



Test Monitoring Center

Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>
412-365-1000

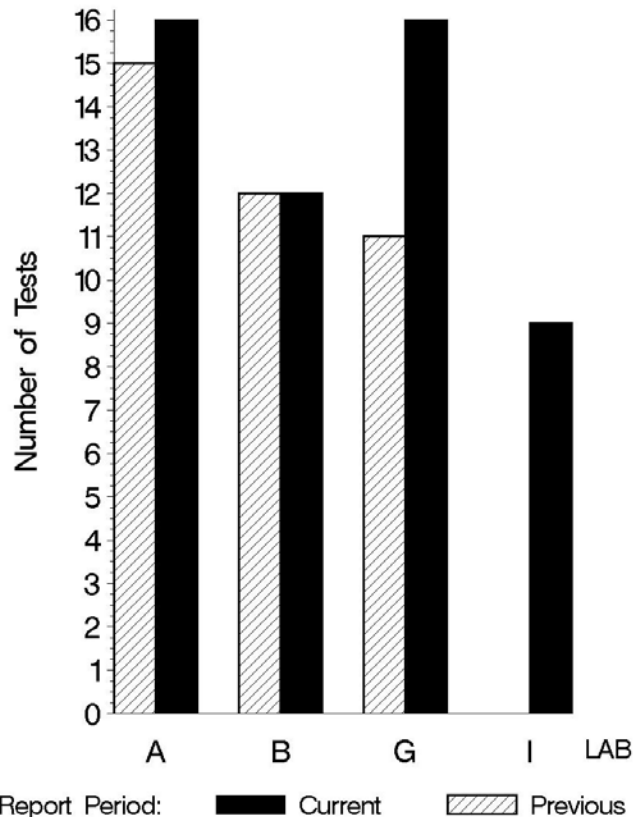
MEMORANDUM: 12-042
DATE: November 28, 2012
TO: Mike Birke,
Chairman, Engine Oil Elastomer Compatibility Surveillance Panel
FROM: Michael T. Kasimirsky *Michael T. Kasimirsky*
SUBJECT: EOEC Testing from April 1, 2012 through September 30, 2012

A total of 253 EOEC tests were reported to the Test Monitoring Center during the period from April 1, 2012 through September 30, 2012. Following is a summary of testing activity this period.

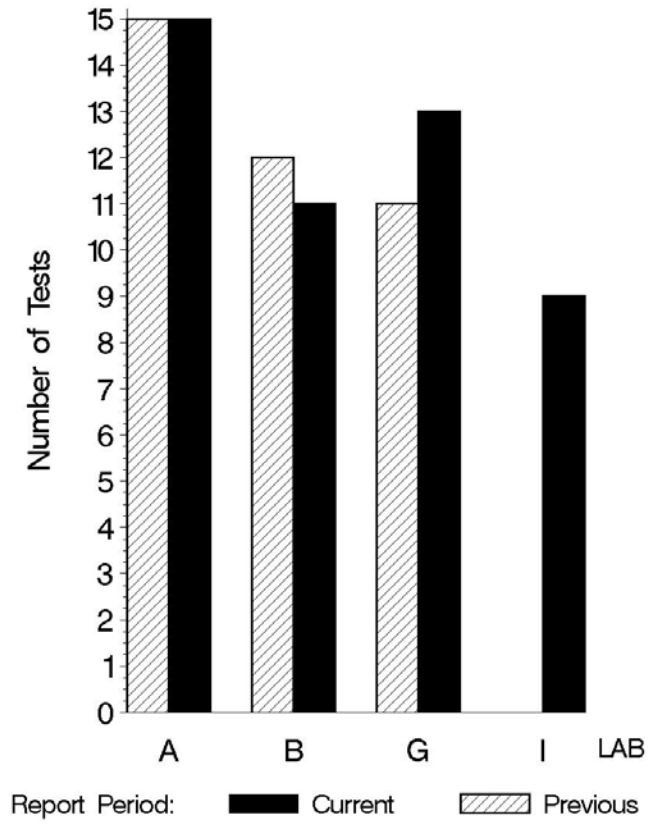
	Reporting Data
Number of Labs	4

Tests reported this period were distributed as shown below:

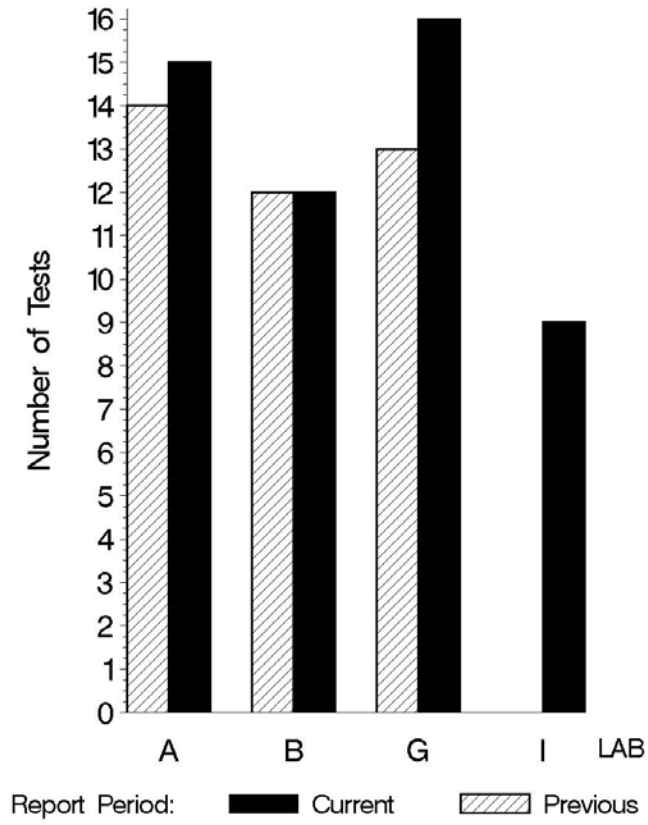
NUMBER OF FLUOROELASTOMER TESTS REPORTED BY LAB AND REPORT PERIOD



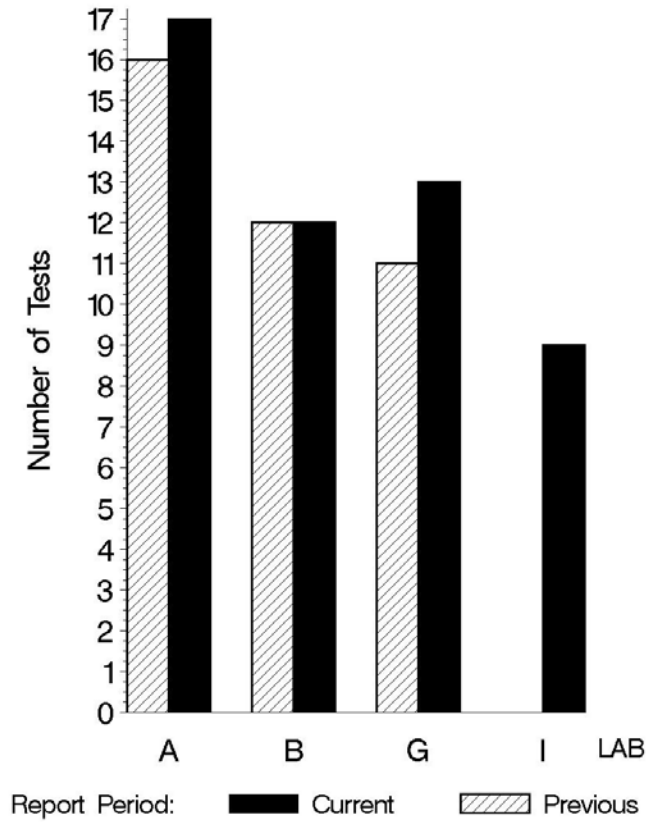
NUMBER OF NITRILE TESTS REPORTED BY LAB AND REPORT PERIOD



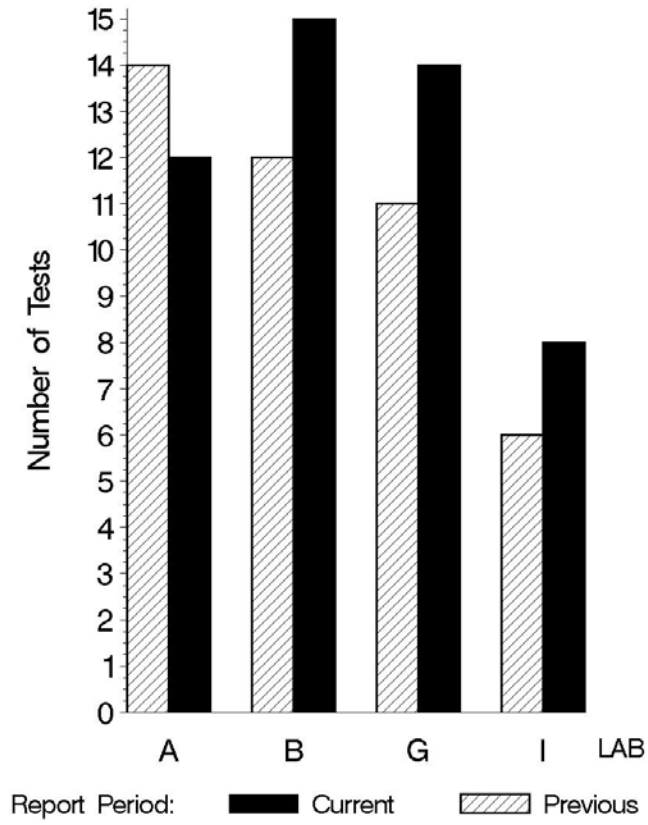
NUMBER OF POLYACRYLATE TESTS REPORTED BY LAB AND REPORT PERIOD



NUMBER OF SILICONE TESTS REPORTED BY LAB AND REPORT PERIOD



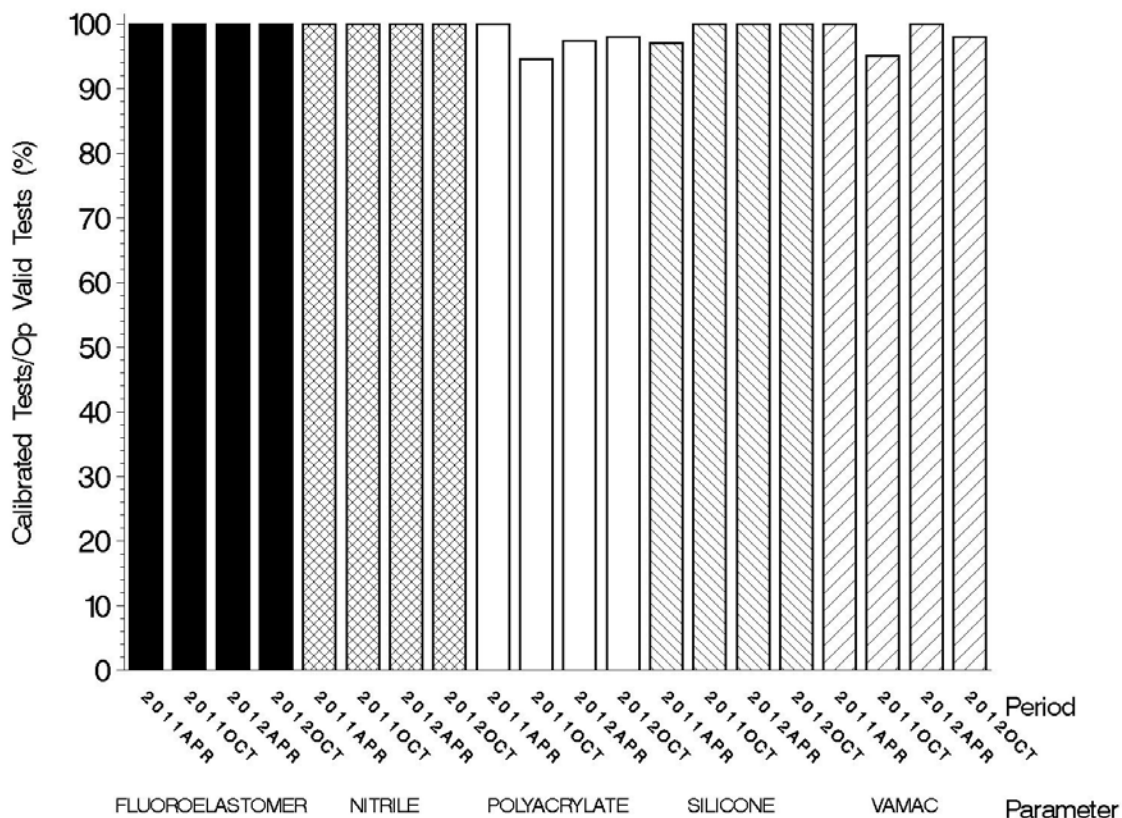
NUMBER OF VAMAC TESTS REPORTED BY LAB AND REPORT PERIOD



Test Distribution by Oil and Validity

							Totals	
		Fluoroelastomer	Nitrile	Polyacrylate	Silicone	Vamac	This Period	Last Period
Accepted for Calibration	AC	53	48	49	47	48	245	195
Rejected	OC	0	0	1	0	1	2	1
Information Run (not for calibration)	NI	0	0	0	4	0	4	0
Operationally Invalid (lab)	LC	0	0	1	0	0	1	0
Operationally Invalid (lab/TMC)	RC	0	0	0	0	0	0	0
Aborted Calibration	XC	0	0	1	0	0	1	0
Total		53	48	52	51	49	253	196

**OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA**



The above chart shows the percentage of accepted operationally valid tests. This period two tests failed to meet the acceptance criteria.

Lost Tests per Start by Lab and Elastomer Type

Lab	Fluoroelastomer			Nitrile			Polyacrylate			Silicone			Vamac			Total		
	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%
A	0	16	0	0	15	0	1	15	7	0	17	0	0	12	0	1	75	1
B	0	12	0	0	11	0	0	12	0	0	12	0	0	15	0	0	62	0
G	0	16	0	0	13	0	1	16	6	0	13	0	0	14	0	1	72	1
I	0	9	0	0	9	0	0	9	0	0	9	0	0	8	0	0	44	0
Total	0	53	0	0	48	0	2	52	4	0	51	0	0	49	0	2	253	1

Lost tests are those that were aborted or operationally invalid.

Causes for Lost Tests

Lab		Cause		Elastomer					Validity			Loss Rate		
				Fluoroelastomer	Nitrile	Polyacrylate	Silicone	VAMAC	LC	RC	XC	Lost	Starts	%
A		Data Collection Error			●					●	1	253	1	
G		Wrong Material Run			●			●			1	253	1	
		Lost	0	0	2	0	0	1	0	1				
		Starts	53	48	52	51	49	253	253	253				
		%	0	0	4	0	0	0.4	0	0.4				

Average Δ /s by Lab						
Elastomer	Lab	n	VOLCYI	HARDYI	TENSYI	ELONYI
Fluoroelastomer	A	16	0.118	0.290	-0.594	-0.750
	B	12	-0.715	0.356	0.010	-0.451
	G	16	-0.169	-0.506	0.251	-0.394
	I	9	0.638	0.116	0.135	-0.285
	Industry	53	-0.069	0.035	-0.078	-0.496
Nitrile	A	15	1.430	1.392	0.153	-0.476
	B	11	1.359	1.676	-0.237	-0.128
	G	13	1.286	1.447	-0.669	-1.183
	I	9	2.397	1.065	-0.278	-0.853
	Industry	48	1.556	1.411	-0.240	-0.658
Polyacrylate	A	14	0.578	0.244	-0.539	0.908
	B	12	0.851	0.376	0.019	1.124
	G	15	0.315	1.320	0.116	1.109
	I	9	1.687	0.654	-1.167	-0.271
	Industry	50	0.764	0.672	-0.322	0.808
Silicone	A	13	-1.038	-0.059	-0.384	0.762
	B	12	0.947	-0.083	-0.416	1.101
	G	13	1.654	1.287	-0.827	0.039
	I	9	0.640	-0.419	-1.676	-0.233
	Industry	47	0.535	0.238	-0.762	0.458
VAMAC	A	12	1.256	-1.747	1.524	0.330
	B	15	1.478	-2.011	1.557	0.431
	G	14	1.585	-0.958	1.399	0.181
	I	8	2.091	-1.616	1.361	-0.417
	Industry	49	1.554	-1.581	1.472	0.196

Individual test results can be viewed at the links shown in the following table:

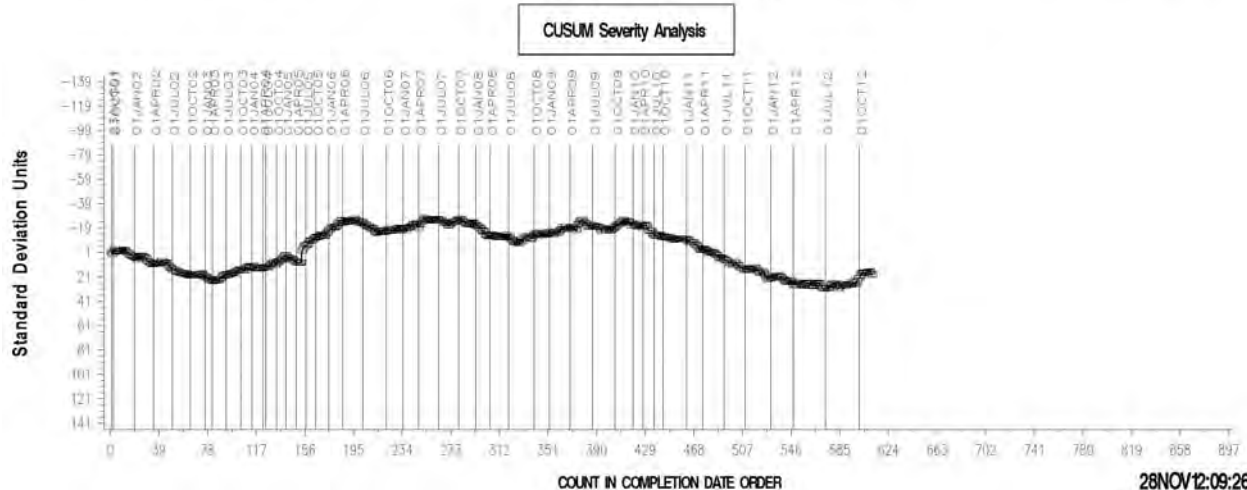
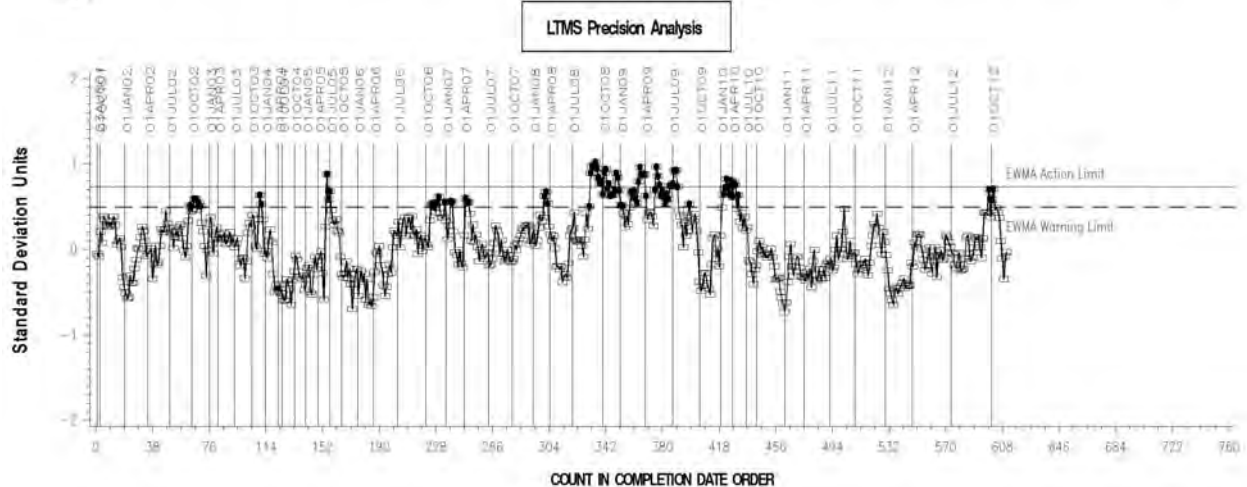
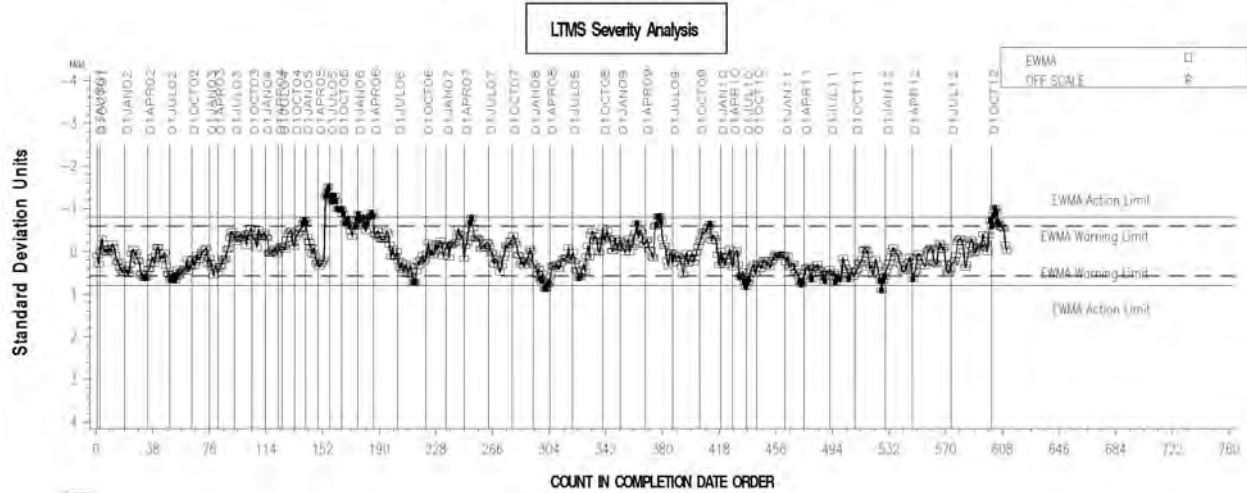
<i>Links to Individual Test Result Data</i>	
Elastomer Type	Web Link to Data
Fluoroelastomer	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eocf/data/
Nitrile	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecn/data/
Polyacrylate	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecp/data/
Silicone	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecs/data/
VAMAC	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecv/data/

LTMS CONTROL CHARTS

EOEC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



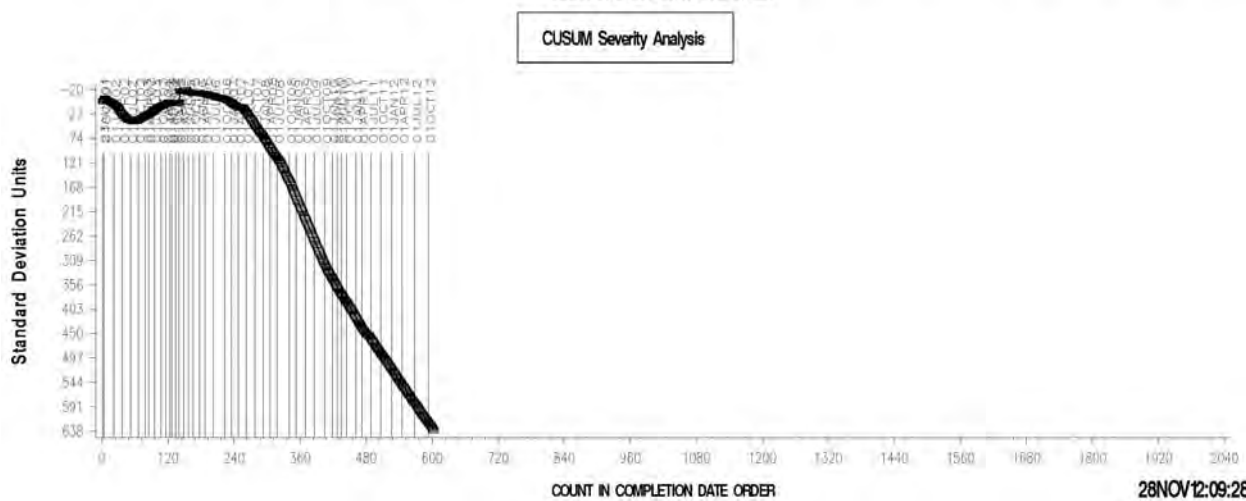
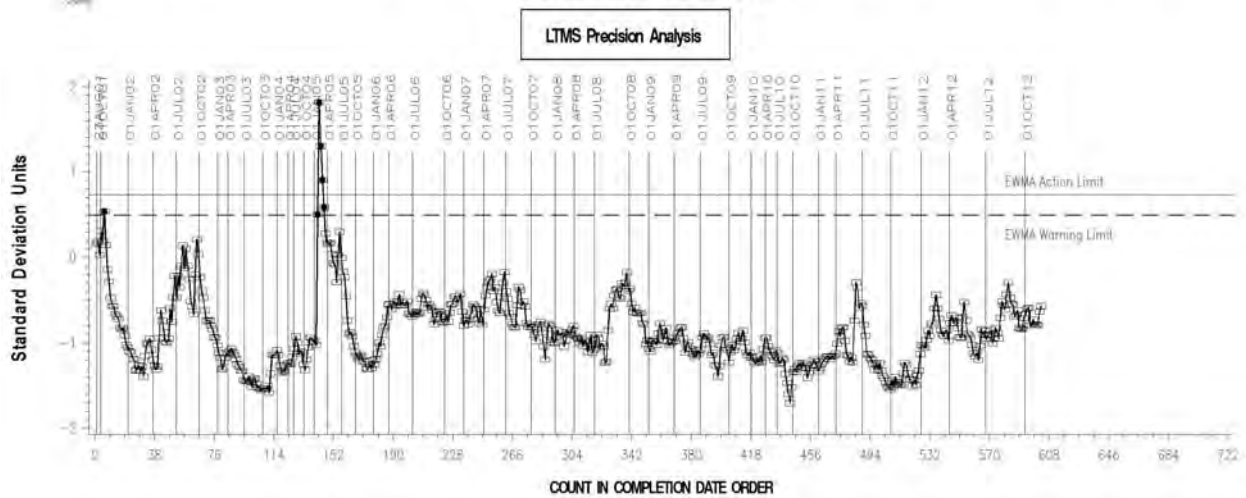
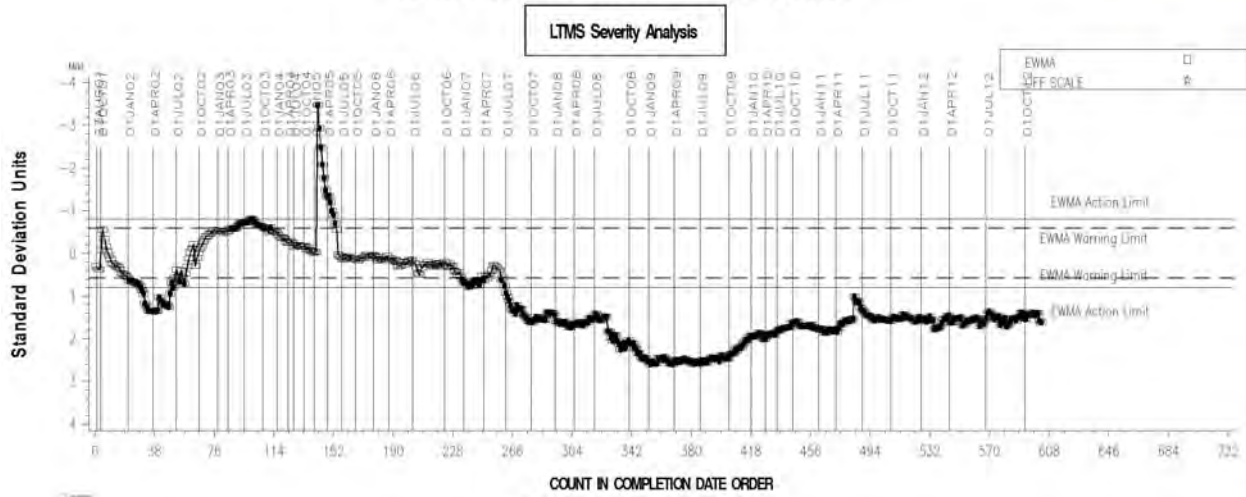
FLUOROELASTOMER VOLUME CHANGE AVG.



EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



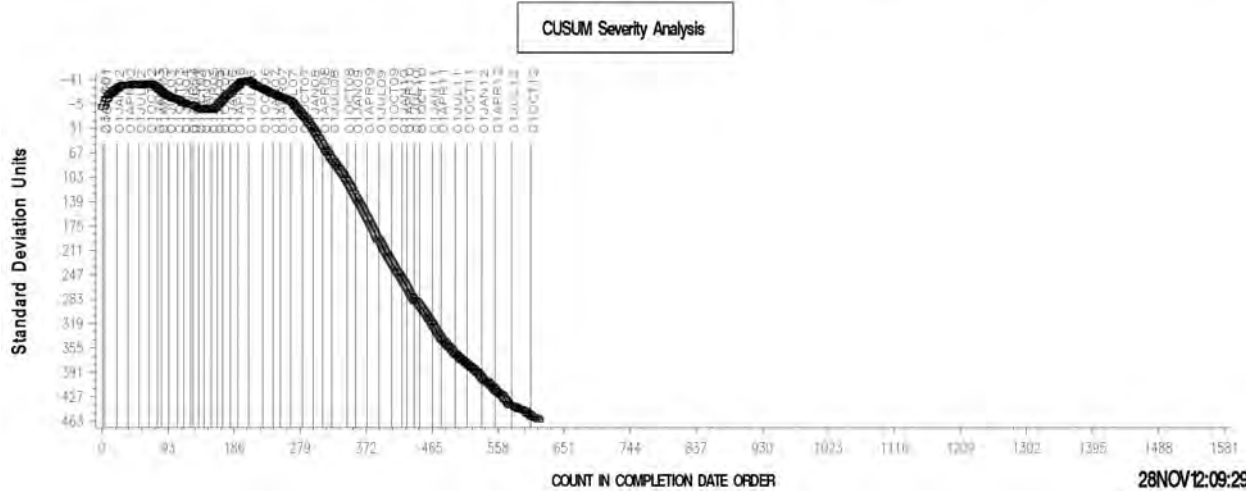
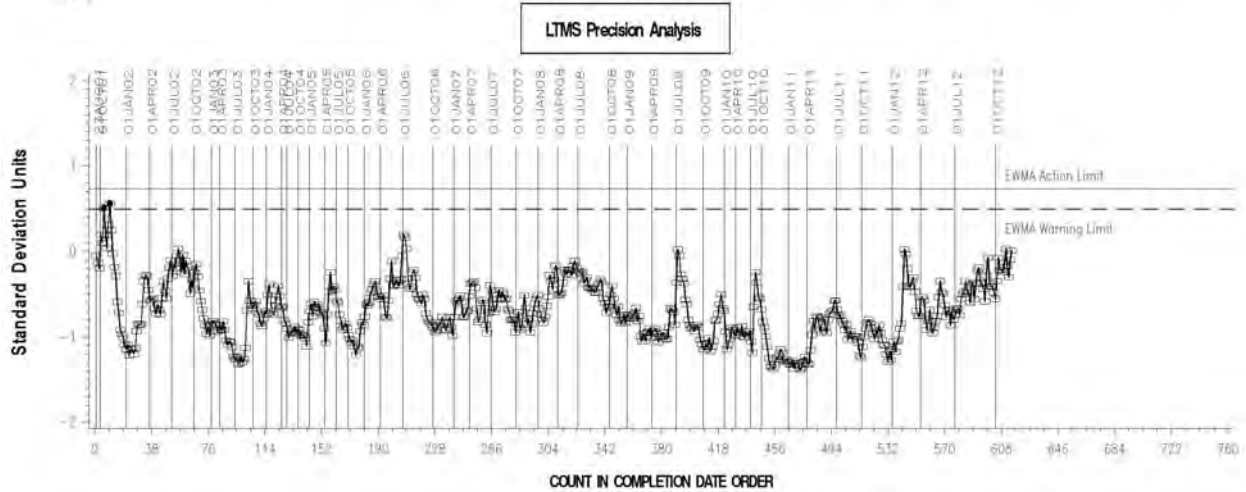
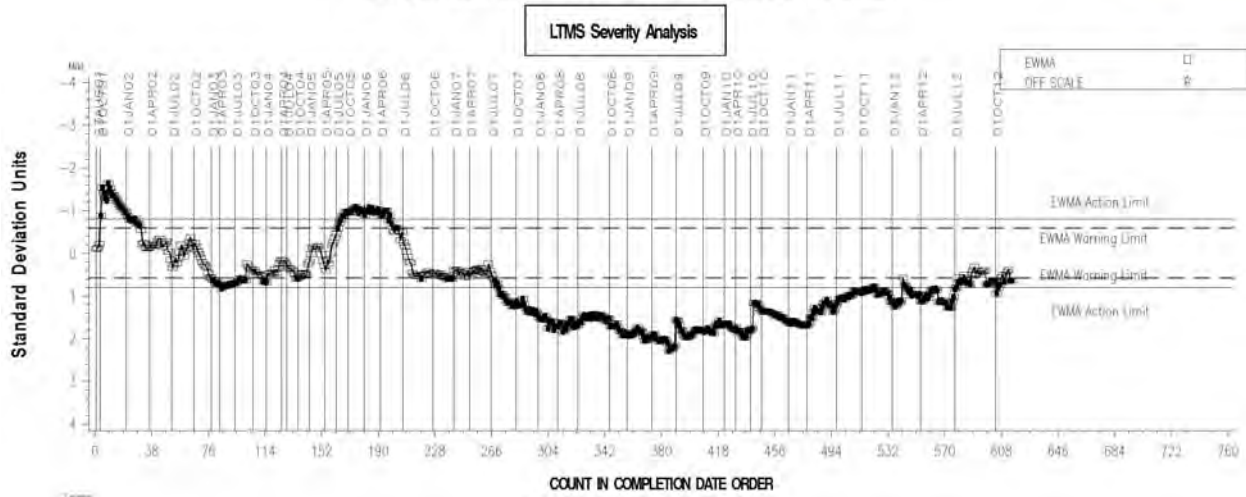
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EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



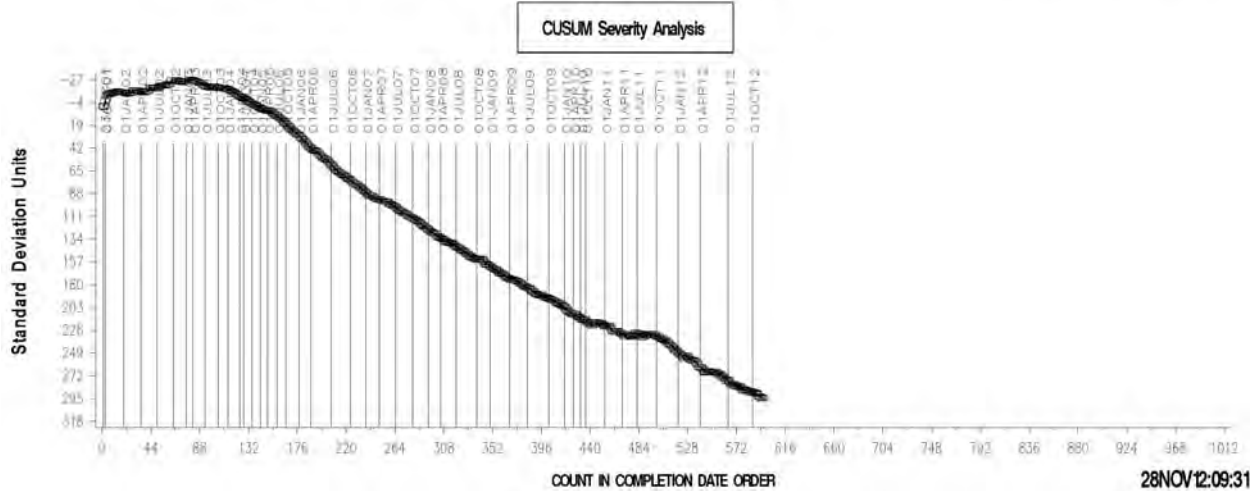
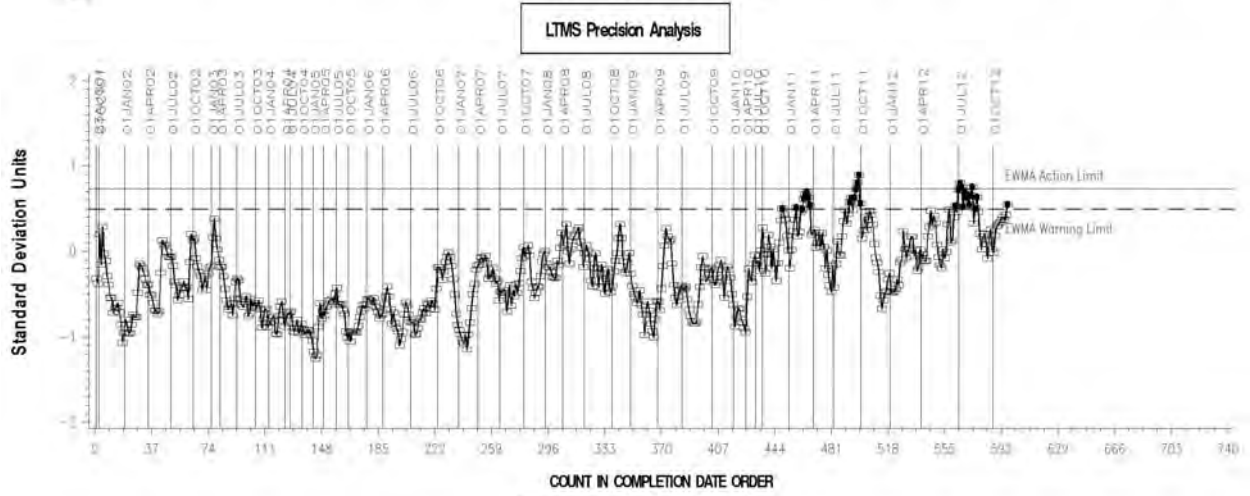
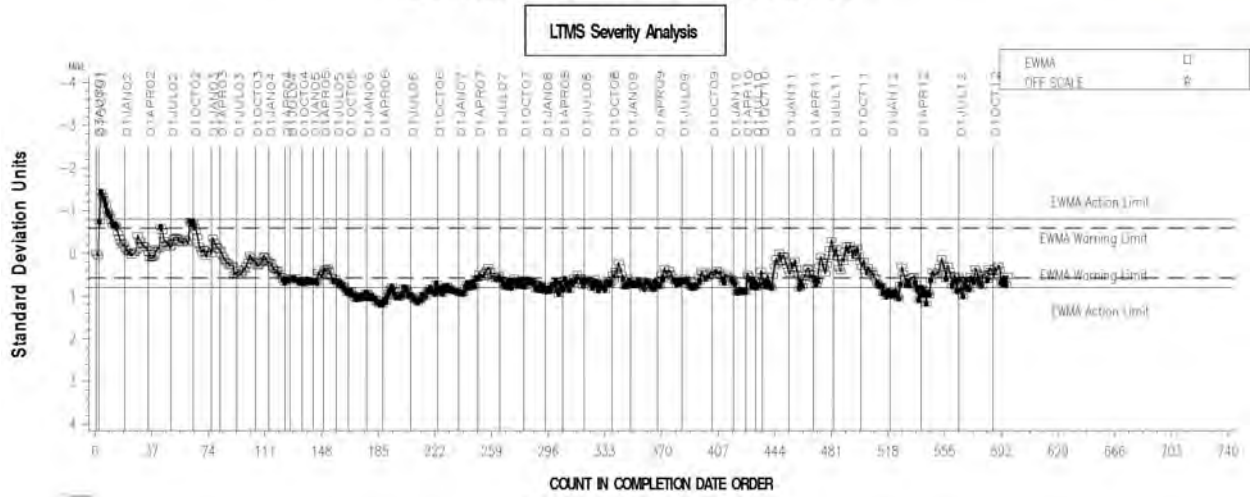
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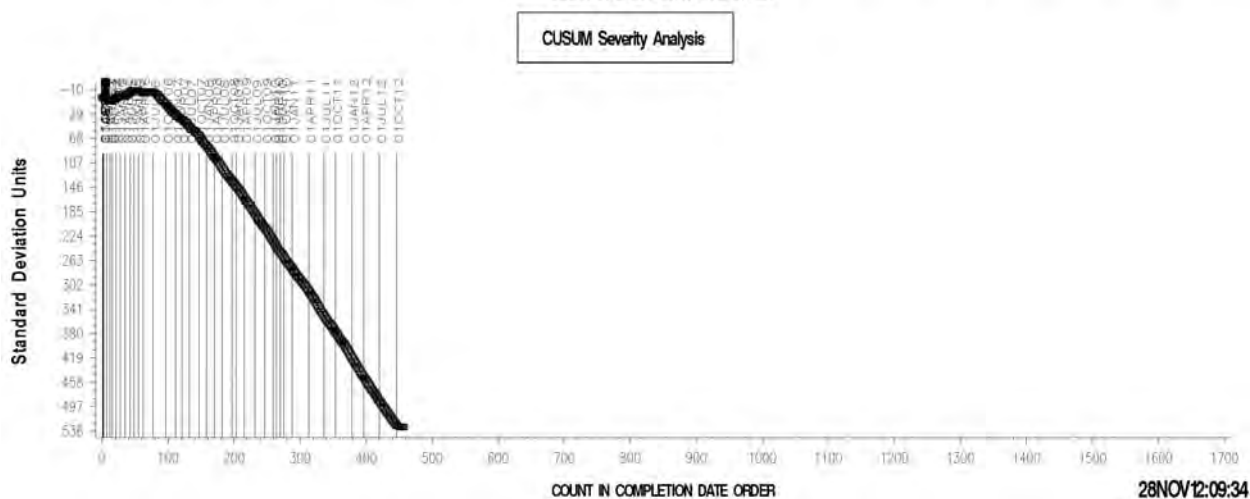
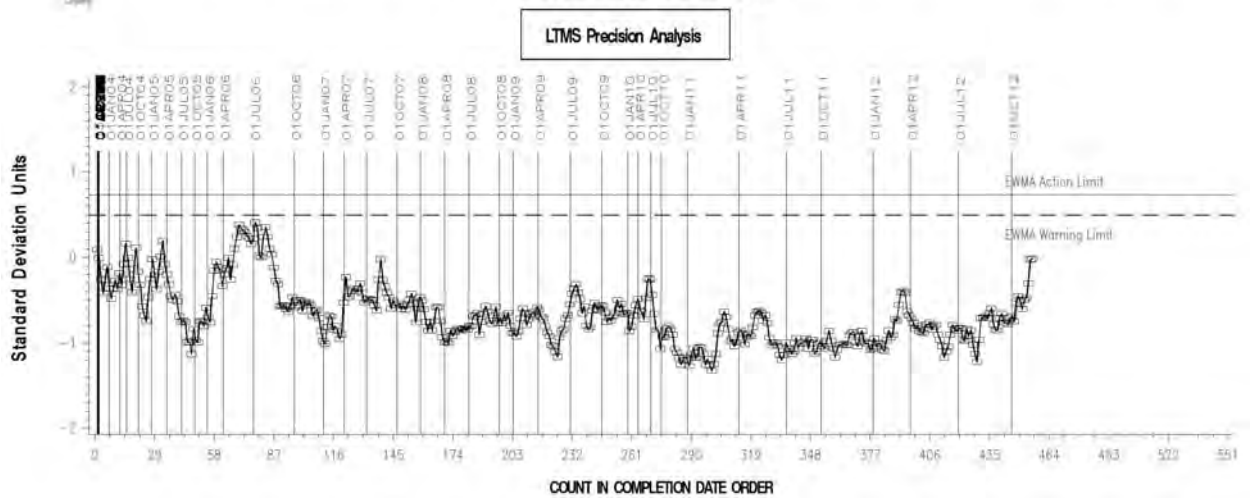
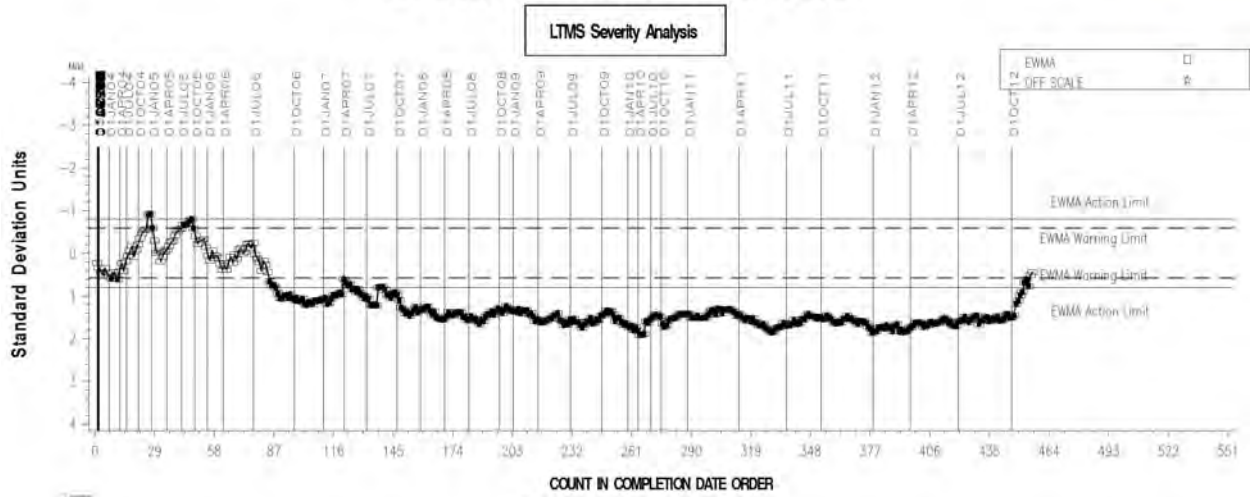
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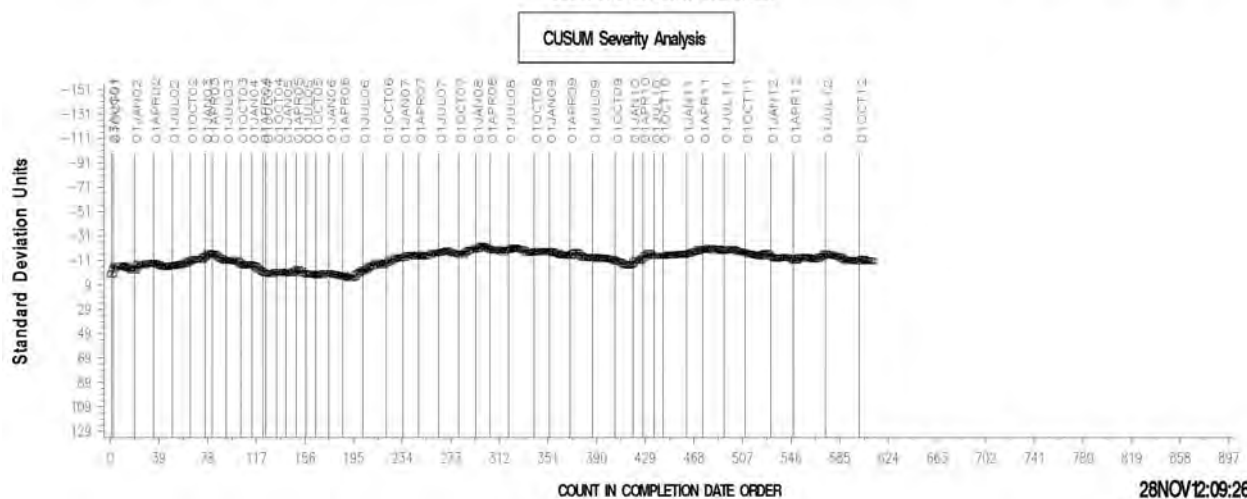
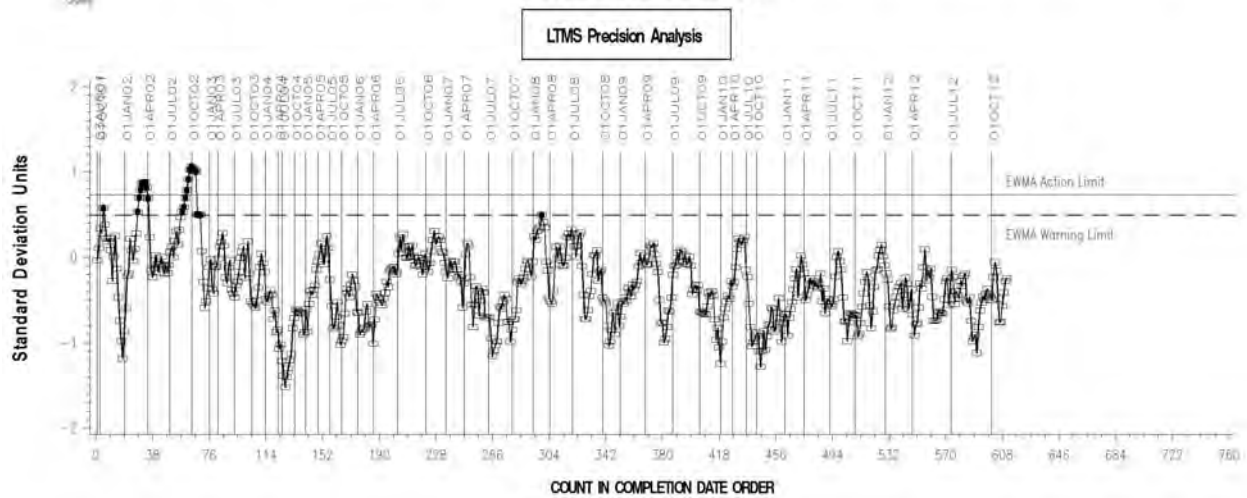
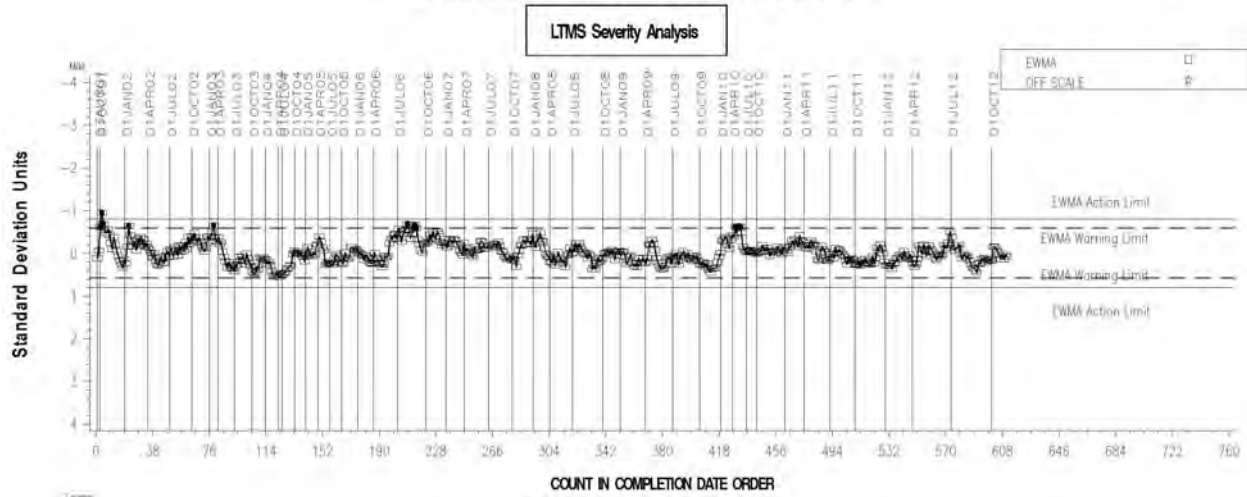
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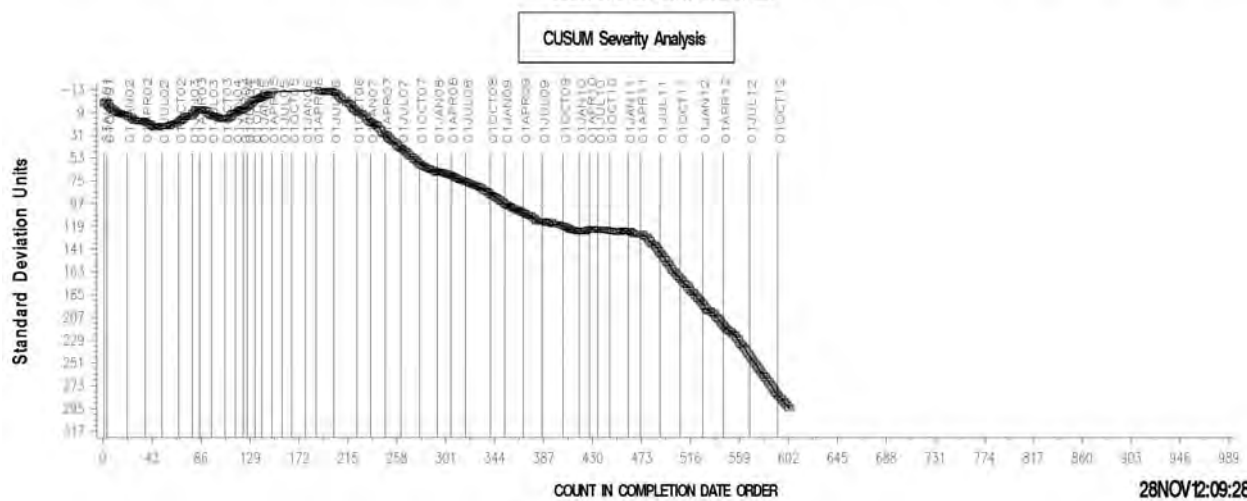
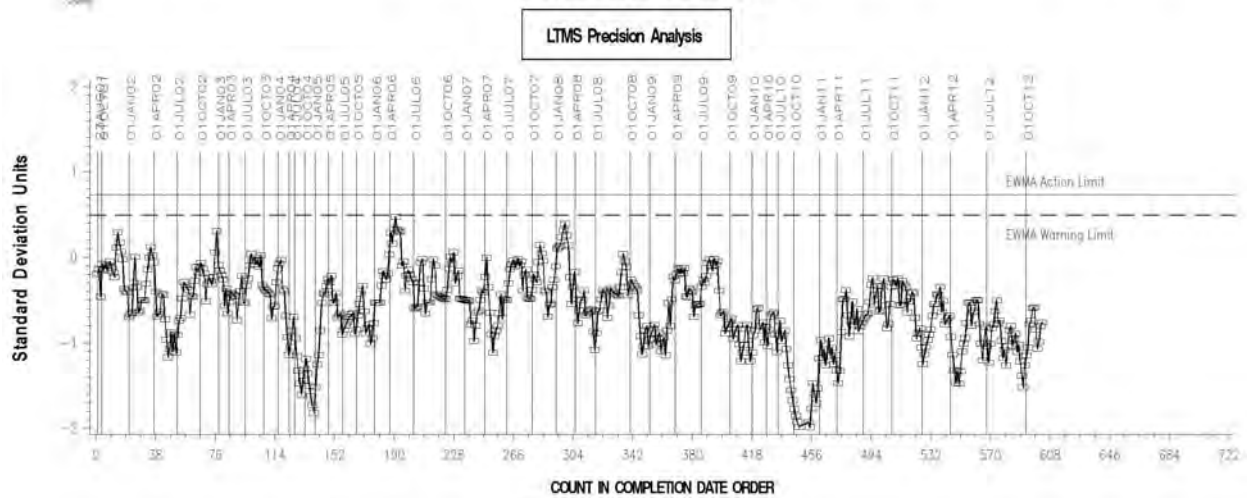
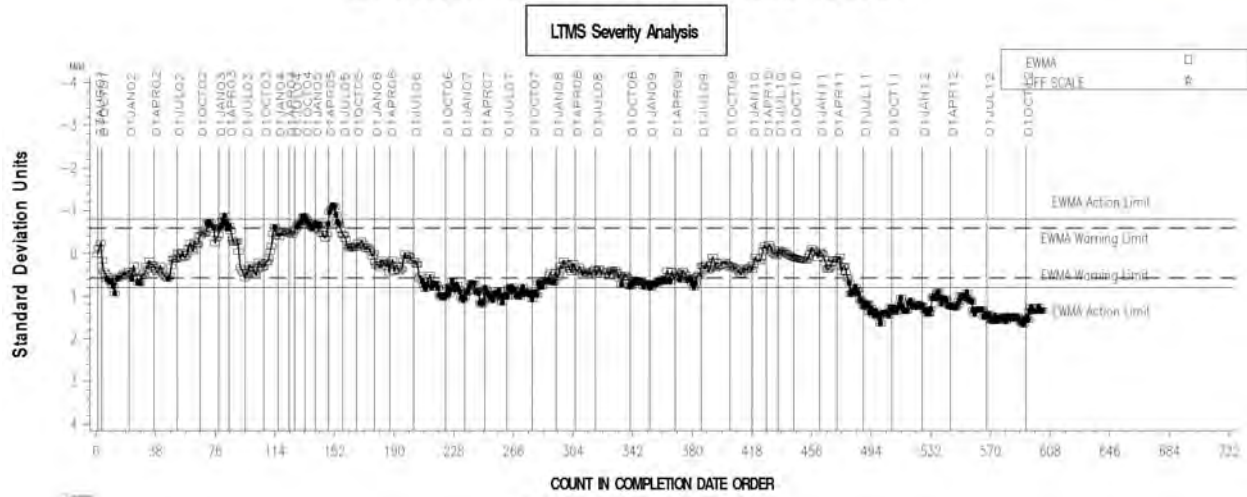
FLUOROELASTOMER POINTS HARDNESS CHANGE



EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



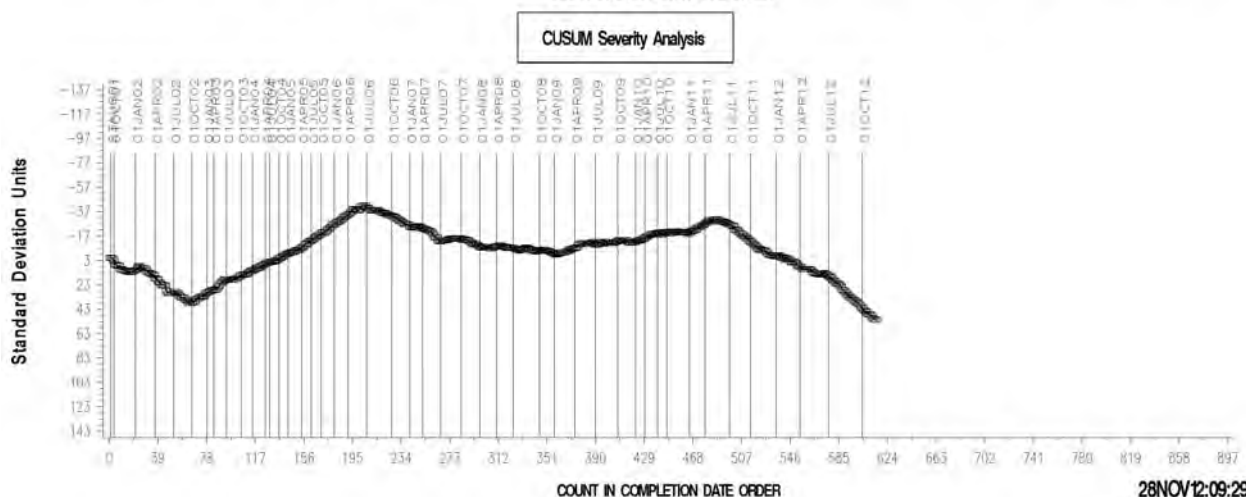
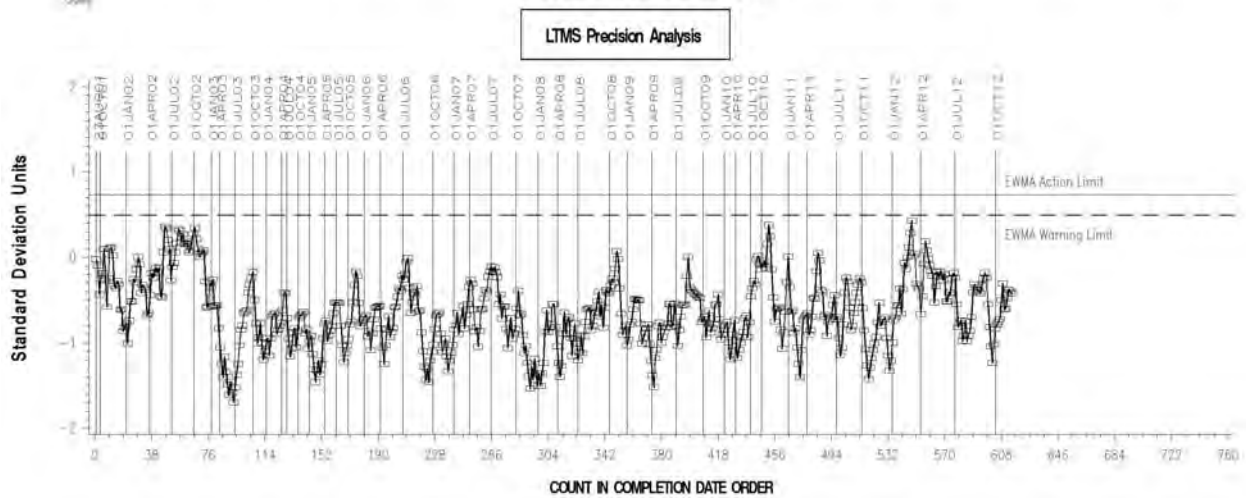
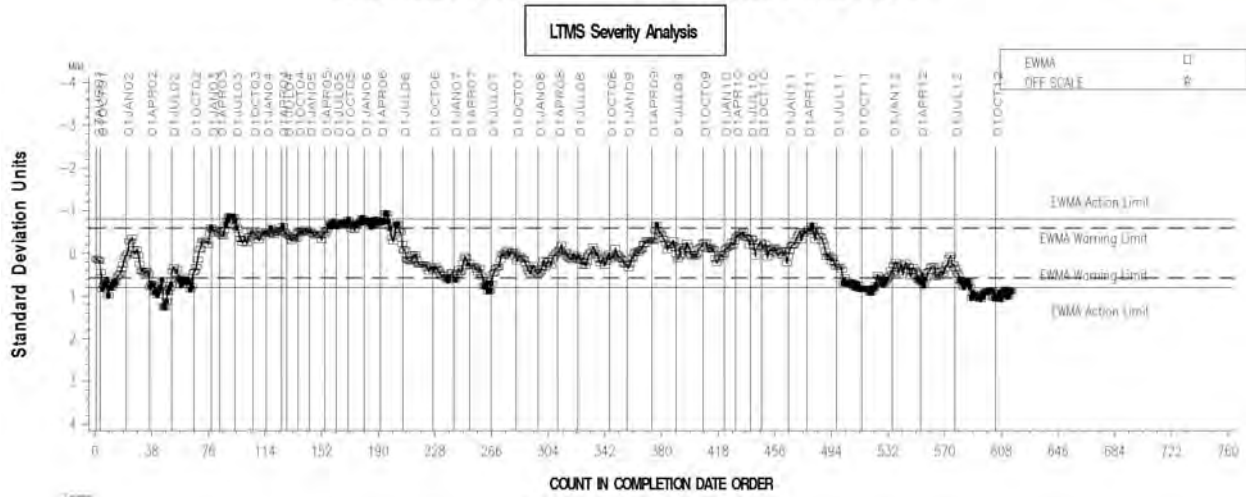
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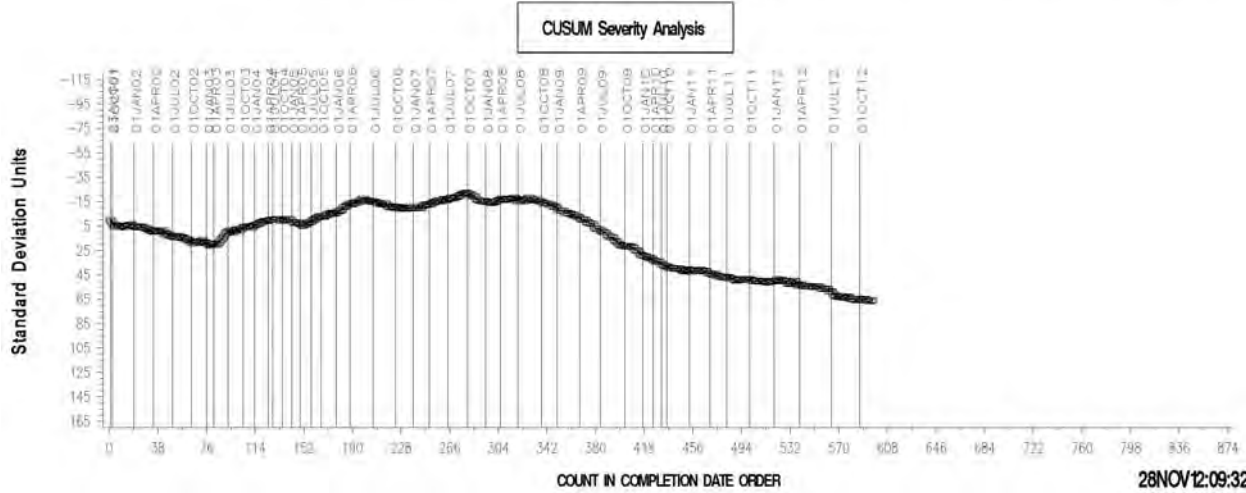
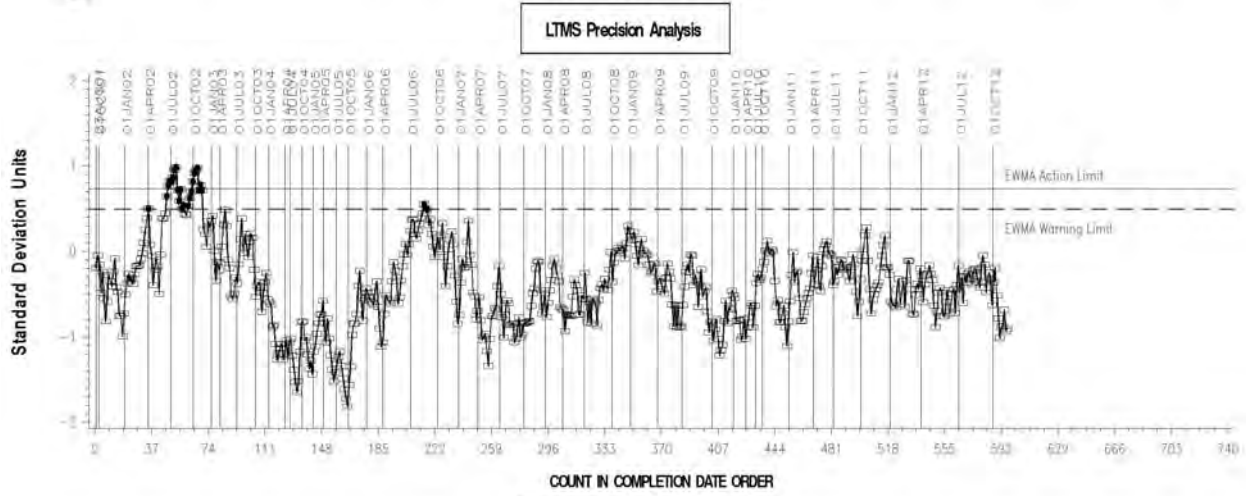
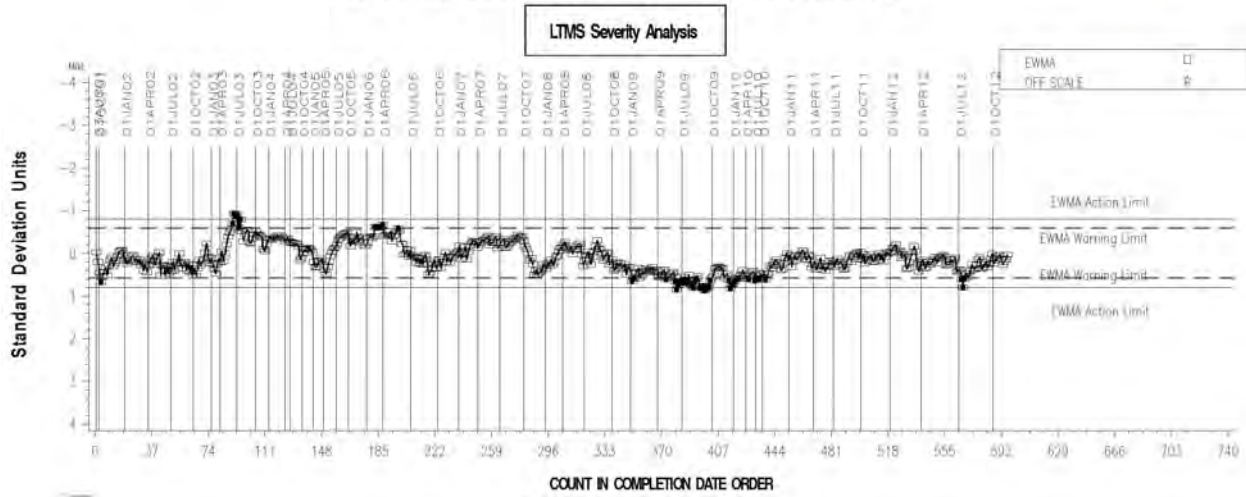
REFERENCE POLYACRYLATE POINTS HARDNESS CHANGE AVER



EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



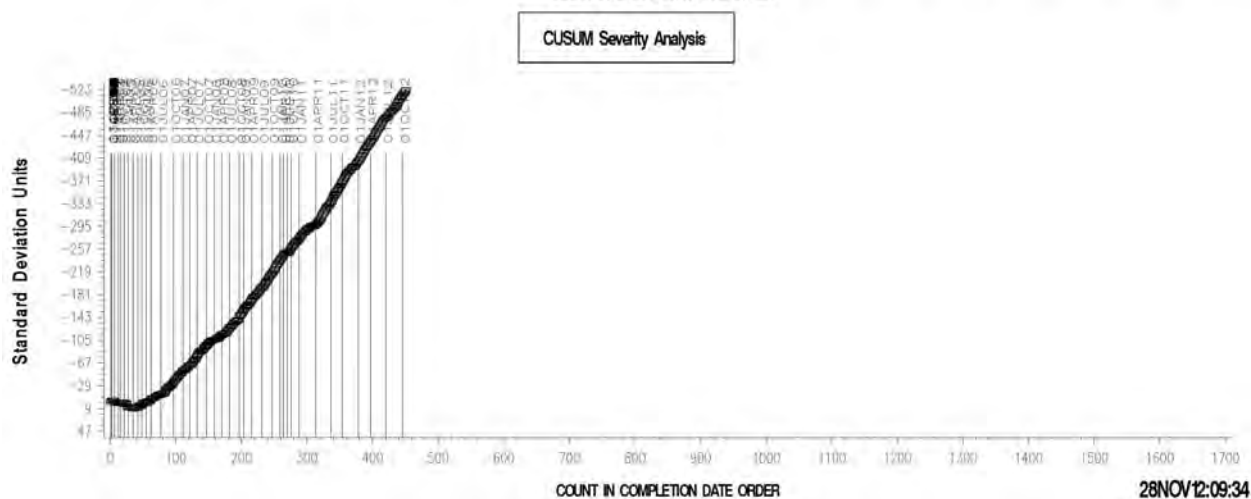
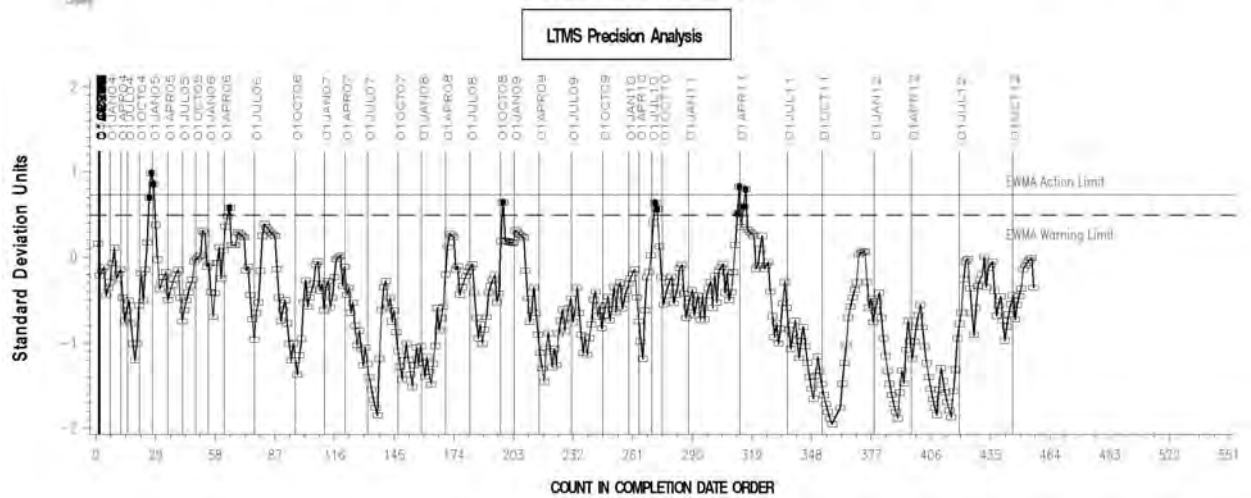
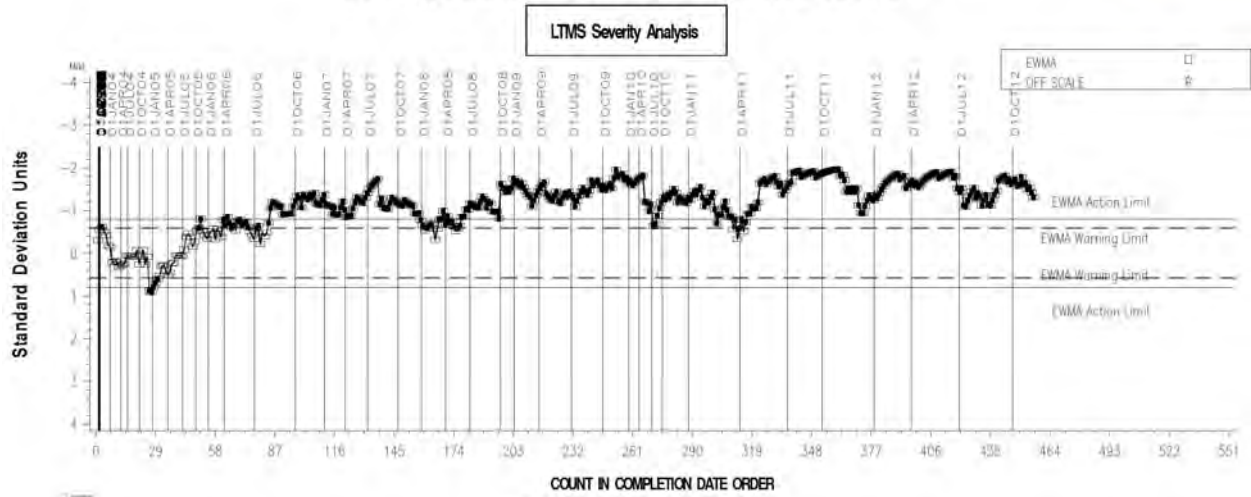
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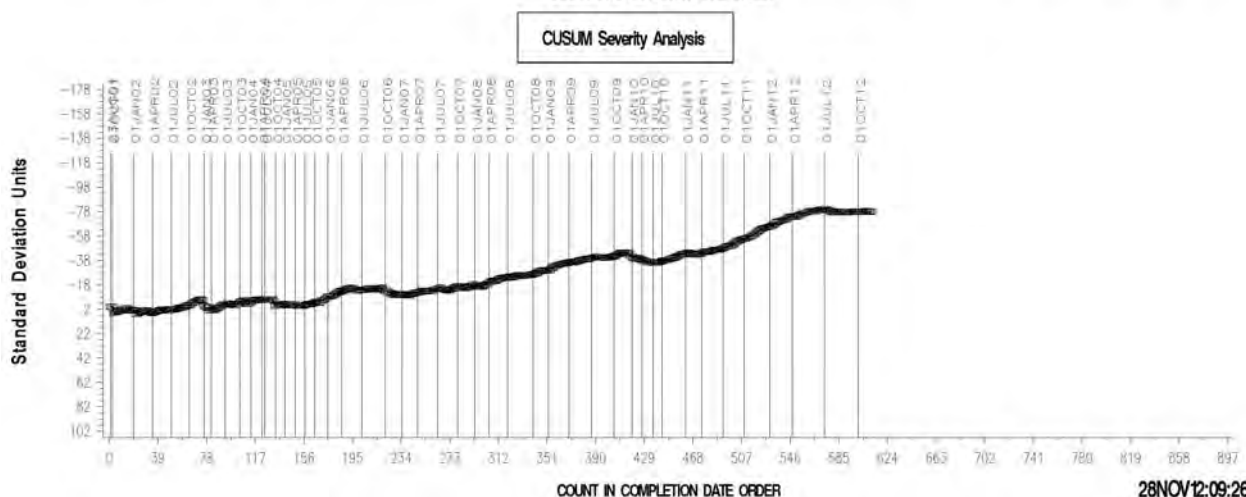
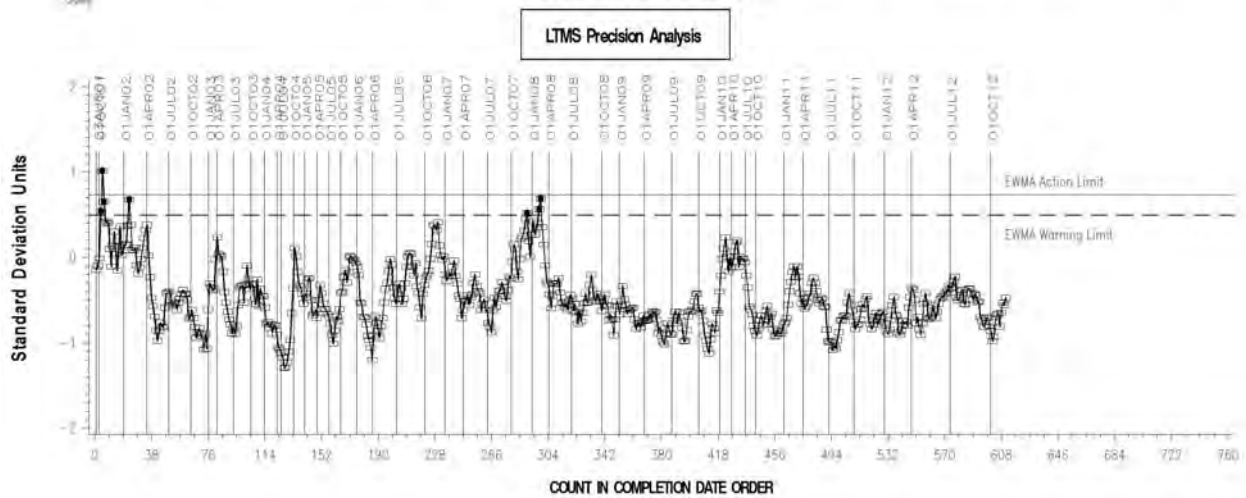
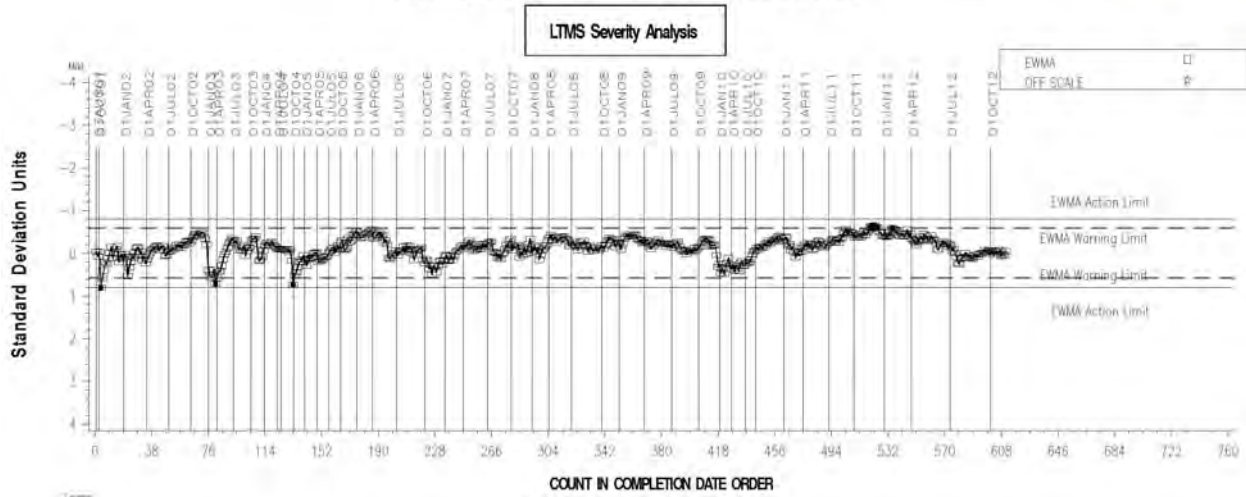
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EOEC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



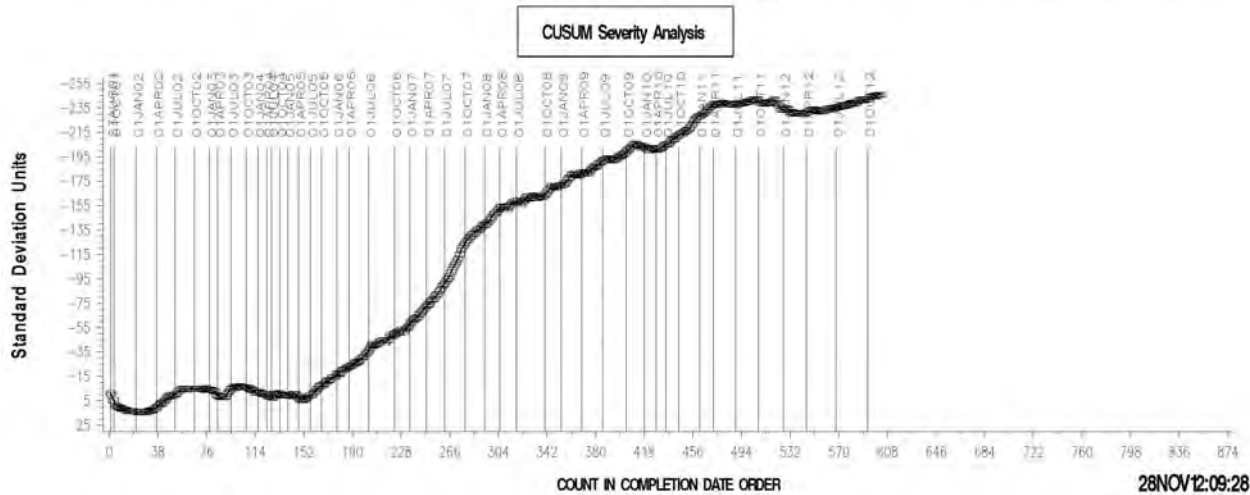
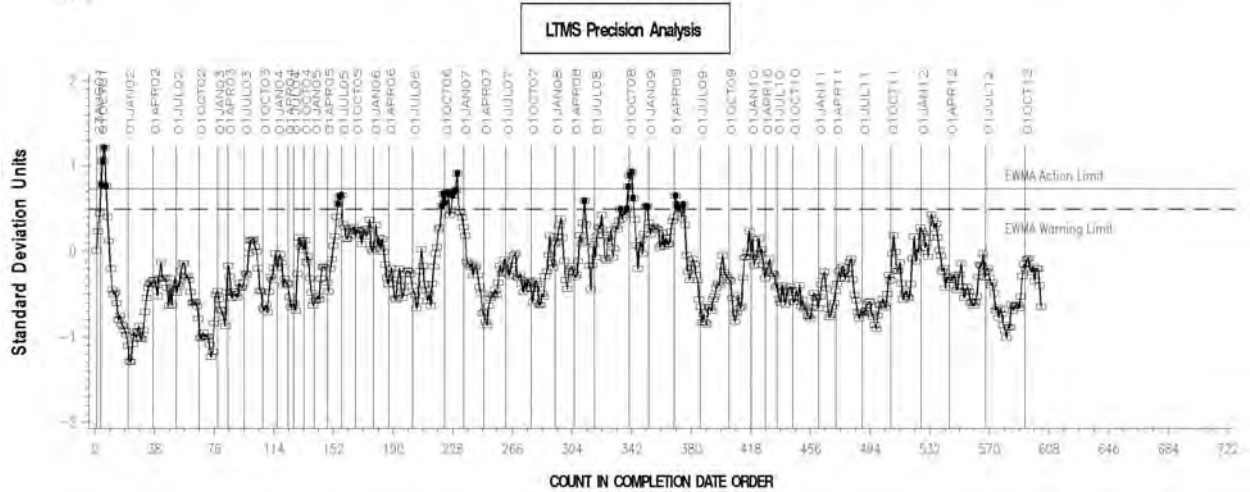
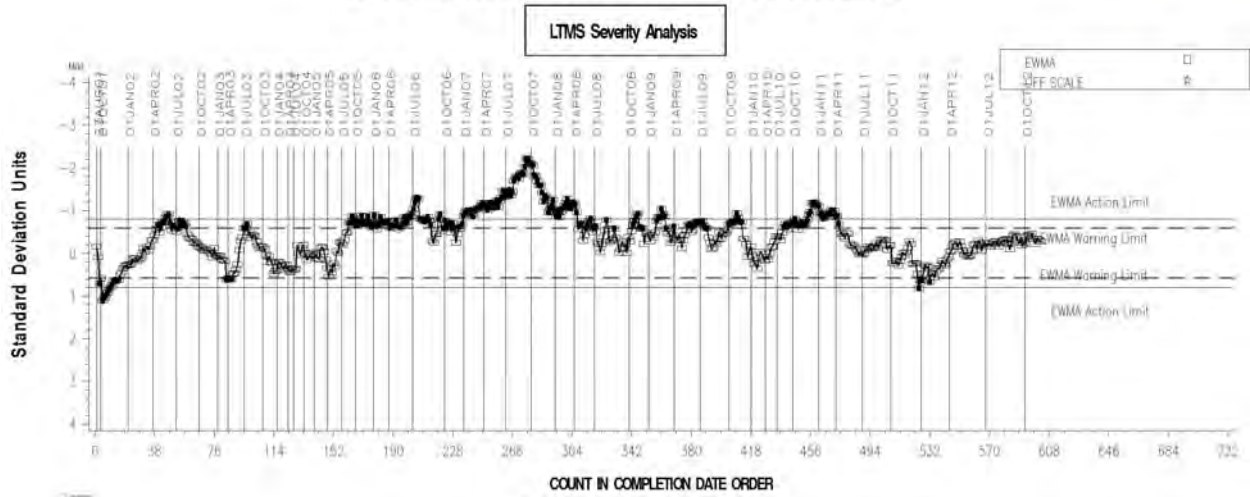
FLUOROELASTOMER TENSILE STRENGTH CHANGE



EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



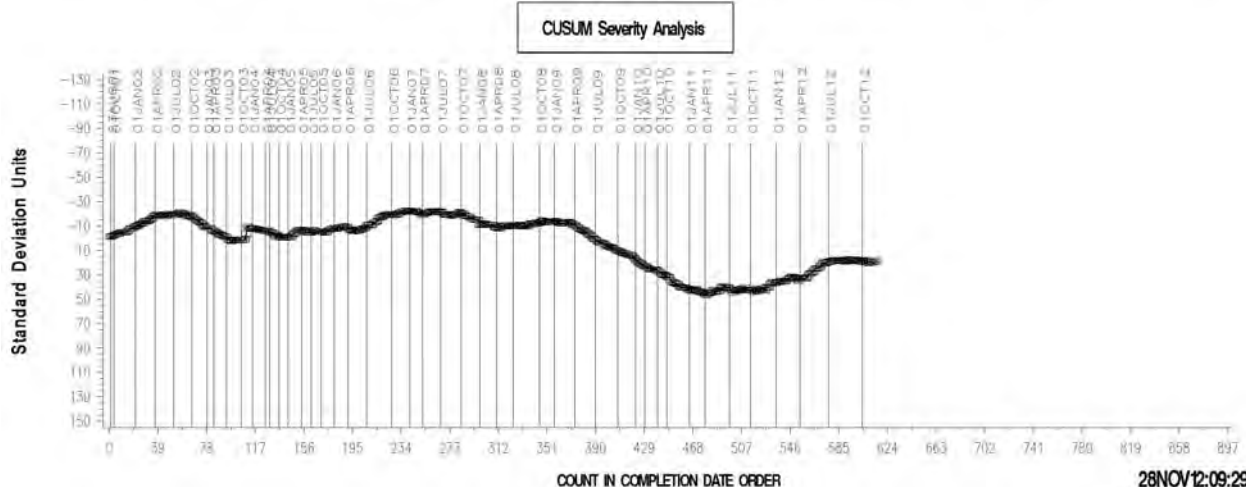
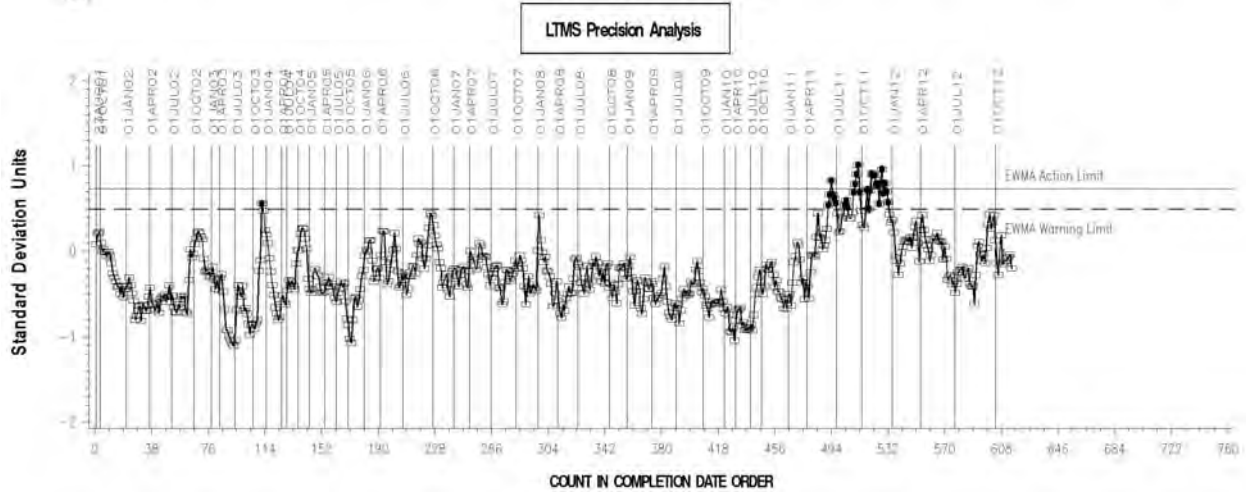
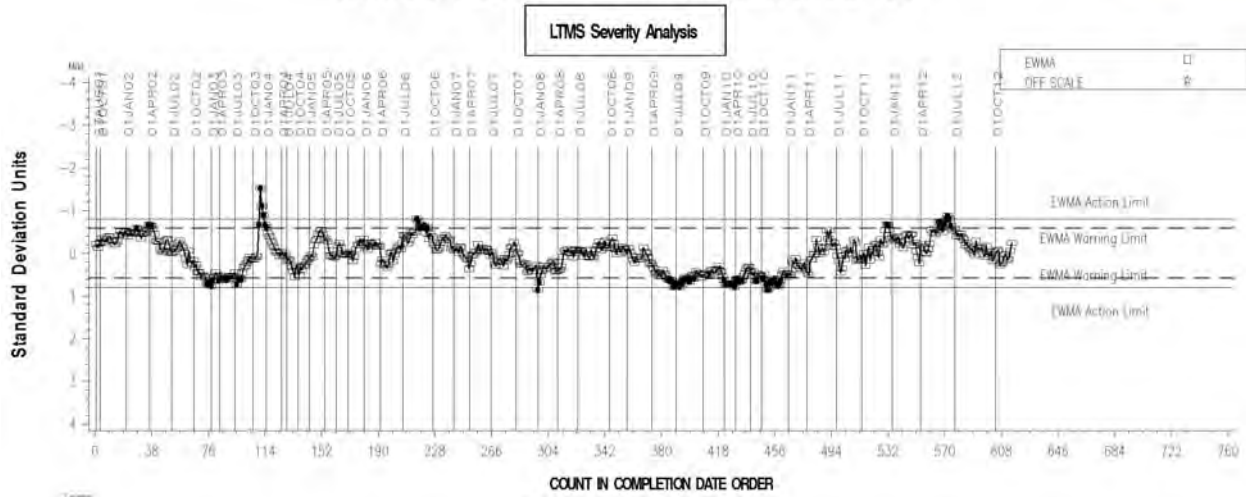
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EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



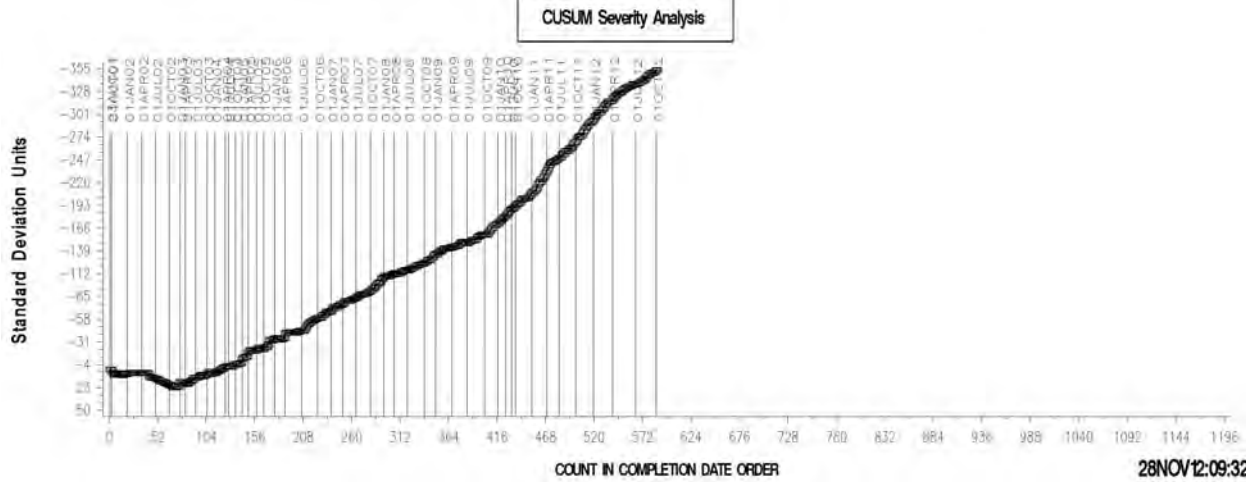
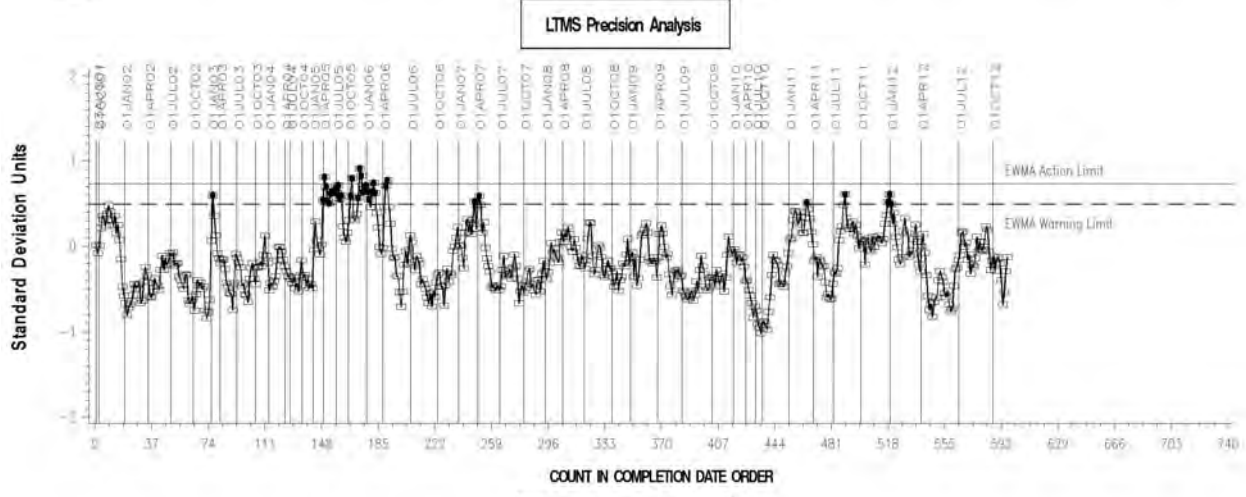
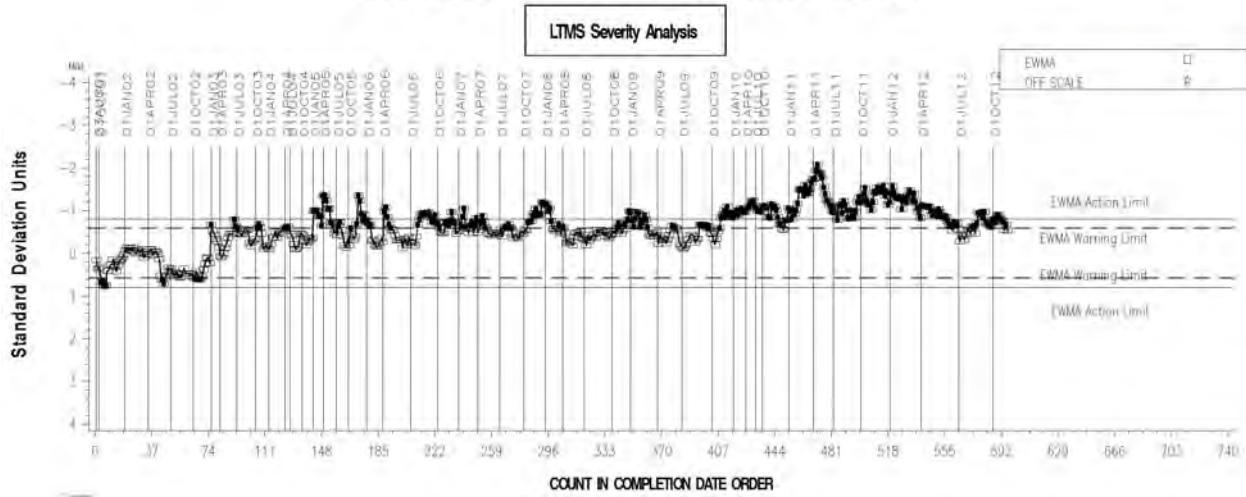
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EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



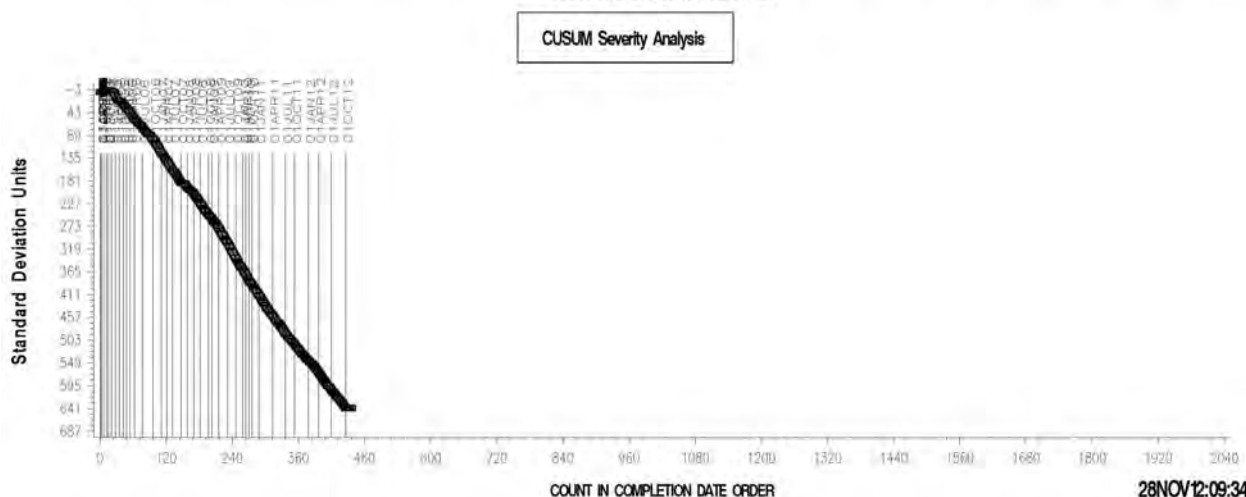
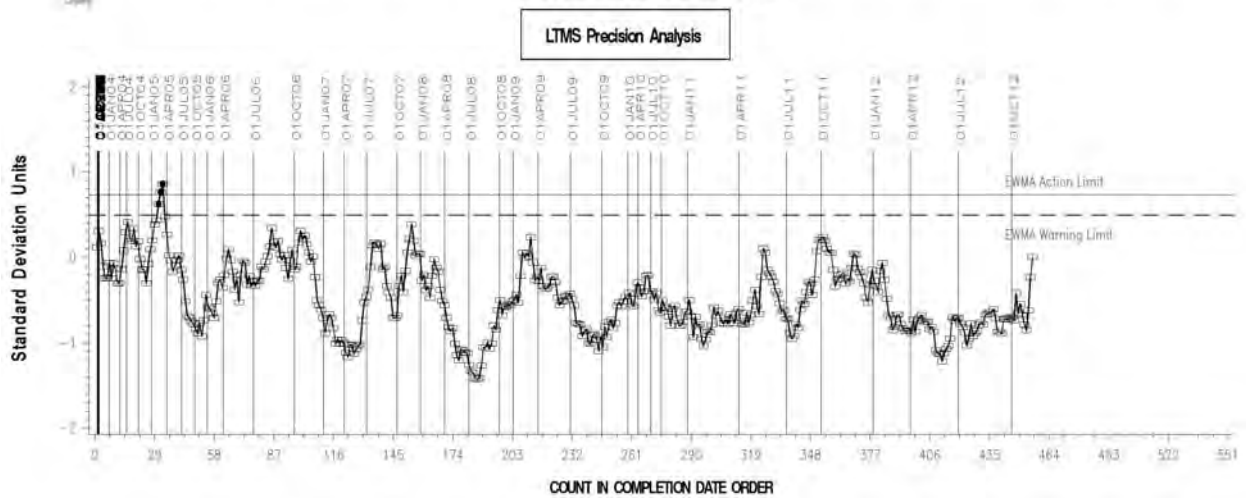
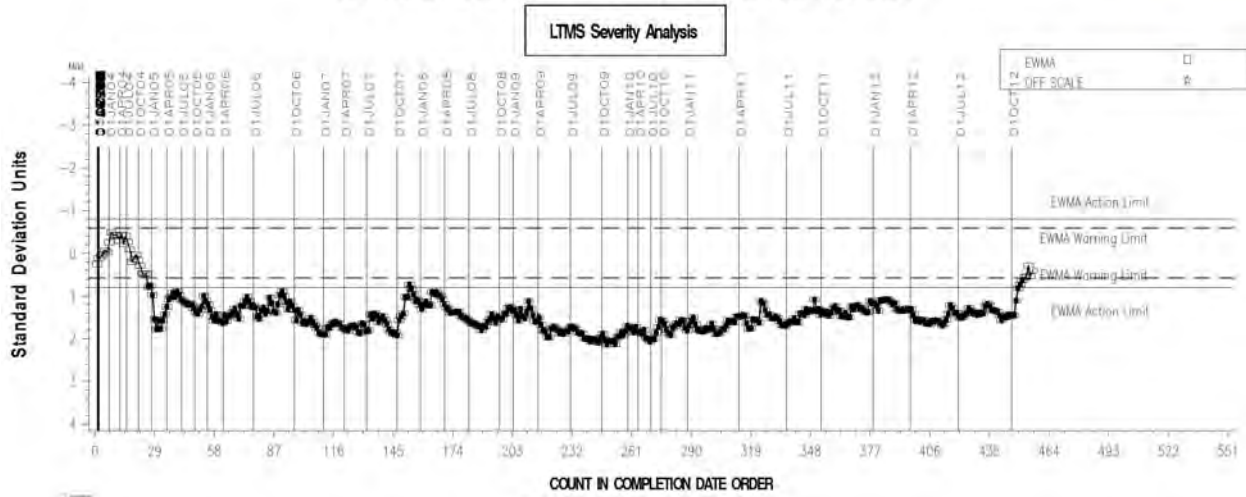
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EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA



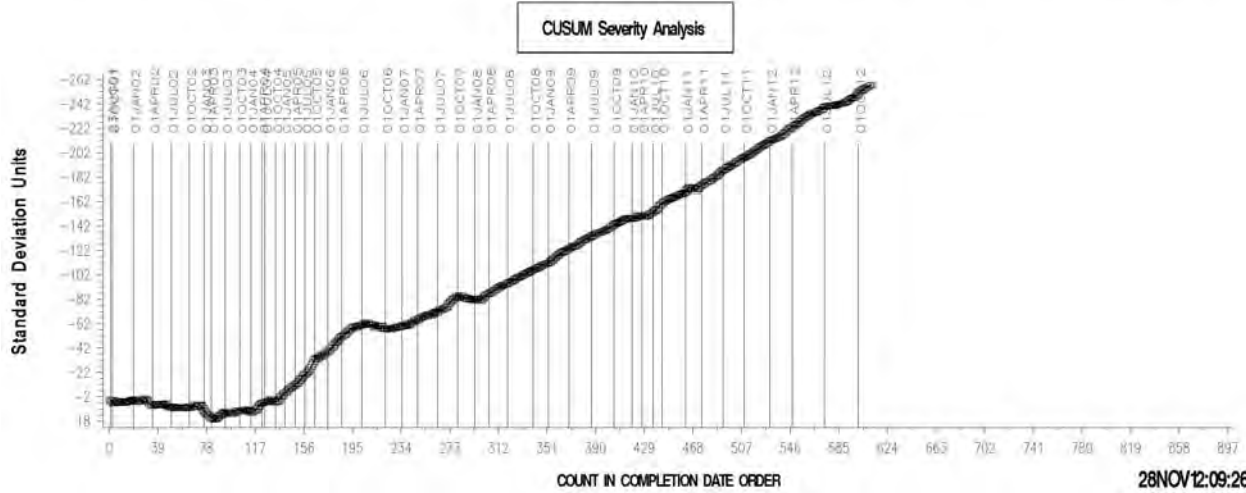
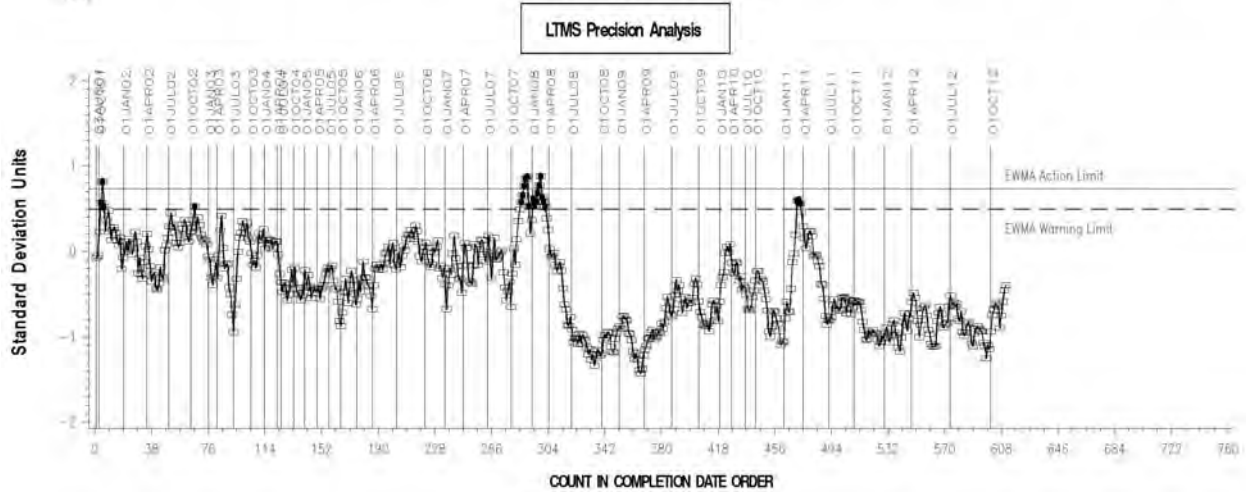
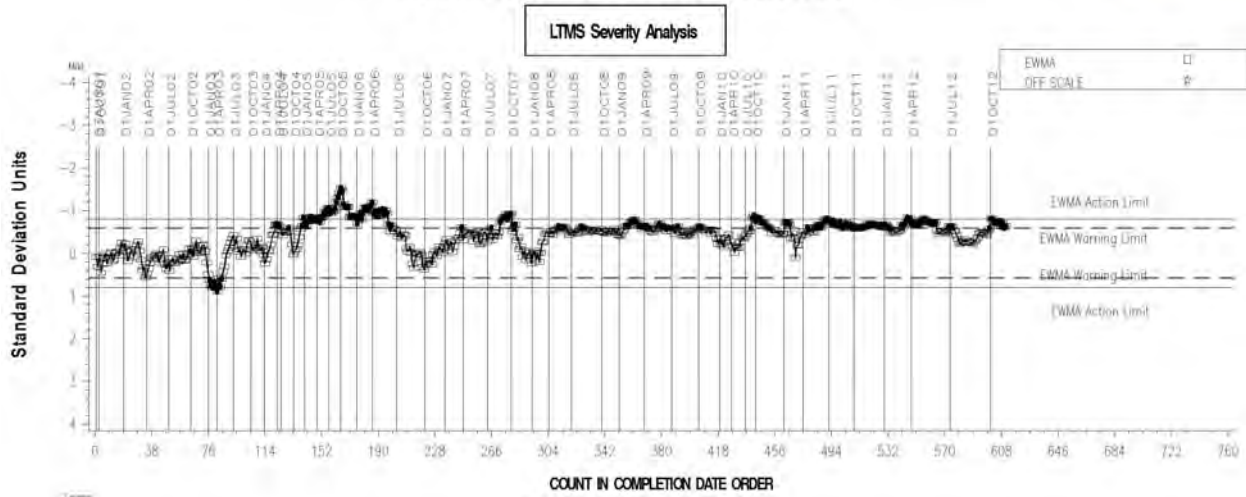
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EOEC – FLUROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



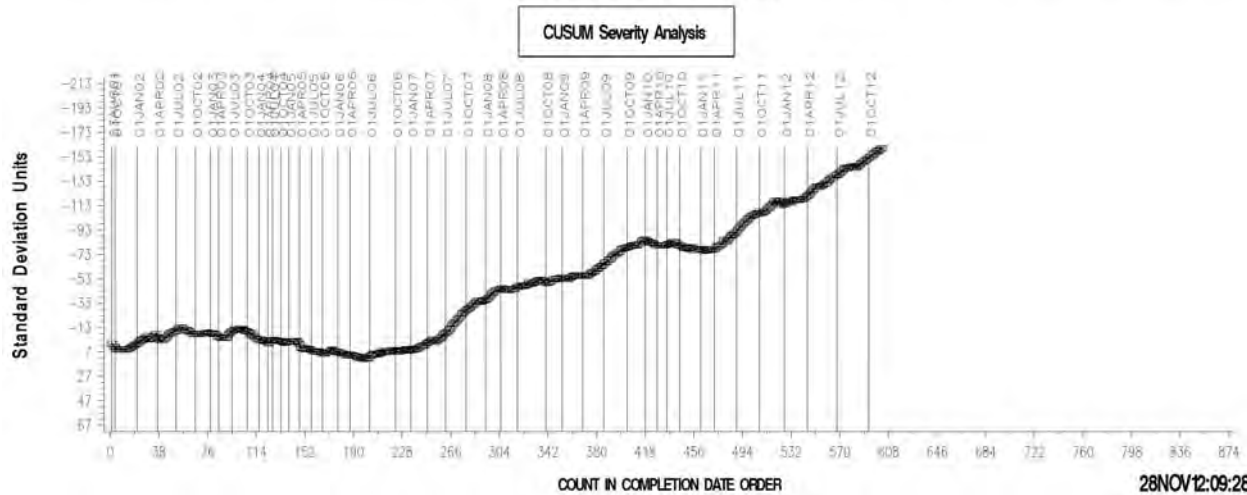
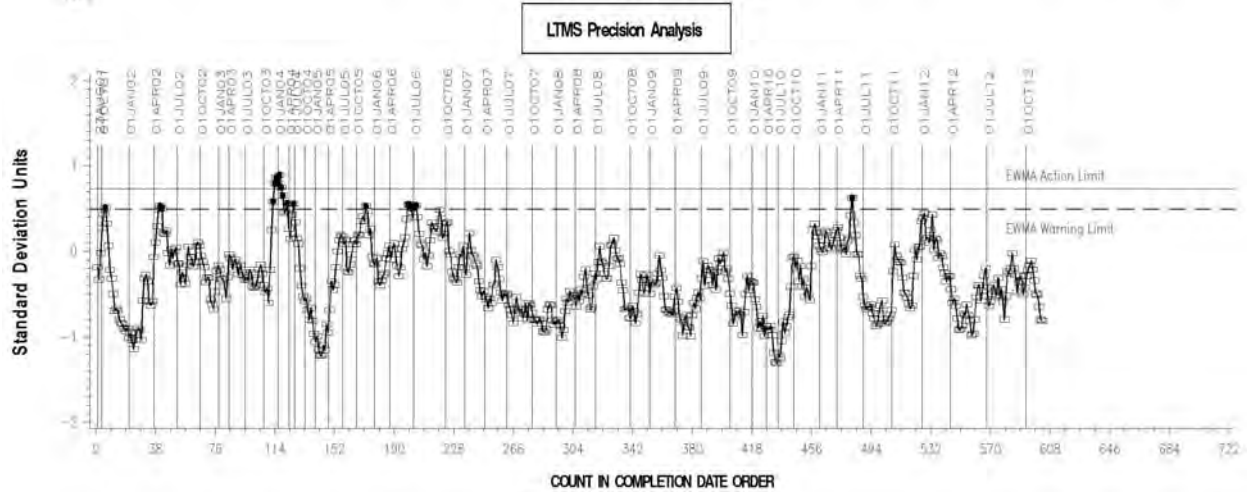
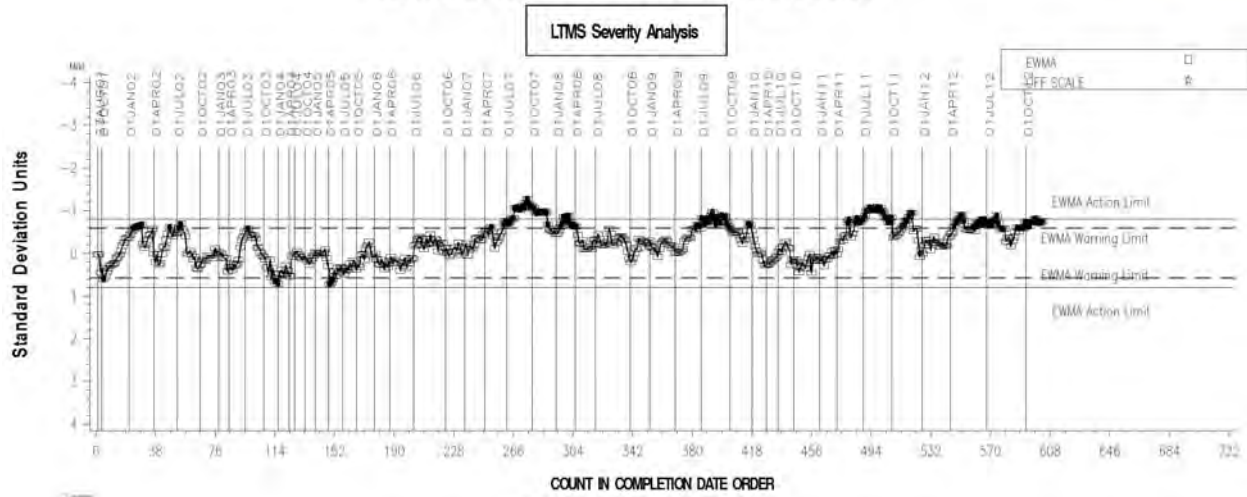
FLUROELASTOMER ELONGATION CHANGE AVG.



EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



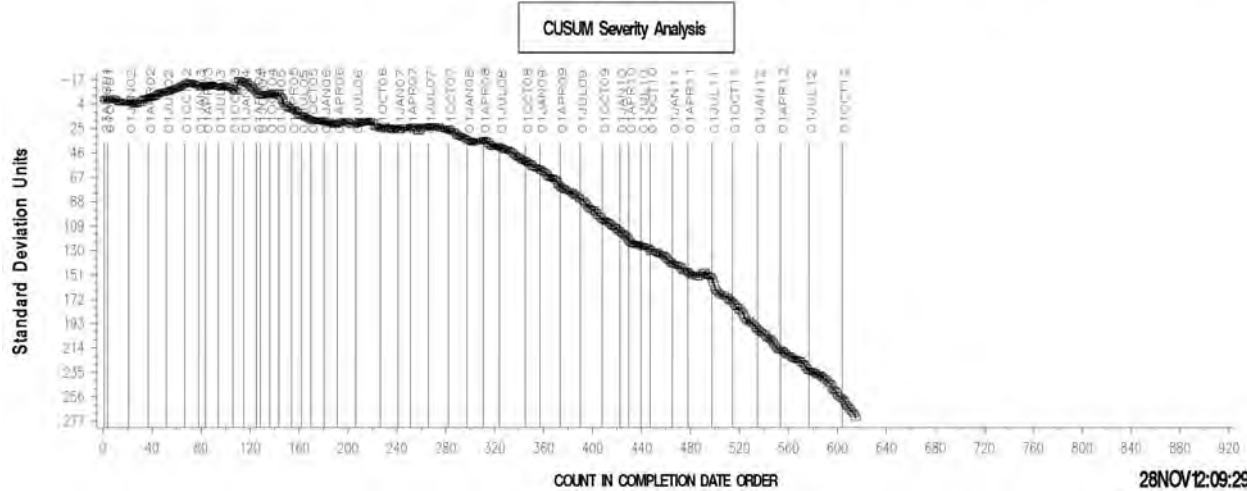
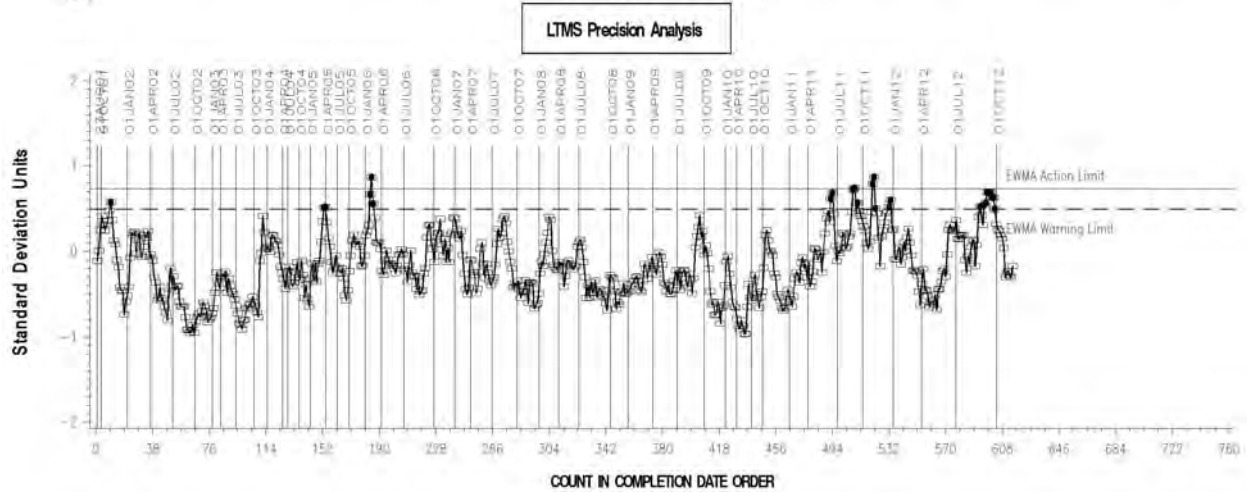
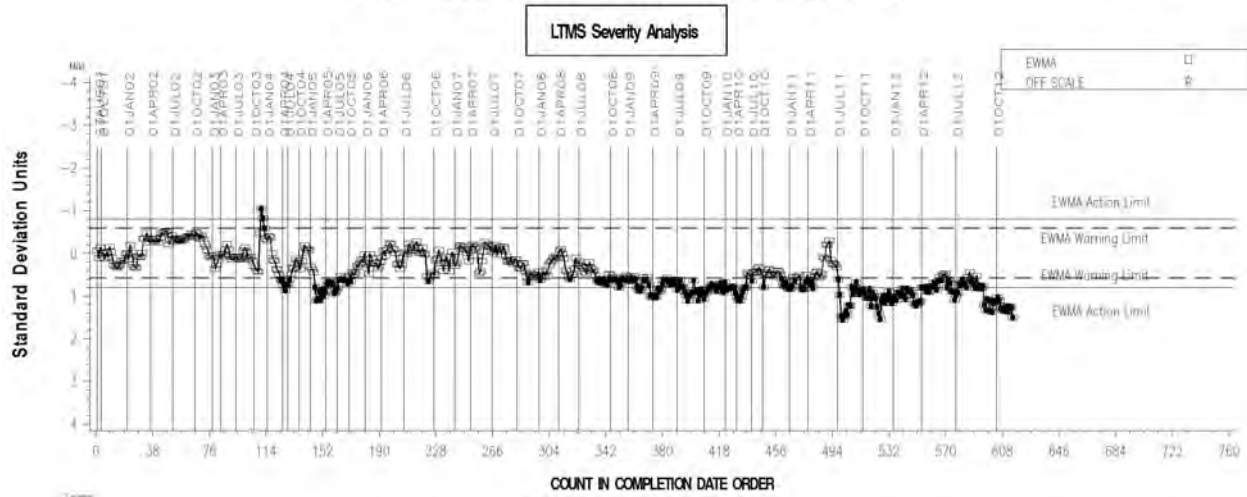
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EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



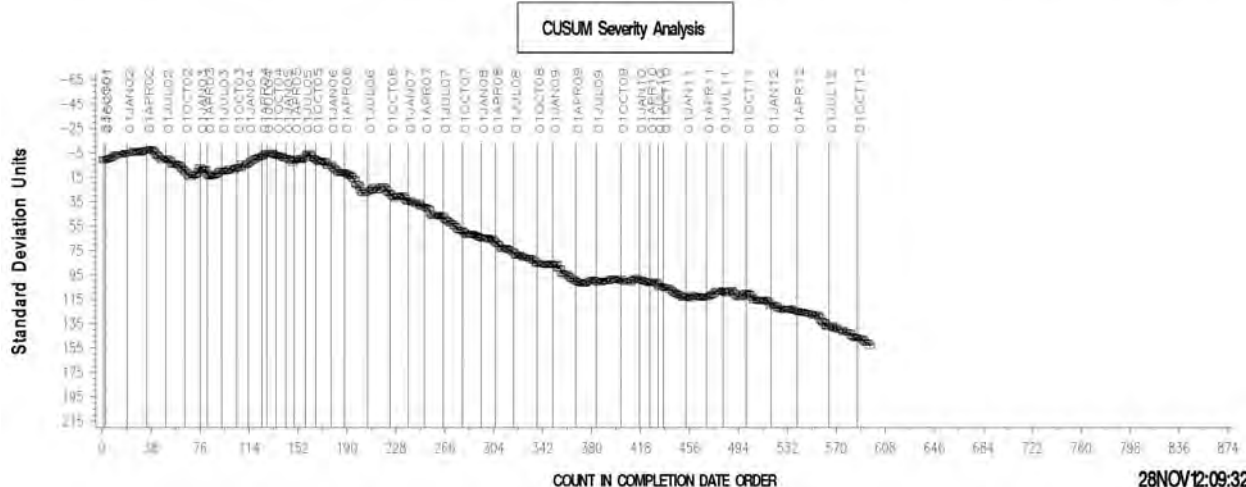
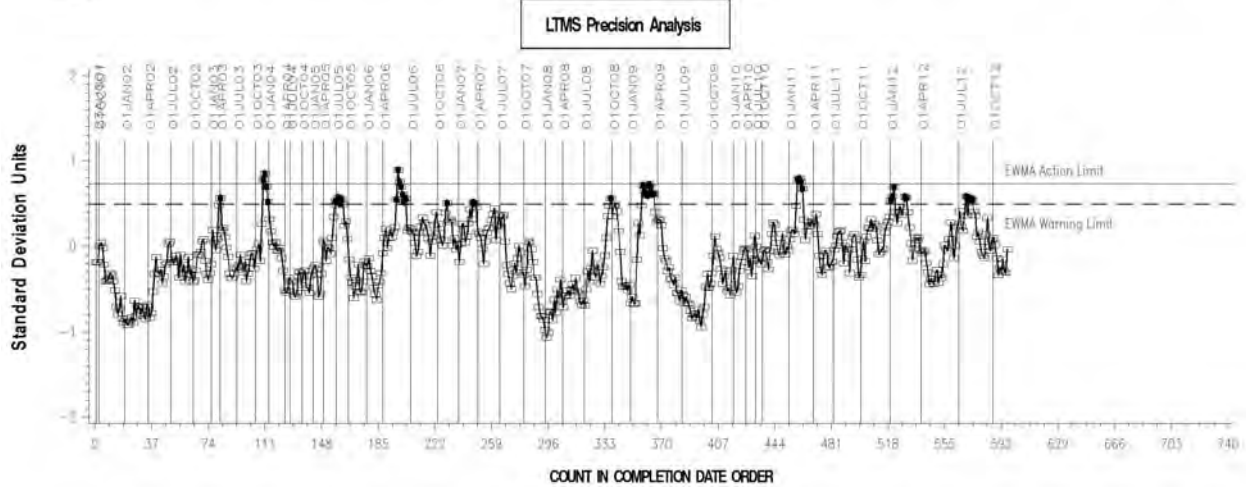
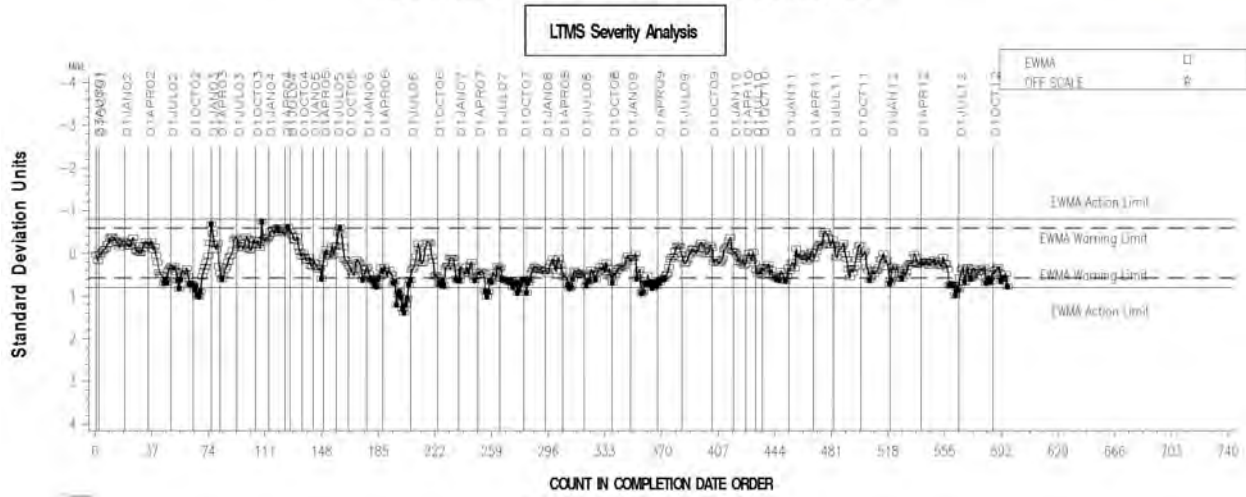
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EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



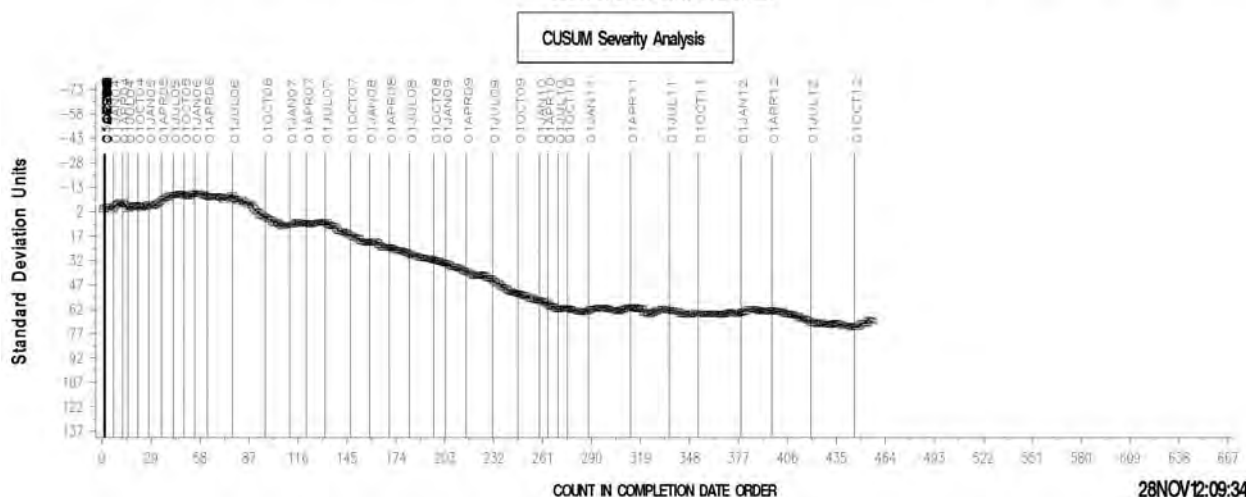
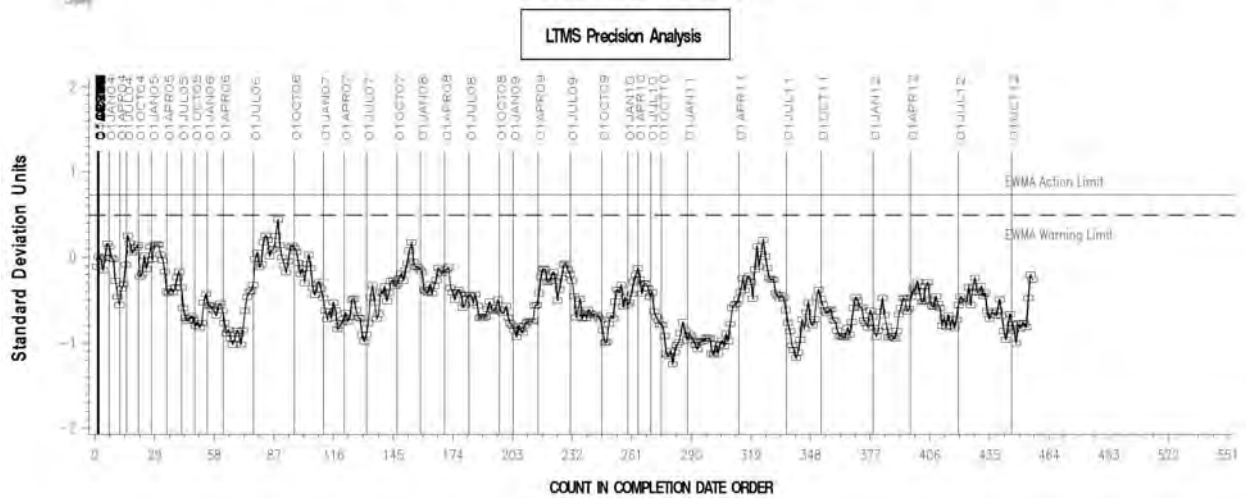
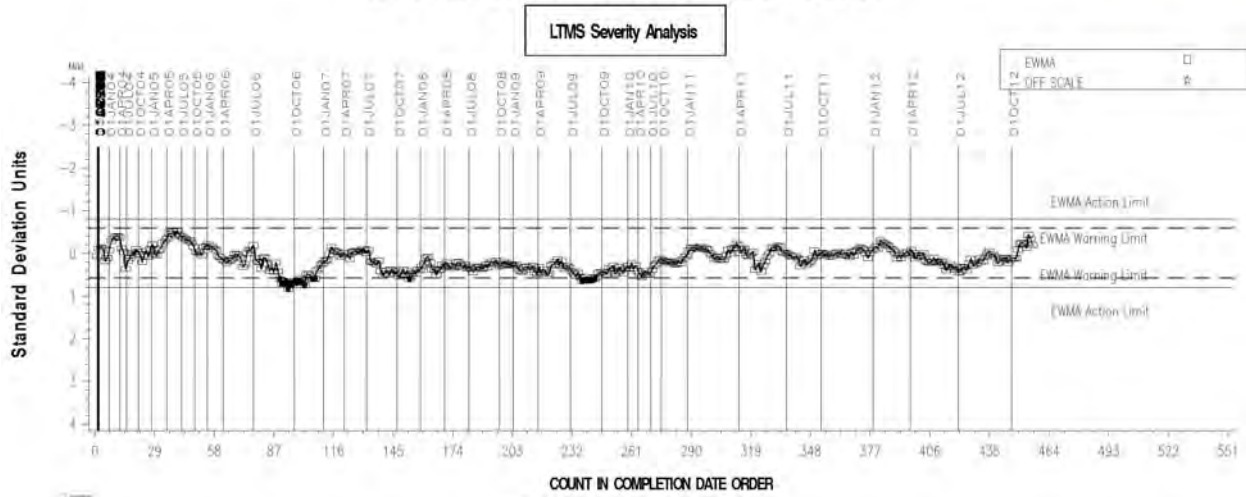
REFERENCE SILICON ELONGATION CHANGE AVERAGE



EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA

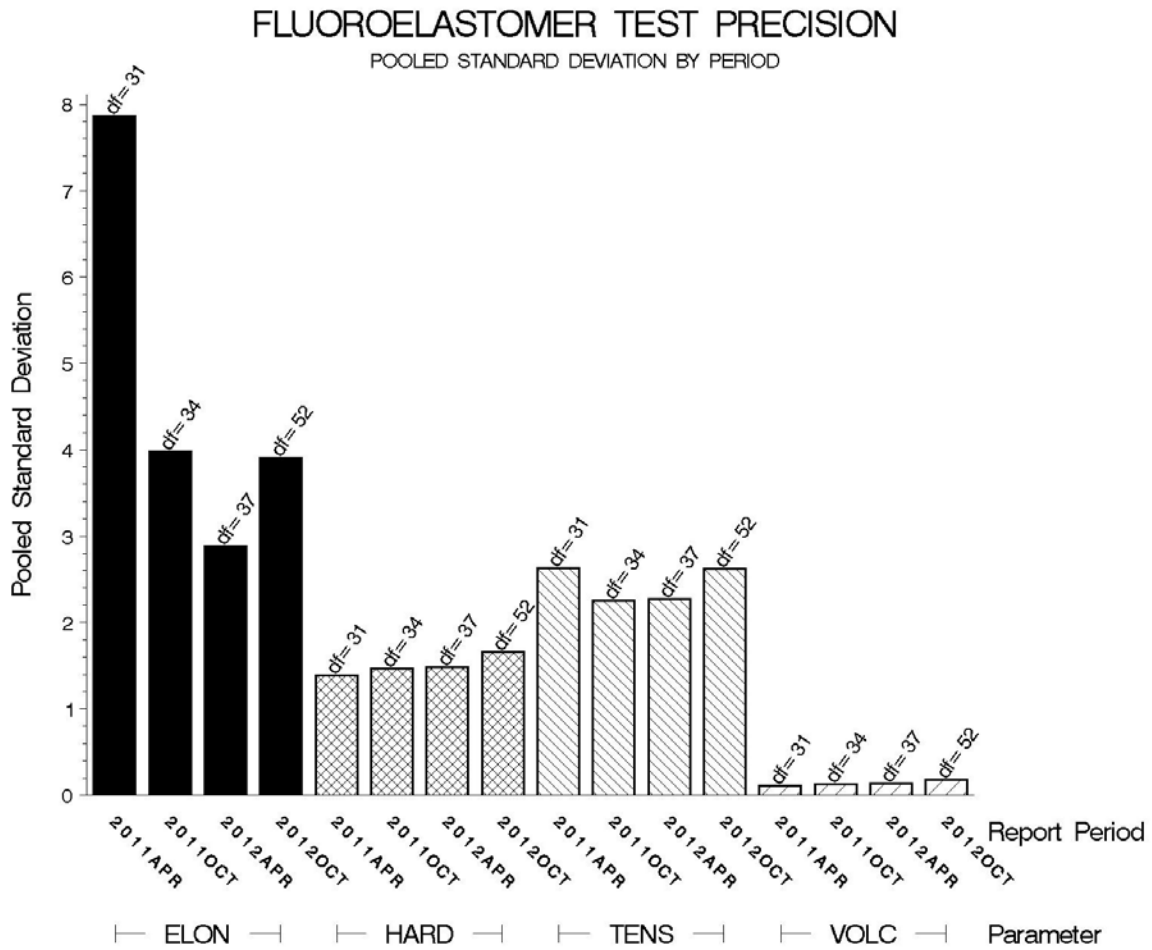


REFERENCE VAMAC G ELONGATION CHANGE AVERAGE



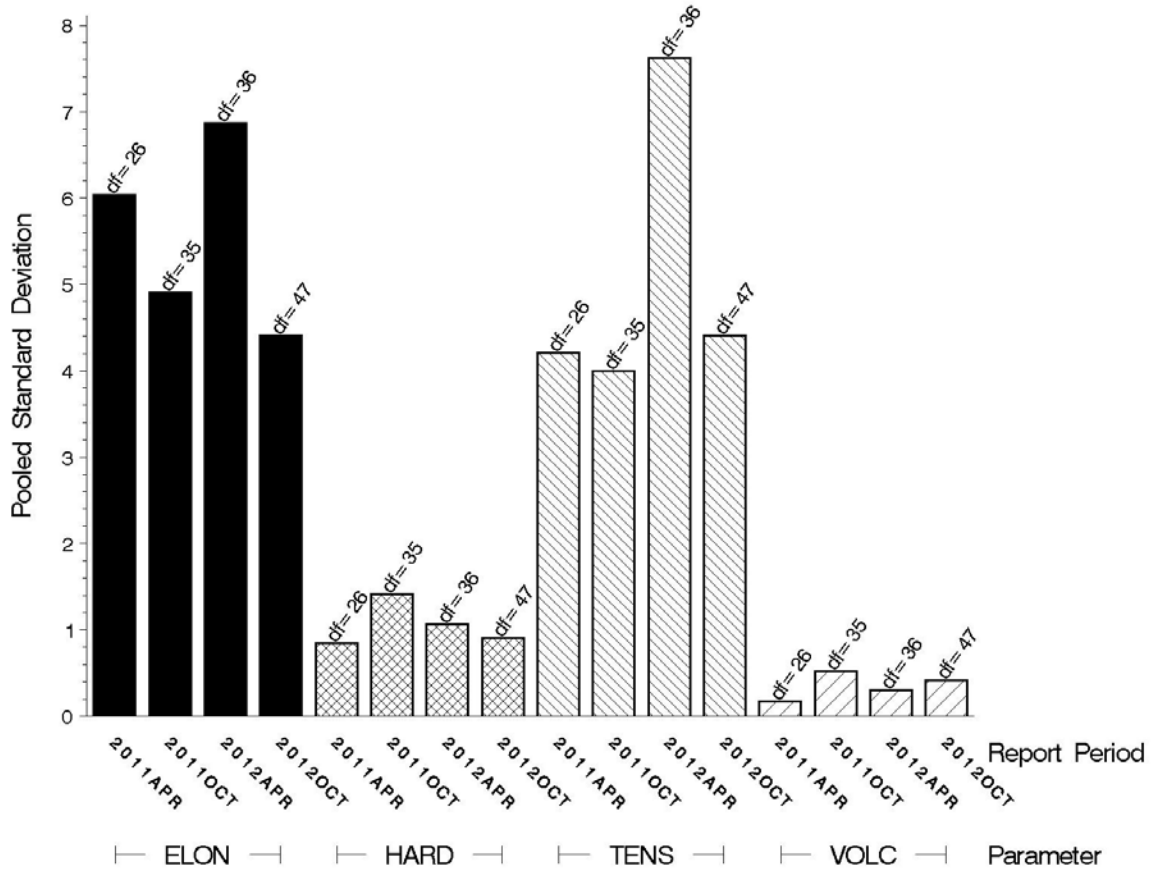
POOLED S:

Shown below are bar charts comparing the pooled s values for the EOEC test parameters over the last four report periods.



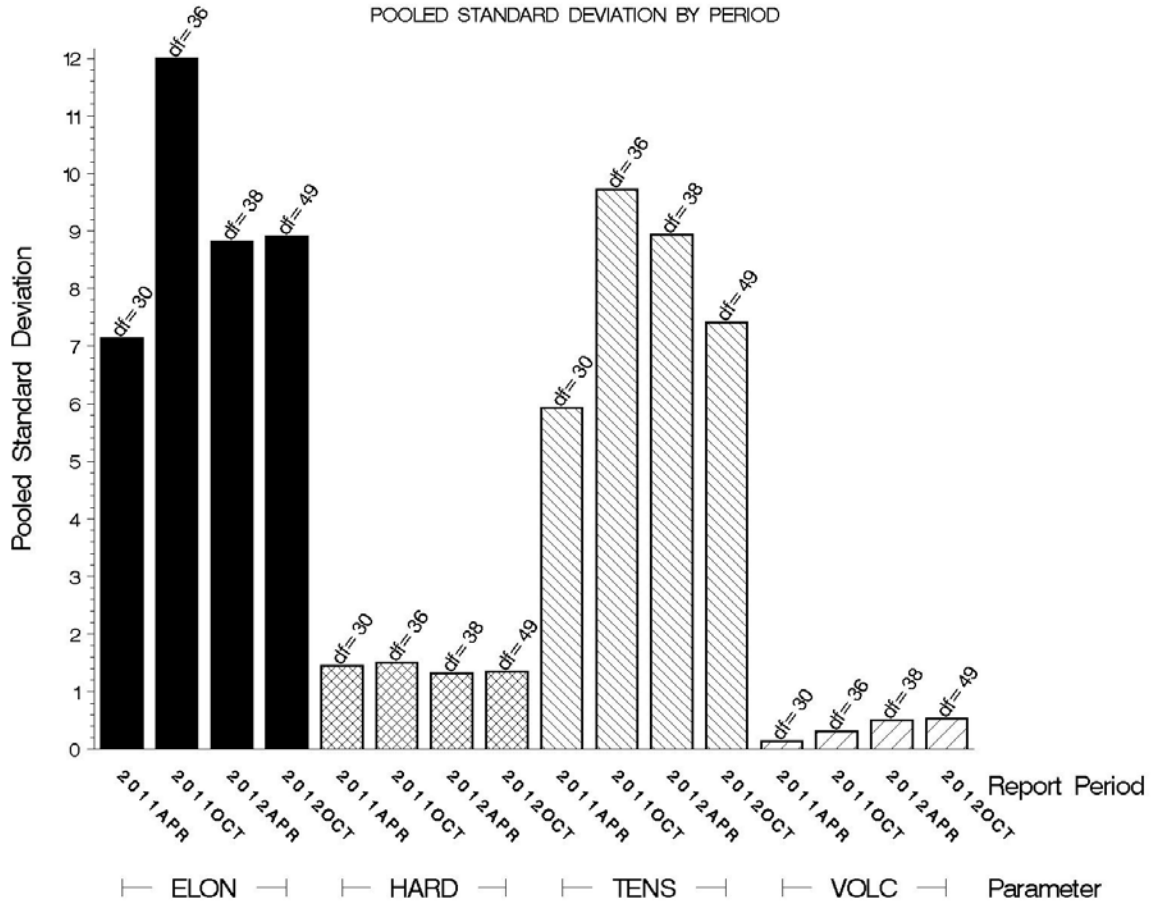
NITRILE TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD

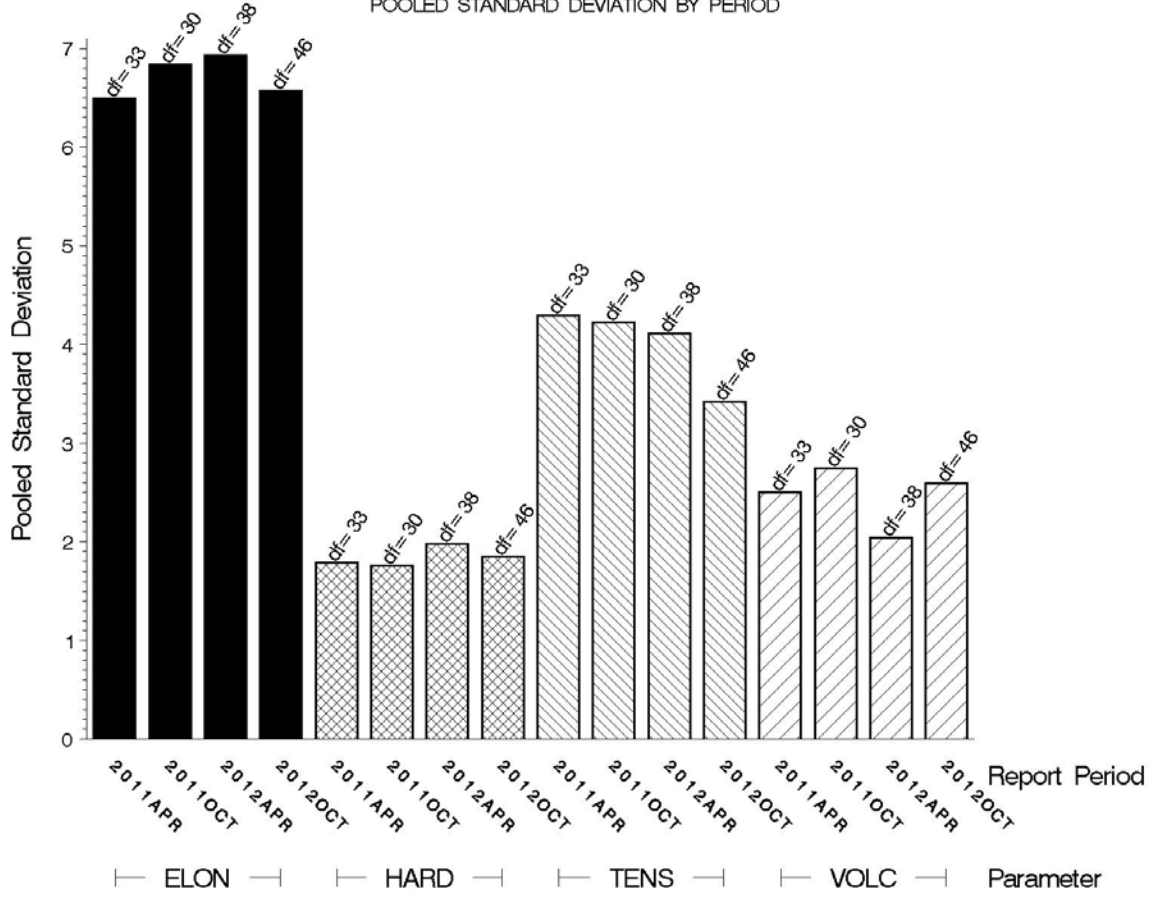


POLYACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD

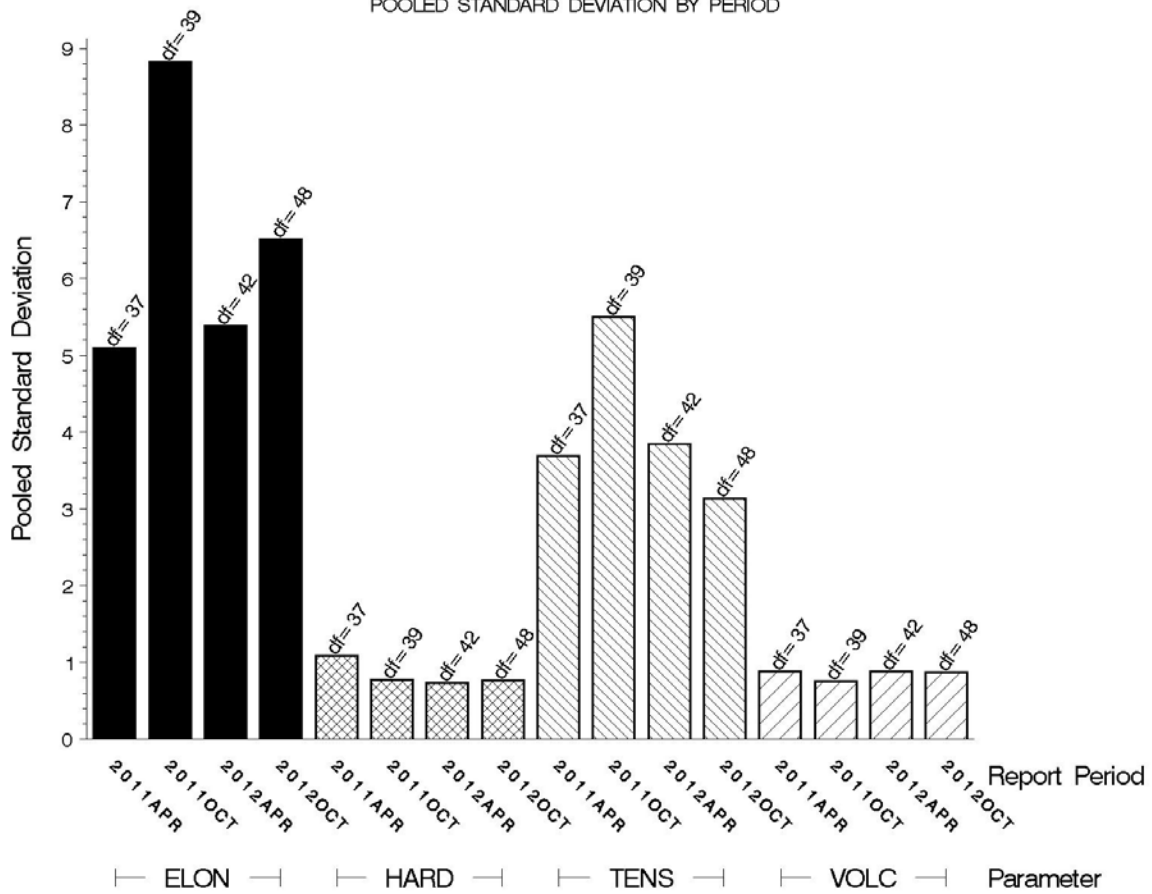


SILICONE TEST PRECISION POOLED STANDARD DEVIATION BY PERIOD



VAMAC TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD



STATUS OF REFERENCE OIL SUPPLY:

At the end of this report period, the testing oil supply stood as outlined in the following table:

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
1006-1	158	6308	1250
Total	158	6308	1250

Be aware that this table presumes that all of each of these oils is dedicated to the EOEC test area. This is not the case, as oil 1006-1 is also used in several other test areas.

INFORMATION LETTERS:

No Information Letters were issued this period.

SUMMARY

**Summary of Severity
as Measured by LTMS Control Charting**

Elastomer	VOLC	HARD	TENS	ELON
Fluoroelastomer	Within limits	Within limits	Within limits	Mild
Nitrile	Severe	Severe	Within limits	Mild
Polyacrylate	Severe	Severe	Within limits	Severe
Silicone	Within limits	Within limits	Within limits	Severe
VAMAC	Within limits	Mild	Within limits	Within limits

**Summary of Precision
as Measured by LTMS Control Charting**

Elastomer	VOLC	HARD	TENS	ELON
Fluoroelastomer	Within limits	Within limits	Within limits	Within limits
Nitrile	Within limits	Within limits	Within limits	Within limits
Polyacrylate	Within limits	Within limits	Within limits	Within limits
Silicone	Warning	Within limits	Within limits	Within limits
VAMAC	Within limits	Within limits	Within limits	Within limits

MTK/mtk/astm1012.doc/mem12-042.mtk.doc

c: F. M. Farber
 J. A. Clark
 EOEC Surveillance Panel
<ftp://ftp.astmtmc.cmu.edu/docs/bench/eoec/semiannualreports/eoec-10-2012.pdf>

Distribution: email