



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

COMMITTEE D02 ON PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS

CHAIRMAN: RANDY F JENNINGS, TENNESSEE DEPT OF AGRIC, P O BOX 40627, NASHVILLE, TN 37204, UNITED STATES (615) 837-5327, FAX: (615) 837-5335, E-MAIL: RANDY.JENNINGS@TN.GOV
FIRST VICE CHAIRMAN: JAMES J SIMNICK, BP AMERICA, 150 W WARRENVILLE RD, NAPERVILLE, IL 60563, UNITED STATES (630) 420-5936, FAX: (630) 420-4831, E-MAIL: SIMNICJJ@BP.COM
SECOND VICE CHAIRMAN: MICHAEL A COLLIER, PETROLEUM ANALYZER Co LP, 21114 HWY 113, CUSTER PARK, IL 60481, UNITED STATES (815) 458-0216, FAX: (815) 458-0217, E-MAIL: MICHAEL.COLLIER@PACLP.COM
SECOND SECRETARY: HIND M ABI-AKAR, CATERPILLAR INC, BLDG H3000, OLD GALENA ROAD, MOSSVILLE, IL 61552, UNITED STATES (309) 578-9553, E-MAIL: ABI-AKAR_HIND@CAT.COM
SECRETARY: SCOTT FENWICK, NATIONAL BIODIESEL BOARD, PO BOX 104848, JEFFERSON CITY, MO 65110-4898, UNITED STATES (800) 841-5849, FAX: (537) 635-7913, E-MAIL: SFENWICK@BIODIESEL.ORG
STAFF MANAGER: ALYSON FICK, (610) 832-9681, FAX: (610) 832-9668, E-MAIL: AFICK@ASTM.ORG

Issued: 06.21.2017
Reply to: Dan Worcester
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238
Phone: 210.522.2405
Email: dworchester@swri.org

These are the unapproved minutes of the 06.20.2017 Sequence VI Conference Call.

This document is not an ASTM standard; it is under consideration within an ASTM technical committee but has not received all approvals required to become an ASTM standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of ASTM committee activities except with the approval of the chairman of the committee having jurisdiction and the president of the society. Copyright ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

The meeting was called to order at 9:05 AM Central Time by Chair Greg Miranda.

Agenda

The Agenda is the included as **Attachment 1**.

1.0 Roll Call

The Attendance list is **Attachment 2**. There were no member changes.

- 1.1.1 Approval of Meeting minutes from 04.26.2017 Seq. VI SP call.
- 2.0 Approval of Meeting minutes from April 26, 2017 Seq. VI SP meeting
 - Approve the Surveillance Panel minutes.
 - 2.1 Greg Miranda made the motion and Jason Bowden seconded.
 - 2.2 The minutes received unanimous approval.
- 3.0 Old Business
 - 3.1 Seq. VIE/F Short Block Hardware Task Force Update Adrian Alfonso
 - 3.1.1 Hardware availability update
 - 14 of the 15 tests scheduled for 3 labs are reported. The 15th test will be called in to TMC the day of this meeting. 20 tests are scheduled. The 4th lab has started the first test in their series. That matrix will complete the end of July. Rich will update the test runs and comments for the data.
 - Bob Campbell asked if those tests were run on calibrated stands. Rich noted that was not specified, but the stand was calibrated prior to running the matrix.
 - The industry concern in remaining life of the OHT-2 engines. There are 24 of those left. Labs will provide OHT with their current inventory for re-distribution.

MOTION #1: After confirming that the engines used for the prove out matrix were built using the latest draft of the Sequence VIE/F GM Kit Assembly Manual as well as confirming with TMC that all the reported tests to date shown on the table below are valid and ran within the parameter of the seq. VI procedure; the Sequence VIE/F Engine Rebuild Task Force recommends to the Seq. VI Surveillance Panel to accept these test as operationally valid and accept them for analysis. The data from the fourth lab will be included at a later time once the 5th of 5 tests are completed.

Adrian Alphonso, Second: Katerina Pecinovsky

Result: 13 Y, 0 N, 1 W

- 3.1.2 Status of short block hardware introduction Matrix
 - See Attachment 3 for the matrix results to date.
 - There was a lot of discussion on whether to wait for the 20 test matrix or to begin analysis with 15 completed tests. Two labs will be low on engines by the end of July. The concern is Stat analysis needs to consider engine hour corrections, and possible adjustment of reference oil targets. There will be a meeting the second week in July [Tuesday July 11 at the same time as the current meeting] for preliminary review of the analysis done to that point.

3.2 Update on BL5 Introduction (Presentation Included) Rich Grundza

3.2.1 **Motion forthcoming:** unanimous consent to approve VIEBL5 for use in Sequence VIE/F testing

Data was from IAR and SwRI each running a 12 stage matrix on BL2 and BL5. This was the 6 stages of BLB. There was discussion on how a lab will convert to BL5. Initial discussion was a single reference in a new engine and allow the generated severity adjustments to correct for differences. This would be lab level approval. An engine calibrated on BL5 would run its calibration period on the same baseline oil. See Attachment 4 for BL5 update.

MOTION #2: Approve BL5 for use once an acceptable reference has been obtained in a stand.

Rich Grundza, Second: Adrian Alphonso

Result: 12 Y, 0 N, 2 W

3.3 Seq. VID-VIF Equivalency Update

3.3.1 Recap from last meeting

CLOG was asked to review test options, including running either or both oils 200 and 300.

3.3.2 Options presented to CLOG

Intertek and SwRI would provide calibrated test stands for the oils to be selected and the number of runs determined.

3.3.3 CLOG recommendation

The recommendation was two runs on oil 300 at each test lab.

3.3.4 Status on Equivalency Work

IAR is running the second VIF reference oil and will be ready to start the matrix June 26th. SwRI is running the first VIF reference oil and would be ready to start 07.05.2017. Results would be ready for review the last week in July. TMC will create CMIR numbers for the oils so they can be reported. The oils are due to arrive at the labs the week of June 20th. Both labs agreed to check and report the arrival.

4.0 New Business

4.1 Reference Oil Status

TMC is down to 18 gallons of 542-2 reference oil. Test labs will need to move to 542-3. Charlie requested labs run 542-3 on OHT-2 engines and BL-4. Rich noted this new blend would not be used on the API or Toyota matrix work.

5.0 Next Meeting

5.1 The next SP meeting is planned July 11, 2017 at 10:00 Eastern Time.

The meeting adjourned at 10:28 AM.

Sequence VI Surveillance Panel Conference Call Agenda June 20, 2017 @ 10:00-11:30 EST

Audio Connection

Call-in Number: +1-415-655-0001
Conference Code: 192 350 647

Webex Meeting URL:

<https://meetings.webex.com/collabs/#/meetings/detail?uuid=MAI29QHMA1GPY981R0MICY6RLN-20XT&rnd=544346.71013>

1. Roll Call (start 10:05 EST)

1.1. SP Membership changes and additions

2. Approval of Meeting minutes from April 26, 2017 Seq. VI SP meeting

3. Old Business

3.1	Seq. VIE/F Short Block Hardware Task Force Update 3.1.1 Hardware availability update 3.1.2 Status of Short block hardware introduction Matrix	Adrian Alfonso
3.2	Update on BL5 Introduction (Presentation Included) 3.2.1 Motion forthcoming: unanimous consent to approve VIEBL5 for use in Sequence VIE/F testing	Rich Grundza
3.3	Seq. VID-VIF Equivalency Update 3.3.1 Recap from last meeting 3.3.2 Options presented to CLOG 3.3.3 CLOG recommendation 3.3.4 Status on Equivalency Work	Greg Miranda

4. New Business??

5. Next Meeting

5.1. TBD

6. Meeting Adjourned

ASTM SEQUENCE VI

Name	Email/Phone	Company	Attend
Adrian Alfonso Voting Member	Phone: (210) 838-0431 Adrian.Alfonso@intertek.com	Intertek	ATTEND
Jason Bowden Voting Member	Phone: (440) 354-7007 jhbowden@ohtech.com	OHT	ATTEND
Amol Savant Voting Member	acsavant@valvoline.com	Valvoline	ATTEND
Tim Cushing Voting Member	Phone: (248) 881-3518 Timothy.Cushing@gm.com	General Motors	ATTEND
Rich Grundza Voting Member	Phone: (412) 365-1034 reg@astmtmc.cmu.edu	TMC	ATTEND
Jeff Hsu Voting Member	Phone: (832) 419-3482 j.hsu@shell.com	Shell	ATTEND
Teri Kowalski Voting Member	Phone: (734) 995-4032 Teri.Kowalski@tema.toyota.com	Toyota	ATTEND
Dan Lanctot Voting Member	Phone: (210) 690-1958 dlanctot@tei-net.com	TEI	ATTEND
Greg Miranda Voting Member	Phone: (440) 347-8516 Greg.Miranda@Lubrizol.com	Lubrizol	ATTEND
Katerina Pecinovsky Voting Member	Phone: Katerina.Pecinovsky@AftonChemical.com	Afton	ATTEND
Brienne Pentz Voting Member	Phone: Brienne.Pentz@bp.com	BP	
Andy Ritchie Voting Member	Phone: (908) 474-2097 Andrew.Ritchie@infineum.com	Infineum	ATTEND
Ron Romano Voting Member	Phone: (313) 845-4068 romano@ford.com	Ford	
Clifford Salvesen Voting Member	Phone: (856) 224-2954 Clifford.r.Salvesen@exxonmobil.com	ExxonMobil	ATTEND
Kaustav Sinha Voting Member	Phone: (713) 432-6642 LFNQ@chevron.com	Chevron Oronite	
Haiying Tang Voting Member	Phone: (248) 512-0593 HT146@Chrysler.com	Chrysler	
Dan Worcester Voting Member	Phone: (210) 522-2405 Dan.Worcester@swri.org	SwRI	ATTEND

ASTM SEQUENCE VI

Name	Email/Phone	Company	Attend
Ed Altman	Ed.Altman@aftonchemical.com	Afton	
Bill Anderson	Bill.anderson@aftonchemical.com	Afton	
Bob Campbell	Bob.Campbell@aftonchemical.com	Afton	ATTEND
Lisa Dingwell	Lisa.Dingwell@AftonChemical.com	Afton	
Todd Dvorak	Todd.Dvorak@aftonchemical.com	Afton	
Greg Guinther	Greg.Guinther@aftonchemical.com	Afton	
Terry Hoffman	Terry.Hoffman@aftonchemical.com	Afton	
Christian Porter	Christian.Porter@aftonchemical.com	Afton	
Jeremy Styer	Jeremy.Styer@aftonchemical.com	Afton	
Timothy Caudill	Tlcaudill@valvoline.com	Valvoline	
Tisha Joy	Tisha.Joy@bp.com	BP	
Michael Blumenfeld	Michael.I.Blumenfeld@exxonmobil.com Phone: (856) 224.2865	EM	
Don Smolenski	Donald.j.Smolenski@Evonik.com	Evonik	
Doyle Boese	Doyle.Boese@infineum.com Phone: (908) 474-3176	Infineum	ATTEND
Gordon Farnsworth	Gordon.Farnsworth@infineum.com	Infineum	ATTEND
Charlie Leverett	Charlie.Leverett@yahoo.com Phone: (210) 414-5448	Infineum	ATTEND
Mike McMillan	mmcmillan123@comcast.net	Infineum	ATTEND
Jordan Pastor	Jordan.Pastor@Infineum.com Phone: (313) 348-3120	Infineum	
William Buscher	William.Buscher@intertek.com	Intertek	ATTEND
Martin Chadwick	Martin.Chadwick@intertek.com	Intertek	
Al Lopez	Al.Lopez@intertek.com	Intertek	
Addison Schweitzer	Addison.Schweitzer@intertek.com	Intertek	
Bob Olree	olree@netzero.net	Intertek	
Andy Buczynsky	Andrew.Buczynsky@gm.com	GM	
Thomas Hickl	Thomas.Hickl@de.gm.com	GM	
Jeff Kettman	Jeff.Kettman@gm.com	GM	
Jonas Leber	Jonas.Leber@opel.com	GM	
Mike Raney	Michael.P.Raney@gm.com Phone: (248) 408-5384	GM	
Angela Willis	Angela.P.Willis@gm.com	GM	
Scott Rajala	srajala@ILAcorp.com	Idemitsu	
Dave Passmore	dpassmore@imtsind.com	IMTS	

ASTM SEQUENCE VI

Name	Email/Phone	Company	Attend
Jerry Brys	Jerome.Brys@lubrizol.com Phone: (440) 347.2631	Lubrizol	
Jessica Buchanan	Jessica.Buchanan@Lubrizol.com	Lubrizol	
Joe Gleason	Jog1@lubrizol.com	Lubrizol	
James Matasik	James.Matasik@lubrizol.com	Lubrizol	
Kevin O'Malley	Kevin.OMalley@lubrizol.com Phone: (440) 347.4141	Lubrizol	ATTEND
Chris Castanien	Chris.Castanien@neste.com Phone: (440) 290-9766	Neste	
Dwight Bowden	dhbowden@ohtech.com	OHT	
Matt Bowden	mjbowden@ohtech.com	OHT	ATTEND
Ricardo Affinito	affinito@chevron.com Phone: (510) 242-4625	Oronite	
Ian Elliot	IanElliott@chevron.com	Oronite	
Jo Martinez	jogm@chevron.com	Oronite	ATTEND
Robert Stockwell	rsto@chevron.com	Oronite	
Christine Eickstead	Christine.Eickstead@swri.org	SwRI	ATTEND
Travis Kostan	Travis.Kostan@swri.org	SwRI	ATTEND
Patrick Lang	Patrick.Lang@swRI.org Phone: (210) 522-2820	SwRI	ATTEND
Michael Lochte	mlochte@swri.org	SwRI	
Karen Haumann	Karen.Haumann@shell.com	Shell	
Scott Stap	Scott.Stap@tgdirect.com	TG Direct	
Clayton Knight	cknight@tei-net.com	TEI	
Zack Bishop	zbishop@tei-net.com Phone: (210) 877-0223	TEI	
Jeff Clark	jac@astmtmc.cmu.edu	TMC	
Hirano Satoshi	Satoshi_Hirano_aa@mail.toyota.co.jp	Toyota	
Jim Linden	lindenjim@jlindenconsulting.com Phone: (248) 321-5343	Toyota	ATTEND
Mark Adams	mark@tribologytesting.com	Tribology Testing	
Tom Smith		Valvoline	
Hap Thompson	Hapjthom@aol.com	Vix Facilitator	
Chris Taylor	Chris.Taylor@vpracingfuels.com	VP Racing Fuels	

ASTM SEQUENCE VI

Name	Email/Phone	Company	Attend
MOTION:	KIT MATRIX	BL5	
Adrian Alfonso Voting Member	APPROVE	APPROVE	
Jason Bowden Voting Member	APPROVE	WAIVE	
Amol Savant Voting Member	APPROVE	APPROVE	
Tim Cushing Voting Member	APPROVE	APPROVE	
Rich Grundza Voting Member	APPROVE	APPROVE	
Jeff Hsu Voting Member	APPROVE	APPROVE	
Teri Kowalski Voting Member	APPROVE	APPROVE	
Dan Lanctot Voting Member	WAIVE	WAIVE	
Greg Miranda Voting Member	APPROVE	APPROVE	
Katerina Pecinovsky Voting Member	APPROVE	APPROVE	
Brienne Pentz Voting Member			
Andy Ritchie Voting Member	APPROVE	APPROVE	
Ron Romano Voting Member			
Clifford Salvesen Voting Member	APPROVE	APPROVE	
Jo Martinez for Voting Member	APPROVE	APPROVE	
Haiying Tang Voting Member			
Dan Worcester Voting Member	APPROVE	APPROVE	
VOTES	13 Y, 0 N, 1 W	12 Y, 0 N, 2 W	

ASTM SEQUENCE VI

Name	Email/Phone	Company	Attend
MOTION:			
Adrian Alfonso Voting Member			
Jason Bowden Voting Member			
Amol Savant Voting Member			
Tim Cushing Voting Member			
Rich Grundza Voting Member			
Jeff Hsu Voting Member			
Teri Kowalski Voting Member			
Dan Lanctot Voting Member			
Greg Miranda Voting Member			
Katerina Pecinovsky Voting Member			
Brienne Pentz Voting Member			
Andy Ritchie Voting Member			
Ron Romano Voting Member			
Clifford Salvesen Voting Member			
Kaustav Sinha Voting Member			
Haiying Tang Voting Member			
Dan Worcester Voting Member			
VOTES			

ASTM SEQUENCE VI

Name	Email/Phone	Company	Attend
MOTION:			
Adrian Alfonso Voting Member			
Jason Bowden Voting Member			
Amol Savant Voting Member			
Tim Cushing Voting Member			
Rich Grundza Voting Member			
Jeff Hsu Voting Member			
Teri Kowalski Voting Member			
Dan Lanctot Voting Member			
Greg Miranda Voting Member			
Katerina Pecinovsky Voting Member			
Brienne Pentz Voting Member			
Andy Ritchie Voting Member			
Ron Romano Voting Member			
Clifford Salvesen Voting Member			
Kaustav Sinha Voting Member			
Haiying Tang Voting Member			
Dan Worcester Voting Member			
VOTES			

TESTKEY	APP	LAB	IND	ENGNO	RUN	VAL	FEI1	FEI1_OR	FEI1yi	FEI2	FEI2_OR	FEISUM	FEI2yi	COM1	COM2	LTMSDATE	ENHR	TOTOCON
124414-VIE	2	G	542-2	100C	1	AI	2.34	2.51	-0.7097	1.47	1.59	3.81	-0.8667	1ST OF 5	GM BUILD	20170419	350	800
125284-VIE	2	G	544	100C	2	AI	1.24	1.31	-0.2308	1.6	1.65	2.84	0.95	2ND OF 5	GM BUILD	20170428	548	1100
126026-VIE	2	G	544	100C	3	AI	1.29	1.25	-0.0385	1.35	1.32	2.64	-0.3	3RD OF 5	GM BUILD	20170509	746	1200
124408-VIE	2	G	1010-1	100C	4	AI	1.61	1.47	-1.0741	1.59	1.49	3.2	-0.92	4th OF 5	GM BUILD	20170518	944	1200
126023-VIE	2	G	542-2	100C	5	AI	2.27	2.03	-0.9355	1.45	1.27	3.72	-0.9333	5th OF 5	GM BUILD	20170527	1143	1000
124421-VIE	2	A	544	101A	1	AI	0.92	1.08	-1.4615	1.08	1.19	2	-1.65	1ST OF 5	GM BUILD	20170428	370	600
123339-VIE	2	A	1010-1	101A	2	AI	1.44	1.49	-1.7037	1.47	1.51	2.91	-1.4	2ND OF 5	GM BUILD	20170509	572	700
124419-VIE	2	A	542-2	101A	3	AI	2.33	2.28	-0.7419355	1.6	1.56	3.93	-0.43333	3RD OF 5	GM BUILD	20170519	773	800
126013-VIE	2	A	542-2	101A	4A	AG	2.57	2.37	0.0323	1.27	1.12	3.84	-1.53333	4th OF 5	GM BUILD	20170607	1061	1400
122936-VIE	3	D	1010-1	001G	1	AI	1.58	1.74	-1.1852	1.29	1.41	2.87	-2.12	1ST OF 5	GM BUILD	20170506	366	100
125285-VIE	3	D	542-2	001G	2	AI	2.37	2.42	-0.6129	1.38	1.42	3.75	-1.1667	2ND OF 5	GM BUILD	20170518	570	400
120619-VIE	3	D	544	001G	3	AI	1.26	1.21	-0.1538462	1.02	0.98	2.28	-1.95	3RD OF 5	GM BUILD	20170527	776	600
126020-VIE	3	D	544	001G	4	AI	1.3	1.14	0	1.06	0.94	2.24	-1.75	4th OF 5	GM BUILD	20170605	978	800

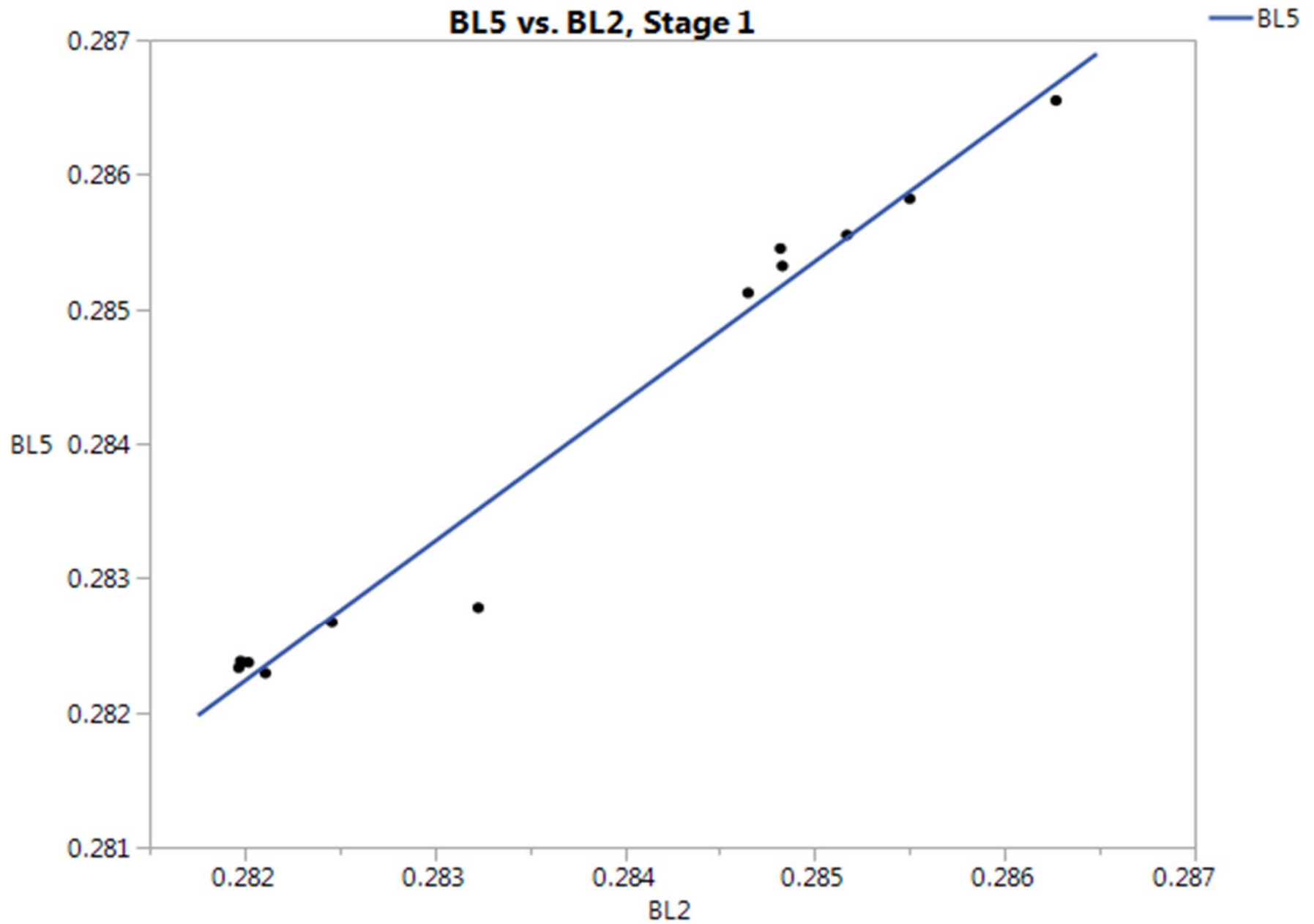


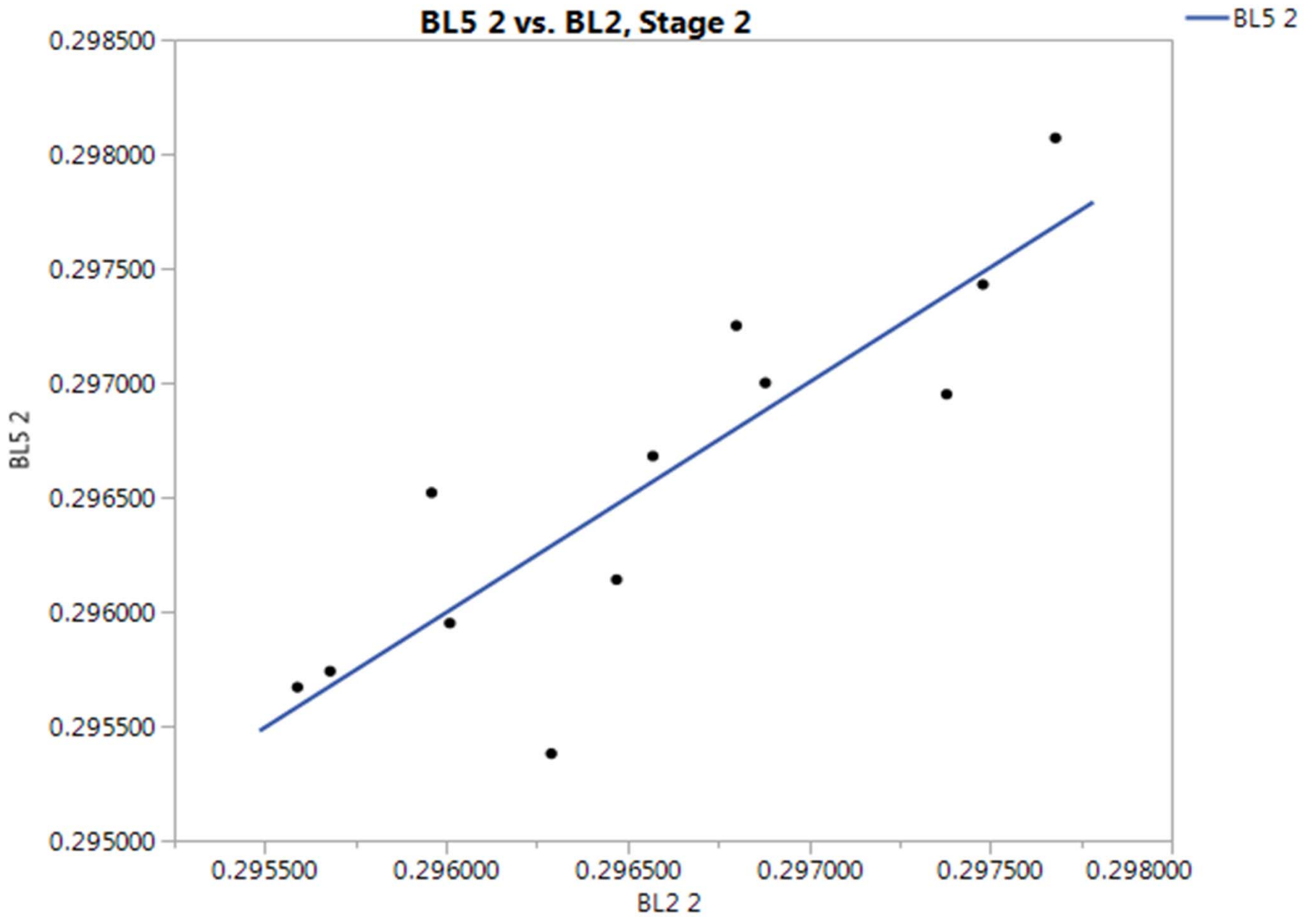
A Program of ASTM International

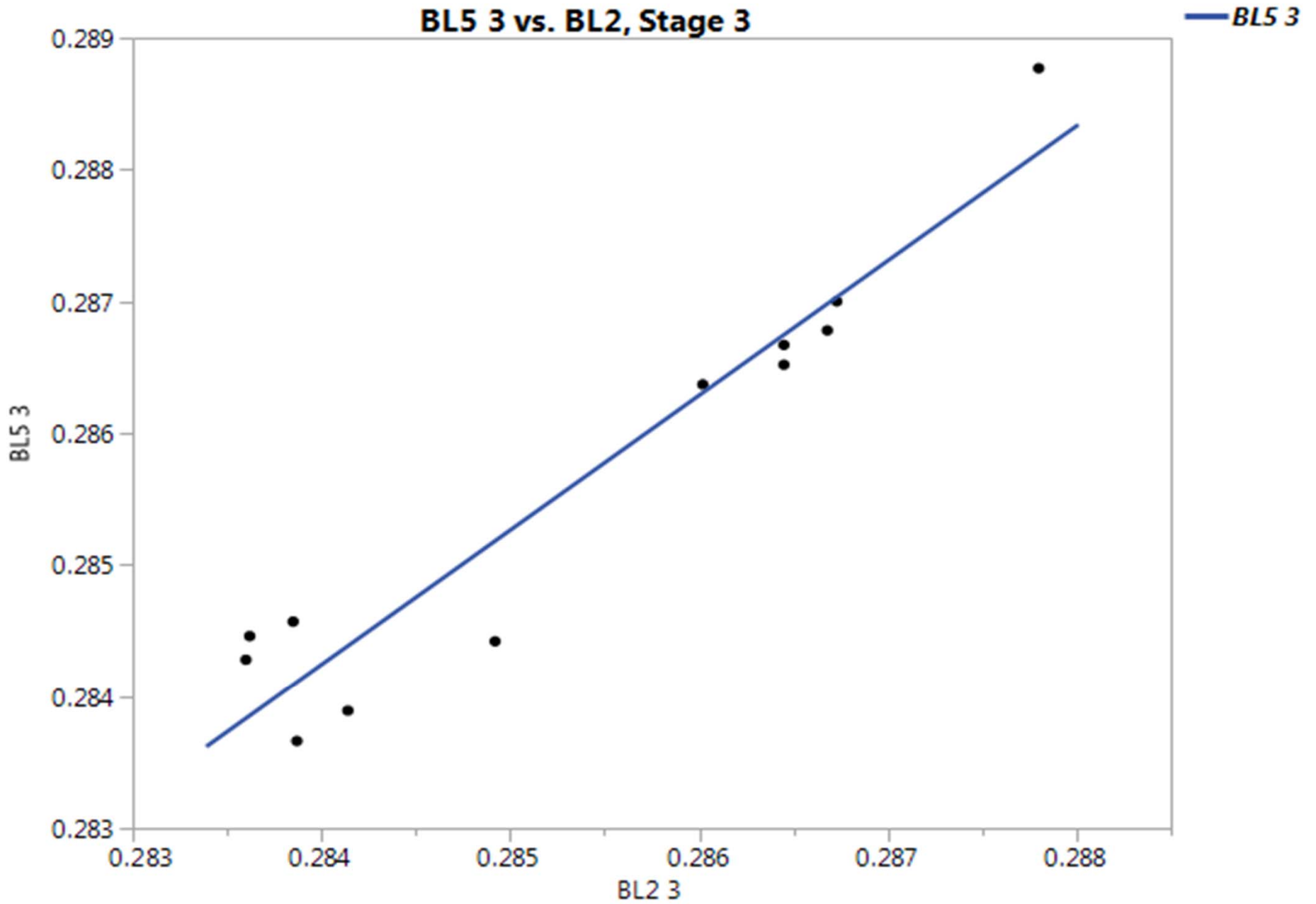
Test Monitoring Center

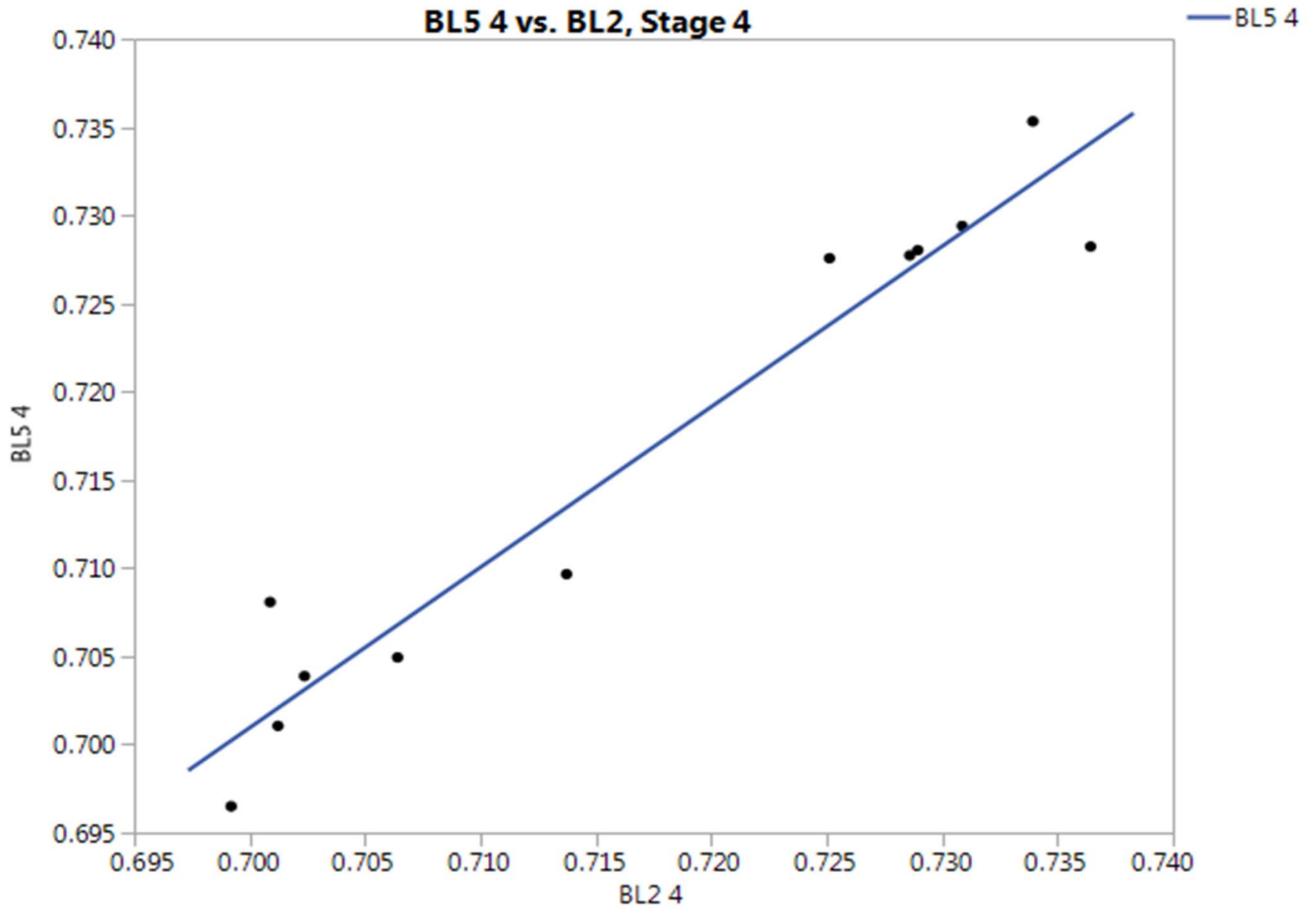
<http://astmtmc.cmu.edu>

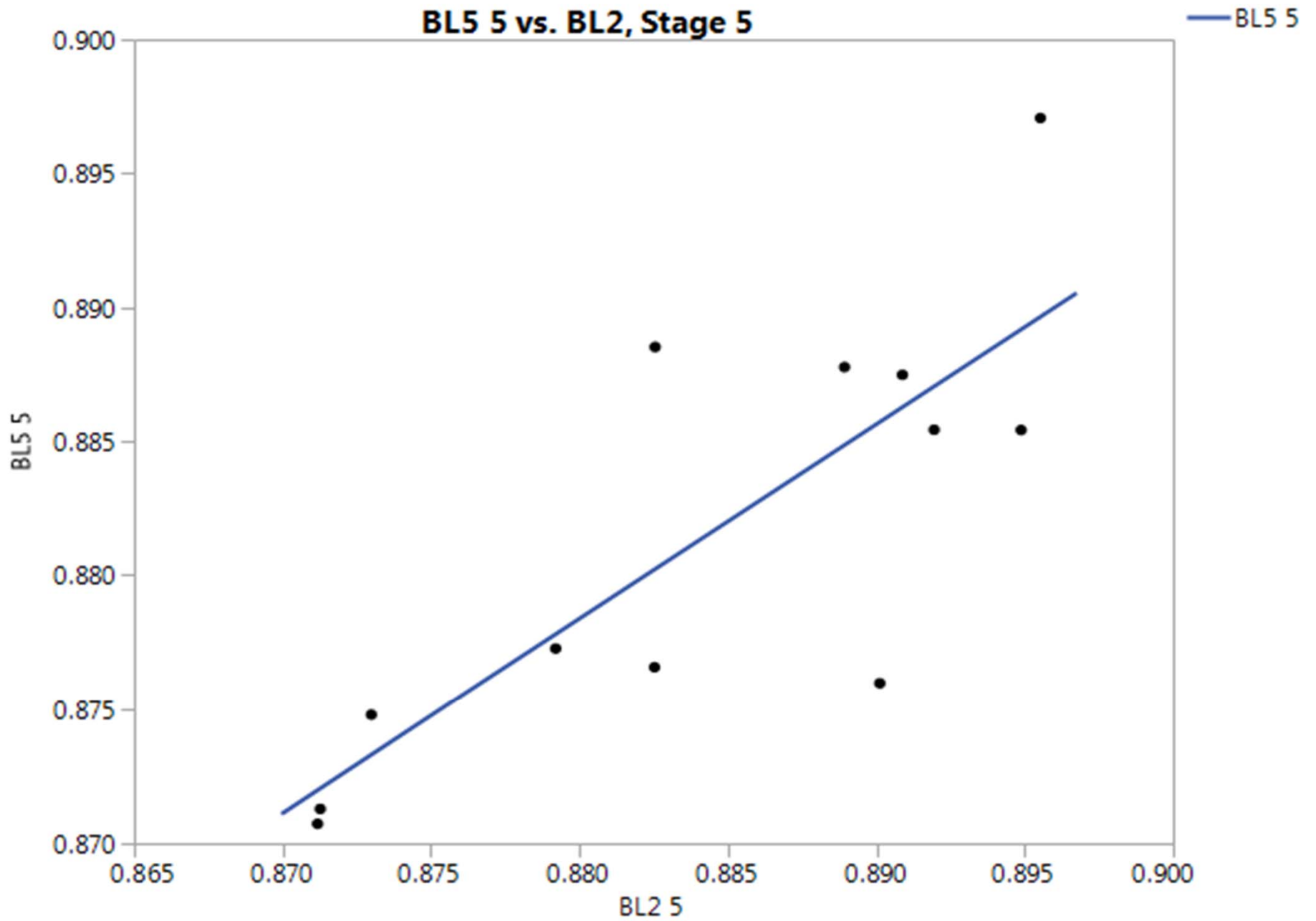
BL-5 Approval Results



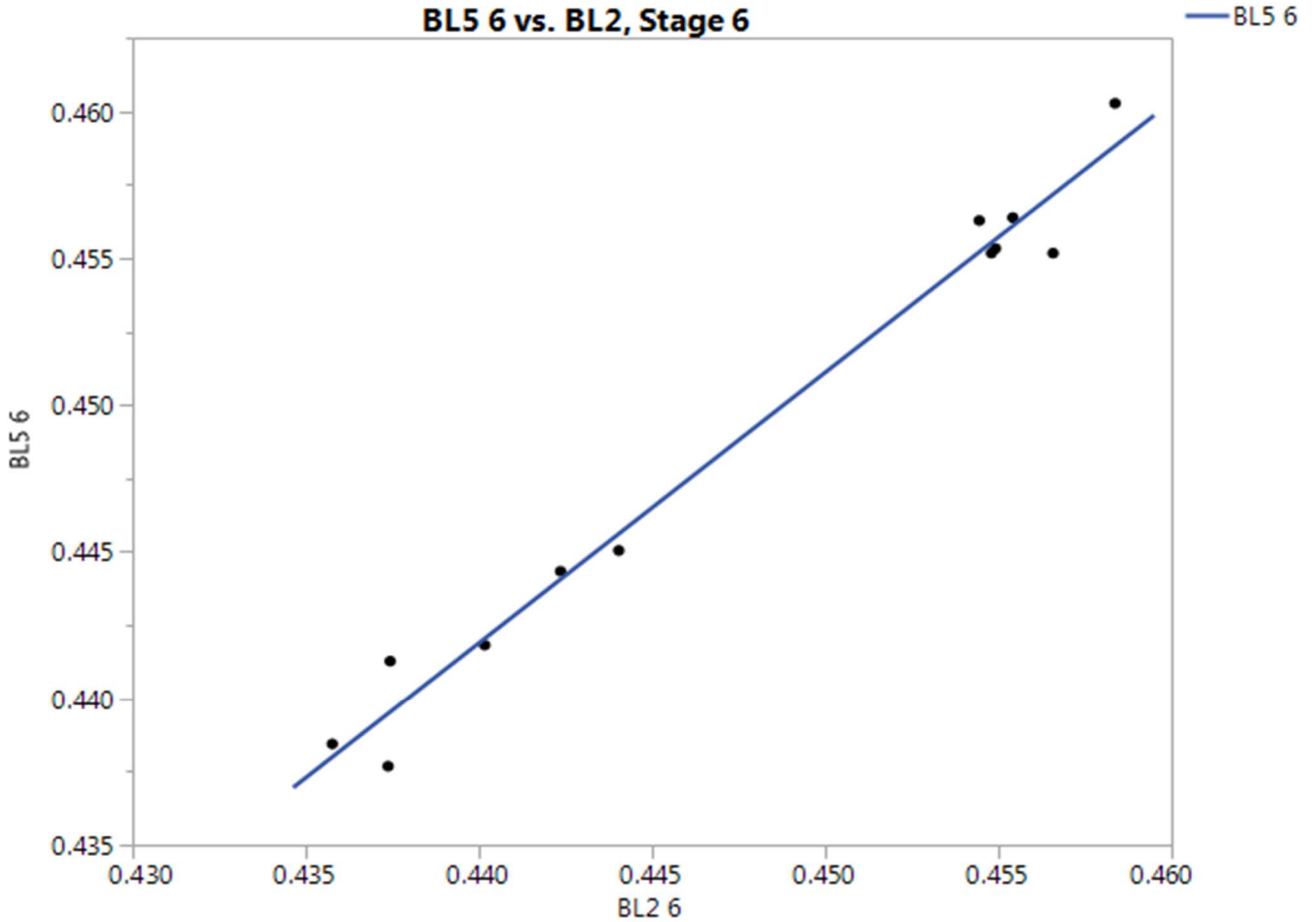








BL5 6 vs. BL2, Stage 6



TMC Analysis

- TMC estimated the average difference between BL-2 and BL-5 (BL-2 minus BL-5) as -0.0051 for Total fuel consumed, while weighted fuel consumed showed a difference of -0.0019. Results of stage data are at the end of the presentation in Appendix 1.
- Historical results are summarized for both BC (VIB) and BL (VID/VIE) on next slide.

TMC Analysis (cont.)

BC/BL Blend Comparison	Difference
BC-2 versus BC-3 (BC-2 minus BC-3)	-0.0003
BC-2 versus BC-4 (BC-2 minus BC-4)	+0.0003
BC-2 versus BC-5 (BC-2 minus BC-5)	-0.0005
BC-2 versus BC-6 (BC-2 minus BC-6)	-0.0004
BL-2 versus BL-3 (BL-2 minus BL-3)	-0.0028
BL-2 versus BL-4 (BL-2 minus BL-4)	-0.0027
BL-2 versus BL-5 (BL-2 minus BL-5)	-0.0051

Conclusions

- BL5 blend less fuel efficient than BL-2.
- Average difference between BL-2 and BL-5, in terms of total fuel consumed is - 0.0051 kg or 5.1 grams of fuel.
- In terms of Weighted fuel consumed, - 0.0019 kg or 1.9 grams of fuel.

Appendix 1

Summary of Results

Lab	SEQUENCE VIE BL5 VERIFICATION DATA								
	Stage 1 BSFC DATA			Stage 2 BSFC DATA			Stage 3 BSFC DATA		
	BL2	BL5	BL2-BL5	BL2	BL5	BL2-BL5	BL2	BL5	BL2-BL5
G	0.28323	0.28278	0.00045	0.29629	0.29538	0.00091	0.28492	0.28442	0.00050
G	0.28198	0.28238	-0.00040	0.29559	0.29567	-0.00008	0.28362	0.28446	-0.00084
G	0.28197	0.28233	-0.00036	0.29568	0.29574	-0.00006	0.28414	0.28389	0.00025
G	0.28202	0.28237	-0.00035	0.29601	0.29595	0.00006	0.28387	0.28366	0.00021
G	0.28246	0.28267	-0.00021	0.29647	0.29614	0.00033	0.28360	0.28428	-0.00068
G	0.28211	0.28229	-0.00018	0.29596	0.29652	-0.00056	0.28385	0.28457	-0.00072
A	0.28627	0.28655	-0.00028	0.29768	0.29807	-0.00039	0.28780	0.28877	-0.00097
A	0.28482	0.28545	-0.00063	0.29680	0.29725	-0.00045	0.28673	0.28700	-0.00027
A	0.28465	0.28512	-0.00047	0.29657	0.29668	-0.00011	0.28668	0.28678	-0.00010
A	0.28517	0.28555	-0.00038	0.29688	0.29700	-0.00012	0.28602	0.28637	-0.00035
A	0.28483	0.28532	-0.00049	0.29738	0.29695	0.00043	0.28645	0.28667	-0.00022
A	0.28550	0.28582	-0.00032	0.29748	0.29743	0.00005	0.28645	0.28652	-0.00007
			-0.00030			0.00000			-0.00027
			0.00027			0.00041			0.00046

Appendix 1 (continued)

Summary of Results

Lab	Stage 4 BSFC DATA			SEQUENCE VIE BL5 VERIFICATION DATA						Stage 6 BSFC DATA		
	BL2	BL5	BL2-BL5	BL2	BL5	BL2-BL5	BL2	BL5	BL2-BL5	BL2	BL5	BL2-BL5
G	0.71373	0.70966	0.00407	0.88253	0.87656	0.00597	0.44404	0.44505	-0.00101			
G	0.70641	0.70494	0.00147	0.87920	0.87726	0.00194	0.44236	0.44434	-0.00198			
G	0.70089	0.70808	-0.00719	0.89012	0.87596	0.01416	0.44017	0.44183	-0.00166			
G	0.70238	0.70388	-0.00150	0.87299	0.87477	-0.00178	0.43744	0.44128	-0.00384			
G	0.70123	0.70106	0.00017	0.87127	0.87128	-0.00001	0.43738	0.43768	-0.00030			
G	0.69920	0.69650	0.00270	0.87118	0.87073	0.00045	0.43577	0.43844	-0.00267			
A	0.73393	0.73533	-0.00140	0.89553	0.89707	-0.00154	0.45837	0.46027	-0.00190			
A	0.72860	0.72773	0.00087	0.89488	0.88542	0.00946	0.45658	0.45517	0.00141			
A	0.72512	0.72757	-0.00245	0.88255	0.88852	-0.00597	0.45480	0.45517	-0.00037			
A	0.72895	0.72803	0.00092	0.89195	0.88543	0.00652	0.45542	0.45638	-0.00096			
A	0.73087	0.72940	0.00147	0.88893	0.88777	0.00116	0.45445	0.45628	-0.00183			
A	0.73643	0.72823	0.00820	0.89088	0.88748	0.00340	0.45492	0.45533	-0.00041			
			0.00061			0.00281			-0.00129			
			0.00375			0.00549			0.00134			



A Program of ASTM International