENT 1

ASTM Sequence III Surveillance Panel (20 Voting members) date: 05/20/2014

15 VOTING PRESENT

Name/Address	Phone/Fax/Email		Signature
Ed Altman Afton Chemical Corporation 500 Spring Street Richmond, VA 23219 USA	804-788-5279 804-788-6358 ed.altman@aftonchemical.com	Voting Member	Present ✓
Jason Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 jhbowden@ohtech.com	Voting Member	Present ✓
Timothy L. Caudill Ashland Oil Inc. 22nd & Front Streets Ashland, KY 41101 USA	606-329-1960 x5708 606-329-2044 tlcaudill@ashland.com	Voting Member	Present ✓
Richard Grundza ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1031 412-365-1047 reg@astmtmc.cmu.edu	Voting Member	Present ✓
Tracey King Haltermann Solutions MI USA	947-517-4107 tking@Jhaltermann.com	Voting Member	Present ✓
Teri Kowalski Toyota Motor North America, Inc. 1555 Woodridge Ann Arbor, MI 48105 USA	734-995-4032 734-995-9049 teri.kowalski@tema.toyota.com	Voting Member	Present
Patrick Lang Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-2820 210-684-7523 plang@swri.edu	Voting Member	Present ✓

ASTM Sequence III Surveillance Panel (20 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Charlie Leverett Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-647-9422 210-523-4607 charlie.leverett@intertek.com	Voting Member	Present ✓
Bruce Matthews GM Powertrain Mail Code 483-730-472 823 Jocyln Avenue Pontiac, MI 48340 USA	248-830-9197 248-857-4441 bruce.matthews@gm.com **Test Sponsor Representative**	Voting Member	Present ✓
Timothy Miranda BP Castrol Lubricants USA 1500 Valley Road Wayne, NJ 07470 USA	973-305-3334 973-686-4039 Timothy.Miranda@bp.com	Voting Member	Present
Mark Mosher ExxonMobil Technology Co. Billingsport Road Paulsboro, NJ 08066 USA	856-224-2132 856-224-3628 mark.r.mosher@exxonmobil.com	Voting Member	Present
Andrew Ritchie Infineum 1900 East Linden Avenue P.O. Box 735 Linden, NJ 07036 USA	908-474-2097 908-474-3637 Andrew.Ritchie@Infineum.com	Voting Member	Present Represented by Gordon Farnsworth
Ron Romano Ford Motor Company Diagnostic Service Center II Room 410. 1800 Fairlane Drive Allen Park, MI 48101 USA	313-845-4068 313-32-38042 rromano@ford.com	Voting Member	Present ✓
Greg Shank Volvo	301-790-5817 greg.shank@volvo.com	Voting Member	Present

ASTM Sequence III Surveillance Panel (20 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Kaustav Sinha, Ph.D. Chevron Oronite Co., LLC 4800 Fournace Place Bellaire, TX 77401 USA	713-432-6642 713-432-3330 LFNQ@chevron.com	Voting Member	Present ✓
Thomas Smith Valvoline P.O. Box 14000 Lexington, KY 40512-1400 USA	859-357-2766 859-357-7084 trsmith@ashland.com **PCEOCP Chair**	Voting Member	Present
Scott Stap Chevrolet Performance	scott.stap@tgidirect.com	Voting Member	Present ✓
Mark Sutherland Test Engineering, Inc. 12718 Cimarron Path San Antonio, TX 78249-3423 USA	210-867-8357 mrsutherland@tei-net.com	Voting Member	Present Represented by ZACH BISHOP
George Szappanos The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2352 440-347-4096 greg.seman@lubrizol.com	Voting Member	Present ✓
Haiying Tang Chrysler LLC	248-512-0593 ht146@chrysler.com	Voting Member	Present ✓

ASTM Sequence III Surveillance Panel (20 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Ricardo Affinito Chevron Oronite Co. LLC	affinito@chevron.com	Non-Voting Member	Present
Art Andrews ExxonMobil Products Research 600 Billingsport Rd. Paulsboro, NJ 08066 USA	856-224-3013 arthur.t.andrews@exxonmobil.com	Non-Voting Member	Present
Zack Bishop Test Engineering, Inc. 12718 Cimarron Path San Antonio, TX 78249-3423 USA	210-877-0223 210-690-1959 zbishop@tei-net.com	Non-Voting Member	Present ✓
Doyle Boese Infineum 1900 E. Linden Avenue Linden, NJ 07036 USA	908-474-3176 908-474-3637 doyle.boese@infineum.com	Non-Voting Member	Present ✓
Adam Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 adbowden@ohtech.com	Non-Voting Member	Present
Dwight H. Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 dhbowden@ohtech.com	Non-Voting Member	Present
Matt Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 mjbowden@ohtech.com	Non-Voting Member	Present
Jerome A. Brys Lubrizol Corp. 29400 Lakeland Blvd. Wickliffe, Ohio 44092 USA	440 347-2631 jerome.brys@lubrizol.com	Non-Voting Member	Present ✓

ASTM Sequence III Surveillance Panel (20 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Bill Buscher III Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-6802 210-684-7523 william.buscher@swri.org	Non-Voting Member	Present
Bob Campbell Afton Chemical Corporation 500 Spring Street Richmond, VA 23219 USA	804-788-5340 804-788-6358 bob.campbell@aftonchemical.com	Non-Voting Member	Present ✓
Chris Castanien	Chris.Castanien@gmail.com	Non-Voting Member	Present ✓
Martin Chadwick Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-706-1543 210-684-6074 martin.chadwick@intertek.com	Non-Voting Member	Present
Jeff Clark ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1032 412-365-1047 jac@atc-erc.org **Sequence III Secretary**	Non-Voting Member	Present ✓
Sid Clark Southwest Research 50481 Peggy Lane Chesterfield, MI 48047 USA	586-873-1255 sidney.l.clark@swri.org	Non-Voting Member	Present
J. Michael Conrad, II The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44902-2298 USA	440-347-4594 440-347-4096 Michael.conrad@lubrizol.com	Non-Voting Member	Present ✓
Todd Dvorak Afton Chemical Corporation P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788- 6367 804-788- 6388 todd.dvorak@aftonchemical.com	Non-Voting Member	Present

Name/Address	Phone/Fax/Email		Signature
Frank Farber ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1030 412-365-1047 fmf@astmtmc.cmu.edu	Non-Voting Member	Present
Gordon R. Farnsworth Infineum RR # 5 Box 211 Montrose, PA 18801 USA	570-934-2776 570-934-0141 gordon.farnsworth@infineum.com	Non-Voting Member	Present ✓
Joe Franklin Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-523-4671 210-523-4607 joe.franklin@intertek.com	Non-Voting Member	Present
David L. Glaenzer Afton Chemical Corporation 500 Spring Street P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788-5214 804-788-6358 dave.glaenzer@aftonchemical.com **Surveillance Panel Chairman**	Non-Voting Member	Present ✓
Karin E. Haumann Southwest Research Institute Fuels & Lubricants Res. Div.	210-522-6351 210-522-6858 karin.haumann@swri.org	Non-Voting Member	Present
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Josephine G. Martinez Chevron Oronite Company LLC 100 Chevron Way Richmond, CA 94802 USA	510-242-5563 510-242-3173 jogm@chevrontexaco.com	Non-Voting Member	Present ✓
Mike McMillan	mmcmillan123@comcast.net	Non-Voting Member	Present

Name/Address	Phone/Fax/Email		Signature
Siamak Moshiri Cad Railway Industries Ltd. 155 Montreal – Toronto Highway H8S 1B4 Montreal, QC CANADA	1-634-3131, ext. 412 smoshiri@cadrail.ca	Non-Voting Member	Present
Bob Olree 5388 Hill 23 Drive Flint, MI 48507 USA	248-689-3078 olree@netzero.net	Non-Voting Member	Present
Kevin O'Malley Lubrizol Corp.	kevin.omalley@lubrizol.com	Non-Voting Member	Present
Christian Porter Afton Chemical Corp. 500 Spring Street Richmond, VA 23219 USA	804-788-5837 804-788-6358 christian.porter@aftonchemical.com	Non-Voting Member	Present ✓
Phil Rabbat BASF Corporation 500 White Plains Road Tarrytown, NY 10591-9005 USA	914-785-2217 914-785-3681 phil.rabbat@basf.com	Non-Voting Member	Present
Allison Rajakumar The Lubrizol Corporation Drop 152A 29400 Lakeland Blvd. Wickliffe, OH 44092 USA	440-347-4679 440-347-2014 Allison.Rajakumar@Lubrizol.com	Non-Voting Member	Present ✓
Scott Rajala Idemitsu Lubricants America Corp.	srajala@ilacorp.com	Non-Voting Member	Present
Jim Rutherford Chevron Oronite Company LLC 100 Chevron Way Richmond, CA 94802 USA	510-242-3410 510-242-3173 jaru@chevrontexaco.com	Non-Voting Member	Present

ASTM Sequence III Surveillance Panel (20 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Amol Savant Ashland Engine Lab 121 22nd St. Ashland, KY 41101 USA	606-320-1960 x5604 acsavant@ashland.com	Non-Voting Member	Present
Addison Schweitzer Intertek AR		Non-Voting Member	Present ✓
Philip R. Scinto The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2161 440-347-9031 prs@lubrizol.com	Non-Voting Member	Present
Don Smolenski GM	248-255-7892 donald.j.smolenski@gm.com	Non-Voting Member	Present
Ben O. Weber Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-5911 210-684-7530 bweber@swri.edu **Sub-Committee D02.B01 Chair**	Non-Voting Member	Present
Tom Wingfield Chevron Phillips Chemical Co. USA	wingftm@cpchem.com	Non-Voting Member	Present

Chris Taylor, ?. Fuels
Robert Stockwell, GM
Janet Buckingham, SRI
Jeff Betts, Chrysler
Dave Caprowie, Ashland
Clayton Knight, TEI

2/12/14

Sequence III Surveillance Panel
May 20, 2014
14:00 EDT
Call-in Number is: (866) 817-9787
Participant Passcode: 2158089
Non Toll-Free: (203) 320-2489

Agenda

1.0) Attendance

2.0) Approval of minutes

2.1) January 29, 2014 Teleconference
2.2) March 18, 2014 Teleconference

3.0) Action Item Review

3.1) Batch 10 Rings for Sequence IIIG test. Motion at 11/19/2013 meeting for labs to donate test; OHT to provide kit. **R. Grundza**
3.2) Sequence IIIF PVIS correction factor 6 month review. **J. Buchanan**

4.0) Old Business

4.1) RO 433-2 re-blend concerns.
4.2) RO 434-2 ready for distribution. **Grundza**
4.3) Remaining cylinder heads at Chevrolet Performance that were rejected for some reason. How can we determine if any are usable? **S. Stap**
4.4) Sequence IIIG Severity Task Force. **G. Szappanos**
4.5) Review of Sequence IIIG EOT used oil copper levels. **M. Chadwick**

5.0) New Business

5.1) Use of Ultrasonic cleaner for Sequence IIIF & IIIG tests. **C. Leverett**
5.2) Review of requirement to calibrate Sunnen honing machine on a yearly basis. What does historic data tell us? **R. Grundza**
5.3) Formation of Sequence IIIH Task Force.
5.4) Test Monitoring Center Semi-Annual report. **R. Grundza**
5.5) Remaining critical hardware availability. **D. Glaenzer**

6.0) Review Scope and Objectives

6.1) All

7.0) Next Meeting

7.1) TBD

8.0) Meeting Adjourned

Test Monitoring Center
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BC-10 Ring Results

May 20, 2014

Results to Date

- 3 operationally valid results as of today
- 2 within acceptance criteria
- 1 was severe for PVIS and WPD
- A fourth test was terminated at test hour 40 due to oil consumption

Results reported to date

TESTKEY	LTMSLAB	LTMSAPP	IND	PVIS	WPD	ACLW	Oil Consumption
97096-IIIG	D	2	435-2	120.3	3.13	22.1	3.68
94738-IIIG	B	2	434-1	736.4	2.94	46.3	4.01
98236-IIIG *	G	2	435-2	57.7	.	.	3.76
98845-IIIG	E	1	438	112.8	2.97	21.2	3.72

* Terminated at 40 hours due to high oil consumption

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ATTACHMENT 4

IIIF PVIS Hours Correction Factor Review

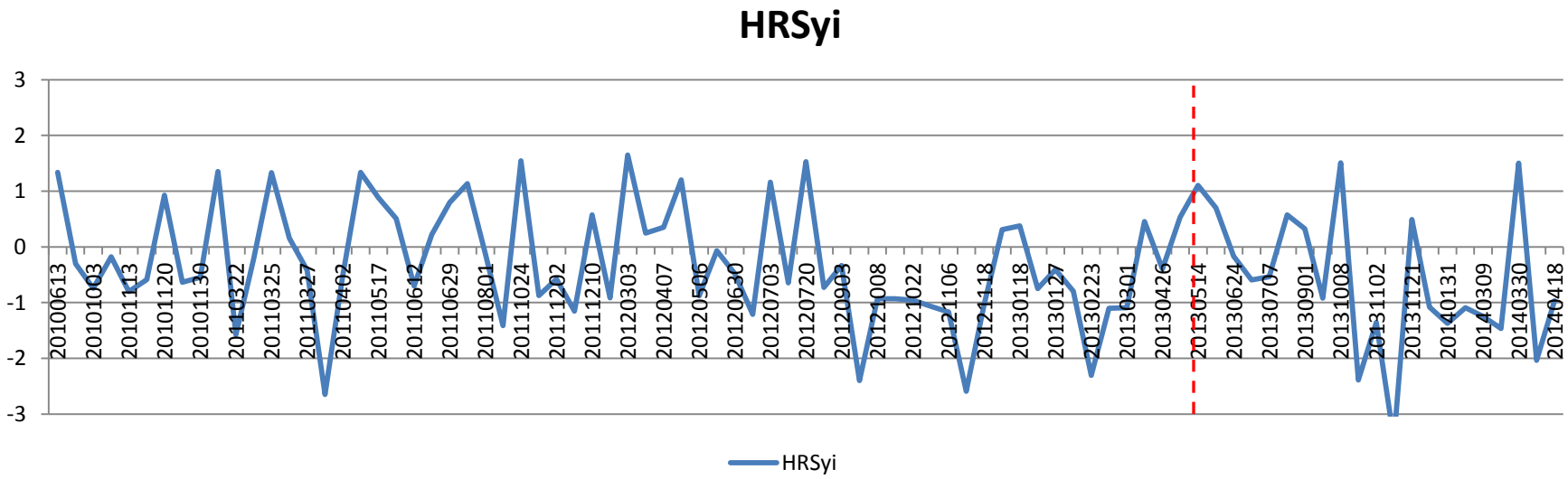
May 20, 2014

Janet Buckingham, Martin Chadwick, Doyle Boese, Jessica Buchanan, Todd Dvorak, Jo Martinez, Rich Grundza, Andy Buczynsky

Summary

- Last reviewed November 2013
- There have been 22 operationally valid data points on Reference Oils since the revised method was implemented in May 2013
  - Lab A (3)
  - Lab B1 (8)
  - Lab G (5) *one on new hardened seat head
  - Lab M2 (6) *2 failed severe
- The hours industry chart is in control
  - PV60 is in severity action alarm
- 3 labs currently have SAs

Hrs Yi
June 2010 to present



Red dash indicates approximate time of Hours correction factor implementation (May 2013)

Recommendations

- The method to monitor PVIS in hours is in control and the correction factor is working as intended.
- Conduct a review yearly, or as deemed necessary by the Surveillance Panel.

Test Monitoring Center
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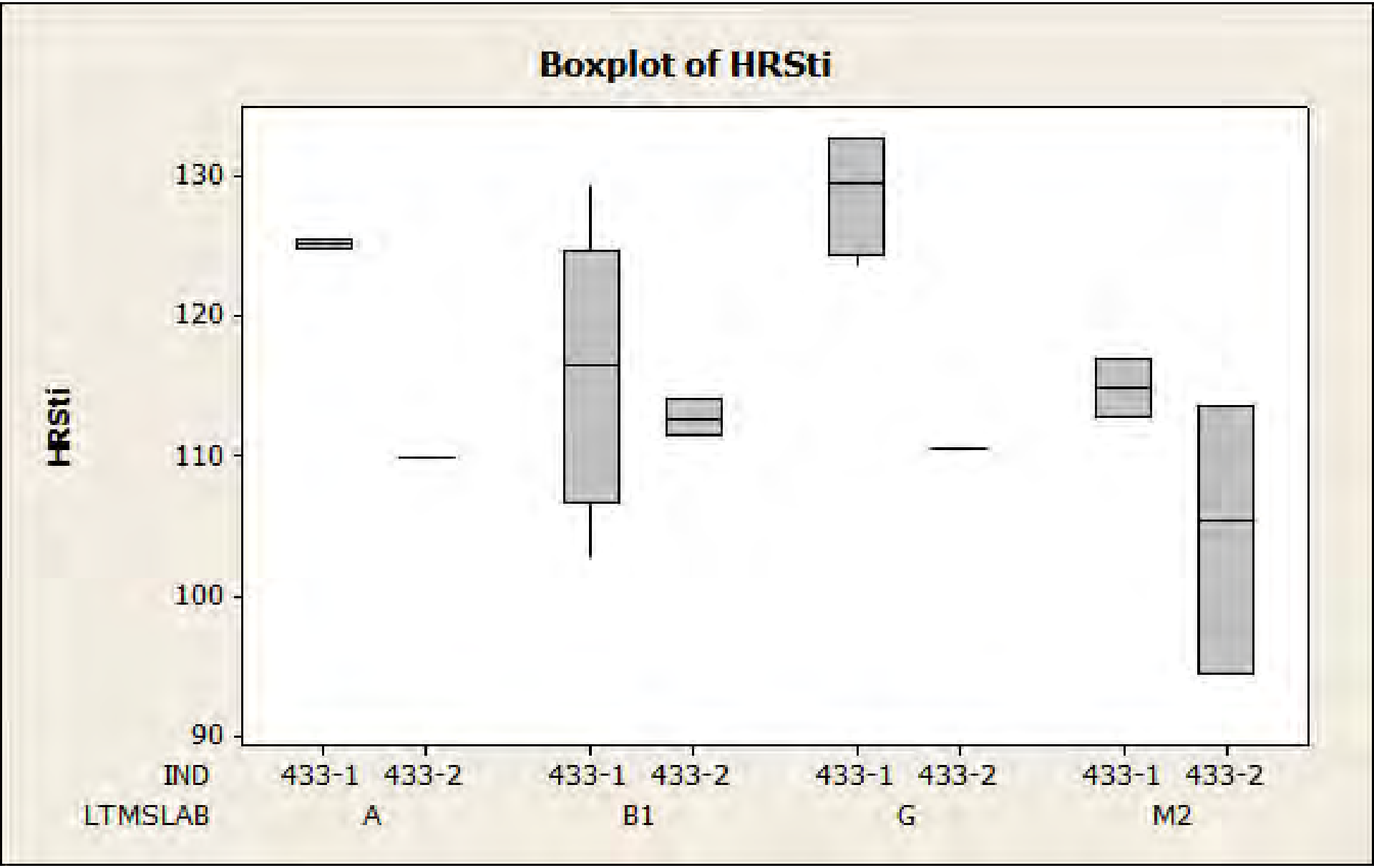
433-2 Review

May 20, 2014

Results to Date

- 8 operationally valid results as of today
- 6 acceptable statistically
- 2 rejected statistically


Boxplot of HRSti
HRSti
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110
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IND
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433-2
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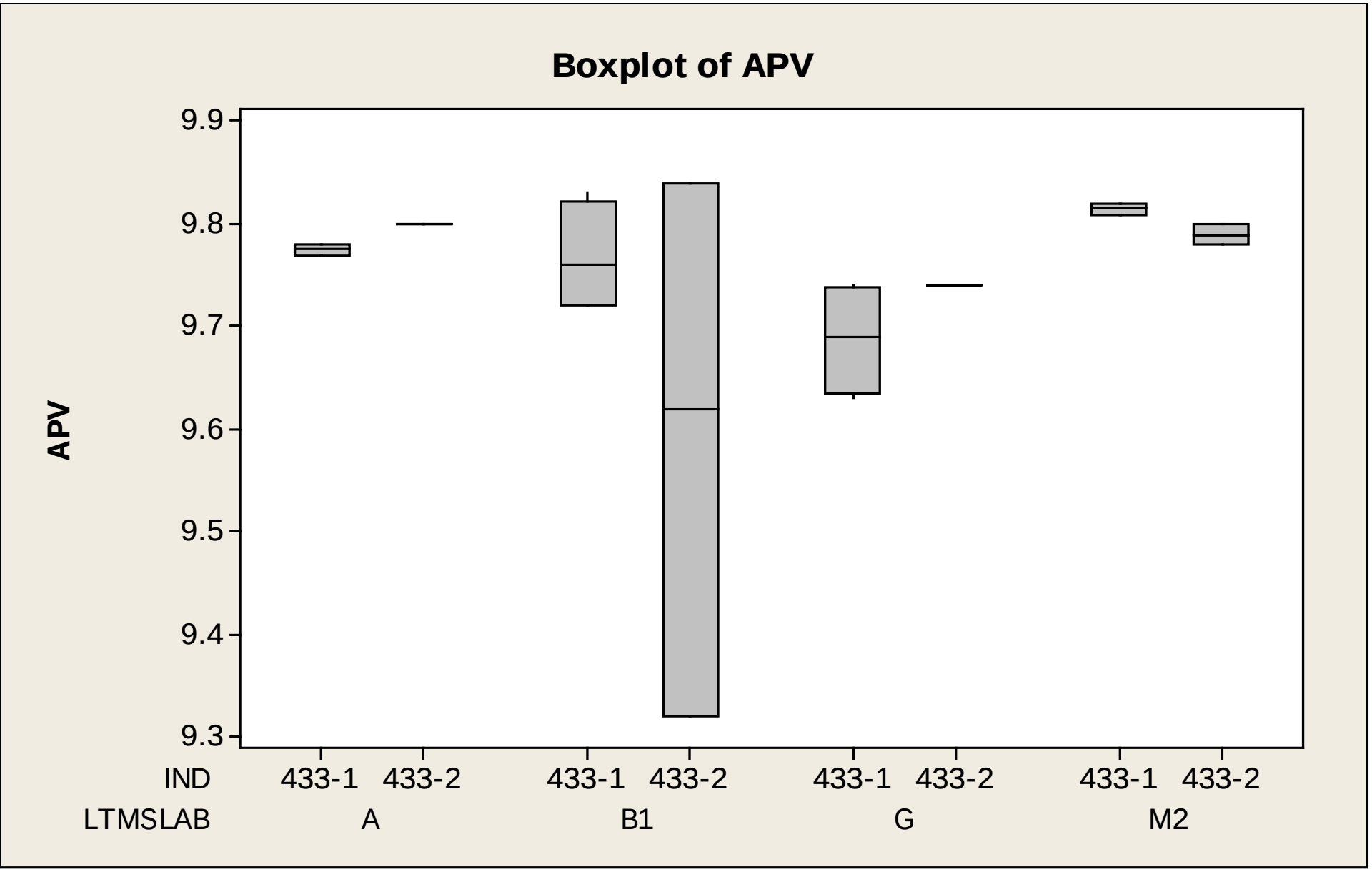
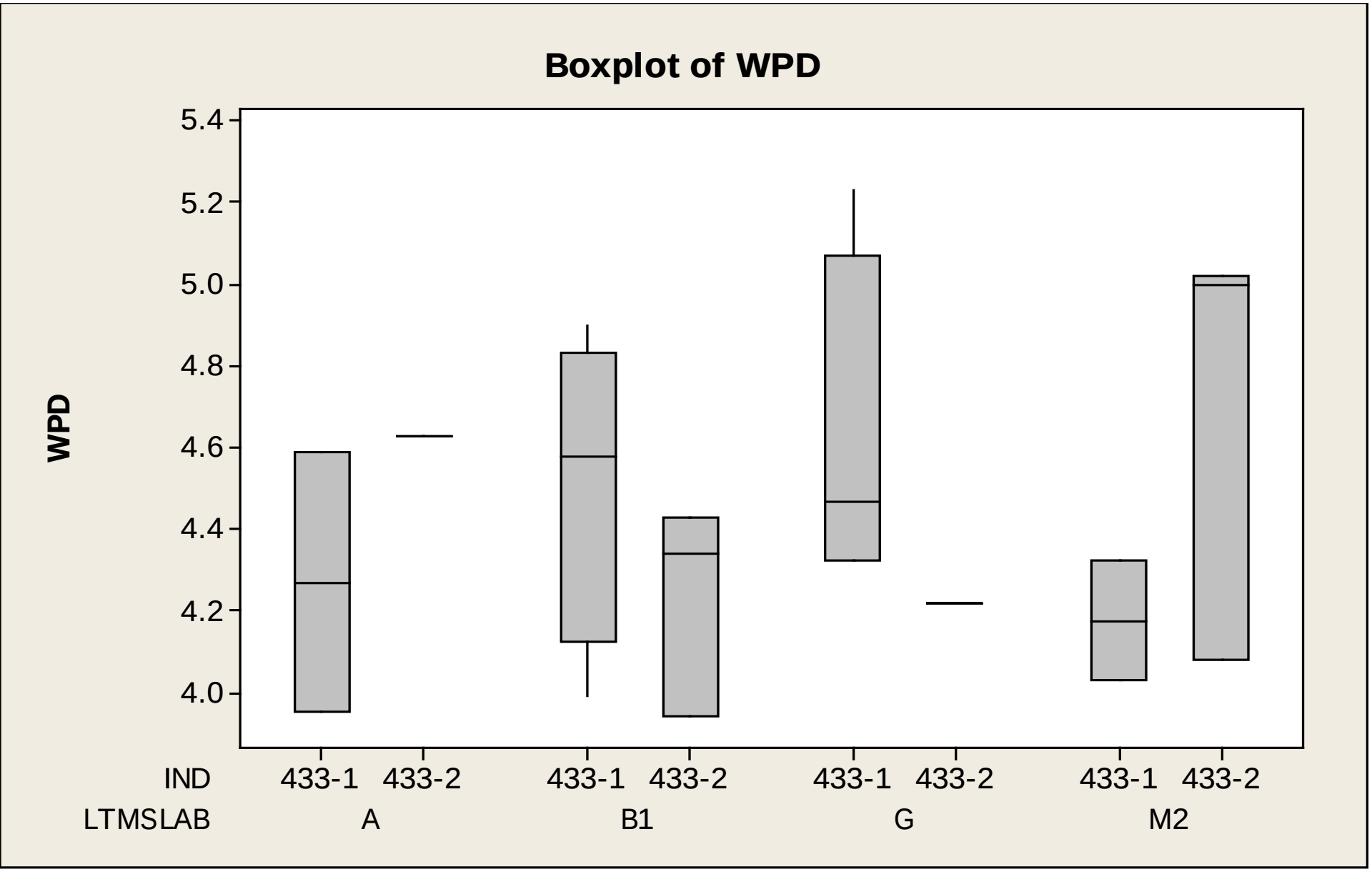
433-1
433-2
LTMSLAB
A
B1
G
M2




Boxplot of WPD
WPD
5.4
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433-2
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LTMSLAB
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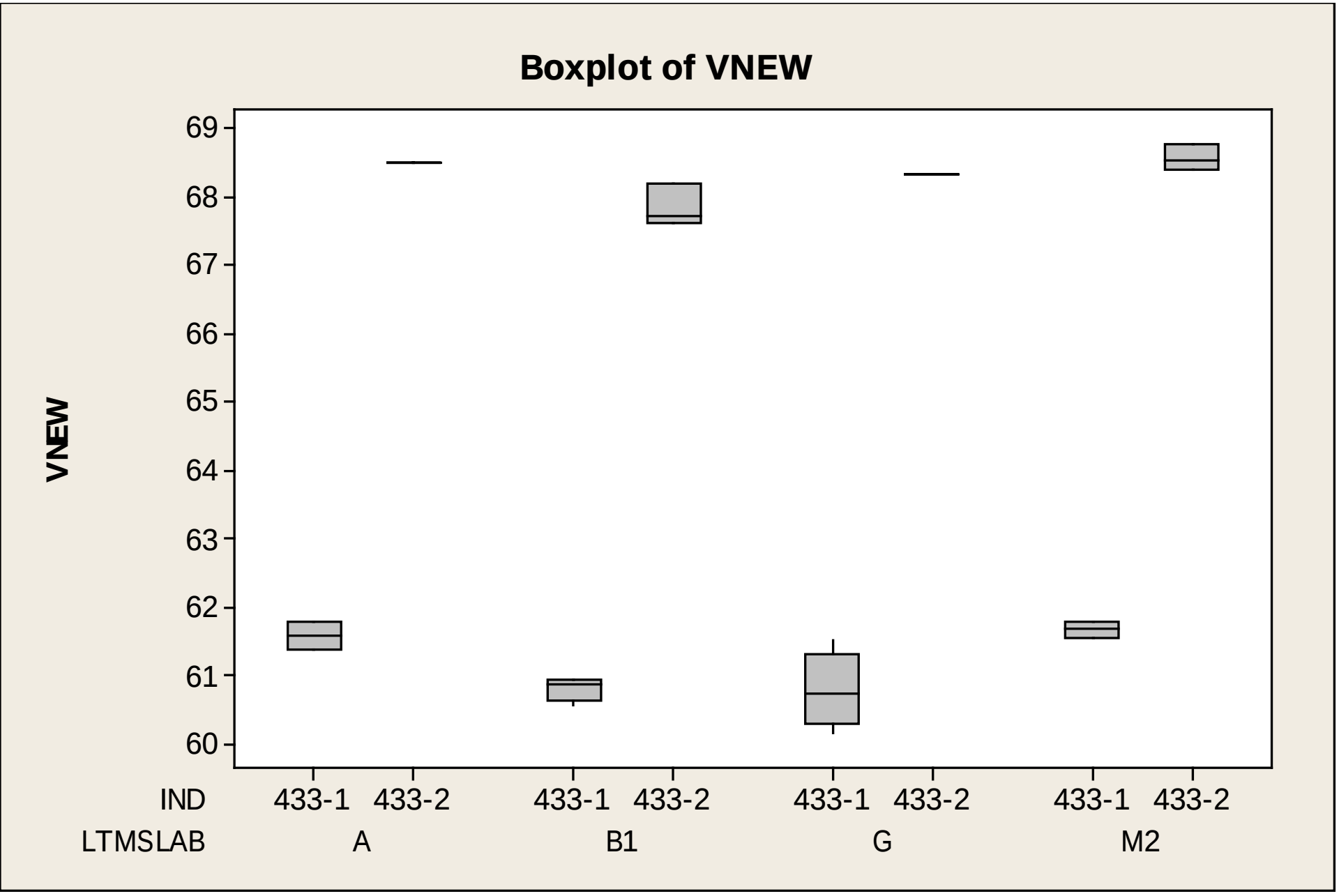
B1
G
M2


Boxplot of VNEW
VNEW
69
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433-1
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LTMSLAB
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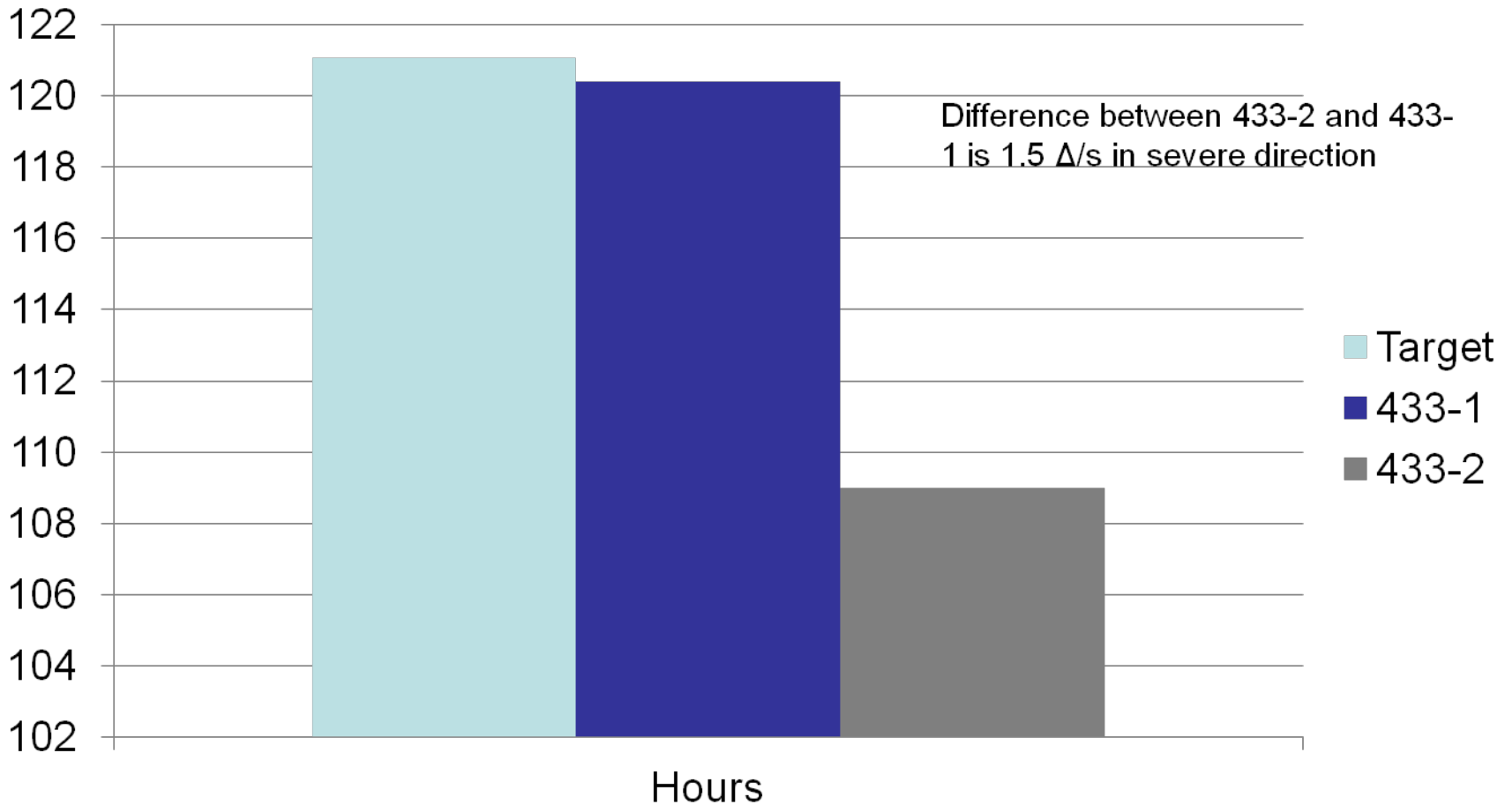
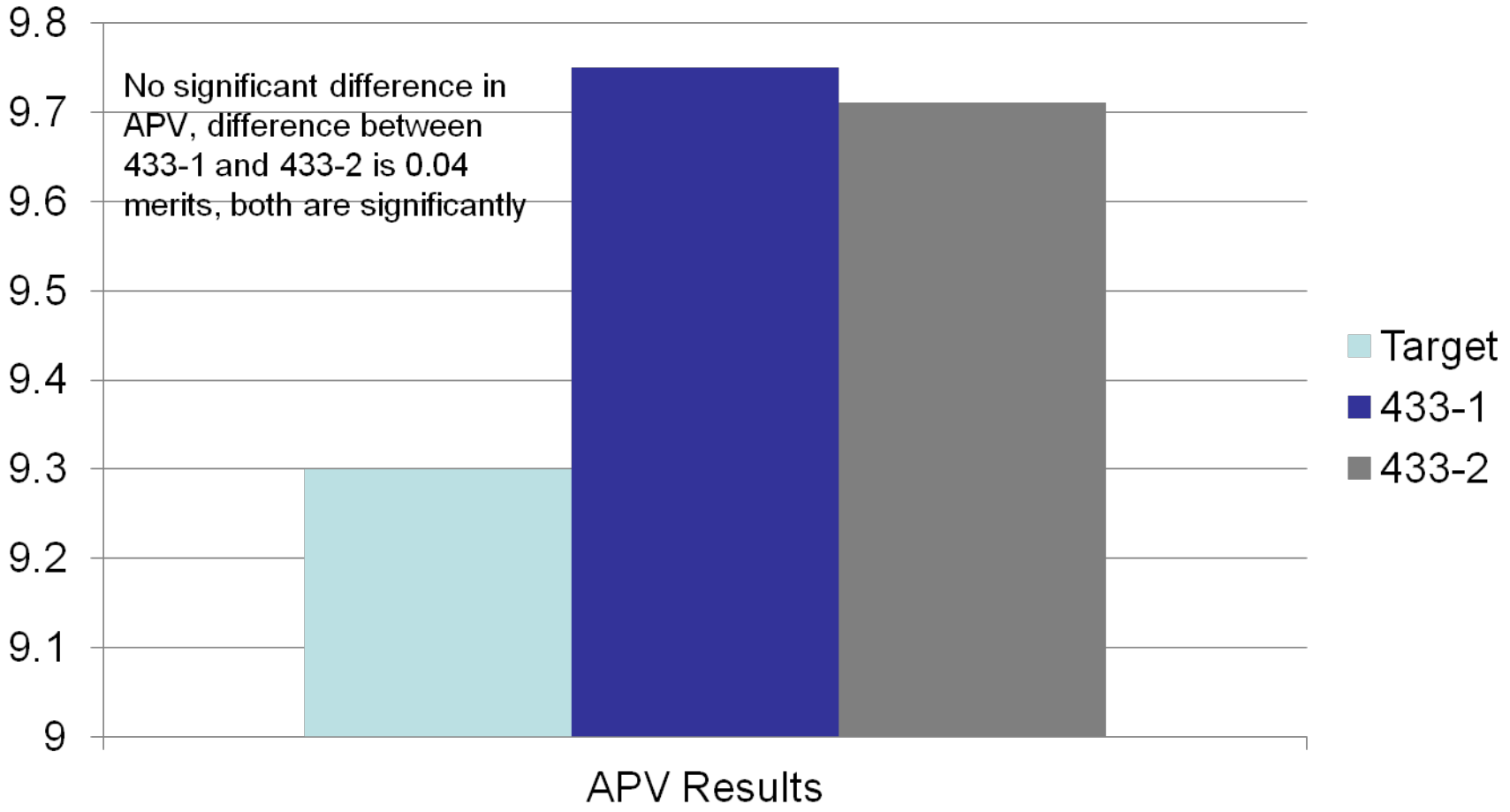
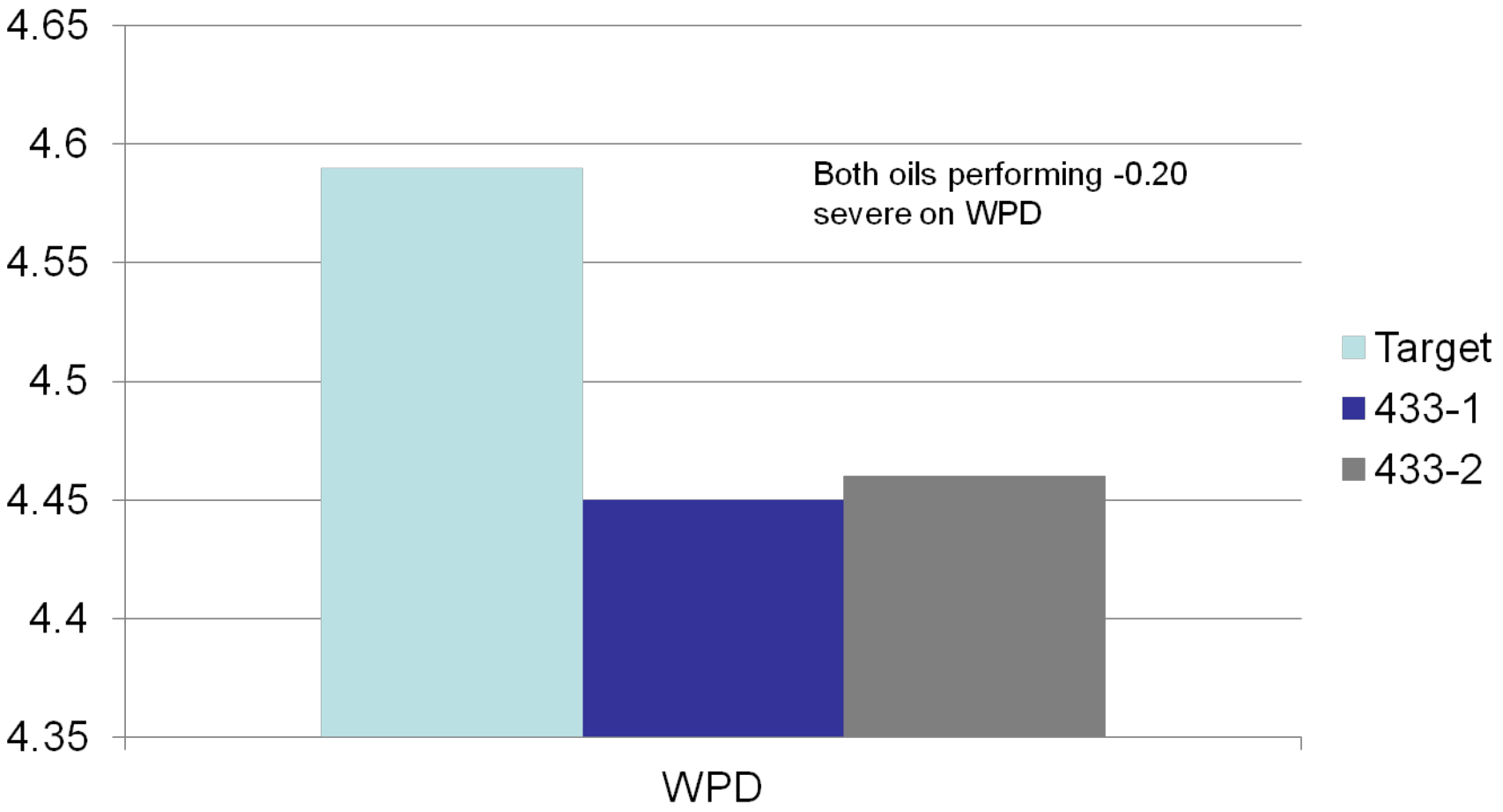
Comparison of 433-1 with 433-3 for Hours



Comparison of 433-1 with 433-3 for APV



Comparison of 433-1 with 433-3 for WPD



Conclusions

- HRS appears to be severe when compared to 433-1 over same time period.
- APV is performing about the same.
- Little difference in WPD performance between 433-1 and 433-2
- New VIS number 6-8 centistokes lower

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Intertek Automotive Research

EOT Copper in Stellite Seat Head Runs

Martin Chadwick
05/16/2014

Background & Data Set

- **Initial review of the first four Stellite seat head runs found that 100 hour copper appeared to be higher than past IIIG runs. The SP requested an additional review when more data was available.**

- **Five of eleven additional references were conducted on Stellite seat heads at the time of this review (397 charted references plus 4 donated head runs).**
- **During the initial review 24 charted references did not include CUWMH100. Only 6 tests were missing CUWMH100 at the time of this review. All six tests were conducted in 2011 or earlier.**
- **During the initial review it was determined that Lab E did not report the engine number in a form that included block run and lab E was not included. The latest result reported from lab E included block run and that run has been included in the analysis.**
- **The oil consumption adjustment for CUWMH100 was carried over from the previous review.**

GLM Output

General Linear Model: Cu100oca versus Block Run, New Heads, ...

Factor	Type	Levels	Values	
Block Run	fixed	6	1, 2, 3, 4, 5, 6	
New Heads	fixed	2	0, 1	
LTMSLAB	fixed	6	A, B, D, E, F, G	**<<< One run from Lab E included**
INDx	fixed	3	434, 435, 438	**<<< Reblends were grouped with original blend**

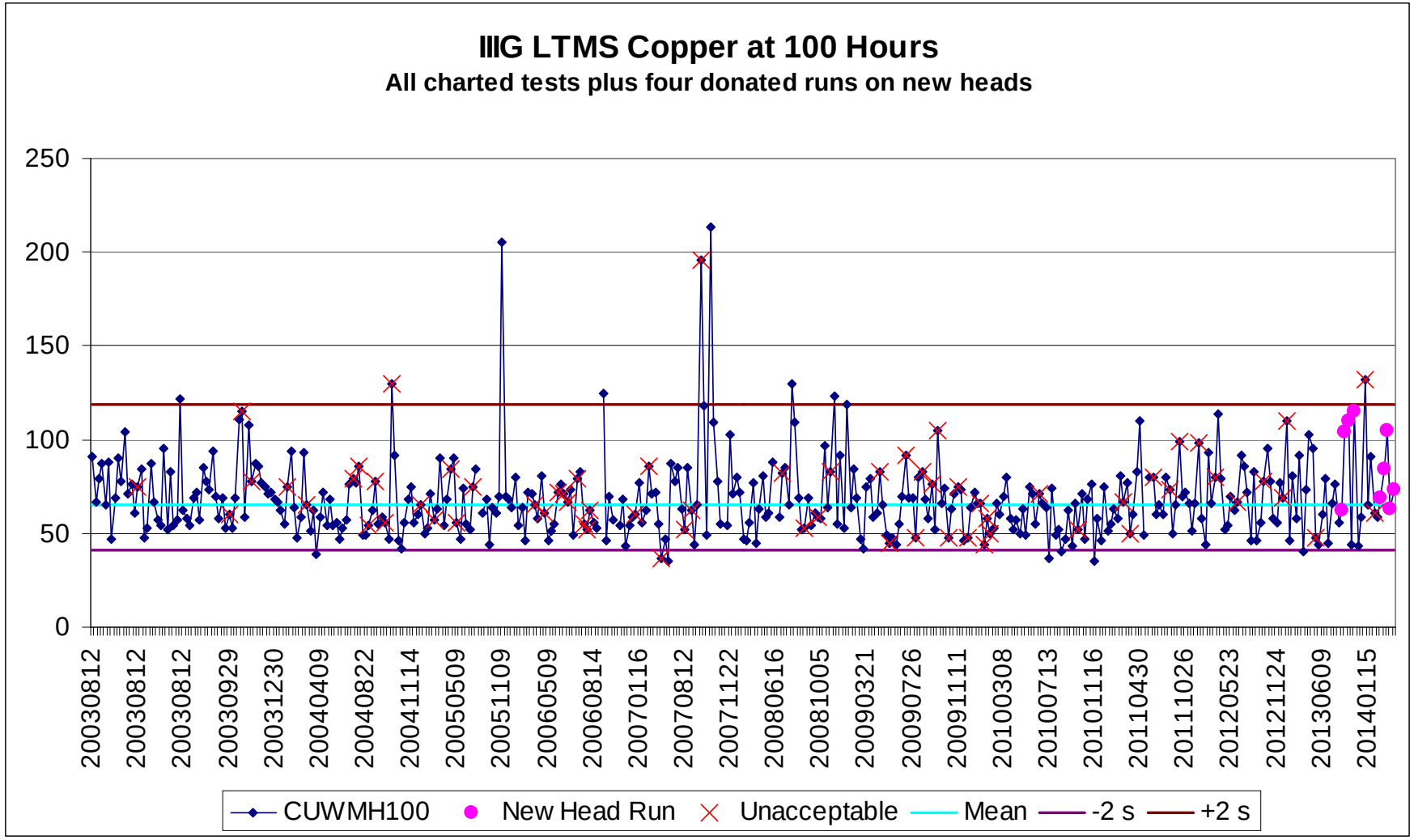
Analysis of Variance for Cu100oca, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Block Run	5	0.0157655	0.0134259	0.0026852	17.34	0.000
New Heads	1	0.0007485	0.0006161	0.0006161	3.98	0.047
LTMSLAB	5	0.0027692	0.0029598	0.000592	3.82	0.002
INDx	2	0.0033021	0.0033021	0.0016511	10.66	0.000
Error	353	0.0546597	0.0546597	0.0001548		
Total	366	0.0772452				

S = 0.0124436 R-Sq = 29.24% R-Sq(adj) = 26.63%

- **1st run blocks had more copper than other runs**
- **5th run blocks had less copper than runs one through four.**
- **Lab B had lower copper than Labs A, D, and G.**
- **The head runs had higher copper than charted references.**
- **Oil 434 has less copper than 435 and 438**

Charted tests indicate that Cu has been relatively stable over time



Conclusions

- **While the oil consumption adjusted copper at 100 hours is still statistically significantly different when comparing Stellite seat heads to original heads the magnitude of the difference during this analysis was half the previous review.**
  - **Original review LS means**
    - **Original Heads = 64, Stellite Heads = 84**
  - **Current review LS means**
    - **Original Heads = 66, Stellite Heads = 76**
- **The results to date indicate copper at 100 hours using Stellite seat heads is in the range of past reference runs.**

Current Wording:

7. Reagents and Materials

7.5.4 Use NAT-50 or PDN-50 soap [20,12] in automatic parts washers to clean Sequence IIIG engine parts. See 9.3.

9.5.3.2 Clean the block in a heated bath or temperature controlled automated parts washer before and after honing. Follow these suggested guidelines to ensure there is no rusting of the engine block after this process:

(1) Use only NAT-50 or PDN-50 soap at a concentration of 7.3 kg of soap per 380 L of water. Change the soap and water solution at least after every 25 h of use.
(2) Set the water temperature to (60 ± 10) °C.
(3) Do not in any manner pre-condition the water that is being used.
(4) Prior to installing the engine in the parts washer, ensure that all coolant passages are blocked off to prevent cleaning solutions from entering the passages.
(5) Allow the block to run through the cleaning cycle for a period of (30 to 40) min.
(6) After the cycle is complete, immediately remove the block from the washer and spray it down with degreasing solvent.
(7) Wipe cylinder bores out with a lint free towel.
(8) Spray engine block with a 50:50 mixture of build-up oil and degreasing solvent.
(9) Do not remove the paint dot from the crankcase area of the block.
(10) Allow the block to cool to room temperature before honing the block.

Proposed Revision:

7.5.4 Use NAT-50 or PDN-50 soap [20,12] in automatic parts washers to clean Sequence IIIG engine parts or solution 7 and solution B if using the ultrasonic cleaner. See 9.3.

9.5.3.2 Clean the block in a heated bath, a temperature controlled automated parts washer or Ultrasonic Cleaner before and after honing. Follow these suggested guidelines to ensure there is no rusting of the engine block after this process:

If using the automated parts washer:

(1) Use only NAT-50 or PDN-50 soap at a concentration of

7.3 kg of soap per 380 L of water. Change the soap and water solution at least after every 25 h of use.
(2) Set the water temperature to (60 ± 10) °C.
(3) Do not in any manner pre-condition the water that is being used.
(4) Prior to installing the engine in the parts washer, ensure that all coolant passages are blocked off to prevent cleaning solutions from entering the passages.
(5) Allow the block to run through the cleaning cycle for a period of (30 to 40) min.
(6) After the cycle is complete, immediately remove the block from the washer and spray it down with degreasing solvent.
(7) Wipe cylinder bores out with a lint free towel.
(8) Spray engine block with a 50:50 mixture of build-up oil and degreasing solvent.
(9) Do not remove the paint dot from the crankcase area of the block.
(10) Allow the block to cool to room temperature before honing the block.

If using the ultrasonic cleaner parts washer:

(1) Use only solution 7 and solution B at a concentration of:

a. Solution 7 at a ratio of 0.035 gallons (4.48 oz) per gallon of water.

b. Solution B at a ratio of 0.003 gallons (0.38 oz.) per gallon of water.

Change the solutions and water (Do not use pre-condition water) at least after every 25 h of use.
(2) Set the water temperature to (65 ± 5) °C.
(3) Allow the block to run through the cleaning cycle for a period of 60 min.
(4) After the cycle is complete, immediately remove the block from the washer and thoroughly spray down the block with hot water.
(5) Spray engine block with a 50:50 mixture of build-up oil and degreasing solvent.
(6) Allow the block to cool to room temperature before honing the block.

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Test Monitoring Center

http://astmtmc.cmu.edu

Honing Machine Verification

May 20, 2014

Summary

- Labs polled for honing calibration verification, as well as records provided to TMC during lab visits, etc.
- Not all labs have had honing machine verified annually
- Test Method D7320 (IIIG) specifies annual verification (9.9.6)but build manuals do not require verification. Added by IL 09-5.

Honer Calibration

All CV-616 hones must be verified on-site by a qualified Sunnen Technician using the Hydraulic Pump and Reservoir Dynamometer. All CV-616 hones should be maintained according to the attached lubrication schedule each time the fluid and filters are changed.

Contact the Test Sponsor, ASTM Test Monitoring Center, Surveillance Panel Chairman, or Operations and Hardware Subpanel Leader for information on Sunnen calibration requirements.

Description of Operation

Specification

REV	Date	Revision History
1	1/1/98	Hone-10
2	12/15/03	Update honer calibration information
3	2/22/10	Changed "All CV-616 honers must be calibrated" to "All CV-616 hones must be verified"

View

Honer Calibration

Lab with reasonably good history, one adjustment in 4 calibrations.

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

April 22, 2014

Mr. ,
The calibration performed on your Sunnen model CV616 serial # Tuesday April 22, 2014, shows the load meter functioning at established guidelines.

The calibration test is carried out by installing a hydraulic pump unit directly to the spindle shaft in order that it may drive the mechanical pump. The stroker drive belt is removed for the test to prevent unwanted reciprocal motion. Restricting the hydraulic flow produces hydraulic pressure creating motor load. Motor current is measured at 10% intervals up to 60% of motor full load for this test.
Measurements are made at the 2T2 connection of the motor junction box for calibration.

With spindle speed set to 170 RPM, measurements are as follows:

Load meter display(%)	Motor current(A)	Hydraulic pressure(PSI)
10	3.45	155
20	3.60	210
30	3.80	265
40	4.00	320
50	4.24	375
60	4.47	420

In summary, the machine is in excellent condition and running at established specifications.

Thank you,
Jim Walsh-Scott
Sunnen Field Services

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

CV616 Spindle Load Calibration

Corp, 03/12/2012, Model CV616, Serial Number

I set up the hydraulic unit and let it run at 170 RPM for 1 hour before checking calibration. This allowed the oil and machine to warm up to get an accurate reading. I found the initial settings to be in range but not what the settings were in the previous year. I turned the gain down just slightly to keep the machine consistent with the customers past readings.

1st reading @ 170 RPM was as follows:

10%	**170 PSI**	**3.3 amps**
20%	**220 PSI**	**3.4 amps**
30%	**270 PSI**	**3.6 amps**
40%	**325 PSI**	**3.8 amps**
50%	**375 PSI**	**4.0 amps**
60%	**425 PSI**	**4.2 amps**

2nd reading after slightly adjusting gain:

10%	**155 PSI**	**3.3 amps**
20%	**210 PSI**	**3.4 amps**
30%	**265 PSI**	**3.6 amps**
40%	**320 PSI**	**3.7 amps**
50%	**370 PSI**	**4.0 amps**
60%	**420 PSI**	**4.2 amps**

After making this adjustment I sealed the edge of the gain pot so it would not vibrate and change the setting.

Technician: Randy Tomlin

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

November 18, 2010

RE: CV616 Calibration report

The calibration performed on your Sunnen model CV616 serial # 2˙ Thursday, November 18, 2010 shows the load meter functioning at factory specification.
All spindle motor current measurements were as at last check with no adjustment to load meter necessary.

The calibration test is carried out by installing a hydraulic pump unit directly to the spindle shaft in order that it may drive the mechanical pump. Stroker drive belt is removed for the test to prevent unwanted reciprocal motion. Restricting the hydraulic flow produces hydraulic pressure creating motor load. Motor current is measured at 10% intervals up to 60% of motor full load for this test.
Measurements are made at the 2T2 connection of the motor junction box for calibration.

With spindle speed set to 170 RPM, measurements are as follows:

Load meter display(%)	Motor current(A)	Hydraulic pressure(PSI)
10	3.0	160
20	3.2	210
30	3.5	265
40	3.8	315
50	4.0	370
60	4.3	420

This test covers range greater than your current setup specifications with 170RPM spindle speed identical to your current setup information.

CV-616 LOAD METER CALIBRATION REPORT

DATE: 3 FEB 2009

CUSTOMER:

MACHINE SERIAL NO. 271.

ADDRESS:

INITIAL LOAD METER VALUES @ 170 RPM

LOAD %		PSI		AMPS
10%		90		3.5
20%		175		3.75
30%		245		3.95
40%		325		4.3
50%		400		4.6
60%		480		5.0

ROUGH CALIBRATION VALUES @ 230 RPM

LOAD%		AMPS		Adjusted to
0%		3.6		3.4
25%		3.7		
50%		4.5		
75%		5.4		
100%		6.2		5.6

FINAL CALIBRATION VALUES @ 170 RPM

LOAD%		PSI		
0-5%		45		
10%		155		
20%		215		
30%		270		
40%		325		
50%		375		
60%		430		

3FEB09

The following three reports are from one lab, no longer calibrated.

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

December 12, 2011

66

RE: CV616 Calibration report

Mr.

The calibration performed on your Sunnen model CV616 serial # Thursday December 8, 2011 shows the load meter functioning at established guidelines.
All spindle motor current measurements were 5% higher and required minor adjustment to load meter. The Load meter is now functioning with in established guidelines.

The calibration test is carried out by installing a hydraulic pump unit directly to the spindle shaft in order that it may drive the mechanical pump. Stroker drive belt is removed for the test to prevent unwanted reciprocal motion. Restricting the hydraulic flow produces hydraulic pressure creating motor load. Motor current is measured at 10% intervals up to 60% of motor full load for this test.
Measurements are made at the 2T2 connection of the motor junction box for calibration.

With spindle speed set to 170 RPM, measurements are as follows:

Load meter display(%)	Motor current(A)	Hydraulic pressure(PSI)
10	3.0	160
20	3.2	220
30	3.5	270
40	3.8	325
50	4.0	375
60	4.3	430

This test covers range greater than your current setup specifications with 170RPM spindle speed identical to your current setup information.

In summary, the machine is in excellent condition and running at established specifications.

CV-616 Calibration

Customer:

Date: 20Jan10

Serial #: 4852

Spindle Rpm @170

Load%	Current Draw	PSI
10%	3.0	160
20%	3.2	220
30%	3.5	270
40%	3.8	325
50%	4.0	375
60%	4.3	430

Spindle Rpm @230

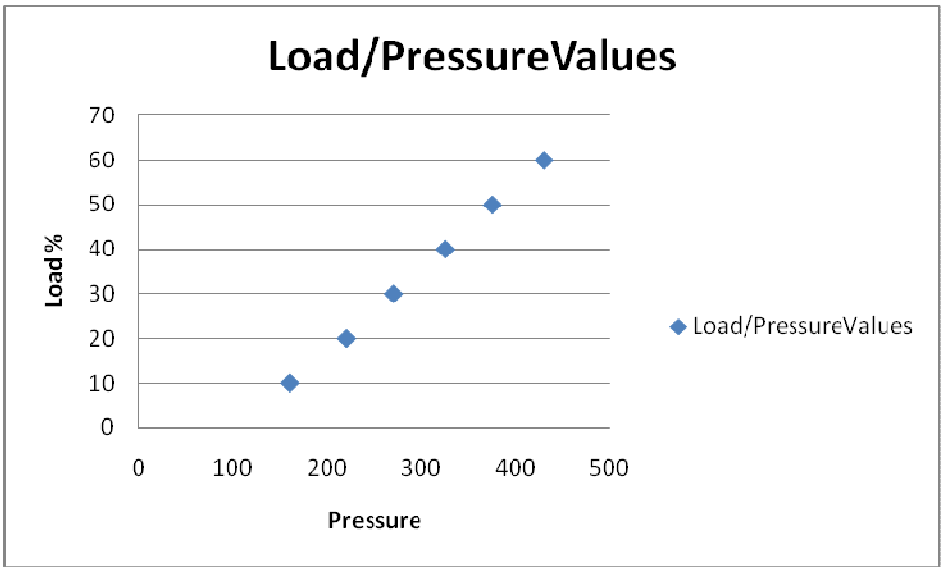
Load %	Current Draw	PSI
25%	3.3	150
50%	4.0	240
75%	4.7	330
100%	5.4	400

Final Readings @170 Rpm

Load %	Current Draw	PSI
10%	3.0	160
20%	3.2	220

30%	**3.5**	**270**
40%	**3.8**	**325**
50%	**4.0**	**375**
60%	**4.3**	**430**

Summary: No adjustments were necessary. See graph below.



Summary:

Honing Machine Calibration

CV-616 LOAD METER CALIBRATION REPORT

DATE:

CUSTOMER: MACHINE SERIAL #

MAP OF CURRENT VALUES @ 170 RPM

% LOAD	PSI	AMPERAGE
0-5%	140	2.8
10%	180	3
20%	235	3.15
30%	280	3.55
40%	340	3.8
50%	385	4
60%	450	4.4
70%	500	4.8

Rough calibration as found @ 230 RPM

% LOAD	AMPS	ADJUSTED TO
0-5 %	2.9	2.9
25%	3.4	3.5
50%	4.2	3.5
75%	4.95	5
100%	5.75	5.6

final calibration @ 170 rpm

5 LOAD	PSI
0-5%	115
10%	155
20%	220
30%	260
40%	320
50%	370
60%	430

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Data from a lab from 2013 and 2012.
2010 as well.
Lab also has 2009 and 2011
records.

April 17, 2013

RE: CV616 Calibration report

The calibration performed on your Sunnen model CV616 serial # , Tuesday April 16, 2013 shows the load meter functioning at established guidelines.

The calibration test is carried out by installing a hydraulic pump unit directly to the spindle shaft in order that it may drive the mechanical pump. The stroker drive belt is removed for the test to prevent unwanted reciprocal motion. Restricting the hydraulic flow produces hydraulic pressure creating motor load. Motor current is measured at 10% intervals up to 60% of motor full load for this test.
Measurements are made at the 2T2 connection of the motor junction box for calibration.

With spindle speed set to 170 RPM, measurements are as follows:

Load meter display(%)	Motor current(A)	Hydraulic pressure(PSI)
0	2.93	110
10	3.08	155
20	3.29	215
30	3.52	270
40	3.75	320
50	4.01	375
60	4.26	425

In summary, the machine is in excellent condition and running at established specifications.

Thank you,
Jim Walsh-Scott
Sunnen Field Services

CV-616 Spindle Load Calibration

The machine ran for 1 hour before taking calibration readings. This allowed the machine and hydraulics to warm up to get accurate readings. There were no changes made to the load meter calibration. The findings were as follows:

Load %	PSI	Motor Currant
0%	110	2.9 amps
10%	155	3.1 amps
20%	215	3.3 amps
30%	270	3.6 amps
40%	320	3.8 amps
50%	375	4.2 amps
60%	425	4.5 amps

```
This is the previous year's report, for year 2012.
```

DATE. 1ST FEB 2011

Company Name: [redacted]

Address. [redacted]

CV-616 HONING MACHINE

[redacted]

Machine Serial#

Initial Load meter values:		
%	PSI	Amps
10%	90	3.0
20%	150	3.2
30%	215	3.4
40%	260	3.6
50%	315	3.9
60%	375	4.2
Settings after adjustment:		
10%	155	3.1
20%	210	3.3
30%	265	3.6
40%	315	3.8
50%	370	4.0
60%	420	4.3

Calibration verified by: [signature] DATE 2/15/14

SUNNEN PRODUCTS COMPANY

at Found - @ 310RPM
Zero - 2.6 Amps
100% Load - 5.6 Amps

Calibration desired values:
With load meter reading of zero the motor draw should be 3.1 to 3.2 Amps.
With load meter reading of 100% the motor draw should be 5.6 to 6.0 Amps.

Lab's 2010 report.

CV-616 Calibration

Customer:

Date: 12Jan10

Serial #:

Spindle Rpm @170

Load%	Current Draw	PSI
10%	3.4	180
20%	3.7	240
30%	4.0	300
40%	4.3	360
50%	4.6	410
60%	4.9	480

Spindle Rpm @230

Load %	Current Draw	PSI
0%	3.18	80
25%	3.8	190
50%	4.5	290
75%	5.3	390
100%	6.2	500

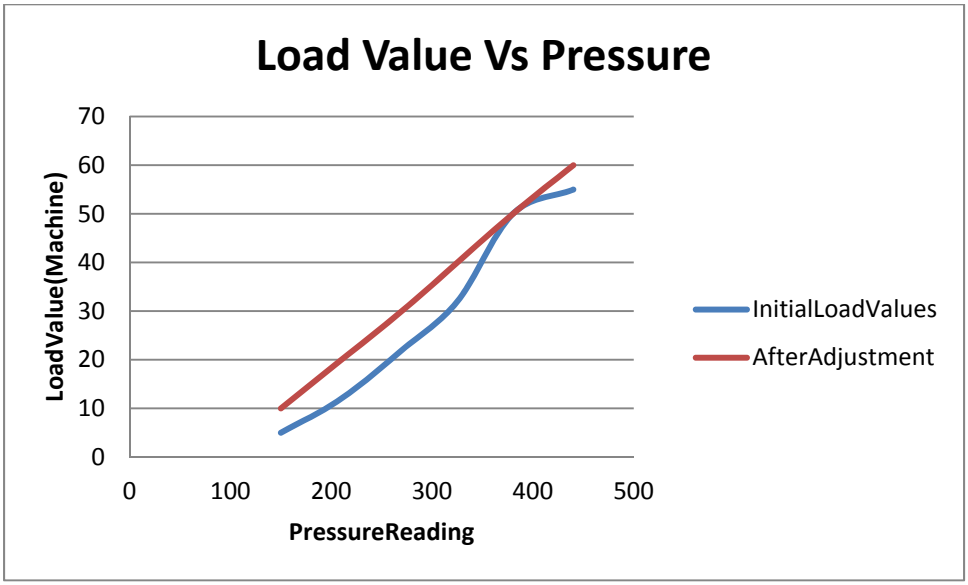
Final Readings @170 Rpm

Load %	Current Draw	PSI
10%	3.2	150
20%	3.5	210
30%	3.7	270
40%	4.1	325
50%	4.4	380
60%	4.6	440

Summary: It was necessary to adjust "0" pot to achieve linearity between load values and pressure readings. This is reflected in the final readings at 170 Rpm.

Curtis Oliver

12Jan10



CV-616 LOAD METER CALIBRATION REPORT

DATE: 1/6/09

CUSTOMER: [redacted]

MACHINE SERIAL NO. [redacted]

ADDRESS: [redacted]

INITIAL LOAD METER VALUES @ 170 RPM				
LOAD %		PSI		AMPS
10%		150		3.22
20%		200		3.4
30%		260		3.65
40%		310		3.9
50%		320		4.2
60%		415		4.5

ROUGH CALIBRATION VALUES @ 230 RPM				
LOAD%		AMPS		
0%		3.1		
25%				
50%				
75%				
100%		6.0		

FINAL CALIBRATION VALUES @ 170 RPM				
LOAD%		PSI		
0-5%		45		
10%		155		
20%		215		
30%		275		
40%		330		
50%		380		
60%		430		

Matt Dahm
Field Service Tech
Sunrise Products Co.

IIIG/IIIF Honing Machine Calibration
2014

As Found/Left:

%	Watts	Volts	Psi
10	700	1.350	165
20	816	1.408	220
30	942	1.472	280
40	1060	1.530	330
50	1189	1.594	390
60	1304	1.651	440

Notes:

1) Found pressure gauge to read ~20psi high. Numbers above compensate for this.

2) As test runs, temperature of the oil increases as well as the pressure. For a given load value, over time, the pressure recorded will increase. Recommend we check values after dyno has run ~30min under 20% load.

3) Data was taken with oil temperature between 87° and 90° F. Temperature was measured using an IR temperature gun aimed at top of oil filter, but not on oil filter mount. This point seemed to read the highest along the output side of the pump.

4) Recommend purchasing a 500psi gauge that we can use for calibrations in the future. This can be calibrated prior to the dyno arriving. Also, we should verify that the gauge is not affected by the temperature range we run in.

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

LAB WITH RESULTS FROM 2009 THROUGH 2014 ONLY ONE ADJUSTMENT

May 16, 2014

RE: CV616 Calibration report

Mr,
The calibration performed on your Sunnen model CV616 serial # ,
Wednesday May 14th, 2014 shows the load meter functioning at established guidelines.

The calibration test is carried out by installing a hydraulic pump unit directly to the spindle shaft in order that it may drive the mechanical pump. The stroker drive belt is removed for the test to prevent unwanted reciprocal motion. Restricting the hydraulic flow produces hydraulic pressure creating motor load. Motor current is measured at 10% intervals up to 60% of motor full load for this test.
Measurements are made at the 2T2 connection of the motor junction box for calibration.

With spindle speed set to 170 RPM, measurements are as follows:

Load meter display(%)	Motor current(A)	Hydraulic pressure(PSI)
0	2.91	120
10	3.2	160
20	3.41	210
30	3.64	270
40	3.88	310
50	4.15	370
60	4.43	420

In summary, the machine is in excellent condition and running at established specifications.

Thank you,
Jim Walsh-Scott
Sunnen Field Services

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

April 17, 2013

RE: CV616 Calibration report
Attn:

~~Mr~~. ,
The calibration performed on your Sunnen model CV616 serial # , Monday April 15th, 2013 shows the load meter functioning at established guidelines.

The calibration test is carried out by installing a hydraulic pump unit directly to the spindle shaft in order that it may drive the mechanical pump. The stroker drive belt is removed for the test to prevent unwanted reciprocal motion. Restricting the hydraulic flow produces hydraulic pressure creating motor load. Motor current is measured at 10% intervals up to 60% of motor full load for this test.
Measurements are made at the 2T2 connection of the motor junction box for calibration.

With spindle speed set to 170 RPM, measurements are as follows:

Load meter display(%)	Motor current(A)	Hydraulic pressure(PSI)
0	2.96	120
10	3.06	160
20	3.28	220
30	3.48	270
40	3.72	320
50	4.03	380
60	4.30	430

In summary, the machine is in excellent condition and running at established specifications.

Thank you,
Jim Walsh-Scott
Sunnen Field Services

SUNNEN PRODUCTS COMPANY
7910 Manchester Rd, St. Louis, MO 63143-2793
314.781.2100
www.sunnen.com

CV-616 Spindle Load Calibration

The machine ran for 2 hours before taking calibration readings. This allowed the machine and hydraulics to warm up to get accurate readings. There were no changes made to the load meter calibration. The findings were as follows:

Load %	PSI	Motor Currant
0%	120	2.7 amps
10%	160	2.9 amps
20%	220	3.1 amps
30%	270	3.3 amps
40%	320	3.5 amps
50%	380	3.8 amps
60%	430	4.1 amps

Name: Wesley M. Mccullough

Signature: Wesley M. McCullough

Title: Field Service Manager

Date: 02-24-12

DATE: 15 FEB 2011

Cor [redacted]

Add

CV-616 HONING MACHINE

4716

Machine Serial#

Initial Load meter values:		
%	PSI	Amps
10%	170	3.2
20%	225	3.4
30%	270	3.6
40%	330	3.7
50%	370	4.2
60%	435	4.6
Settings after adjustment:		
10%	155	
20%	220	
30%	270	
40%	320	
50%	375	
60%	430	

Calibration verified by: [signature] DATE: 2/15/11

SUNNEN PRODUCTS COMPANY

AS FOUND!
LOADMETER AT ZERO, 130 PSI, 3.0 AMPS.

RESET ZERO TO 115 PSI @ 3.0 AMPS

Calibration desired values:
With load meter reading of zero the motor draw should be 3.1 to 3.2 Amps.
With load meter reading of 100% the motor draw should be 5.6 to 6.0 Amps.

Lab did not have 2010 report, however, Sunnen was able to provide results from their records.

Rich Grundza

From: McCullough, Wes [wmccullough@sunnen.com]
Sent: Thursday, May 01, 2014 12:04 PM

Here is what I have in our data base.

2010

Final Readings @170 Rpm

Load %	Current Draw	PSI
10%	3.1amps	165
20%	3.2amps	220
30%	3.4amps	270
40%	3.6amps	320
50%	4.0amps	375
60%	4.2amps	425

2

CV-616 LOAD METER CALIBRATION REPORT

DATE: 1/6/09

CUSTOME

MACHINE SERIAL NO. 401

ADDRESS:

INITIAL LOAD METER VALUES @ 170 RPM				
LOAD %		PSI		AMPS
10%		150		3.2
20%		210		3.4
30%		260		3.7
40%		320		3.9
50%		370		4.2
60%		420		4.5

ROUGH CALIBRATION VALUES @ 230 RPM				
LOAD%		AMPS		
0%		3.2		
25%		3.6		
50%		4.25		
75%		5.0		
100%		5.6		

FINAL CALIBRATION VALUES @ 170 RPM				
LOAD%		PSI		
0-5%		115		
10%		155		
20%		220		
30%		270		
40%		320		
50%		375		
60%		430		

I MADE NO ADJUSTMENTS. THE VALVE ARE STILL GOOD - SAME VALUES AS RECORDED - 6/15/09

Rick Donaldson
Service Technician -
Sunrise Products. Co.

A Program of ASTM International