



Address 100 Barr Harbor Drive  
PO Box C700  
W. Conshohocken, PA  
19428-2959 | USA

Phone 610.832.9500  
Fax 610.832.9666  
Web [www.astm.org](http://www.astm.org)

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### Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

*Chairman:* KENNETH O. HENDERSON, Cannon Instrument Co., 2139 High Tech Road, State College, PA 16803, (814) 353-8000, Fax: (814) 353-8007, e-mail: [kenohenderson@worldnet.att.net](mailto:kenohenderson@worldnet.att.net)  
*First Vice-Chairman:* BEN R. BONAZZA, TI Group Automotive Systems, Caro Research Center, 326 Green Street, Caro, MI, 48723 (989) 673-8181 ext. 227, Fax: (989) 673-3241, e-mail: [bbonazza@us.tiauto.com](mailto:bbonazza@us.tiauto.com)  
*Second Vice-Chairman:* JANET L. LANE, ExxonMobil Research & Engrg., 600 Billingsport Rd, Paulsboro, NJ 08066-0480 (856) 224-3302, Fax: (856) 224-3616, e-mail: [janet.l.lane@exxonmobil.com](mailto:janet.l.lane@exxonmobil.com)  
*First Secretary:* RALPH A. CHERRILLO, Shell Global Solutions (US) Inc., Westhollow Tech Ctr., 3333 Highway 6 South, Houston, TX 77082 (281) 544-8789, Fax: (281) 544-8150, e-mail: [ralph.cherrillo@shell.com](mailto:ralph.cherrillo@shell.com)  
*Second Secretary:* MICHAEL A. COLLIER, Petroleum Analyzer Co. LP, PO Box 206, Wilmington, IL 60481, (815) 458-0216, Fax: (815) 458-0217, e-mail: [macvarlen@aol.com](mailto:macvarlen@aol.com)  
*Staff Manager:* DAVID R. BRADLEY, (610) 832-9681, Fax: (610) 832-9668, e-mail: [dbradley@astm.org](mailto:dbradley@astm.org)

May 24, 2012 (Corrected)

Reply to:

Larry Hamilton

The Lubrizol Corporation

29400 Lakeland Blvd.

Wickliffe, Ohio 44092

(440) 347-2326

[Larry.Hamilton@lubrizol.com](mailto:Larry.Hamilton@lubrizol.com)

ASTM D02.B0.03 L-60-1 Surveillance Panel

Members and Guests:

Attached for your review and comments are the unconfirmed minutes of the May 9, 2012

L-60-1 Surveillance Panel meeting held at Automation Alley; Troy, MI

Please direct any corrections or comments to my attention.

Sincerely,

Larry Hamilton; Chairman

L-60-1 Surveillance Panel

## ASTM L-60-1 (D5704) Surveillance Panel Meeting Minutes

Automation Alley; Troy, MI

05/24/2012 (**CORRECTED**)

**Attendees:** voting member in **BOLD**

SwRI	<b>Koehler</b>
Lubrizol	<b>Hamilton; Venhoff, Gropp</b>
Afton	<b>Gottwald, Bell, Higuchi, Kearney, Boschert, Recinos</b>
Intertek	<b>Smith, Trader</b>
TMC	<b>Parke</b>
Meritor	<b>McGlone, Muransky</b>
Chevron	<b>Zakarian</b>
GM	<b>Zreik</b>

### Sign-in and Review of Agenda

The sign-in sheet and Agenda and Ad Hoc minutes are included; see attachments

### Approval of Meeting Minutes

- **February 8, 2012 (PRI Headquarters – Warrendale, PA)**
- **April 23, 2012 (Ad Hoc Teleconference)**
- **May 02, 2012 (Ad Hoc Teleconference)**

**Motion** by D. Smith / 2nd B. McGlone to approve the minutes as presented. Approval by unanimous vote. 7/0/0

### Summary of Meeting Discussions

- I. Intertek had no information, or Data, to report on using RTD's for Air and Oil temperature control. Requested time at the August Surveillance Panel Meeting to present.
- II. S. Higuchi reported that the Alternator Load Heater as mention in section 6.1.3.2 of test Method D5704 has a footnote that is a misprint. The footnote reads Ogden FD 1Z0895. Confirmed with manufacture and Testing Labs A; B and D; that the correct part number for this heater is Ogden FD 2Z0895.

**Motion** by S. Higuchi / 2nd D. Smith; to change section 6.1.3.2 footnote 12 to Ogden FD 2Z0895. Approval by unanimous vote; 7/0/0. Requested TMC to issue Information Letter to correct this misprint.

- III S. Higuchi reported using part number 118-553661-514; 1500W; 208V as the Primary Heater Element; B. Koehler reported using part number 118-074906-010; 1500W; 120V as the Primary Heater Element as the Primary Heater Element; L. Hamilton reported using part number 118-553661-505; 1500W; unsure of volts as the Primary Heater Element as stated in section 6.1.3.1 footnote 10 of test Method D5704

**Motion** by S. Higuchi / 2nd D. Smith; to allow part numbers 118-553661-514; 1500W, 208Volts; and 118-074906-010; 1500W, 120 Volts as acceptable part number for the Primary Heater Element as well as the current part number 118-553661-505; 1500W, 120 Volts. Approval by unanimous vote; 7/0/0. Requested TMC to work with L-60-1 Chairman to reword section 6.1.3 and 6.1.3.1 footnote 10 and then issue Information Letter.

- IV New gear sets and Matrix results were reviewed. TMC present data, from the matrix tests, for the new gear sets and data from LTMS for current gear sets. TMC also brought to our attention that the 151-2 targets were not sets at 30 tests and locked in as the 148-1 oil was. The 151-2 oil was locked in at 9 tests. The discussion that followed was lengthy and resulted in the agreement for a continued discussion for the Surveillance Panel by Teleconference.

**Motion** by S. Higuichi / 2nd B. McGlone; Continue the Matrix testing using the test rig used in previous matrix testing. All three (3) Labs' will run the same gears and oil; Small Gear 03; Large Gear 36 with RO 151-2. Lab A and Lab D will run one (1) test each while Lab B will run two (2) tests for total of four (4). Approval by unanimous vote; 7/0/0.

#### New Business

There was no new business for discussion.

#### Adjournment

**Motion** to adjourn by S. Higuichi / 2nd D. Smith; Approval by unanimous vote; 7/0/0.

Respectfully submitted;

A handwritten signature in blue ink that reads "Larry Hamilton". The signature is written in a cursive, flowing style.

Larry Hamilton

L-60-1 Surveillance Panel Chairman

# L-60-1 Surveillance Panel

May 9, 2012; 2:00 PM– 3:00 PM

Troy, MI

## Agenda

- I. Call to Order
- II. Membership and agenda review
- III. Approval of the February 2012 SP meeting minutes
- IV. Discuss the use of RTD for Air and Oil temperatures
- V. Alternator Heater Ogden FD 1Z0895 misprint
- VI. Primary Heater Chromalox No. 118-553661-505 1500 watt
- VII. New Gear Sets and Matrix Results; Ad Hoc meeting notes and next steps
- VIII. New Business
- IX. Adjournment

\*For those not traveling to Troy MI, the call in number will be 216-706-7052; Code 324160

L-60-1 Ad Hoc Conference Call 04/23/2012 minutes

Attendance: Samuel Higuchi; Scott Parke; Brian Koehler; Dale Smith; Jerry Group; Larry Hamilton

- Reviewed test results of the nine (9) L-60-1 tests completed on the new gear sets; as direction of the L-60-1 Surveillance Panel. All parameters were discussed but the conversation quickly centered on the Average Carbon Varnish (ACV).
- TMC supplied control charts for all three Testing Labs from 1994 to present; to compare the ACV Matrix results to the historical and current results for each Lab.
- All Labs noticed the new gear sets had a different appearance from the 2000 gears and that the new gears are easier to prepare.
- LDHA to check with Boston Gear about the steel used in this batch and if it is the same steel batch as the 2000 Gears. *Gears were not manufactured from the same steel bars as previous gears. It is the same type of steel and this is why we took core samples to confirm that the steel was as close as possible to the previous batch.*
- It was unanimously decided to continue the matrix testing to help determine ACV severity and to eliminate any Bar to Bar differences.

Lab B will run one (1) test using oil 151-2 on Gears from Bars 32/03.

Lab A will run two (2) tests using oil 148-1 on Gears from Bars 36/03 on both tests (one of these tests will be sponsored by Lab D).

L-60-1 Ad Hoc Conference Call 05/02/2012 minutes

Attendance: Samuel Higuchi; Scott Parke; Brian Koehler; Dale Smith; Jerry Group; Larry Hamilton

After evaluating the three (3) new test results and comparing them to the previous matrix results it was decided to do a statistical study to compare these matrix results to the current approved gears. We will look at all parameters on the selected test stands from January 2011 to current date TMC will present findings at Surveillance Panel meeting in May. Not all Labs will have the time to complete a statistical study by the May ASTM meeting and will share their findings at a later time to be determined.

# TMC ATTACHMENT 1

Question: are ACVti results on the new gear batch different from results on the old gear batch with 95% confidence? Where the answer is "Yes", GEAR\*IND will have Pr>F less than 0.05.

Data included:

Stands: A-10A, B-5A, and D-3E Date window: >=20110101

collected output.txt

5/7/2012

ACVti vs GEAR (only 3 mx stands, ltms >=20110101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.36223482	0.36223482	3.46	0.0731
IND	1	0.00292243	0.00292243	0.03	0.8685
GEAR*IND	1	0.08901155	0.08901155	0.85	0.3642

Level of GEAR	N	-----ACVTI-----	
		Mean	Std Dev
NEW	12	1.20074938	0.35175608
OLD	21	1.40865933	0.29926701

Level of IND	N	-----ACVTI-----	
		Mean	Std Dev
148-1	19	1.29747115	0.31178622
151-2	14	1.38134905	0.35904383

Level of GEAR	Level of IND	N	-----ACVTI-----	
			Mean	Std Dev
NEW	148-1	8	1.23137784	0.35947736
NEW	151-2	4	1.13949246	0.38033909
OLD	148-1	11	1.34553901	0.28015380
OLD	151-2	10	1.47809169	0.31873341

Discussion:

During the teleconference last week, the ad hoc group decided that the parameters of the investigation would be to use 1) only data from the 3 stands contributing new-batch matrix data, 2) compare against only data generated on or after 20110101, and 3) use a 95% confidence level for all statistical tests.

Under these criteria, ACVti results do not differ between the old and new gear batches.

However, the sample size for the old gears under these restrictions is 21 and may not adequately represent old-gear performance. We could either consider including older data or more stands. Since more data was available, this investigation made use of it. The analysis was iteratively repeated testing both options (more stands, older data) adding a year at a time to the cutoff date.

Opening up the date window to 20080101 and using all stand data, the GEAR\*IND difference becomes significant. Or, alternately, keeping the stand restriction requires going back to 20040101 before the GEAR\*IND difference becomes significant.

collected output.txt

5/7/2012

ACVti vs GEAR (all stands, ltms >=20080101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.74854322	0.74854322	11.03	0.0011
IND	1	0.06686899	0.06686899	0.99	0.3224
GEAR*IND	1	0.30124210	0.30124210	4.44	0.0367

Level of GEAR	N	Mean	Std Dev
NEW	12	1.20074938	0.35175608
OLD	155	1.46343780	0.28207286

Level of IND	N	Mean	Std Dev
148-1	83	1.32186222	0.22536787
151-2	84	1.56580103	0.30524558

Level of GEAR	Level of IND	N	Mean	Std Dev
NEW	148-1	8	1.23137784	0.35947736
NEW	151-2	4	1.13949246	0.38033909
OLD	148-1	75	1.33151389	0.20755271
OLD	151-2	80	1.58711646	0.28764070

collected output.txt

5/7/2012

ACVti vs GEAR (only 3 mx stands, ltms >=20040101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.52003031	0.52003031	7.68	0.0072
IND	1	0.07240538	0.07240538	1.07	0.3047
GEAR*IND	1	0.29805192	0.29805192	4.40	0.0396

Level of GEAR	N	Mean	Std Dev
NEW	12	1.20074938	0.35175608
OLD	61	1.42255085	0.27231273

Level of IND	N	Mean	Std Dev
148-1	39	1.27759405	0.24664491
151-2	34	1.51054195	0.30182523

Level of GEAR	Level of IND	N	Mean	Std Dev
NEW	148-1	8	1.23137784	0.35947736
NEW	151-2	4	1.13949246	0.38033909
OLD	148-1	31	1.28952081	0.21491208
OLD	151-2	30	1.56001522	0.25918553

The within-oil effect of the new hardware also needs to be investigated. Results repeating the analysis using the above 3-stand and all-stand datasets but isolating the oils are shown on the following page.

collected output.txt

5/7/2012

ACVti vs GEAR (only 3 mx stands, 148-1 data ltms >=20040101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.02149718	0.02149718	0.35	0.5592

Level of GEAR	N	Mean	Std Dev
NEW	8	1.23137784	0.35947736
OLD	31	1.28952081	0.21491208

ACVti vs GEAR (only 3 mx stands, 151-2 data ltms >=20040101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.62413903	0.62413903	8.38	0.0068

Level of GEAR	N	Mean	Std Dev
NEW	4	1.13949246	0.38033909
OLD	30	1.56001522	0.25918553

collected output.txt

5/7/2012

ACVti vs GEAR (all mx stands, 148-1 data ltms >=20080101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.07248599	0.07248599	1.43	0.2345

Level of GEAR	N	Mean	Std Dev
NEW	8	1.23137784	0.35947736
OLD	75	1.33151389	0.20755271

ACVti vs GEAR (all stands, 151-2 data ltms >=20080101)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GEAR	1	0.76330379	0.76330379	8.98	0.0036

Level of GEAR	N	Mean	Std Dev
NEW	4	1.13949246	0.38033909
OLD	80	1.58711646	0.28764070

For both the 3-stand and all-stand datasets, the new-vs-old difference for oil 148-1 is not significant. The 151-2 difference, however, is.

### Correction factor considerations:

One reference oil indicates need for correction; one reference oil does not.

Should the correction correct new-gear data back to the old-gear performance or back to target?

If the same correction is applied to all oils, it may under-correct some oils and over-correct others.

Laboratory control charts indicate long-standing lab-to-lab differences.

If either of the 2 very severe 151-2 results go away, so do any of the new-vs-old differences in the above-analyses.



IND	Variable	N	Mean	Std Dev	Current Targets*	
					Mean	Std Dev
148-1	VISIT1	30	3.71	0.08	3.61	0.15
148-1	TOLTI	30	-1.12	0.46	-1.36	0.49
148-1	PENTI	30	-0.73	0.28	-0.95	0.39
148-1	ACVTI	30	1.12	0.21	1.59	0.47
148-1	ASLTI	30	0.71	0.20	0.76	0.19
151-2	VISIT1	30	3.55	0.11	3.62	0.15
151-2	TOLTI	30	0.27	0.23	0.26	0.50
151-2	PENTI	30	0.66	0.12	0.75	0.37
151-2	ACVTI	30	1.41	0.38	1.81	0.40
151-2	ASLTI	30	0.46	0.14	0.54	0.23

\*148-1 copied from 30-test 148 from 1994  
 151-2 based on 9 tests from 2000

ASTM L-60-1 Surveillance Panel Membership/Mailing List


Meeting Date: May 9, 2012

Present	Name	Voting Status	Company Name & Address	Phone & Fax & E-Mail
	Athey, Allison	Non-voting	Volvo Group Trucks Technology 13302 Pennsylvania Avenue Hagerstown, Maryland 21740	Phone: 301-573-5684 Fax: E-Mail: allison.athey@volvo.com
	Dwoenick, Bridget	Non-voting	AMSTRD-TAR-D/210 6501 E.11 Mile Rd Warren, MI 48397-5000	Phone: 586-574-4222 Fax: 586-574-4244 E-Mail: rachel.jackman@us.army.mil
DB	Bell, Don	Non-voting	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219	Phone: 804-788-6332 Fax: 804-788-6342 E-Mail: Don.Bell@aftonchemical.com
TCB	Boschert, Tom	Non-voting	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219	Phone: 804-788-5202 Fax: 804-788-6342 E-Mail: Don.Bell@aftonchemical.com
	Bryson, Tom	Non-voting	Volvo Trucks 13302 Pennsylvania Avenue Hagerstown, Maryland 21740	Phone: 301-790-5454 Fax: 301-790-6744 E-Mail: tom.bryson@volvo.com
	Chambers, Harold	Non-voting	43945 Merrill Rd. Sterling Hts., MI 48314	Phone: (586) 770-4694 Fax: E-Mail: haroldchambers@gmail.com
	Clark, Jeff	Non-voting	ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, Pennsylvania 15206	Phone: 412-365-1032 Fax: 412-365-1047 E-Mail: fmf@astmtmc.cmu.edu
	Comfort, Allen	Non-voting	AMSTA-TR-D/210 (Allen Comfort) U S Army Tank, Automotive, and Armament Command Warren, Michigan 48397-5000	Phone: 586-574-4225 Fax: 586-574-4244 E-Mail: comforta@cc.tacom.army.mil
	Dharte, John	Non-voting	American Axle	Phone: Fax: E-Mail:

\* Initial to indicate attendance at subject meeting

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**Meeting Date: May 9, 2012**

Present	Name	Voting Status	Company Name & Address	Phone & Fax & E-Mail
	Eliot, Stephen W.	Non-Voting	Commercial Vehicle Lubricants ExxonMobil Lubricants & Specialties Leesburg, Virginia	Phone: 703-669-9916 Fax: 703-669-9917 E-Mail: stephen.w.eliot@exxonmobil.com
	Gottwald, Thomas	Non-voting	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219	Phone: 804-788-5230 Fax: 804-788-6358 E-Mail: thomas.gottwald@aftonchemical.com
	Greene, Galen	Non-voting	The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, Ohio 44092	Phone: 440-347-2394 Fax: 440-347-2878 E-Mail: galen.greene@lubrizol.com
	Gropp, Jerry	Non-voting	The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, Ohio 44092	Phone: 440-347-1223 Fax: 440-347-1555 E-Mail: jerrold.gropp@lubrizol.com
<i>LDH</i>	Hamilton, Larry	Voting	The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, Ohio 44092	Phone: 440-347-2326 Fax: 440-347-2878 E-Mail: larry.hamilton@lubrizol.com
<i>SH</i>	Higuchi, Sam	<del>Non-voting</del> <i>Voting</i>	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219	Phone: 804-788-5375 Fax: 804-788-6358 E-Mail: samuel.higuchi@aftonchemical.com
	Huron, John	Non-voting	Chevron Oronite 4502 Centerview Drive, Suite 210 San Antonio, Texas 78228	Phone: 210-731-5609 Fax: 210-731-5699 E-Mail: HURO@ChevronTexaco.com
	Kanga, Percy R.	Non-Voting	Commercial Vehicle, Marine & Gas Engine Lubricants ExxonMobil Research & Engineering 600 Billingsport Road Paulsboro, NJ. 08066	Phone: 856-224-2094 Fax: 856-224-3613 E-Mail: percy.r.kanga@exxonmobil.com
<i>WAK</i>	Kearney, Bill	Non-voting	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219	Phone: 248-350-0640 Fax: E-Mail: bill.kearney@aftonchemical.com

\* Initial to indicate attendance at subject meeting

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Meeting Date: May 9, 2012

Present	Name	Voting Status	Company Name & Address	Phone & Fax & E-Mail
	Koehler, Brian	Voting	Southwest Research Institute Culebra Road Bldg.209 San Antonio, TX 78238-5166	6220 Phone: (210) 522-3588 Fax: (210) 684-7523 E-Mail: bkoehler@swri.org
	Marougy, Thelma	Non-voting	Eaton Corporation 26201 Northwestern Highway Southfield, Michigan 48037	Phone: 248-354-6985 Fax: 248-354-2739 E-Mail: thelmaemarougy@eaton.com
	McGlone, Bruce	<del>Non</del> -voting	<del>Meritor</del> 2135 West Maple Troy, Michigan 48084	Phone: 248-435-9929 Fax: 248-435-1411 E-Mail: <del>mcglone@meritor.com</del> Bruce.McGlone@Meritor.com
	Parke, Scott	Voting	ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, Pennsylvania 15206	Phone: 412-365-1030 Fax: 412-365-1047 E-Mail: fmf@astmtmc.cmu.edu
	Shah, Rajesh	Non-voting	Koehler Instrument Company 1595 Sycamore Avenue Bohemia, New York 11716	Phone: 516-589-3800 Fax: 516-589-3815 E-Mail:
	Smith, Dale	Voting	Intertek Automotive Research 5454 Bandera Rd San Antonio TX 78238	Phone: 412-855-6854 Fax: E-Mail: Dale.Smith@intertek.com
	Sullivan, Bill	Non-voting	WTSullivan, Inc. 5 Scheiber Drive Brick, New Jersey 08723	Phone: 908-930-3512 Fax: 267-220-7750 E-Mail: wtsullivan@comcast.net
	Ved, shintan	Non-voting	Ford- Trans & Driveline Lubrication 35500 Plymouth Rd. Livonia, MI 48150	Phone: 313-805-9695 Fax: 267-220-7750 E-Mail: cved@ford.com
	Villahermosa, Luis	Non-voting	AMSTA-TR-D/210 (Luis Villahermosa) U S Army Tank, Automotive, and Armament Command Warren, Michigan 48397-5000	Phone: 586-574-4207 Fax: 586-574-4123 E-Mail: villahel@cc.tacom.army.mil

\* Initial to indicate attendance at subject meeting

ASTM L-60-1 Surveillance Panel Membership/Mailing List

Meeting Date: May 9, 2012

Present	Name	Voting Status	Company Name & Address	Phone & Fax & E-Mail
JAZ	Zakarian, Jack	Non-voting	Chevron Products Company 100 Chevron Way Richmond, California 94802-0627	Phone: 510-242-3595 Fax: 510-242-3758 E-Mail: jaza@chevron.com
K.Z	Zreik, Khaled	Non-voting	General Motors	Phone: 248-977-9214 Fax: E-Mail: khaled.zreik@gm.com
	Recinos, Will	NV	Afton Chemical	Phone: 804-788-5323 Fax: E-Mail: william.recinos@aftonchemical.com
ATT	Trader, Angela	NV	Intertek Automotive Research	Phone: 210 706 1533 Fax: E-Mail: angela.trader@intertek.com
JPM	Muransky, Troy	V Alternate	Meritor	Phone: 248 435-1409 Fax: E-Mail: troy.muransky@meritor.com
WVE	WES VENHOFF	NV	LUBRIZOL	Phone: 440 347 4879 Fax: E-Mail: WVE@LUBRIZOL.COM
				Phone: Fax: E-Mail:
				Phone: Fax: E-Mail:
				Phone: Fax: E-Mail:
				Phone: Fax: E-Mail:
				Phone: Fax: E-Mail:

\* Initial to indicate attendance at subject meeting