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**Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS**

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Mat 15<sup>th</sup>, 2020

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ASTM D02.B0.03 L-42 Surveillance Panel  
Members and Guests:

Attached for your review and comment are the unconfirmed minutes of the:

**May 13, 2020 L-42 Surveillance Panel Meeting (Virtual Meeting – Skype)**

Please direct any corrections or comments to my attention.

Very Respectfully,

Matt Sangpeal, Chairman  
L-42 Surveillance Panel

## L-42 Surveillance Panel Meeting Minutes

Virtual Meeting - Skype

May 13, 2020

**Attendees:** voting members in **bold**, \* indicates called in via teleconference

J. Anderson	<b>A. Comfort (Army)</b>	<b>T. Muransky (AAM)</b>
<b>D. Beck (TMC)</b>	D. Dragert	<b>M. Sangpeal (Afton/C)</b>
D. Bell (Afton)	K. Drlja (LZ)	<b>R. Slocum (LZ)</b>
T. Bender	D. Horvath (Afton)	D. Smith (Intertek)
<b>M. Cabaj (Linamar)</b>	P. Kanga (Exxon Mobil)	W. Venhoff (LZ)
J. Carter (Meritor)	<b>J. LaBond (Meritor)</b>	<b>R. Warden (SwRI)</b>
J. Clark (TMC)	<b>A. Lange (Intertek)</b>	<b>A. Zyski (Dana)</b>

### Call to Order

#### Review of Agenda

The meeting agenda is attached.

#### Review of Membership

No membership changes were needed.

#### Approval of Meeting Minutes

Meeting minutes for approval:

- "20200219\_L42\_SP" → February 19, 2020 – PRI Headquarters – Warrendale, PA

A motion was made to approve meeting minutes as presented.

Motion: J. LaBond (Meritor)

Second: A. Comfort (Army)

All in favor, no objections, no abstentions.

#### L-42-1 Development

M. Sangpeal stated that Afton has not been able to perform more development work due to rig availability. No progress has been made by the other labs.

M. Sangpeal will review previous work done on L-42-1 development. He will send this information out to the L-42 distribution list. More discussion to follow.

#### Drive-by-wire Throttle Body

No progress has been made by any labs in this area. D. Smith (Intertek) stated that the main control board in the Jordan Controller would still be required for the DBW TB. This conversion would only be of benefit if current throttle body fails, as it is discontinued.

**TMC 113 Dropout / New Discrimination Oil Development**

The SP discussed results from acceptance testing of TMC 119. Results are as follows:

testkey	ltmslab	ltmsapp	strun	ltmsdate	ind	pinbat	ringbat	rinit	ecsprate	ecsrrate
142244-L42	G	1	333	20190730	119	C1L925	P8AD078X	JMR	48	43
142245-L42	G	1	356	20200211	119	C1L925	P8AD078X	JMR	73	52
153924-L42	G	1	359	20200318	119	C1L925	P8AD078X	JMR	73	66
142250-L42	D	3	2141	20190318	119	C1L925	P8AD078X	BK	95	77
142251-L42	D	3	2258	20190903	119	C1L446	P8AD132	DS	75	50
153778-L42	D	3	2341	20200327	119	C1L446	P8AD132	DS	65	55
142248-L42	B	3	1068	20190509	119	C1L925	P8AD078X	JOBY	38	25
142249-L42	B	3	1070	20190514	119	C1L925	P8AD078X	VADE	62	47
153776-L42	B	3	1124	20200311	119	C1L925	P8AD078X	BJF	64	39
142252-L42	A	2A	709	20190404	119	C1L925	P8AD078X	BT	58	51
142253-L42	A	2A	749	20190816	119	C1L925	P8AD078X	BT	68	59
148284-L42	A	2A	801	20200425	119	C1L446	P8AD132	AS	60	54

	Stats	
	Pinion Scoring	Ring Scoring
Max	95	77
Min	38	25
Mode	73	#N/A
Avg	64.92	51.50
STD DEV P	14.18	13.08
STD DEV S	14.87	13.72

Row Labels	Average of ecsprate	Average of ecsrrate
A	62.00	54.67
B	54.67	37.00
D	78.33	60.67
G	64.67	53.67
<b>Grand Total</b>	<b>64.92</b>	<b>51.50</b>

D. Beck (TMC) compiled historical TMC 113 performance data. Results were compared to those of TMC 119:

113 Calibration History	Average	63.1
	Std.	12.5
	Min	44
	Max	95

119 Matrix	Average	64.9
	Std.	14.3
	Min	38
	Max	95

A motion was made to accept these 12 donated runs as the official approval runs for acceptance of TMC 119. TMC 119 has been accepted as the replacement for TMC 113. This motion will become effective May 27, 2020. TMC will not send out any more TMC 113 oil after that date. However, if labs currently have TMC 113 in stock, it may be used until depleted, as labs have already paid for this reference oil.

Motion: W. Venhoff (LZ)

Second: R. Warden (SwRI)

All in favor, no objections, no abstentions.

**New Hardware Order**

M. Sangpeal stated that Afton needs to order L-42 axles soon. No other labs currently need hardware. R. Warden (SwRI) stated that individual labs may purchase separate batches from Dana since the L-42 test is self-referencing.

**New/Open Issues**

No new issues.

**Adjournment**

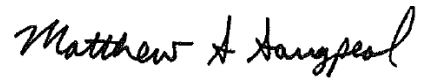
Motion: R. Warden (SwRI)

Second: A. Lange (Intertek).

All in favor, no objections, no abstentions.

Meeting adjourned.

Respectfully submitted,

A handwritten signature in black ink that reads "Matthew A. Sangpeal". The signature is written in a cursive style with a large initial 'M' and a long, sweeping tail on the 'l'.

Matt Sangpeal

L-42 Surveillance Panel Chairman



# L-42 Surveillance Panel Meeting

ASTM D7452

Virtual Meeting

May 13, 2020

3:15 pm - 3:45 pm EST

Passion for Solutions™

# Agenda

- ▲ Call to Order
- ▲ Agenda
- ▲ Membership Review & Update
- ▲ Approval of Meeting Minutes
- ▲ L-42-1 Development
- ▲ Drive-by-Wire Throttle Update
- ▲ TMC 113 Dropout / New discrimination oil development
  - ▲ Historical reference data comparison
- ▲ Hardware Order
- ▲ New Issues
- ▲ Adjournment

## L-42 SP Voting Members

 Rob Banas:	ExxonMobil
 Dylan Beck:	TMC
 Mike Cabaj:	Linamar
 Allen Comfort:	US Army
 Arjun Goyal:	BASF
 Troy Muransky:	AAM
 Jessica LaBond:	Meritor
 Matt Sangpeal:	Afton Chemical (Chair)
 Robert Slocum:	Lubrizol
 Anthony Lange:	Intertek
 R. Warden:	SwRI
 Amy Zyski:	Dana

# Approval of Meeting Minutes

## **SP Meeting Minutes**

- ▲ “20200219\_L42\_SP” → February 19, 2020 – PRI Headquarters – Warrendale, PA



# L-42-1 Development (No Recent Developments)

## Summary

- ▲ Electric T-rig (input and outputs)
- ▲ Dana 44 mounted without springs

## Goal is to have the rig follow L-42 set points first then use mathematical model for set points

## Development to date

- ▲ Data from L-42 run was used to create 100 Hz setpoints for initial L-42-1 testing
- ▲ Initial testing shows good progress, fine tuning still needed to hit exact set points consistently

## On hold at Afton, current setup is functioning well

## Drive-by-Wire Throttle (No Recent Developments)

- During the August 2017 meeting, the panel discussed options of a Drive-by-Wire throttle body to replace the current, old design using the Jordan.
- R. Slocum (Lz) found an off the shelf card that controls a drive-by-wire throttle body but no progress yet.
- Updates?

# TMC 113 Dropout / New Discrimination Oil Development

## August 2017 meeting:

- ▲ Additive dropout was found in latest QC testing
- ▲ Gear oil drums are mixed prior to shipment. Homogenization may be limiting the impact that this has on the performance of the oil.

## November 2017 meeting:

- ▲ Not possible to make new drum of TMC 113
  - 52 USG remaining – 104 tests worth
- ▲ Afton and Lubrizol to research possible new discrimination oils

## May 2018 meeting:

- ▲ Lubrizol has direction towards potential new discrimination oil
- ▲ The SP clarified that the new oil needs to consistently have double the scoring of the current passing oil

## August 2018 meeting:

- ▲ Lubrizol to blend 55 USG drum and send to TMC
- ▲ Each lab will run this oil on a currently referenced test stand and report results

## November 2018 meeting:

- ▲ A drum of oil was sent to the TMC the week of 11/5/18
- ▲ D. Beck will let E. Donovan know when the oil is ready to be shipped to labs

# TMC 113 Dropout / New Discrimination Oil Development

## February 2019 meeting:

- ▲ Acceptance testing for TMC 119
  - 1 test on a currently referenced test stand per lab. Run as 2<sup>nd</sup> discrimination run in 4 test calibration sequence or any time during a reference period

## May 2019 meeting:

- ▲ Updates on TMC 119 runs from each lab
  - Lab D – EOT pinion 95, EOT ring 77
  - Lab G – EOT pinion 48, EOT ring 43
  - Lab B – EOT pinion 38, EOT ring 25; EOT pinion 62, EOT ring 47
  - Lab A – EOT pinion 58, EOT ring 51
  - 35 USG of TMC 113 remain at the TMC

## August 2019 meeting:

- ▲ Labs A, D, G agreed to run 1 more test with TMC 119

## November 2019 meeting:

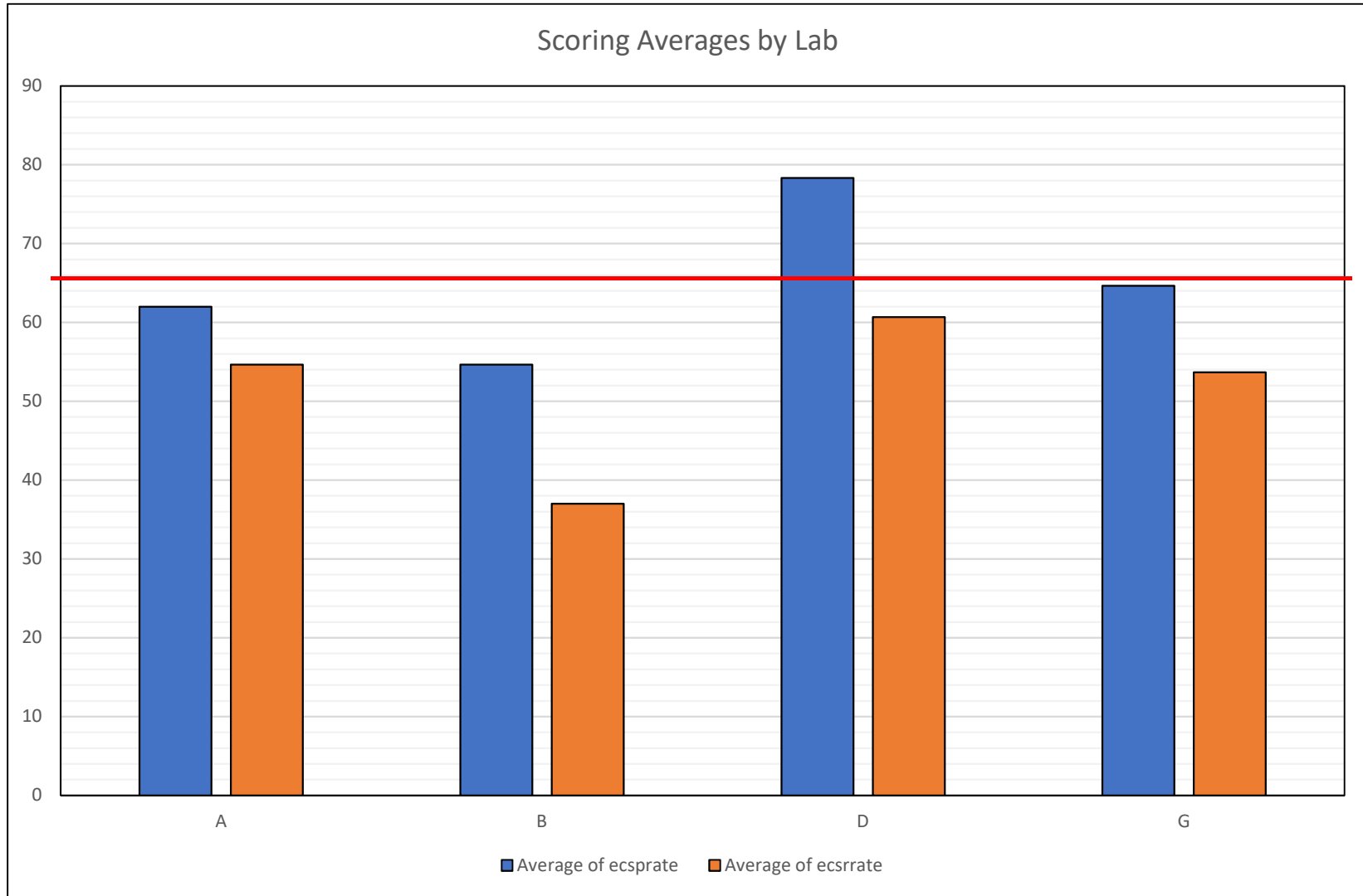
- ▲ Results of additional TMC 119 test:
  - Lab D: EOT pinion 75, EOT ring 50
  - Lab A: EOT pinion 68, EOT ring 59
  - Lab G: ?
- ▲ 32 USG of TMC 113 remain at the TMC

# TMC 119 Test Results: May 2020

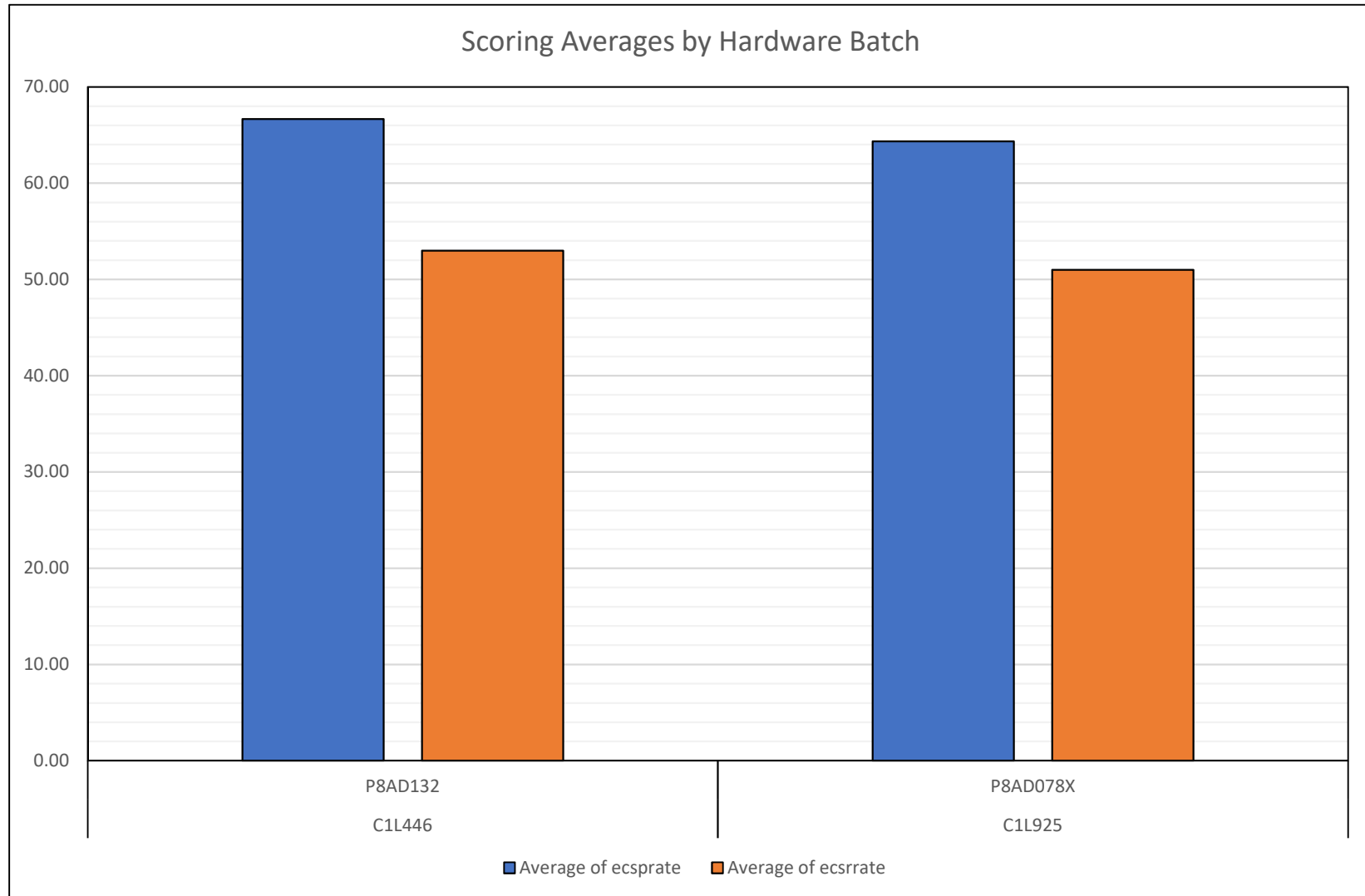
testkey	ltmslab	ltmsapp	strun	ltmsdate	ind	pinbat	ringbat	rinit	ecsprate	ecsrrate
142244-L42	G	1	333	20190730	119	C1L925	P8AD078X	JMR	48	43
142245-L42	G	1	356	20200211	119	C1L925	P8AD078X	JMR	73	52
153924-L42	G	1	359	20200318	119	C1L925	P8AD078X	JMR	73	66
142250-L42	D	3	2141	20190318	119	C1L925	P8AD078X	BK	95	77
142251-L42	D	3	2258	20190903	119	C1L446	P8AD132	DS	75	50
153778-L42	D	3	2341	20200327	119	C1L446	P8AD132	DS	65	55
142248-L42	B	3	1068	20190509	119	C1L925	P8AD078X	JOBY	38	25
142249-L42	B	3	1070	20190514	119	C1L925	P8AD078X	VADE	62	47
153776-L42	B	3	1124	20200311	119	C1L925	P8AD078X	BJF	64	39
142252-L42	A	2A	709	20190404	119	C1L925	P8AD078X	BT	58	51
142253-L42	A	2A	749	20190816	119	C1L925	P8AD078X	BT	68	59
148284-L42	A	2A	801	20200425	119	C1L446	P8AD132	AS	60	54

Stats			Row Labels	Average of ecsprate	Average of ecsrrate
	Pinion Scoring	Ring Scoring	A	62.00	54.67
Max	95	77	B	54.67	37.00
Min	38	25	D	78.33	60.67
Mode	73	#N/A	G	64.67	53.67
Avg	64.92	51.50	Grand Total	64.92	51.50
STD DEV P	14.18	13.08			
STD DEV S	14.87	13.72			

# TMC 119 Test Results by Lab: May 2020



## TMC 119 Test Results by Hardware Batch: May 2020



# TMC 119 Test Results Compared to TMC 113

113 Discrim Run Info								117 Reference Sequence Runs (orange denotes 116-1 oil)						
testkey	ltmsial	val	ind	ltmsdate	ECSP	PINBAT	RINGBAT	Testkey 117 Run #1	ECSP 117 Run #1	Testkey 117 Run #2	ECSP 117 Run #2	Testkey 117 Run #3	ECSP 117 Run #3	1173-Run Avg.
152498-L42	A	AS	113	20200217	64	C1L446	P8AD132	152501-L42	24	152502-L42	23	144494-L42	22	23
143044-L42	D	AS	113	20191003	80	C1L446	P8AD132	145104-L42	23	146777-L42	21	146778-L42	22	22
139996-L42	B	AS	113	20190912	63	C1L925	P8AD078X	147260-L42	16	147261-L42	17	147262-L42	17	17
142494-L42	G	AS	113	20190729	55	C1L925	P8AD078X	142247-L42	23	142497-L42	19	142246-L42	24	22
143043-L42	D	AS	113	20190503	77	C1L446	P8AD132	145098-L42	21	145099-L42	16	143042-L42	20	19
130180-L42	D	AS	113	20190409	95	C1L446	P8AD132	144313-L42	14	144311-L42	21	144312-L42	19	18
130179-L42	D	AS	113	20190305	95	C1L925	P8AD078X	143035-L42	21	132926-L42	24	132927-L42	21	22
130178-L42	D	AS	113	20190122	85	C1L925	P8AD078X	132923-L42	18	132924-L42	16	132925-L42	17	17
130937-L42	B	AS	113	20190115	60	C1L925	P8AD078X	139999-L42	21	140000-L42	19	139998-L42	22	21
142301-L42	G	AS	113	20190109	74	C1L925	P8AD078X	140178-L42	30	140176-L42	29	119675-L42	17	25
119659-L42	G	AS	113	20181017	71	C1L925	P8AD078X	119671-L42	22	119670-L42	21	119667-L42	21	21
119562-L42	A	AS	113	20181009	66	C1L925	P8AD078X	130662-L42	31	NULL	NULL	NULL	NULL	
119561-L42	A	AS	113	20180315	52	C1L925	P8AD078X	130659-L42	20	NULL	NULL	NULL	NULL	
130177-L42	D	AS	113	20180112	61	C1L925	P8AD078X	124587-L42	28	132916-L42	26	124585-L42	25	26
117788-L42	B	AS	113	20171120	60	V1L637	P8L604	123418-L42	17	NULL	NULL	NULL	NULL	
123424-L42	D	AS	113	20170914	44	C1L925	P8AD078X	123429-L42	17	NULL	NULL	NULL	NULL	
119559-L42	A	AS	113	20170907	70	C1L925	P8AD078X	119284-L42	24	NULL	NULL	NULL	NULL	
99979-L42	B	AS	113	20170317	62	C1L925	P8AD078X	94919-L42	21	NULL	NULL	NULL	NULL	
108741-L42	A	AS	113	20170210	51	C1L925	P8AD078X	119281-L42	24	NULL	NULL	NULL	NULL	
117581-L42	D	AS	113	20170112	73	C1L925	P8AD078X	112376-L42	25	NULL	NULL	NULL	NULL	
109021-L42	D	AS	113	20160426	73	C1L925	P8AD078X	109025-L42	26	112371-L42	29	112372-L42	24	26
108738-L42	G	AS	113	20160202	46	C1L925	P8AD078X	91558-L42	17	96638-L42	15	91555-L42	22	18
99978-L42	B	AS	113	20160105	72	C1L925	P8AD078X	114517-L42	31	107536-L42	23	107535-L42	23	26
108703-L42	A	AS	113	20151206	68	C1L925	P8AD078X	111165-L42	20	NULL	NULL	NULL	NULL	
99977-L42	D	AS	113	20150520	52	C1L925	P8AD078X	99972-L42	24	99969-L42	25	99970-L42	26	
91097-L42	A	AS	113	20150501	71	C1L925	P8AD078X	104611-L42	23	104609-L42	19	104610-L42	16	19
91095-L42	G	AS	113	20140721	58	B6L544	P4L806	91553-L42	29	91554-L42	31	91552-L42	24	28
88626-L42	B	AS	113	20131203	50	C1L680	P8T025A	94916-L42	27	94914-L42	21	94913-L42	23	24
91093-L42	G	AS	113	20131121	60	B6L544	P4L806	91550-L42	21	NULL	NULL	NULL	NULL	
87868-L42	B	AS	113	20130524	51	C1L680	P8T025A	92841-L42	21	92842-L42	28	92840-L42	24	24
88640-L42	D	AS	113	20130514	51	C1L680	P8T025A	88635-L42	16	88633-L42	16	88634-L42	14	15
87867-L42	B	AS	113	20130303	55	C1L680	P8T025A	91595-L42	21	91594-L42	23	91592-L42	26	23
88361-L42	A	AS	113	20130104	56	C1L680	P8T025A	88341-L42	27	87657-L42	20	87656-L42	16	21
90802-L42	G	AS	113	20121031	48	B6L544	P4L806	87400-L42	19	87401-L42	22	90803-L42	18	20
86881-L42	G	AS	113	20120306	55	B6L544	P4L806	86883-L42	27	86878-L42	27	86879-L42	27	27
83450-L42	B	AS	113	20110825	64	C1L446	P8L119	83911-L42	27	83065-L42	25	83066-L42	27	26
71256-L42	A	AS	113	20110224	49	C1L446	P8L119	77697-L42	21	77696-L42	22	77695-L42	22	22
70115-L42	B	AS	113	20091002	55	C1L446	P8L119	71911-L42	19	70114-L42	17	71910-L42	25	20
71254-L42	A	AS	113	20090527	69	C1L446	P8L119	69254-L42	25	NULL	NULL	NULL	NULL	

113 Calibration History	Average	63.1
	Std.	12.5
	Min	44
	Max	95



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# TMC 119 Test Results Compared to TMC 113

testkey	ltmslab	val	ind	ltmsdate	ECSP	PINBAT
152498-L42	A	AS	113	20200217	64	C1L446
143044-L42	D	AS	113	20191003	80	C1L446
139996-L42	B	AS	113	20190912	63	C1L925
142494-L42	G	AS	113	20190729	55	C1L925
143043-L42	D	AS	113	20190503	77	C1L446
130180-L42	D	AS	113	20190409	95	C1L446
130179-L42	D	AS	113	20190305	95	C1L925
130178-L42	D	AS	113	20190122	85	C1L925
130937-L42	B	AS	113	20190115	60	C1L925
142301-L42	G	AS	113	20190109	74	C1L925
119659-L42	G	AS	113	20181017	71	C1L925
119562-L42	A	AS	113	20181009	66	C1L925
119561-L42	A	AS	113	20180315	52	C1L925
130177-L42	D	AS	113	20180112	61	C1L925
117788-L42	B	AS	113	20171120	60	V1L637
123424-L42	D	AS	113	20170914	44	C1L925
119559-L42	A	AS	113	20170907	70	C1L925
99979-L42	B	AS	113	20170317	62	C1L925
108741-L42	A	AS	113	20170210	51	C1L925
117581-L42	D	AS	113	20170112	73	C1L925
109021-L42	D	AS	113	20160426	73	C1L925
108738-L42	G	AS	113	20160202	46	C1L925
99978-L42	B	AS	113	20160105	72	C1L925
108703-L42	A	AS	113	20151206	68	C1L925
99977-L42	D	AS	113	20150520	52	C1L925
91097-L42	A	AS	113	20150501	71	C1L925
91095-L42	G	AS	113	20140721	58	B6L544
88626-L42	B	AS	113	20131203	50	C1L680
91093-L42	G	AS	113	20131121	60	B6L544
87868-L42	B	AS	113	20130524	51	C1L680
88640-L42	D	AS	113	20130514	51	C1L680
87867-L42	B	AS	113	20130303	55	C1L680
88361-L42	A	AS	113	20130104	56	C1L680
90802-L42	G	AS	113	20121031	48	B6L544
86881-L42	G	AS	113	20120306	55	B6L544
83450-L42	B	AS	113	20110825	64	C1L446
71256-L42	A	AS	113	20110224	49	C1L446
70115-L42	B	AS	113	20091002	55	C1L446
71254-L42	A	AS	113	20090527	69	C1L446

113 Calibration History	Average	63.1
	Std.	12.5
	Min	44
	Max	95

testkey	ltmslab	val	ind	ltmsdate	ECSP	PINBAT
148284-L42	A	NI	119	20200425	60	C1L446
153778-L42	D	NI	119	20200327	65	C1L446
153924-L42	G	NI	119	20200318	73	C1L925
153776-L42	B	NI	119	20200311	64	C1L925
142245-L42	G	NI	119	20200211	73	C1L925
142251-L42	D	NI	119	20190903	75	C1L446
142253-L42	A	MI *	119	20190816	68	C1L925
142244-L42	G	NI	119	20190730	48	C1L925
142249-L42	B	NI	119	20190514	62	C1L925
142248-L42	B	NI	119	20190509	38	C1L925
142252-L42	A	NI	119	20190404	58	C1L925
142250-L42	D	NI	119	20190318	95	C1L925

119 Matrix	Average	64.9
	Std.	14.3
	Min	38
	Max	95

\* Test was conducted on an unreferenced stand

# TMC 119 Test Results Compared to TMC 113

<b>113 Calibration History</b>	<b>Average</b>	<b>63.1</b>
	<b>Std.</b>	<b>12.5</b>
	<b>Min</b>	<b>44</b>
	<b>Max</b>	<b>95</b>

<b>119 Matrix</b>	<b>Average</b>	<b>64.9</b>
	<b>Std.</b>	<b>14.3</b>
	<b>Min</b>	<b>38</b>
	<b>Max</b>	<b>95</b>

▲ 119 results comparable to historic 113

▲ Vote to approve?

▲ Next steps?

L-42 (D7452)

## STATUS OF REFERENCE OIL SUPPLY

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
113	16	57	28.7
117	34	657	328.5
119	8	89	44.5
Total	58	803	401.7

## L-42 Hardware Order

- ▲ Afton has <1 year of C1L446 hardware in stock
- ▲ Need to place an order soon
- ▲ Do other labs have a need?
  - ▲ If not, is anyone willing to sell / trade / redistribute?
  - ▲ Afton is looking for ~100 axles
- ▲ Other options?

# New Issues



Thanks!



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