

Oil Seal Compatibility Test (OSCT) Surveillance Panel Meeting Minutes

Pittsburgh, PA (PRI Headquarters)

2/8/2012

D. Bell

Participants:

S. Parke (TMC)	J. Clark (TMC)	A. Athey (Volvo)	T. Bryson (Volvo)
J. Keiter (Lz, phone)	B. Dwornick (Army)	S. Eliot (XOM)	G. Greene (Lz)
B. Grinfield (SWRI, phone)	L. Hamilton (Lz)	S. Higuichi (Afton)	B. Koehler (SWRI)
J. Gropp (Lz)	B. McGlone (Meritor)	T. Muransky (Meritor)	B. Kearney (Afton)
D. Bell (Afton)	C. Knight (TEI)	P. Kanga (XOM)	K. Hobson (Afton)
D. Smith (Intertek)	K. Zreik (GM)	C. Knight (TEI, phone)	T. Boschert (Afton)
T. Gottwald (Afton)			

The OSCT Surveillance Panel membership list of voting and non-voting members was reviewed and those non-voting members that have not participated over the last year have been eliminated from the list.

A motion made by J. Gropp and 2nd by T. Bryson was unanimously approved by 7 voting members to approve the OSCT Surveillance Panel meeting minutes from 11/2/2011 and 12/12/2011 available on the TMC website.

There are multiple baths available at both Lz and SWRI with no known related "stand" bath problems or severity issues.

The Test Engineering Institute (TEI) has the approximate seal inventory as of 1/25/2012:

- PA 344: 0 slabs
- PA345: 300 slabs (qualification data reviewed 2/8)
- PA346: Instructed to order 300 slabs to arrive end 3/2012
- FL383: 0 slabs
- FL384: 200 slabs (qualification data reviewed 2/8)
- FL385: 200 slabs ordered 1/25/2012 to arrive early 3/2012
- NI338: 52 slabs
- NI339: 200 slabs (labs conducting qualification testing)

Since the inventory of approved polyacrylate (PA) and fluoroelastomer (FL) was depleted, it was recommended that Test Engineering Institute (TEI) order a new batch of PA and FL as soon as the prior lot is approved to ensure an adequate supply of inventory is maintained. Since NI is not used as often,

the typical protocol of ordering new NI when the TEI inventory drops to 100 slabs will remain in place. TEI was instructed to place an order for PA346 and send to both labs for qualification testing upon receipt.

SWRI was asked by one of their clients for the name of the NI manufacturer. The chairman instructed SWRI not to provide the D5662 elastomer manufacturer since this information is to remain confidential unless the OSCT Surveillance Panel votes to release this information.

The qualification data conducted by Lz and SWRI as compiled by the TMC for the new batch of FL384 (data in Appendix), was reviewed by the Panel. The % elongation and volume change, as well as shore hardness change for FL384 in both 160-1 and 161-1 reference oils fell within the Shewhart acceptance bands. A motion passed unanimously (7 approved) that was made by B. Grinfield and 2nd by J. Gropp: Effective immediately approve FL384 batch for ASTM D5662 testing. TEI was instructed to release FL384 for sale as orders are received.

The Lz and SWRI qualification data as compiled by the TMC for the new batch of polyacrylate, PA345 (data in Appendix), was also reviewed by the Panel. The only data deemed not acceptable was the % elongation in 161-1 that failed high outside of the acceptance bands for lab B and was high but within acceptance bands for lab C. A motion passed unanimously (7 approved) that was made by B. Grinfield and 2nd by J. Gropp: Re-run PA345 qualification testing at both labs in 161-1 using 12 dumbbells and report all three parameters. Since TMC and SWRI depleted their inventory of 161-1, Lz agreed to ship a sufficient quantity of their 161-1 to SWRI to expedite qualification testing as per this motion.

TMC-169 has been identified as a J2360 oil that can be used as a replacement for the discontinued TMC reference oil 161-1. TMC and SWRI have depleted their inventory of 161-1 and Lz is almost out as well. TMC has 5 drums of TMC 169 and have provided some to both test labs that have collected data points along with reference oil 161-1. The Test Monitoring Center (TMC) proposed tentative acceptance bands for reference oil 169, but the Panel has concerns of some of the bands being overly restrictive and based upon too few elastomer batches. The proposed acceptance bands are shown in the Appendix.

As background, when 161-1 was first introduced, acceptance bands for hardness change with PA were -20 to +5 until test labs began to fail reference tests with new batches of elastomer. The acceptance bands were widened to -25 to +5 to compensate for batch-to-batch elastomer variability. However, the problem recurred with additional batches of elastomer, so the bands were widened again to -35 to +5, but not until an excessive number of reference oil tests and associated candidate oil tests were rejected. About 40% of the results on TMC 161 in the TMC database today do not meet the initial set of acceptance bands for this oil. The problem was encountered as a result of setting the acceptance bands based upon limited amount of data and too few elastomer batches and the failures resulted in an unnecessary cost to the industry in terms of wasted manpower and materials and delayed or possibly prevented introduction of new lubricants to the market.

The TMC proposed acceptance bands for TMC 169 are significantly narrower for at least 9 test parameters than current bands for TMC 161 that it will replace. The proposed bands have an average reduction in width of 46% and maximum reduction in width of 88%. This is likely due to the proposed acceptance bands being based upon data from too few batches of elastomer. The current bands for TMC 161 are based upon data from ~12 to 24 different elastomer batches, whereas the proposed acceptance bands for TMC 169 are based upon data from only ~2-3 batches of elastomer (number varies by test parameter). Please refer to the Appendix for comparative charts.

The failure to establish appropriate acceptance bands for TMC 169 will result in repeating history. A motion was made by J. Gropp and 2nd by B. Grinfield to establish TMC 169 acceptance bands based upon the mean of the results obtained on TMC 169 and either the standard deviation currently being used to calculate the acceptance bands for TMC 161 or standard deviation from data developed to date on TMC 169, whichever is larger. The acceptance bands for TMC 169 will be monitored and tightened as appropriate once a sufficient number for elastomer batches is tested. The motion was approved with a vote of 4 approved/0 disapproved/3 abstentions. The TMC abstained since they argued of some factual inconsistencies on the previous background information and felt that their acceptance band proposal was justified. However, since the motion was approved, TMC will establish the new TMC 169 acceptance bands based upon the motion above.

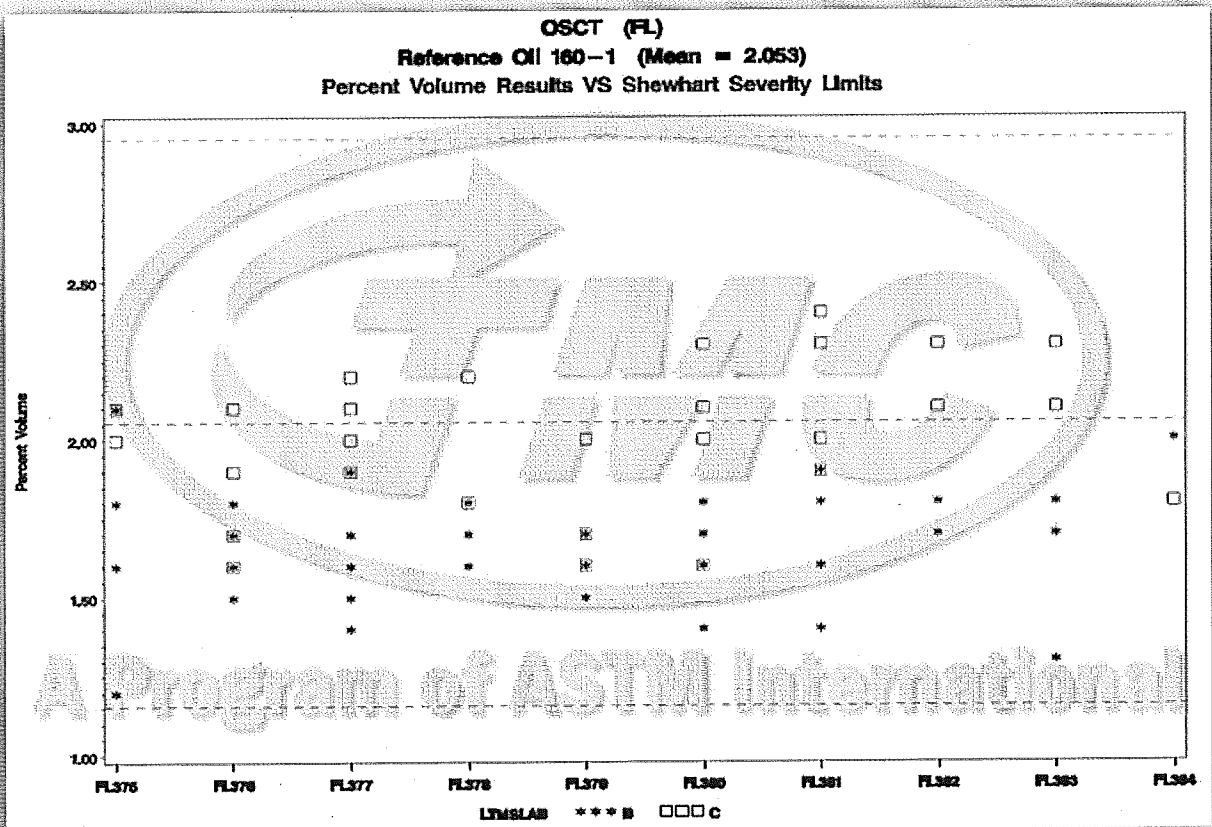
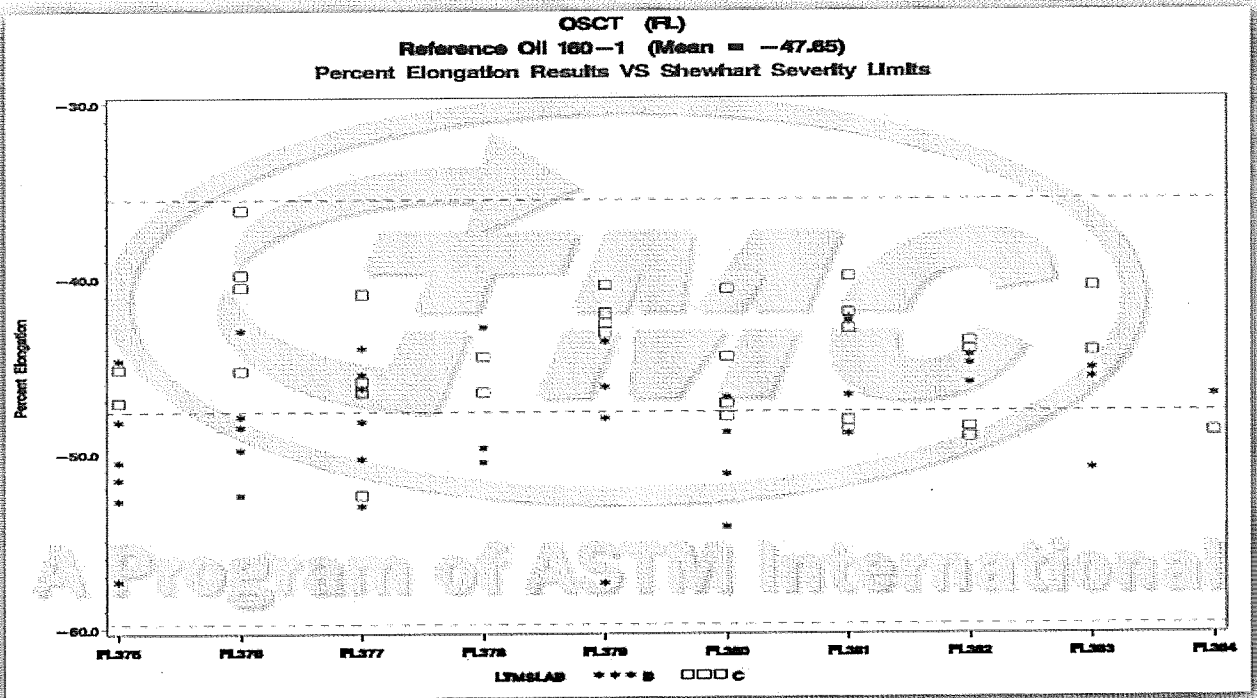
Meeting adjourned at 2:14 pm on 2/8/2012.

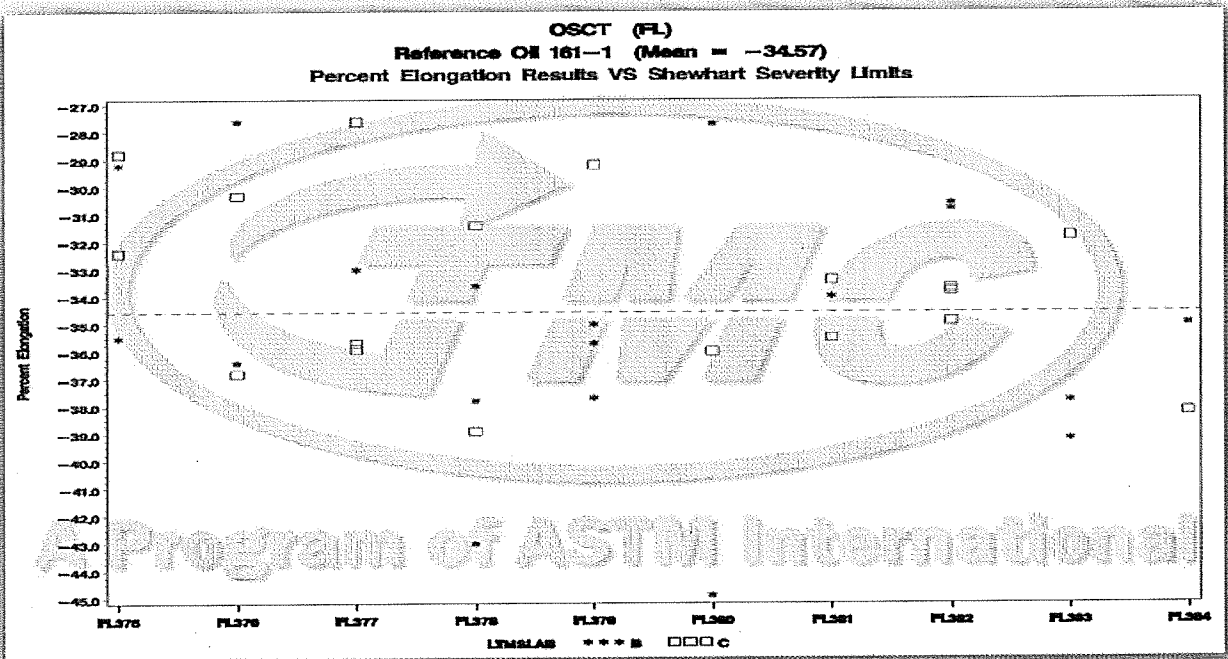
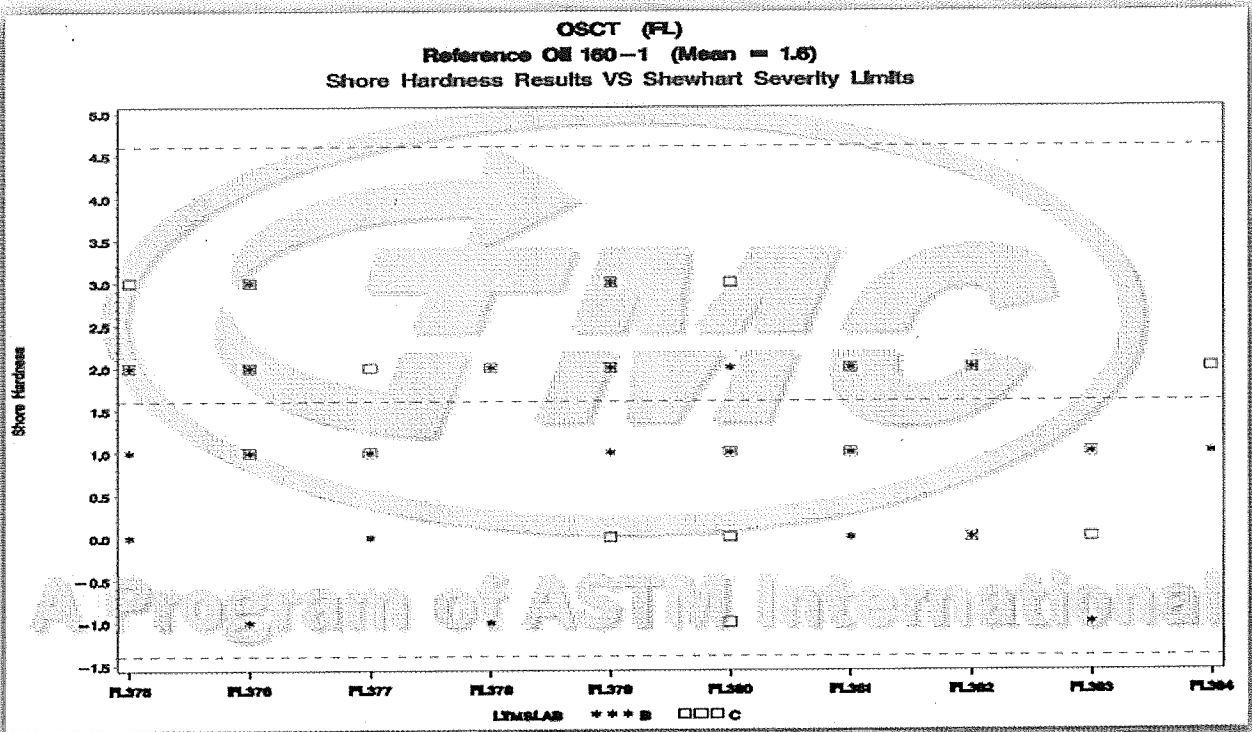
Appendix

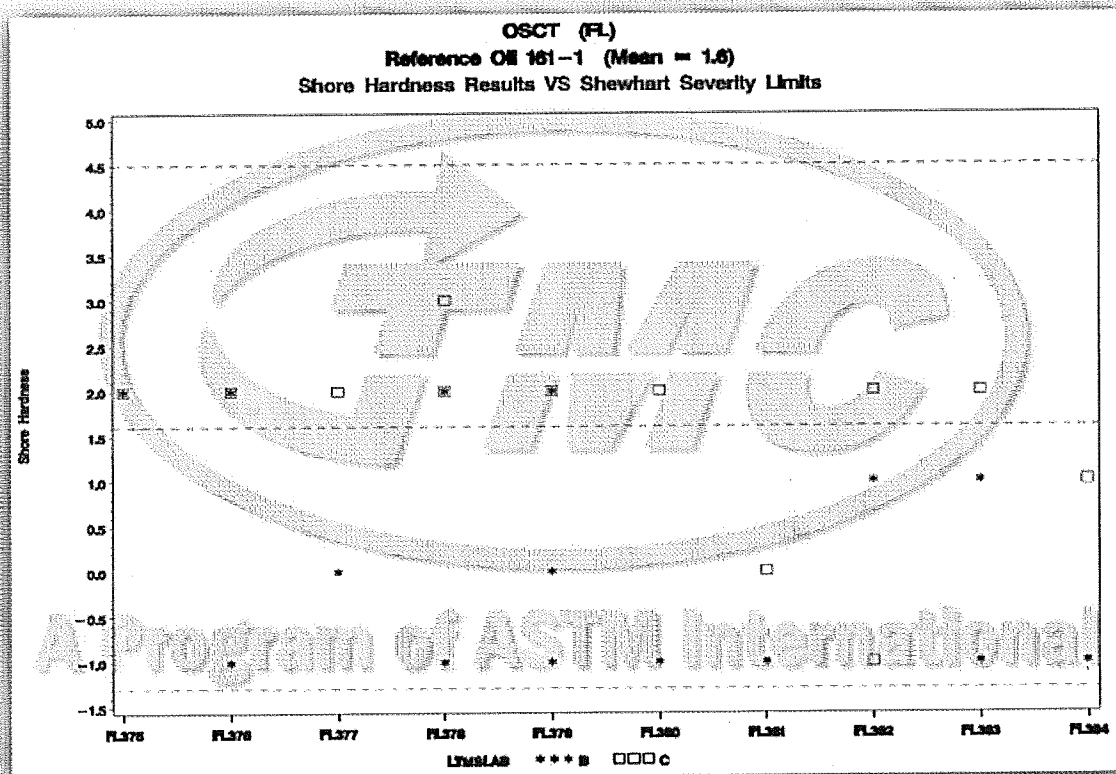
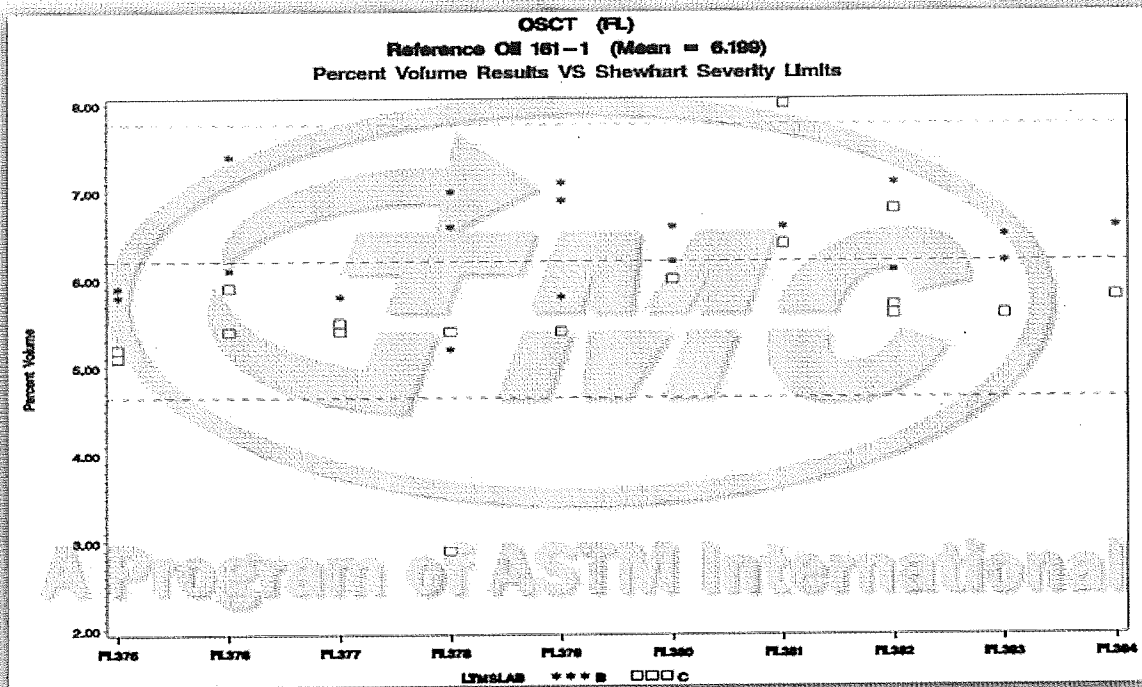
OSCT Surveillance Panel Meeting

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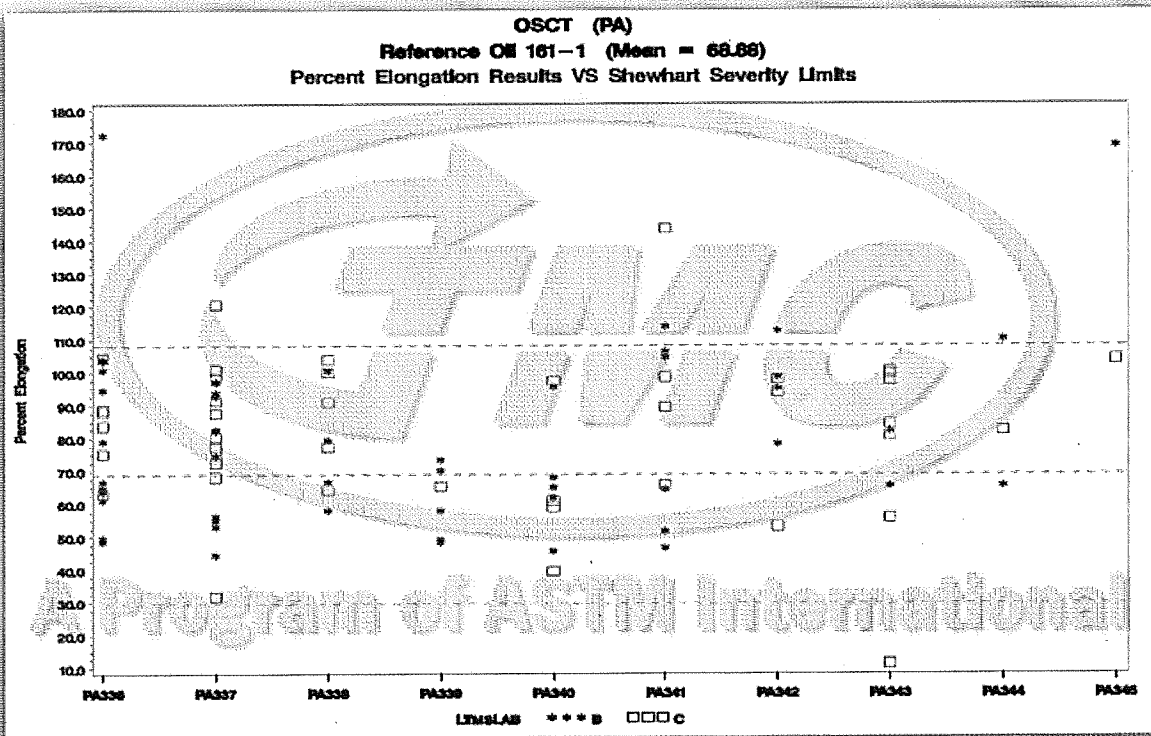
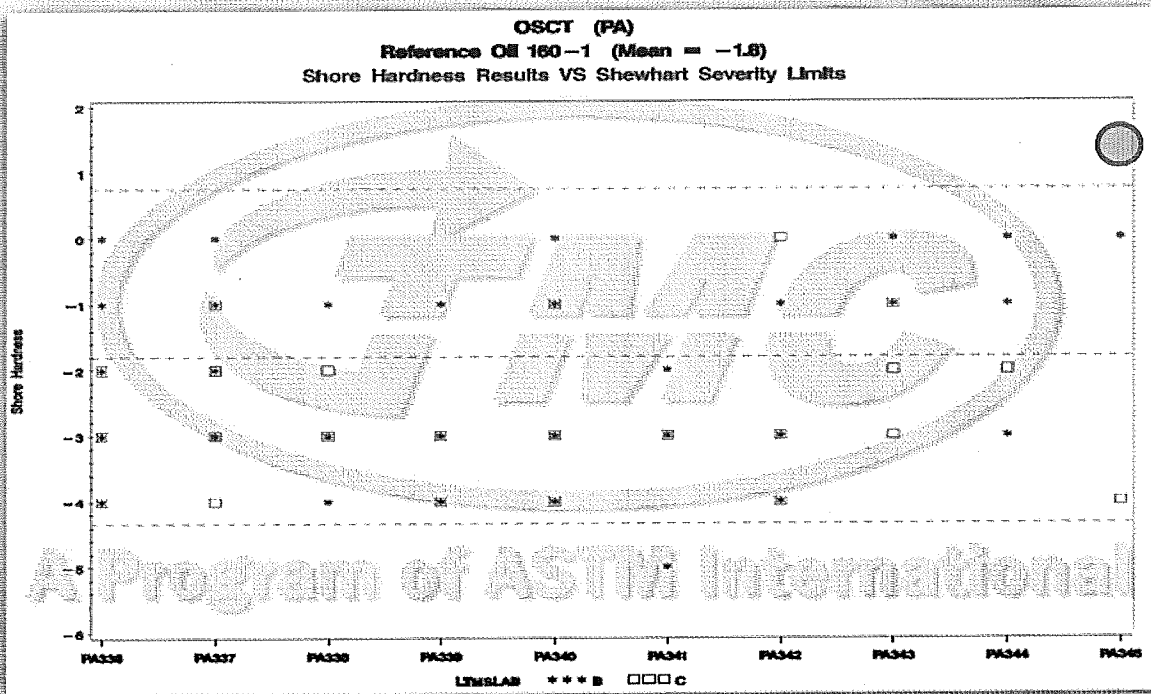
FL384: TMC Reference Oil Data

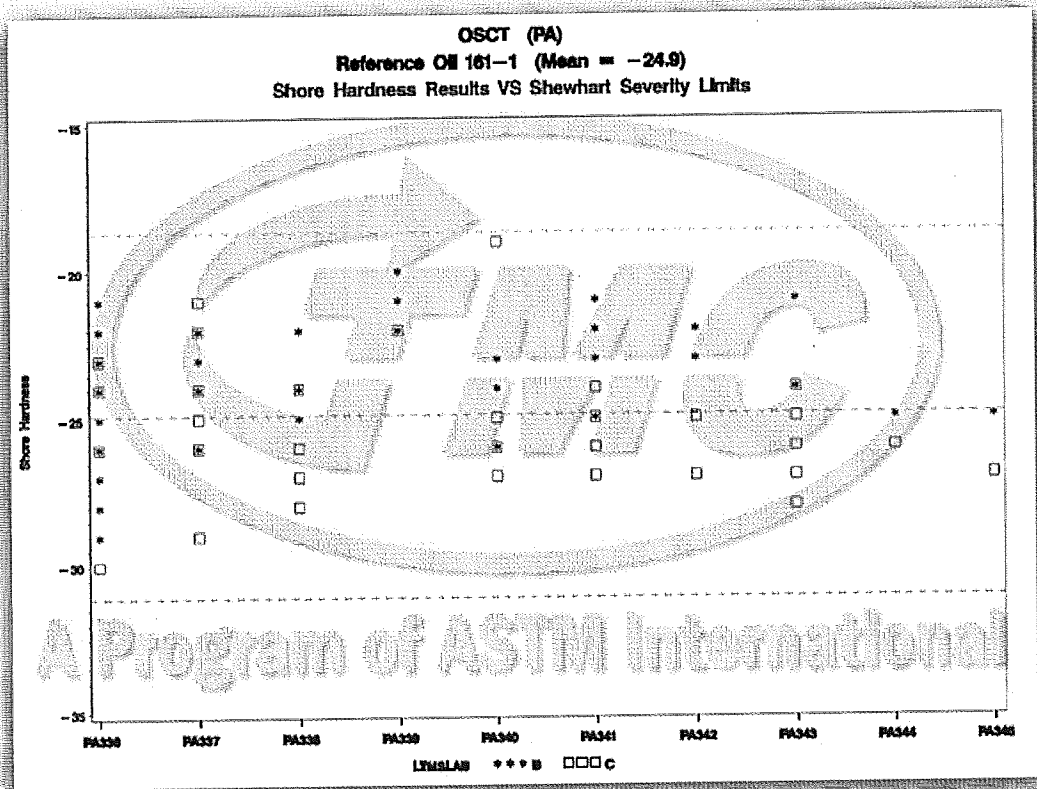
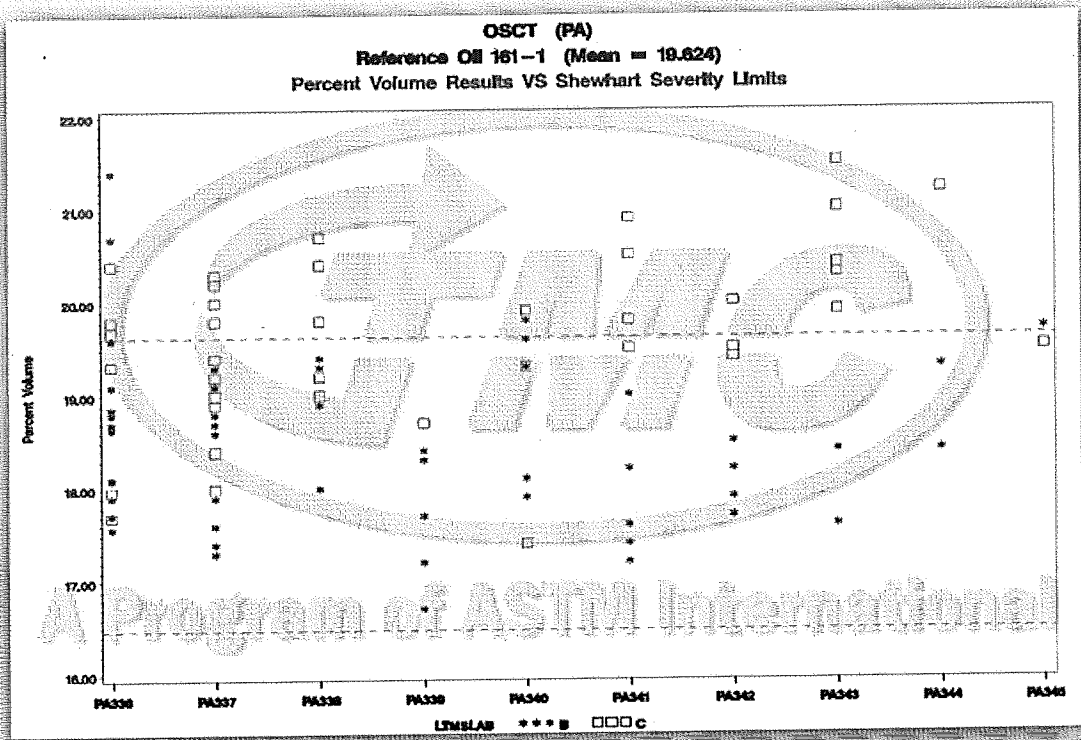




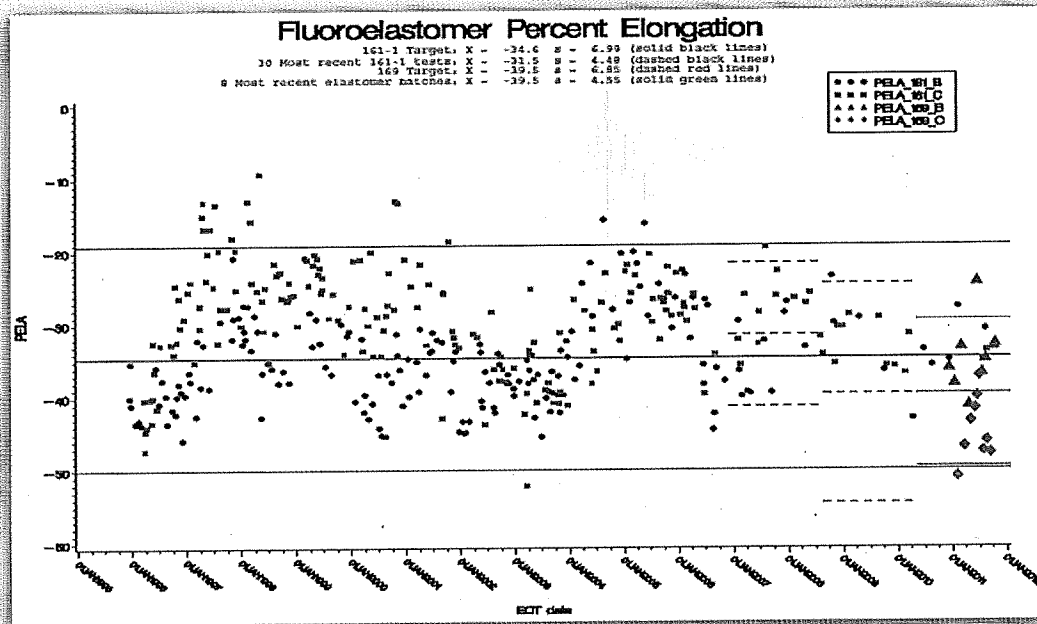
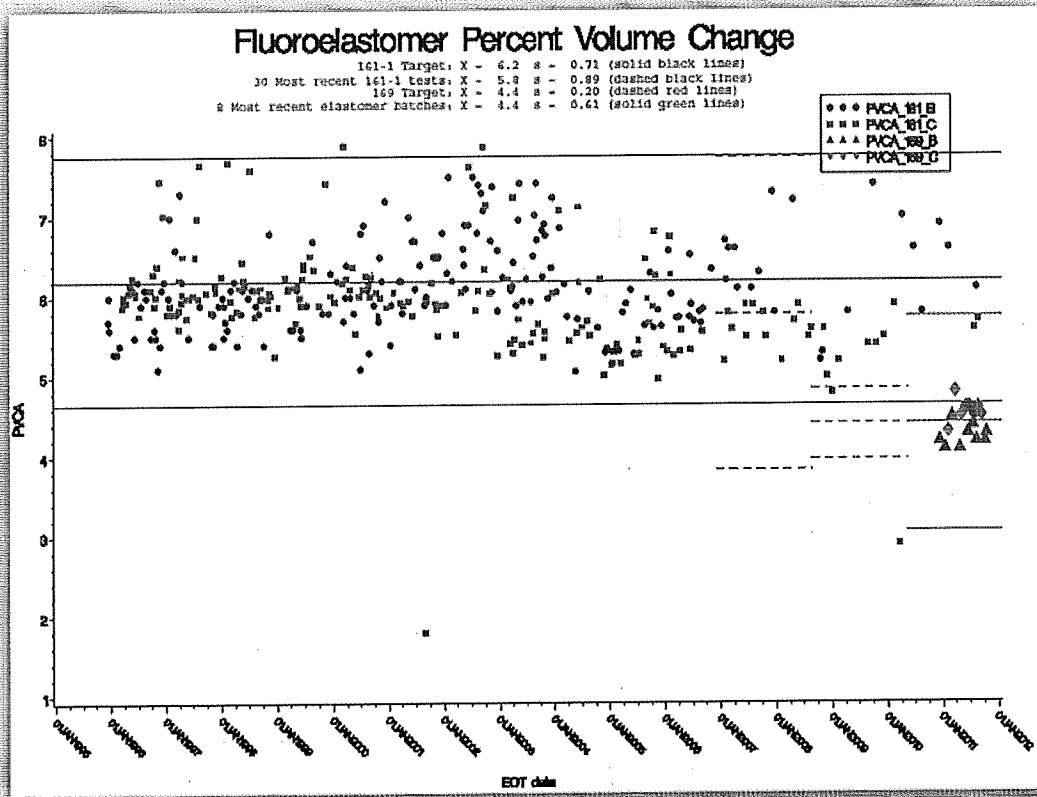


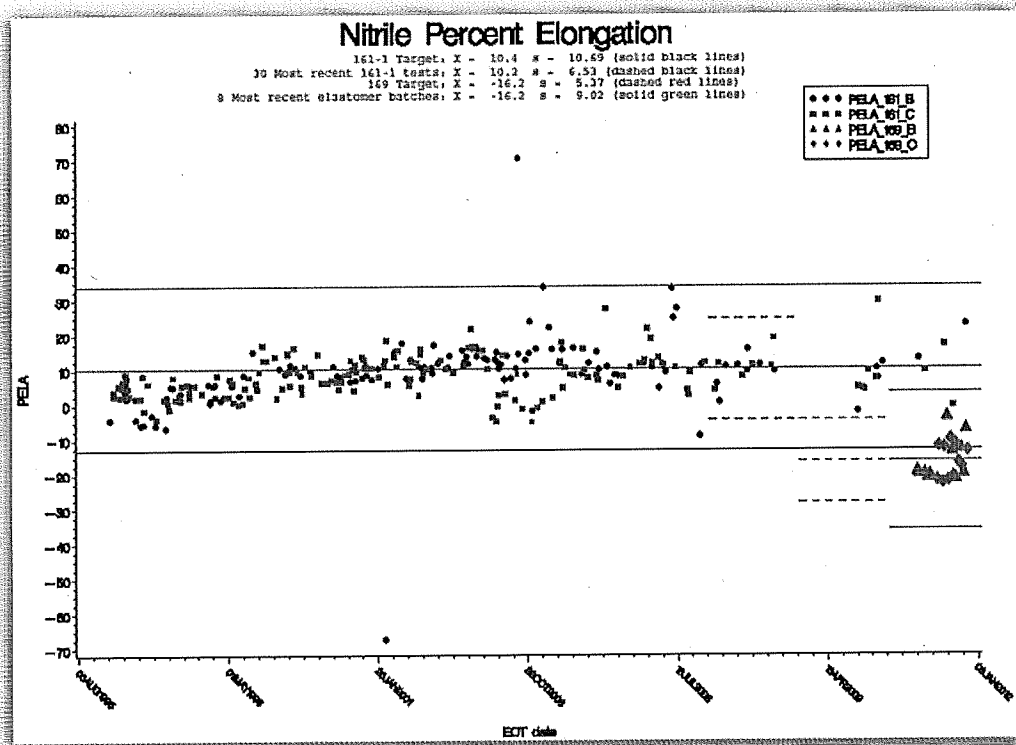
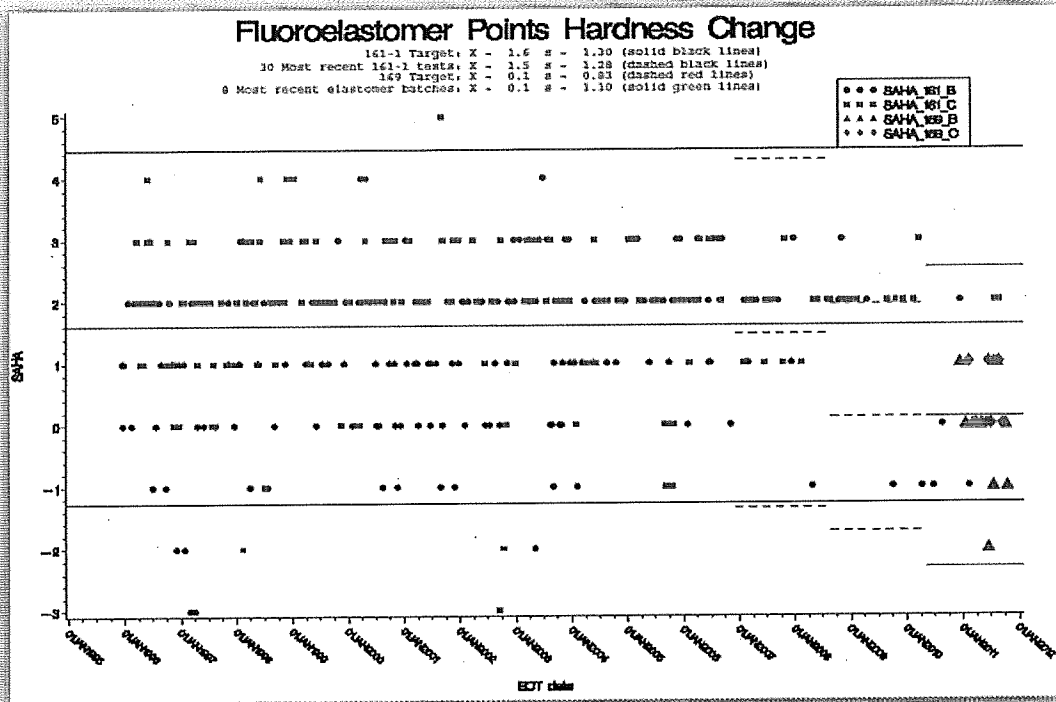
PA345: TMC Reference Oil Data

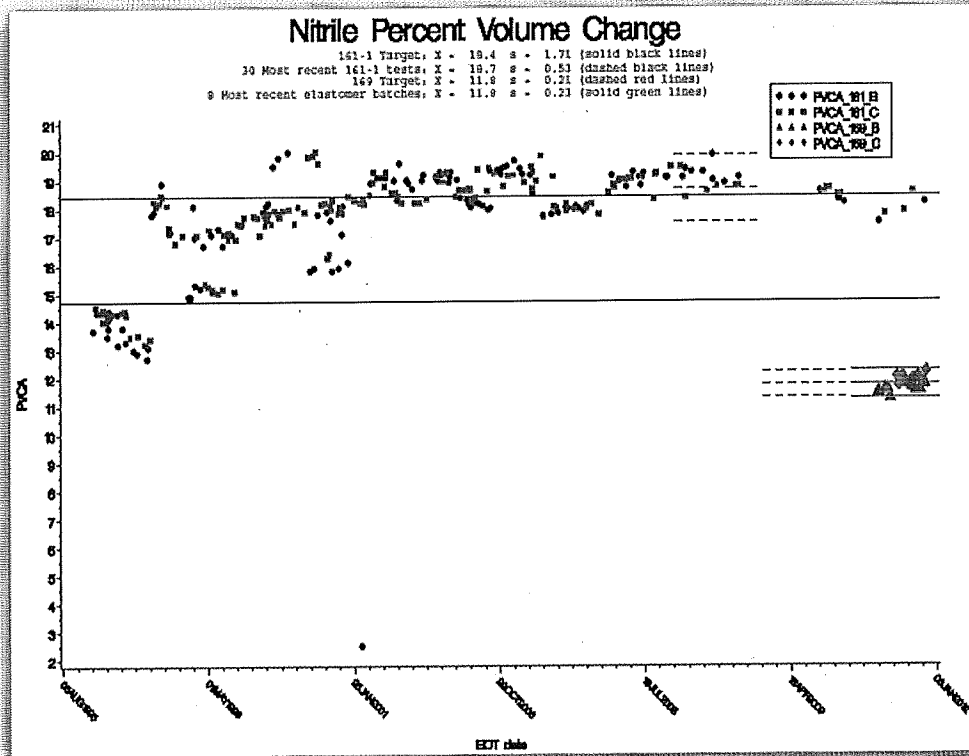
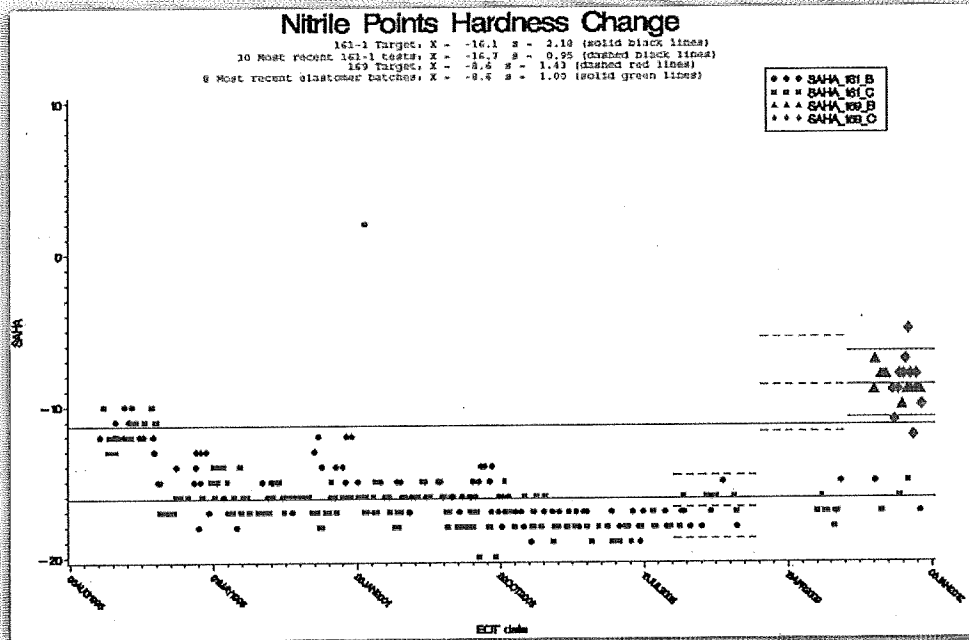


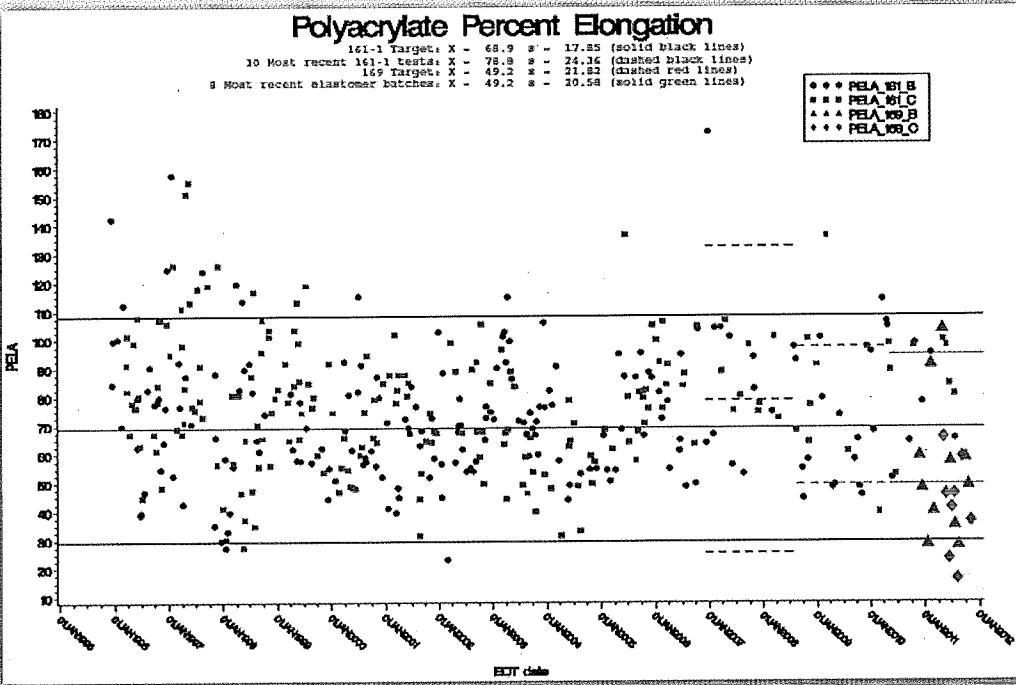
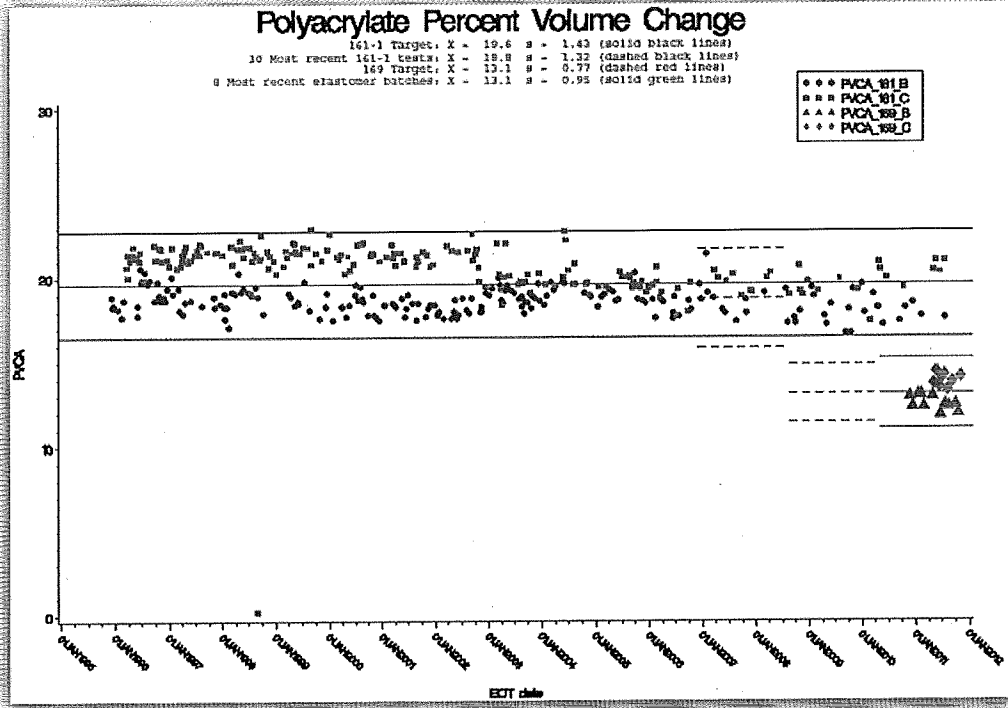


**TMC's Initial Proposed Acceptance
Bands for TMC 169**





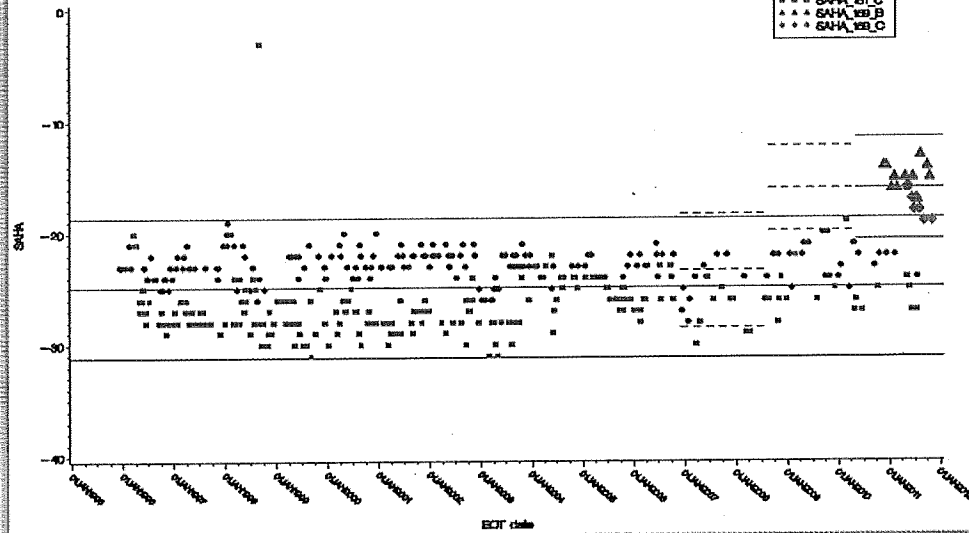




Polyacrylate Points Hardness Change

161-1 Target: $\bar{X} = -24.9$ $s = 2.83$ (solid black lines)
 10 Most recent 161-1 tests: $\bar{X} = -23.4$ $s = 2.31$ (dashed black lines)
 169 Target: $\bar{X} = -16.0$ $s = 1.73$ (dashed red lines)
 8 Most recent elastomer batches: $\bar{X} = -16.0$ $s = 2.08$ (solid green lines)

* * * SAHA_161_B
 * * * SAHA_161_C
 * * * SAHA_169_B
 * * * SAHA_169_C



Introduction of TMC 169

Comparison of Acceptance Bands for Fluoroelastomer

<u>Oil</u>	<u>Elastomer</u>	<u>Test Parameter</u>	<u>Origin of Standard Deviation</u>	<u>Standard Deviation</u>	<u>Width of Acceptance Band</u>
TMC 161	FL	Elongation change	Current TMC 161 targets	6.99	30.76
TMC 169	FL	Elongation change	Targets proposed by TMC	6.85	30.14
2% reduction in width of acceptance band					
TMC 161	FL	Volume change	Current TMC 161 targets	0.71	3.12
TMC 169	FL	Volume change	Targets proposed by TMC	0.29	0.88
72% reduction in width of acceptance band					
TMC 161	FL	Hardness change	Current TMC 161 targets	1.30	5.72
TMC 169	FL	Hardness change	Targets proposed by TMC	0.83	3.65
36% reduction in width of acceptance band					

Introduction of TMC 169

Comparison of Acceptance Bands for Polyacrylate

<u>Oil</u>	<u>Elastomer</u>	<u>Test Parameter</u>	<u>Origin of Standard Deviation</u>	<u>Standard Deviation</u>	<u>Width of Acceptance Band</u>
TMC 161	PA	Elongation change	Current TMC 161 targets	17.85	78.54
TMC 169	PA	Elongation change	Targets proposed by TMC	21.82	96.00
No reduction in width of acceptance band					
TMC 161	PA	Volume change	Current TMC 161 targets	1.43	6.30
TMC 169	PA	Volume change	Targets proposed by TMC	0.77	3.39
46% reduction in width of acceptance band					
TMC 161	PA	Hardness change	Current TMC 161 targets	2.83	12.46
TMC 169	PA	Hardness change	Targets proposed by TMC	1.73	7.61
39% reduction in width of acceptance band					

Introduction of TMC 169

Comparison of Acceptance Bands for Nitrile

<u>CH</u>	<u>Elastomer</u>	<u>Test Parameter</u>	<u>Origin of Standard Deviation</u>	<u>Standard Deviation</u>	<u>Width of Acceptance Band</u>
TMC 161	NI	Elongation change	Current TMC 161 targets	10.09	47.04
TMC 169	NI	Elongation change	Targets proposed by TMC	5.37	23.63
				50% reduction in width of acceptance band	
TMC 161	NI	Volume change	Current TMC 161 targets	1.70	7.46
TMC 169	NI	Volume change	Targets proposed by TMC	0.21	0.92
				81% reduction in width of acceptance band	
TMC 161	NI	Hardness change	Current TMC 161 targets	2.16	9.59
TMC 169	NI	Hardness change	Targets proposed by TMC	1.43	6.29
				34% reduction in width of acceptance band	

OIL SEAL COMPATIBILITY SURVEILLANCE PANEL

Date: Feb. 8, 2012

Initials	V = Voting NV = Non-voting	Name	Company & Address	Phone / FAX / e-Mail
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OIL SEAL COMPATIBILITY SURVEILLANCE PANEL

Date: _____

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