



Test Monitoring Center

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

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

MEMORANDUM: 13-069

DATE: November 21, 2013

TO: Mike Birke,
Chairman, Engine Oil Elastomer Compatibility Surveillance Panel

FROM: Michael T. Kasimirsky *Michael T. Kasimirsky*

SUBJECT: EOEC Testing from April 1, 2013 through September 30, 2013

A total of 241 EOEC tests were reported from 4 labs to the Test Monitoring Center during the period from April 1, 2013 through September 30, 2013.

Please find attached a summary of testing activity this period.

MTK/mtk/mem13-069.mtk.doc

cc: Frank Farber

Jeff Clark

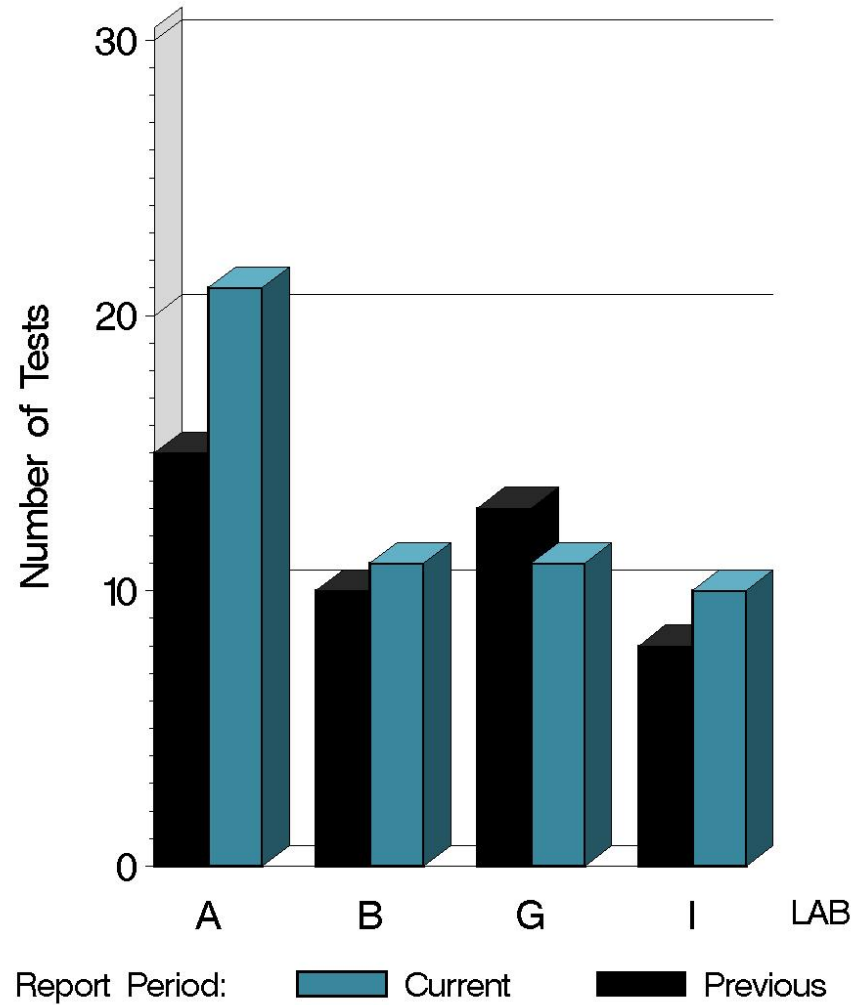
EOEC Surveillance Panel

<ftp://ftp.astmtmc.cmu.edu/docs/bench/eoec/semiannualreports/eoec-10-2013.pdf>

Distribution: email

EOEC (D 7216)

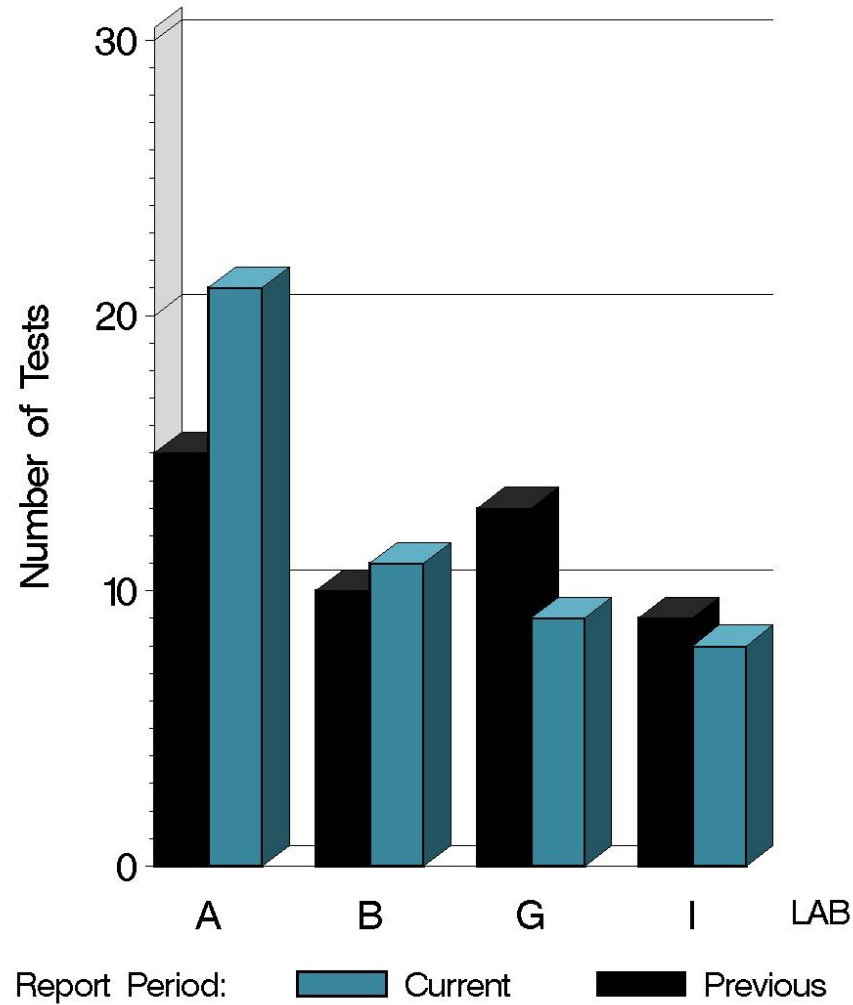
NUMBER OF FLUOROELASTOMER TESTS
REPORTED BY LAB AND REPORT PERIOD



15:01:37 16NOV2013

EOEC (D 7216)

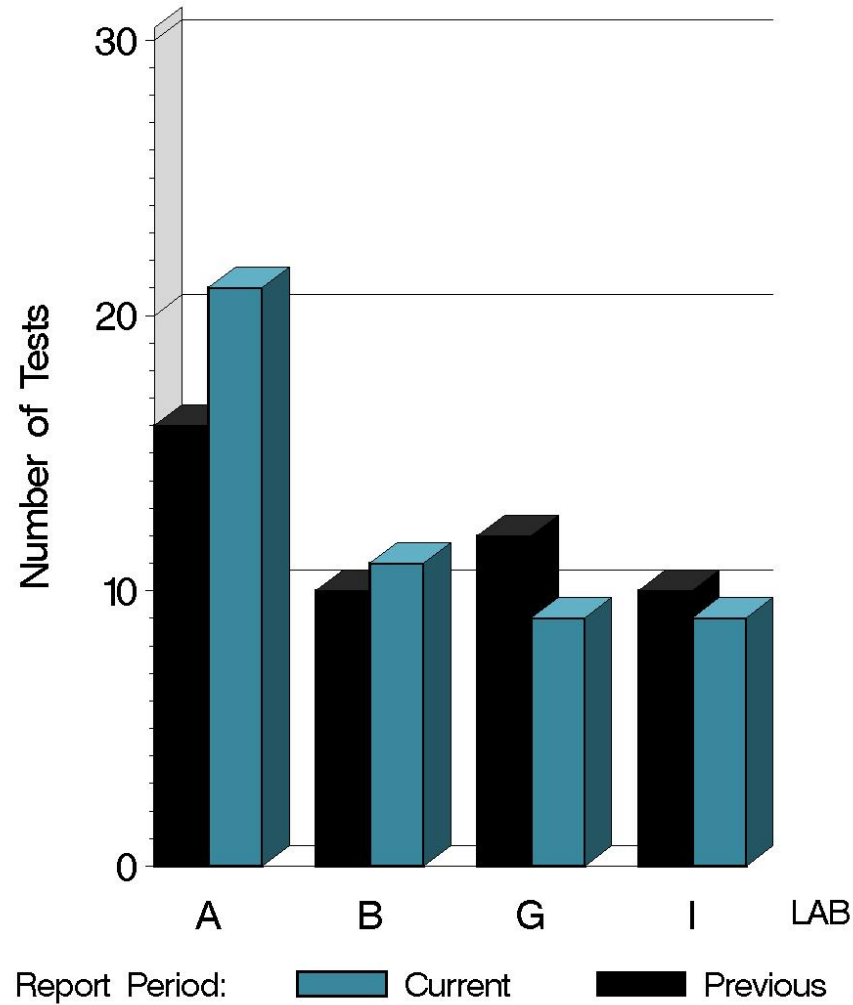
NUMBER OF NITRILE TESTS
REPORTED BY LAB AND REPORT PERIOD



15:01:37 16NOV2013

EOEC (D 7216)

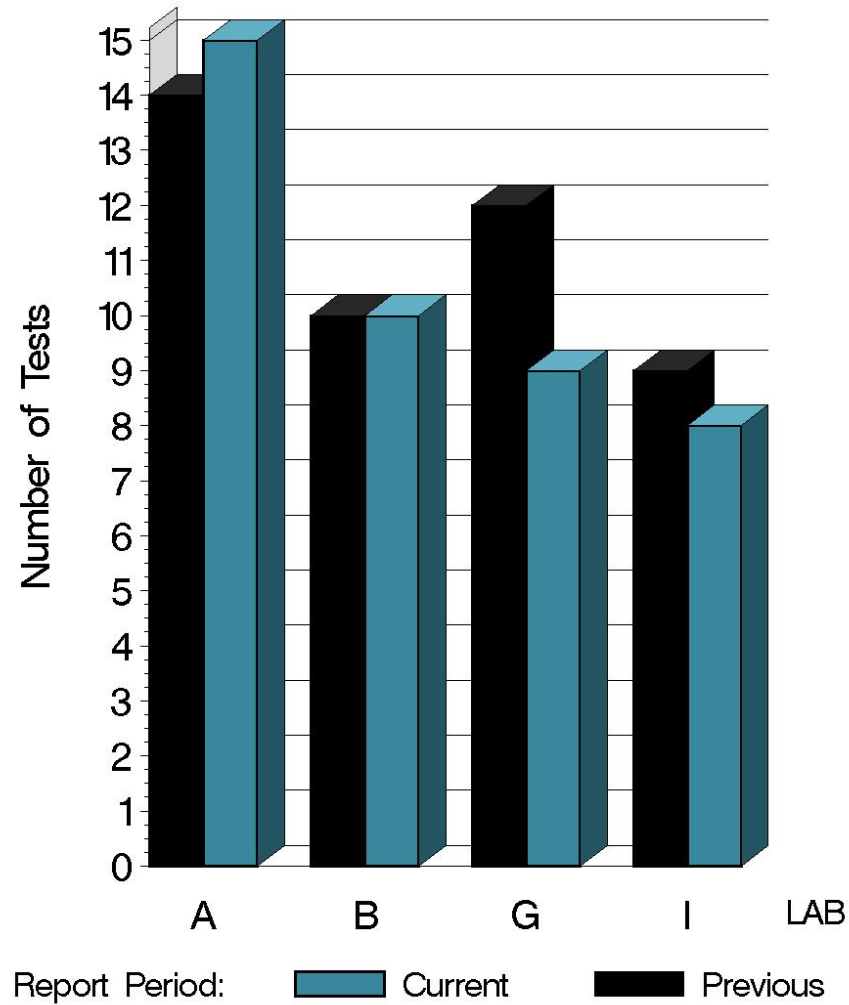
NUMBER OF POLYACRYLATE TESTS
REPORTED BY LAB AND REPORT PERIOD



15:01:37 16NOV2013

EOEC (D 7216)

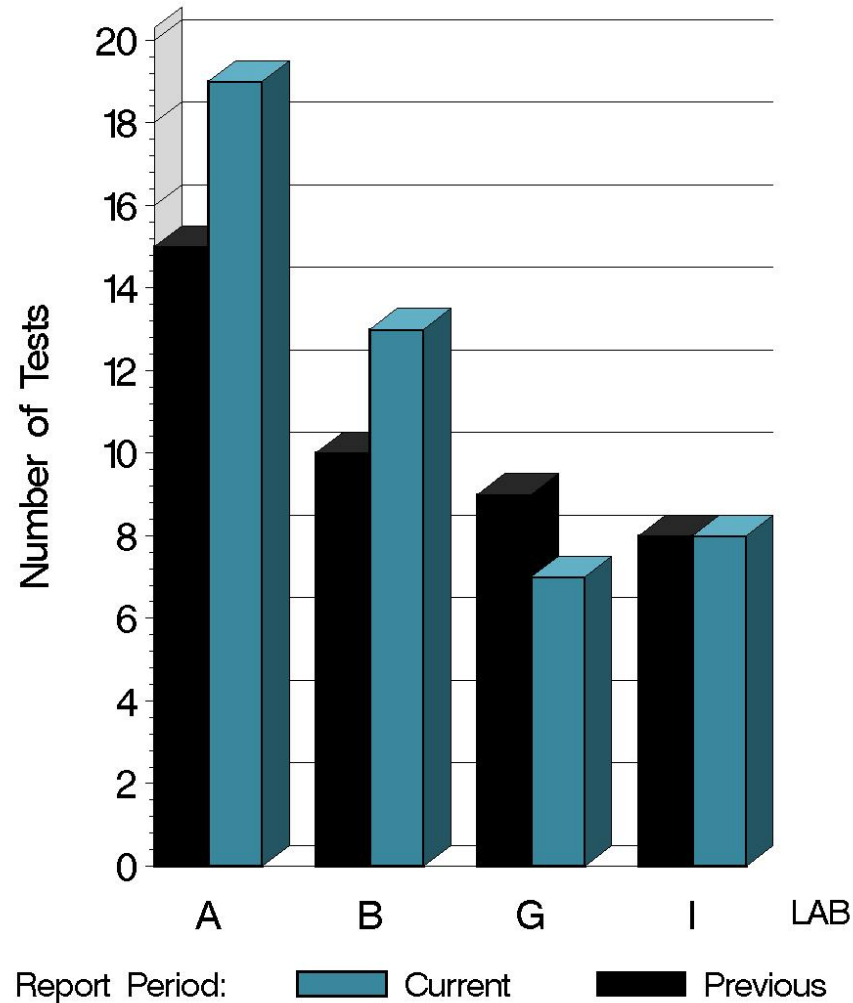
NUMBER OF SILICONE TESTS
REPORTED BY LAB AND REPORT PERIOD



15:01:37 16NOV2013

EOEC (D 7216)

NUMBER OF VAMAC TESTS REPORTED BY LAB AND REPORT PERIOD



15:01:37 16NOV2013

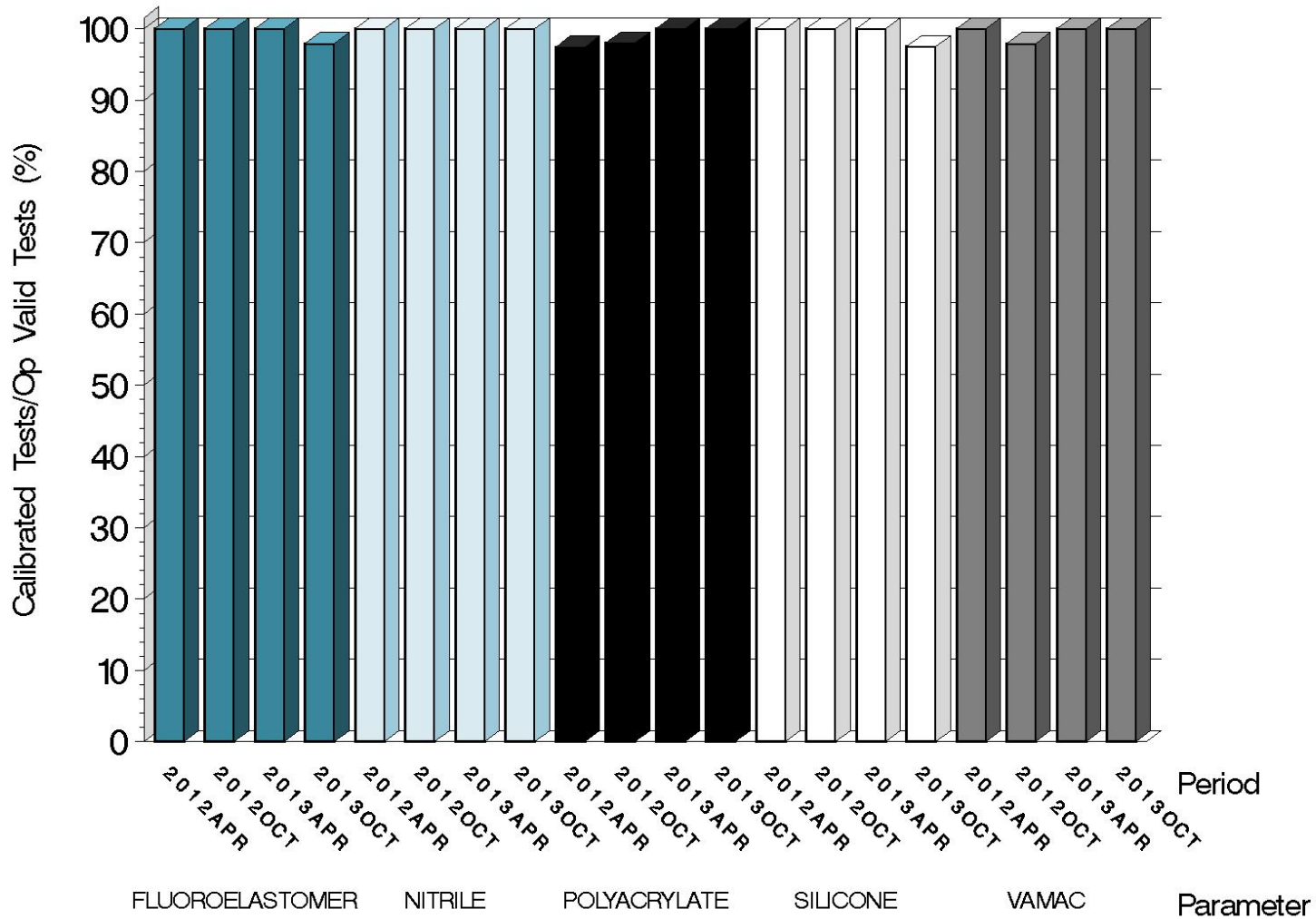
EOEC (D 7216)

Test Distribution by Oil and Validity

		Fluoroelastomer	Nitrile	Polyacrylate	Silicone	Vamac	This Period	Last Period
Accepted for Calibration	AC	48	48	49	39	46	230	225
Rejected	OC	1	0	0	1	0	2	0
Information Run	NI	0	0	0	0	0	0	0
Operationally Invalid (lab)	LC	0	0	0	0	0	0	3
Operationally Invalid (lab/TMC)	RC	0	0	0	0	0	0	0
Aborted Calibration	XC	4	1	1	2	1	9	0
Total		53	49	50	42	47	241	228

EOEC (D 7216)

OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA



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EOEC (D 7216)

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	21	0	0	21	0	0	21	0	0	15	0	0	19	0	0	97	0
B	1	11	9	1	11	9	1	11	9	1	10	10	1	13	8	5	56	9
G	2	11	18	0	9	0	0	9	0	1	9	11	0	7	0	3	45	7
I	1	10	10	0	8	0	0	9	0	0	8	0	0	8	0	1	43	2
Total	4	53	8	1	49	2	1	50	2	2	42	5	1	47	2	9	241	4

EOEC (D 7216)

CAUSES FOR LOST TESTS

Lab	Cause	Elastomer					Validity			Loss Rate		
		Fluoroelastomer	Nitrile	Polyacrylate	Silicone	VAMAC	LC	RC	XC	Lost	Starts	%
B	Power Failure	•	•	•	•	•			•	5	56	9
G	Bath Failure	•			•				•	2	45	4
	Wrong Material Run	•							•	1		2
I	Bath Failure	•							•	1	43	2
	Lost	4	1	1	2	1	0	0	9			
	Starts	53	49	50	42	47	241	241	241			
	%	8	2	2	5	2	0	0	4			

Lost tests are calibration attempts that were either aborted or operationally invalid

EOEC (D 7216)

Average Δ 's by Lab						
Elastomer	Lab	n	VOLCYI	HARDYI	TENSYI	ELONYI
Fluoroelastomer	A	21	0.103	0.340	-0.488	-0.618
	B	10	-0.804	0.364	-0.138	-0.632
	G	9	-0.653	-0.591	0.783	-0.236
	I	9	-0.285	0.318	0.285	-0.315
	Industry	49	-0.292	0.170	-0.041	-0.495
Nitrile	A	21	1.167	1.263	0.212	-0.074
	B	10	1.383	0.977	-0.329	-0.214
	G	9	1.083	0.626	-0.889	-0.796
	I	8	1.927	1.175	-0.408	-0.581
	Industry	48	1.323	1.069	-0.211	-0.323
Polyacrylate	A	21	1.106	-0.034	-0.142	0.908
	B	10	1.345	-0.106	-0.269	0.687
	G	9	1.167	1.209	-0.027	1.259
	I	9	1.814	0.469	-0.204	0.414
	Industry	49	1.296	0.272	-0.158	0.837
Silicone	A	15	-0.390	0.201	0.206	0.730
	B	9	0.785	0.183	-0.697	-0.530
	G	8	0.339	2.260	0.085	0.590
	I	8	0.552	0.177	-1.139	-0.477
	Industry	40	0.208	0.604	-0.290	0.177
VAMAC	A	19	-0.481	-1.990	0.430	0.182
	B	12	-0.116	-1.067	-0.004	-0.220
	G	7	-0.139	1.089	-0.465	-0.645
	I	8	-0.139	-2.295	0.026	-1.049
	Industry	46	-0.274	-1.334	0.110	-0.263

EOEC (D 7216)

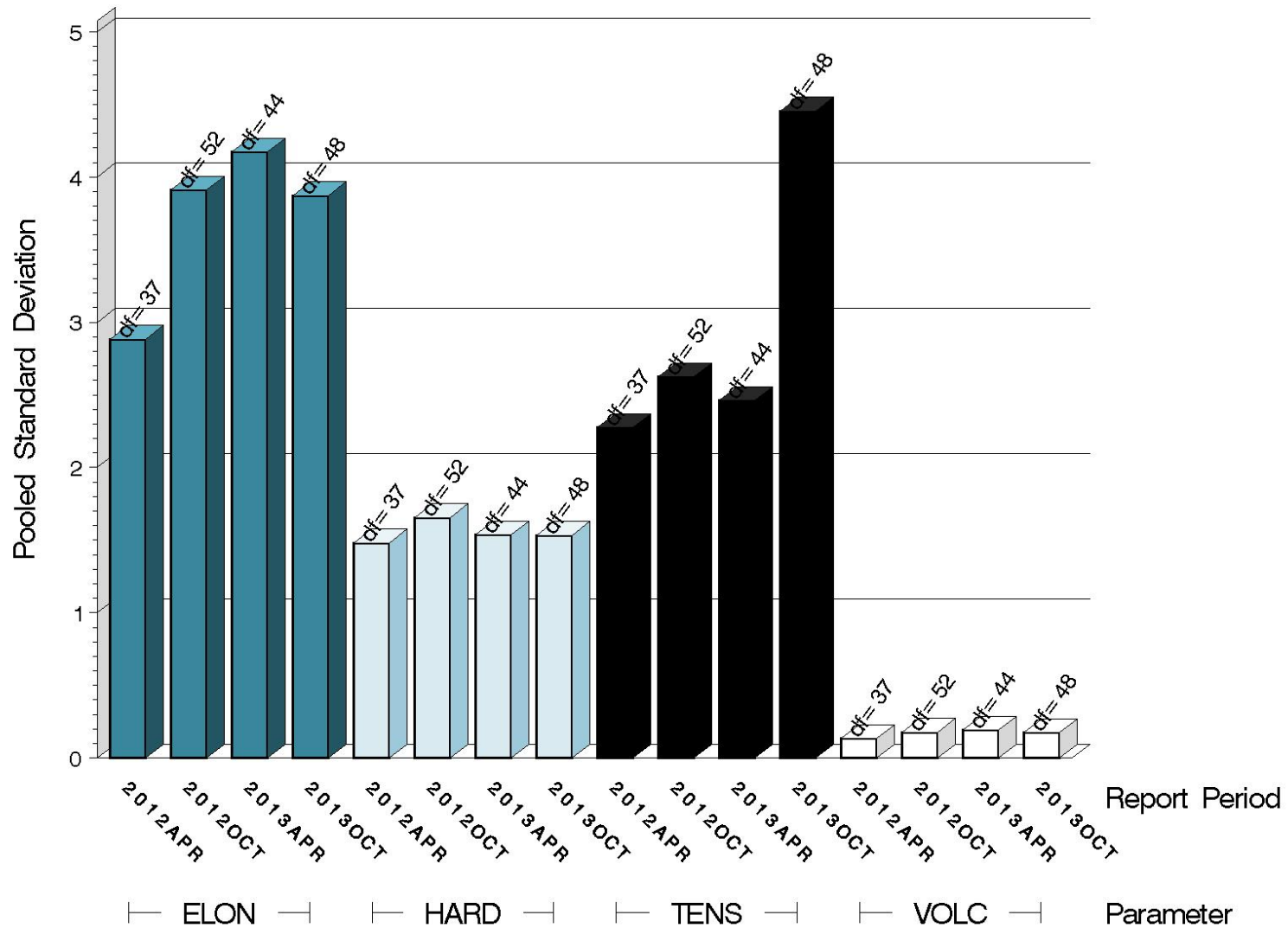
Individual test results can be viewed at the links shown in the following table:

<i>Links to Individual Test Result Data</i>	
Elastomer Type	Web Link to Data
Fluoroelastomer	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecf/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/

EOEC (D 7216)

FLUOROELASTOMER TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD

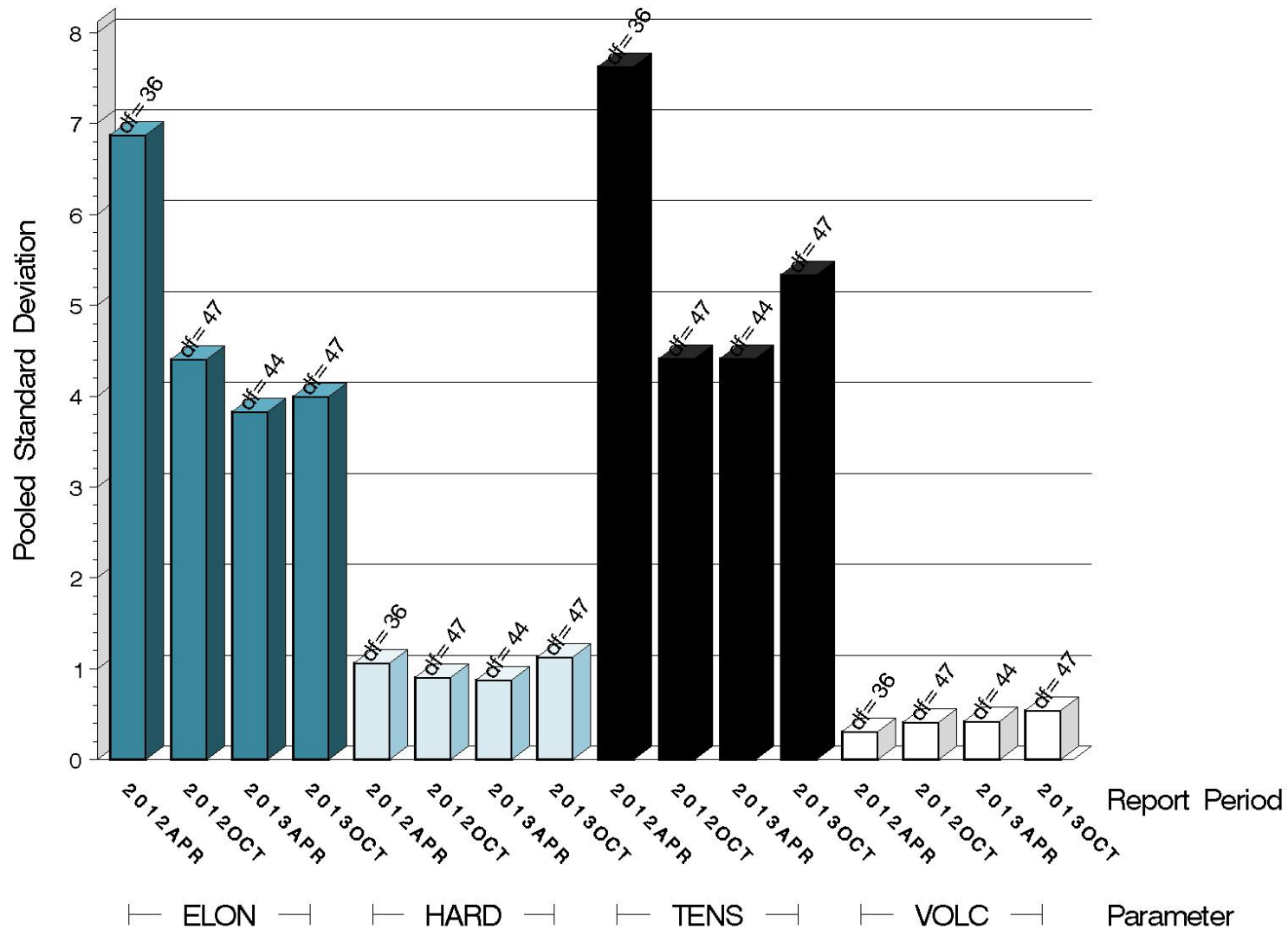


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EOEC (D 7216)

NITRILE TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD

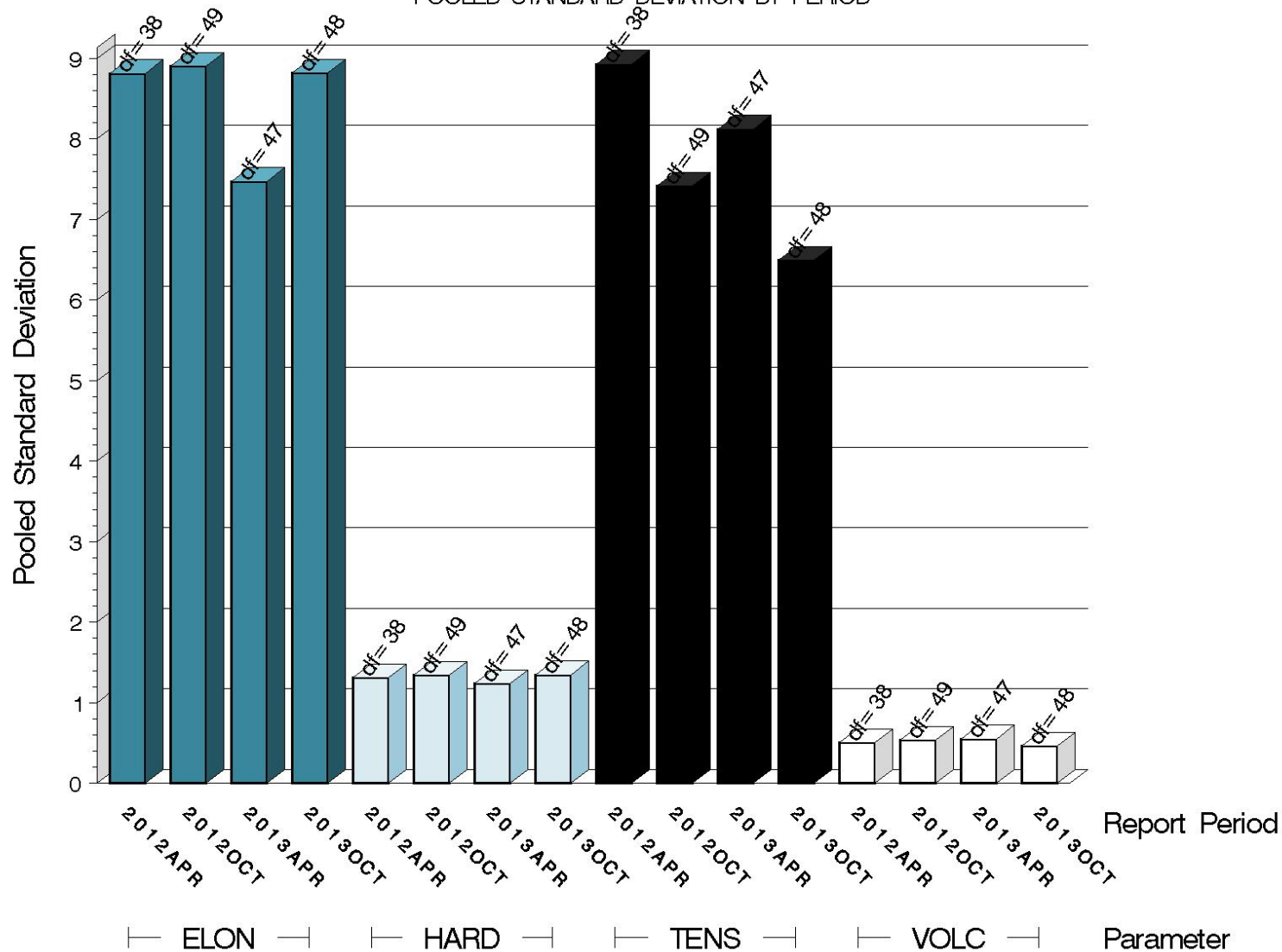


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EOEC (D 7216)

POLYACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD



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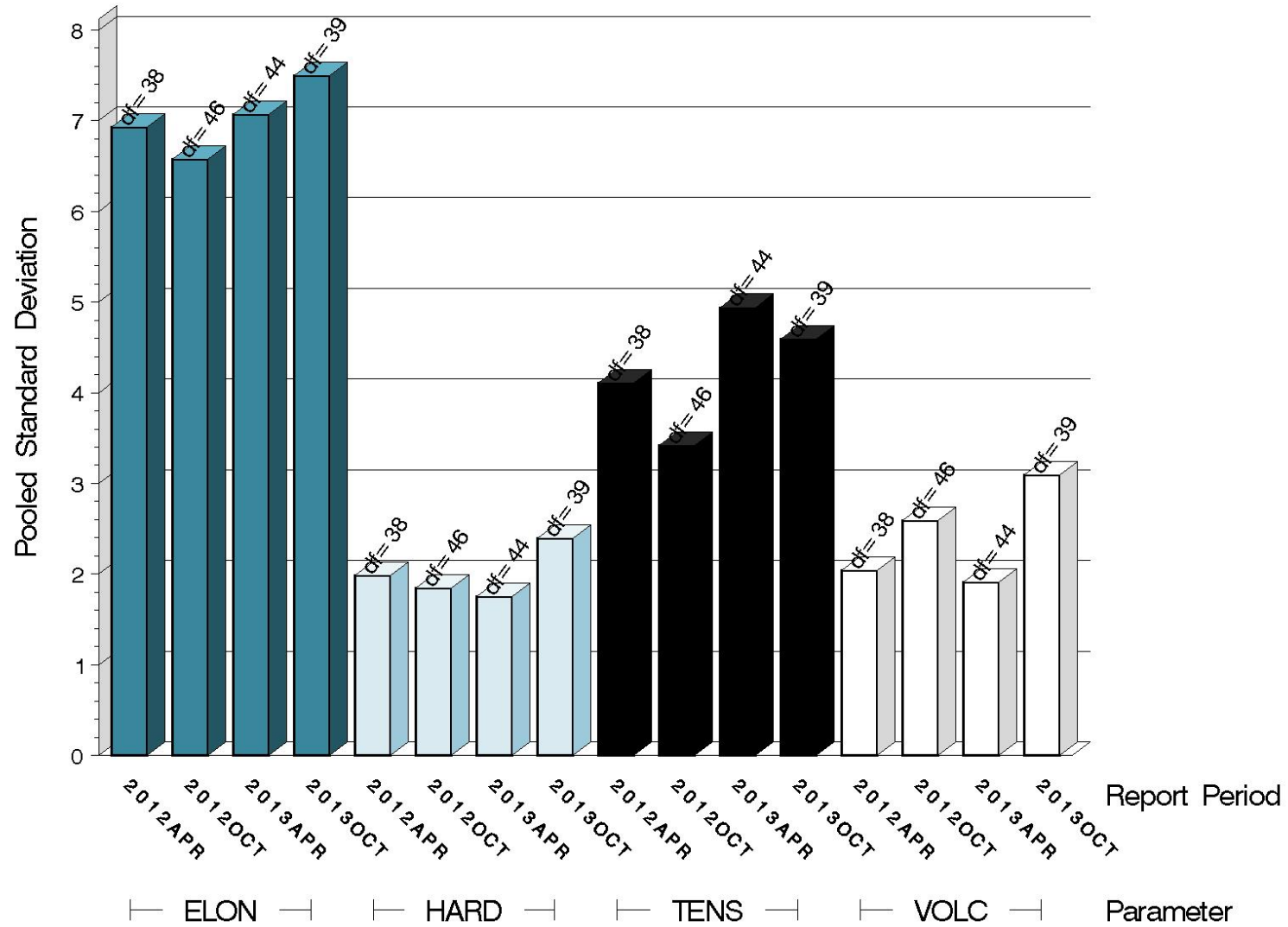


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EOEC (D 7216)

SILICONE TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD

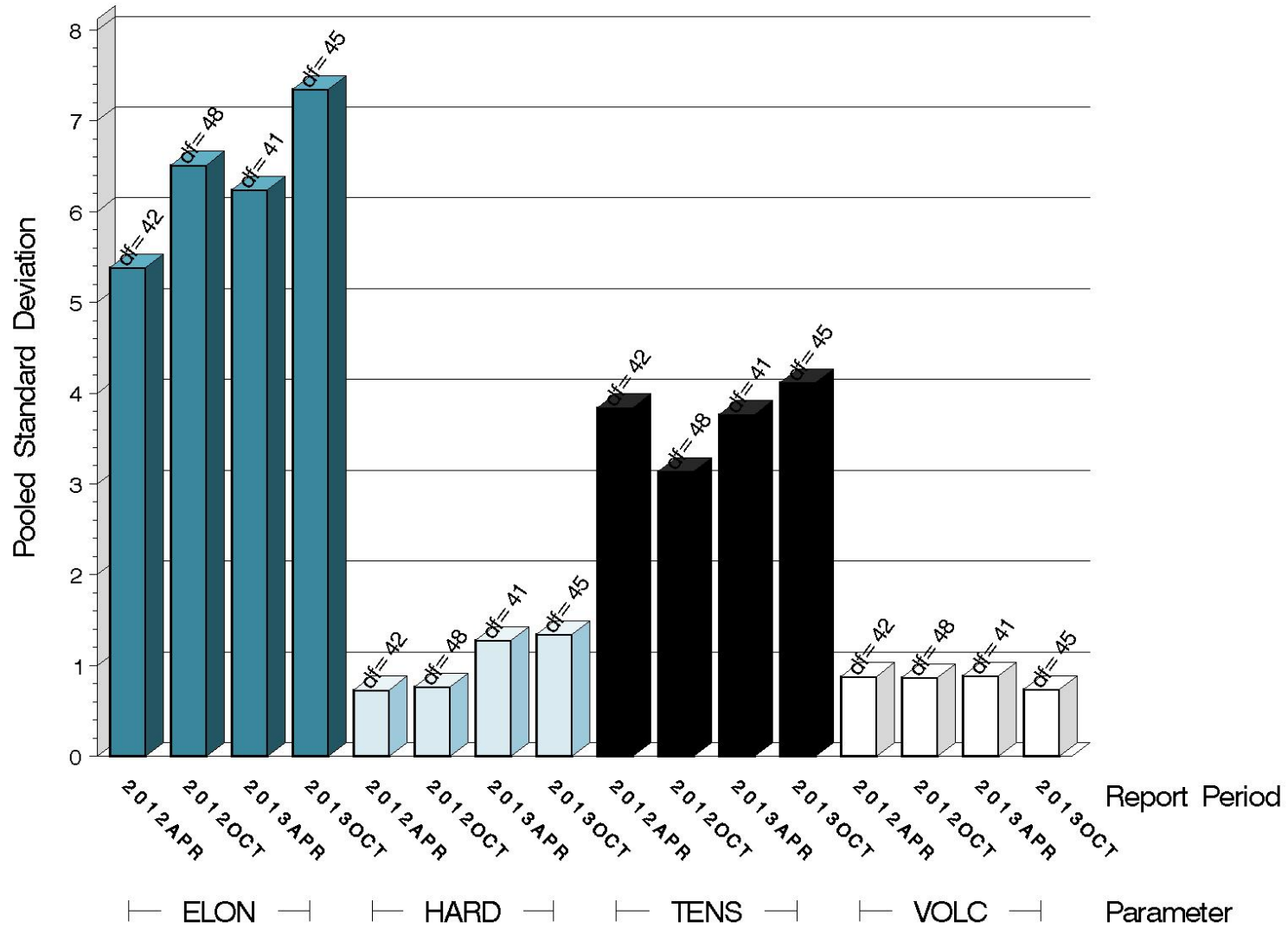


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EOEC (D 7216)

VAMAC TEST PRECISION

POOLED STANDARD DEVIATION BY PERIOD



15:01:37 16NOV2013

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EOEC (D 7216)

SUMMARY OF SEVERITY & PRECISION

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	Mild	Mild
Polyacrylate	Severe	Within limits	Within limits	Severe
Silicone	Within limits	Within limits	Within limits	Within limits
VAMAC	Mild	Mild	Within limits	Within limits

EOEC (D 7216)

SUMMARY OF SEVERITY & PRECISION (continued)

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	Within limits	Within limits	Within limits	Within limits
VAMAC	Within limits	Within limits	Within limits	Within limits

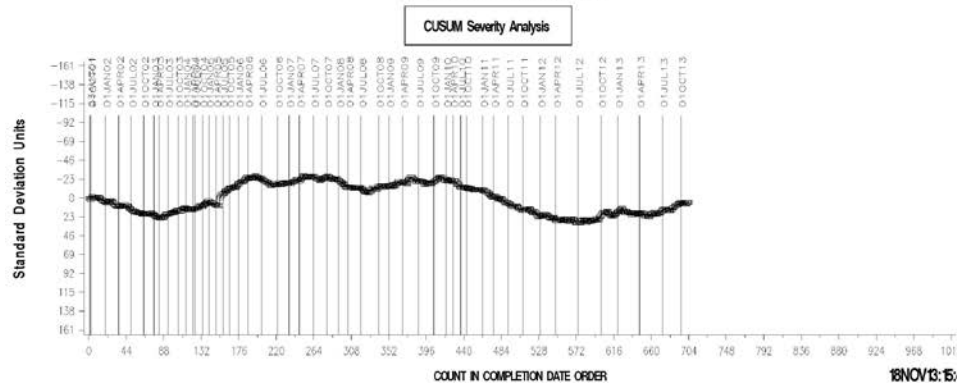
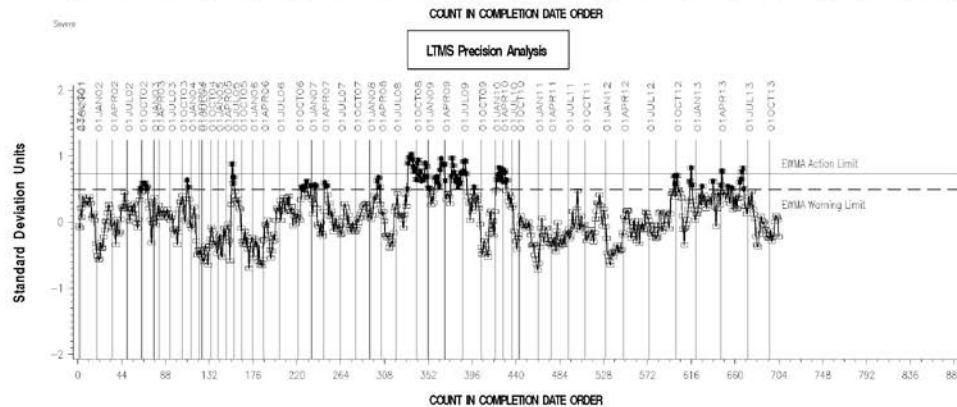
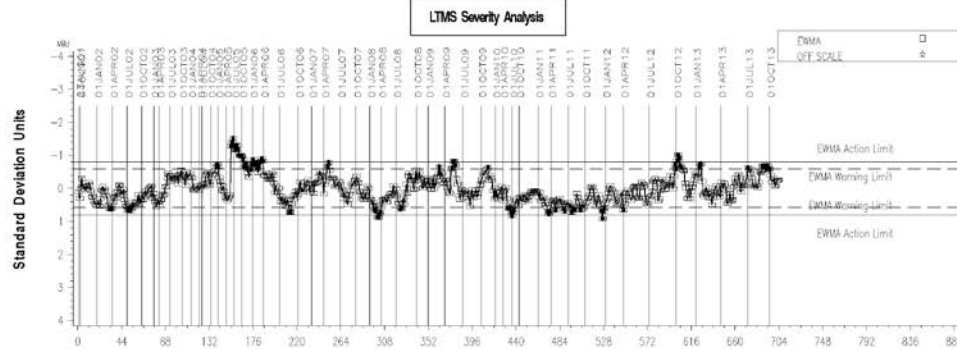
Industry control charts follow.

EOEC (D 7216)

EOEC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



FLUOROELASTOMER VOLUME CHANGE AVG.



18NOV13:15:47

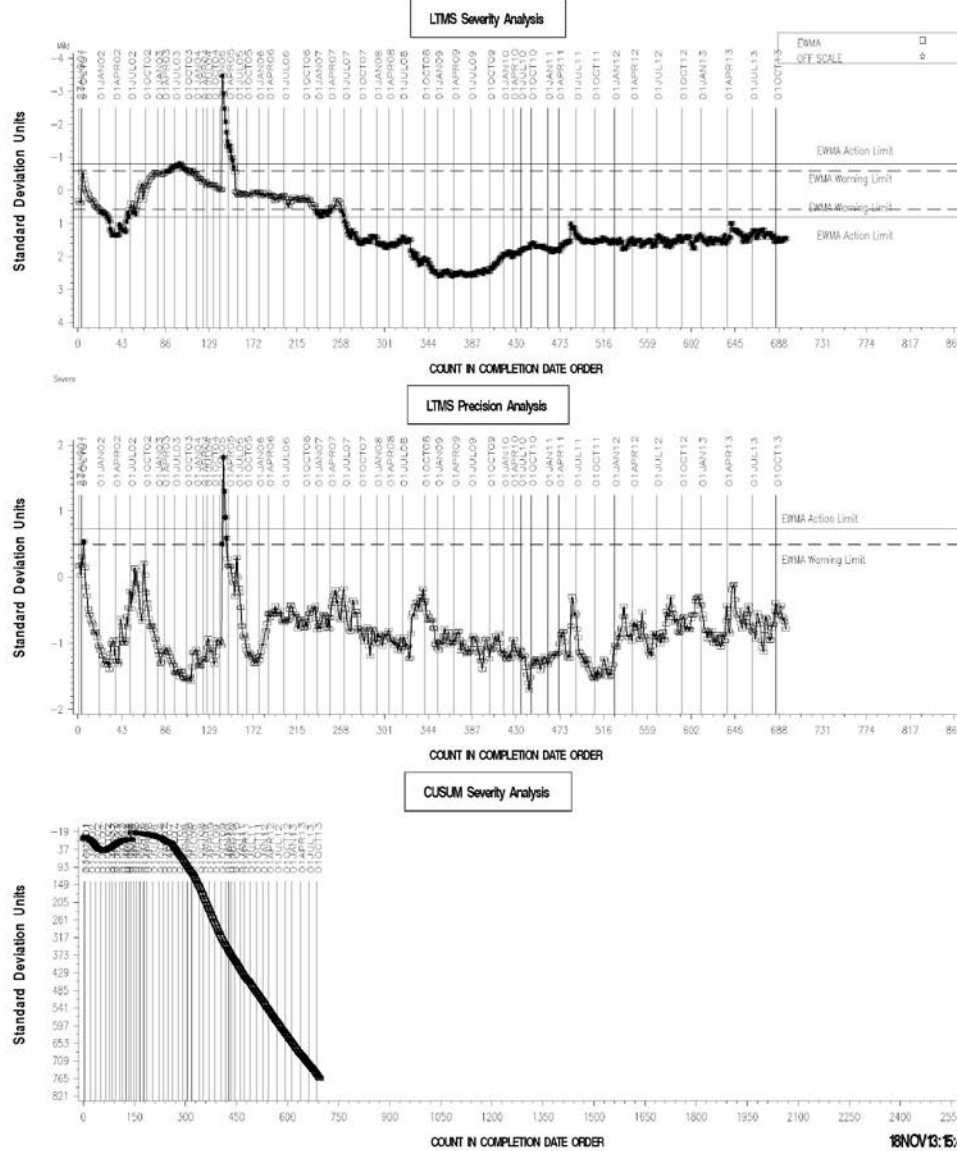


EOEC (D 7216)

EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE NITRILE VOLUME CHANGE AVERAGE

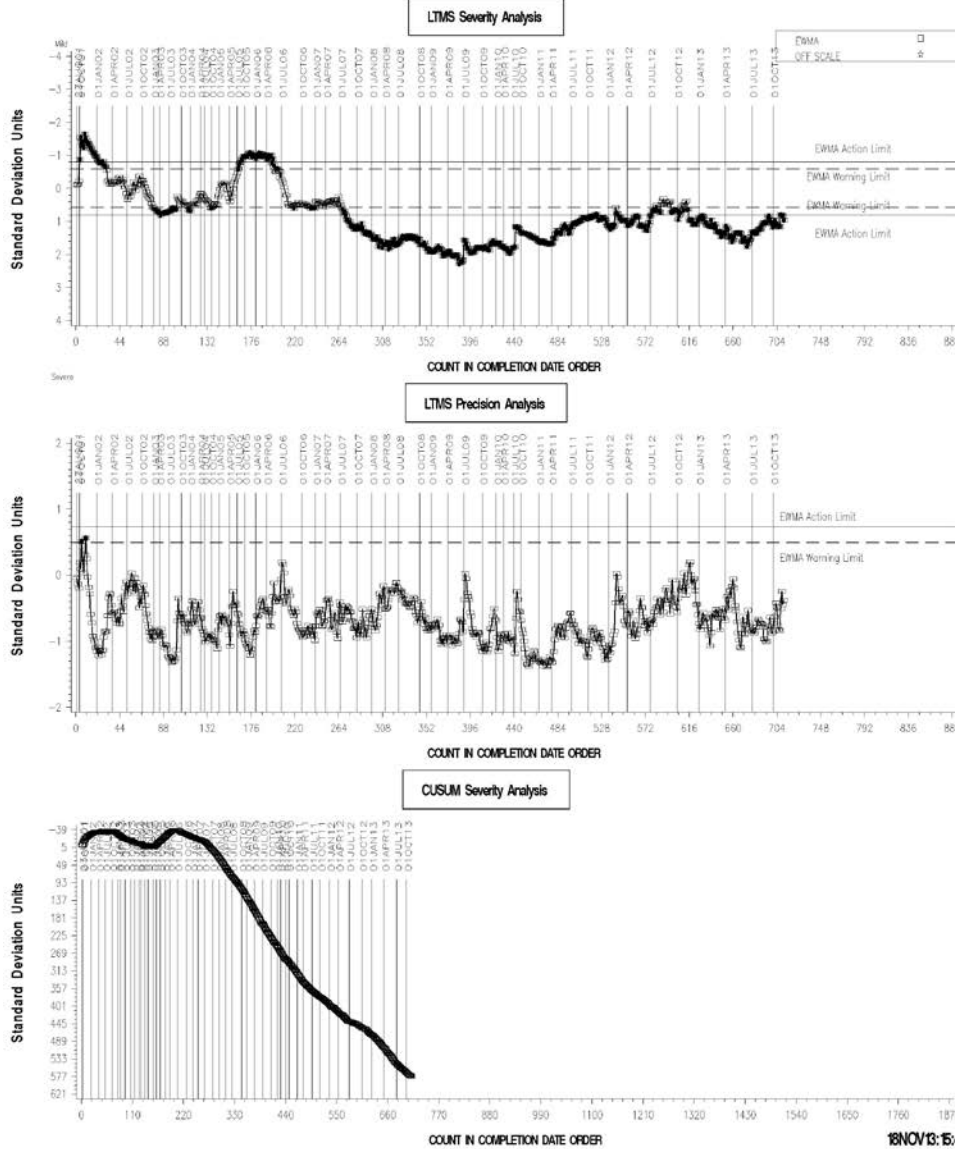


EOEC (D 7216)

EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE POLYACRYLATE VOLUME CHANGE AVERAGE



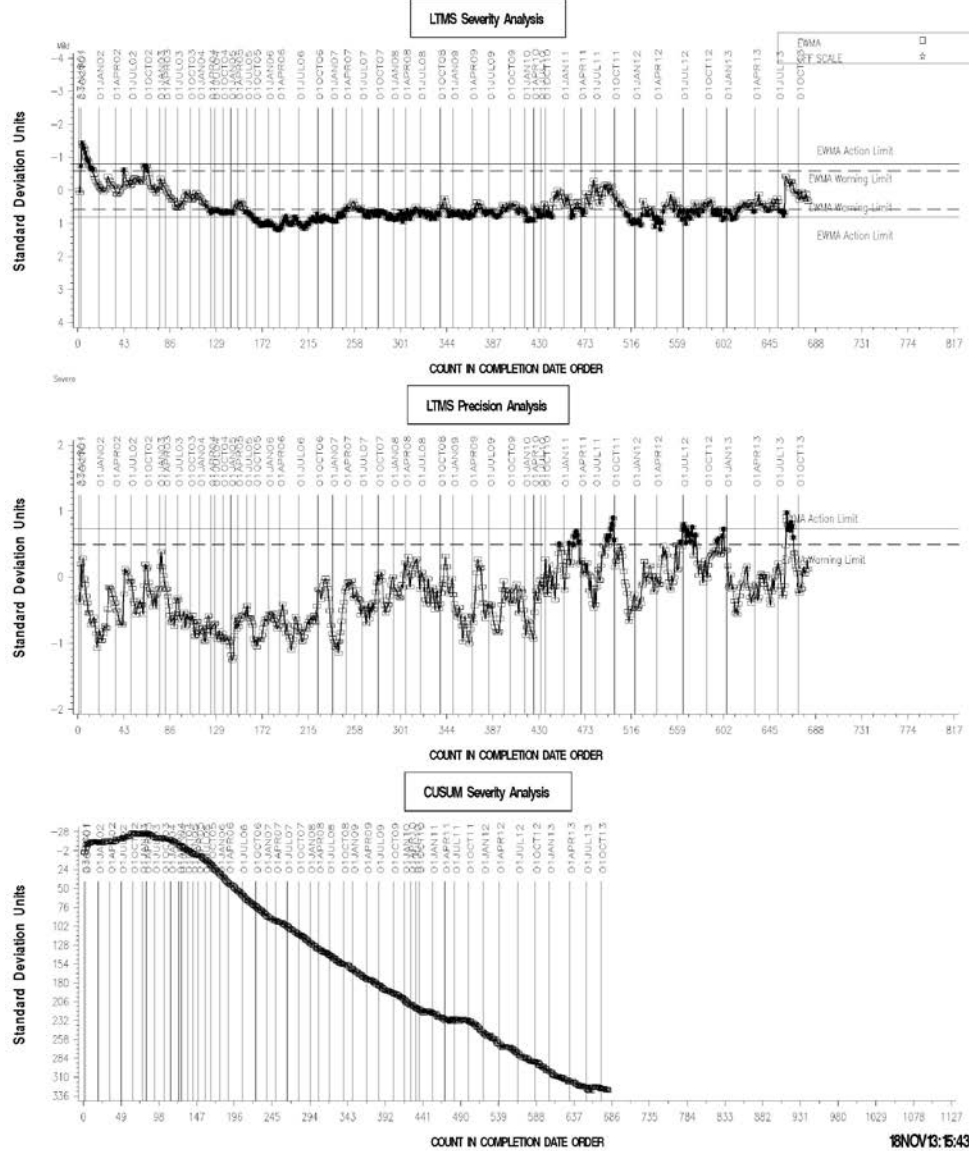
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EOEC (D 7216)

EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE SILICON VOLUME CHANGE AVERAGE

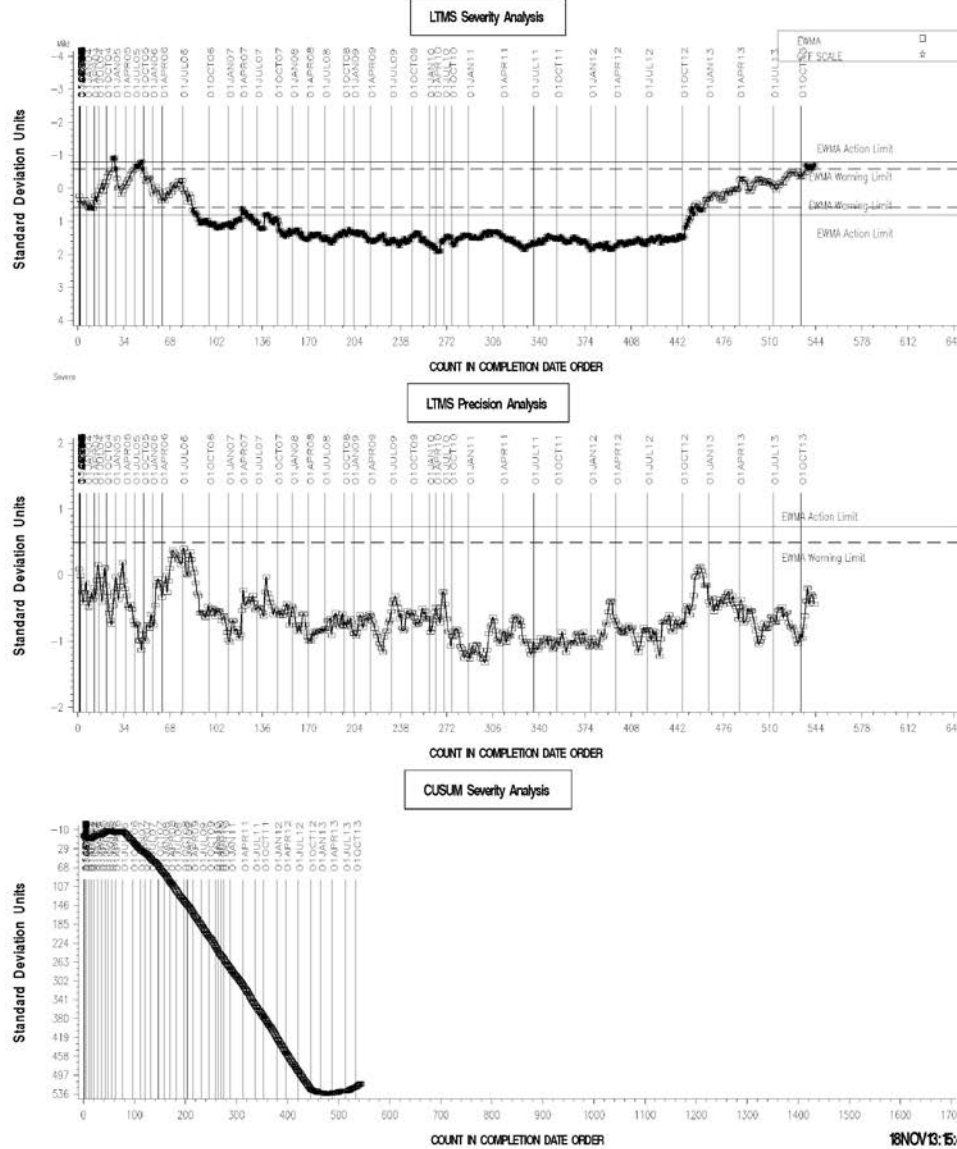


EOEC (D 7216)

EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA



REFERENCE VAMAC G VOLUME CHANGE AVERAGE

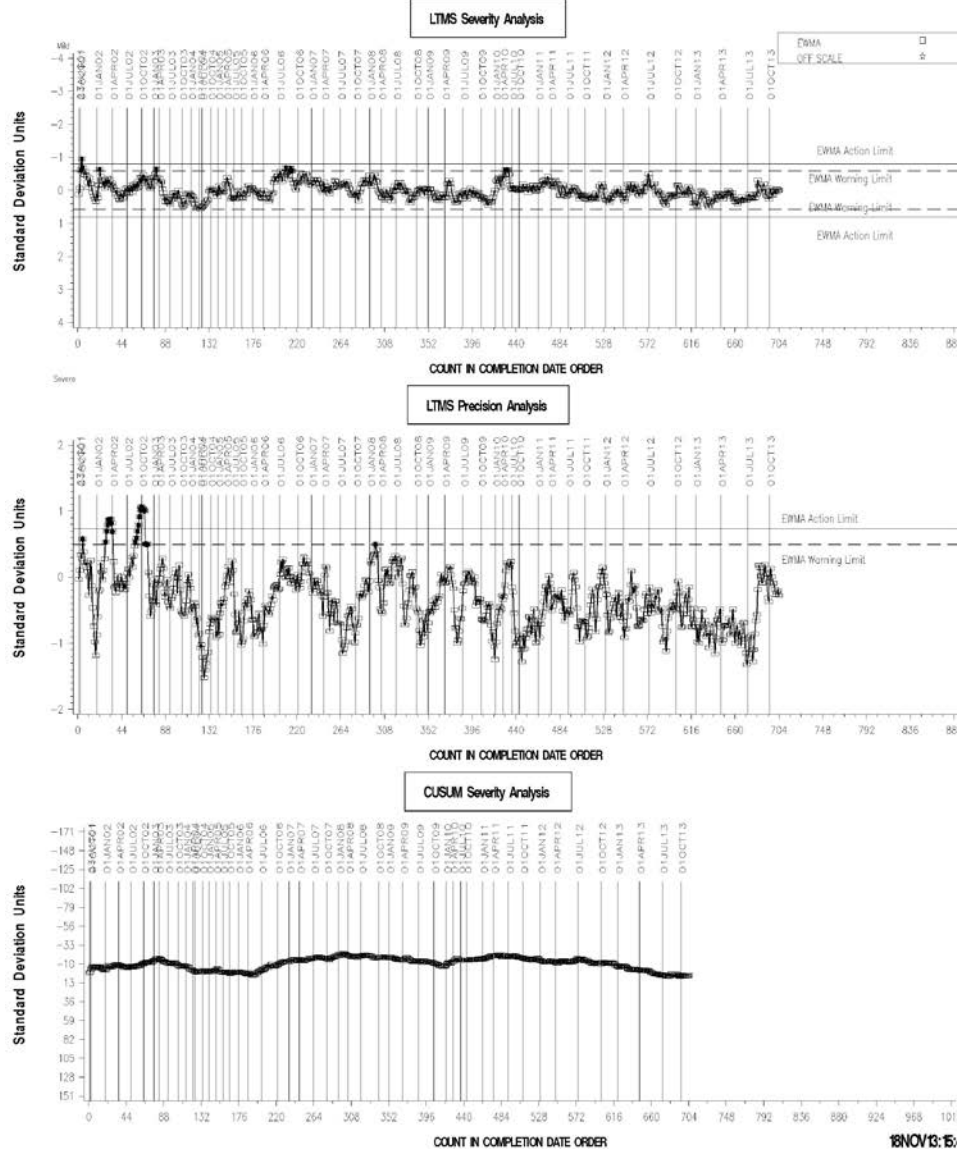


EOEC (D 7216)

EOEC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



FLUOROELASTOMER POINTS HARDNESS CHANGE

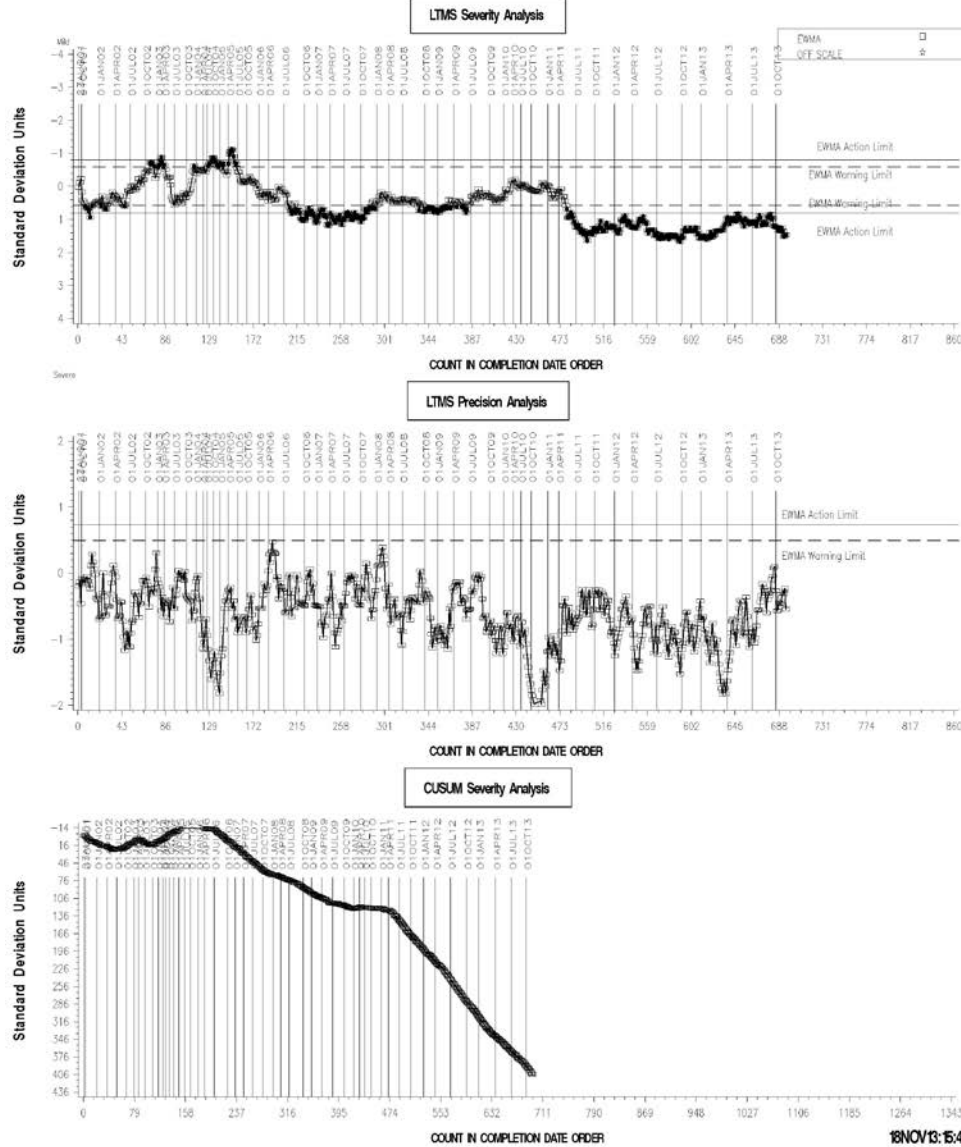


EOEC (D 7216)

EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE NITRILE POINTS HARDNESS CHANGE AVERAGE



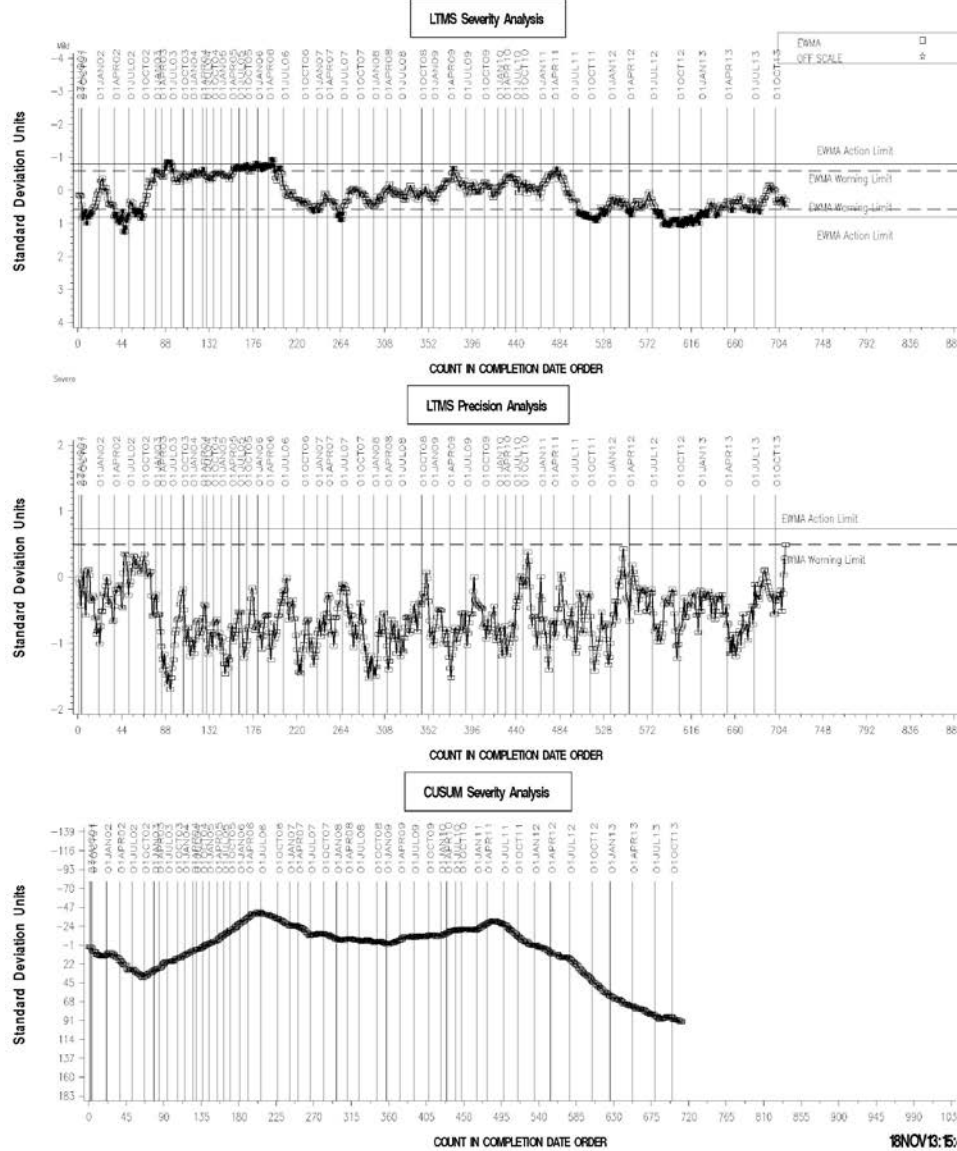
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EOEC (D 7216)

EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE POLYACRYLATE POINTS HARDNESS CHANGE AVER

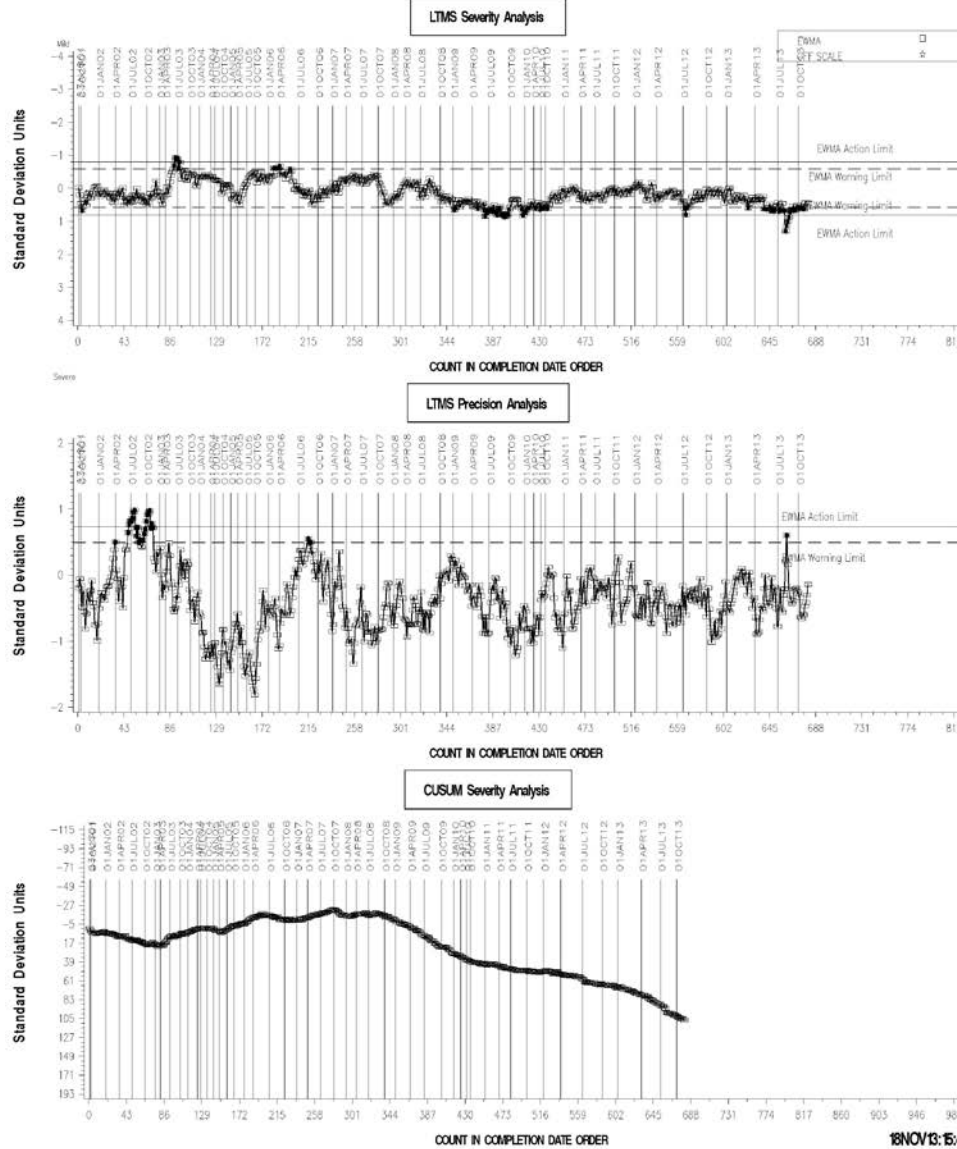


EOEC (D 7216)

EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE SILICON POINTS HARDNESS CHANGE AVERAGE

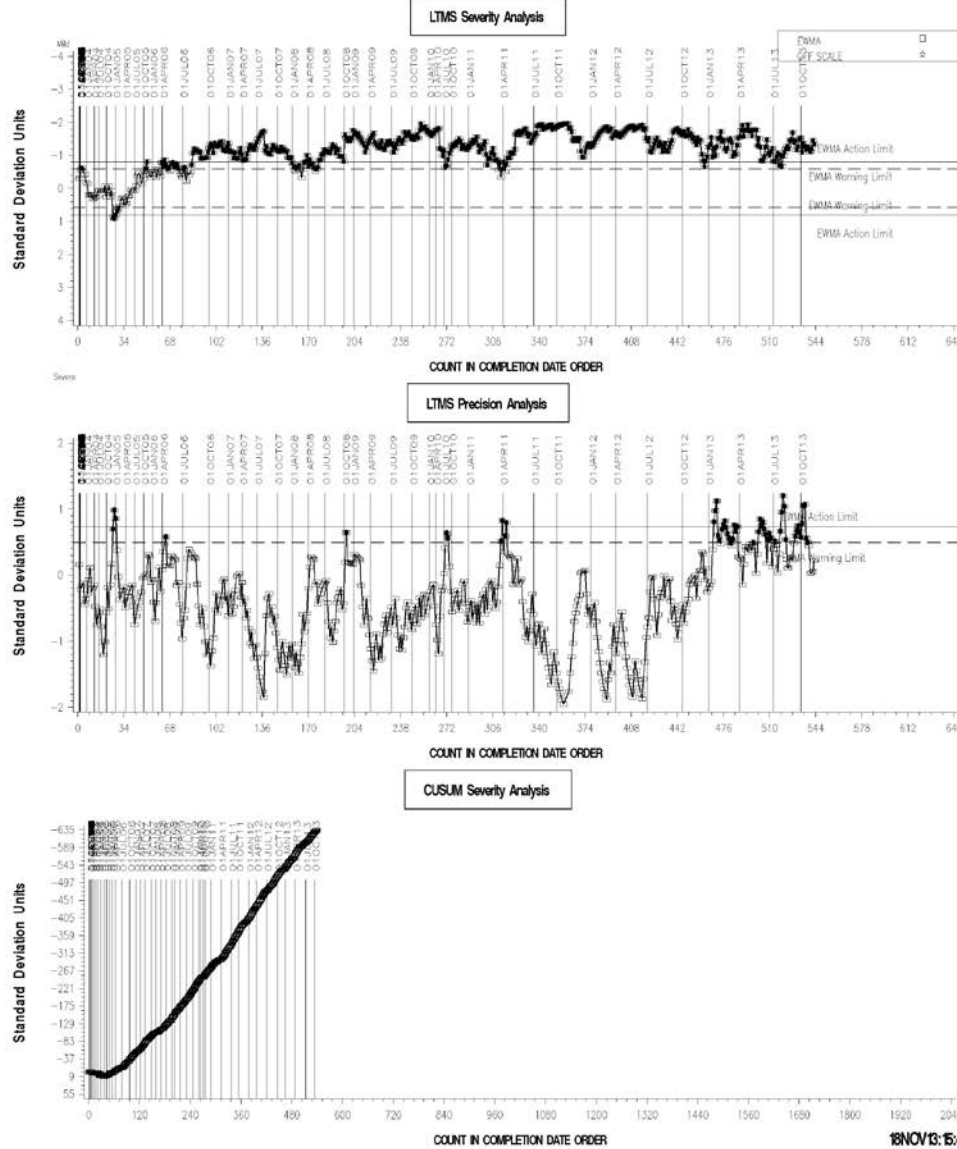


EOEC (D 7216)

EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA



REFERENCE VAMAC G POINTS HARDNESS CHANGE AVERAGE

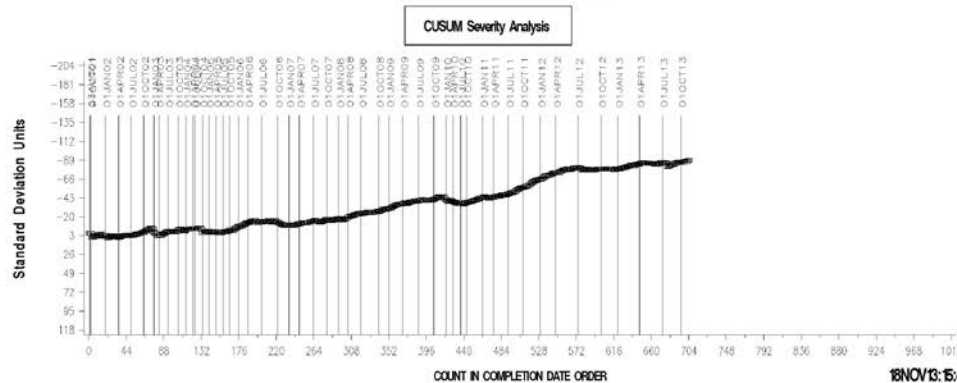
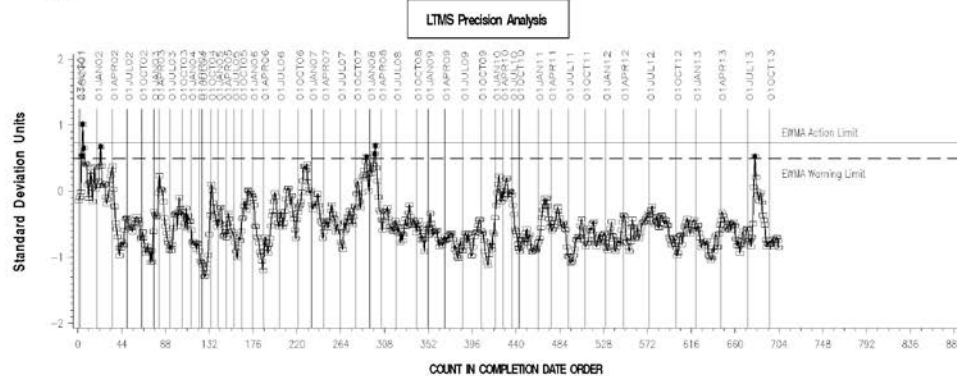
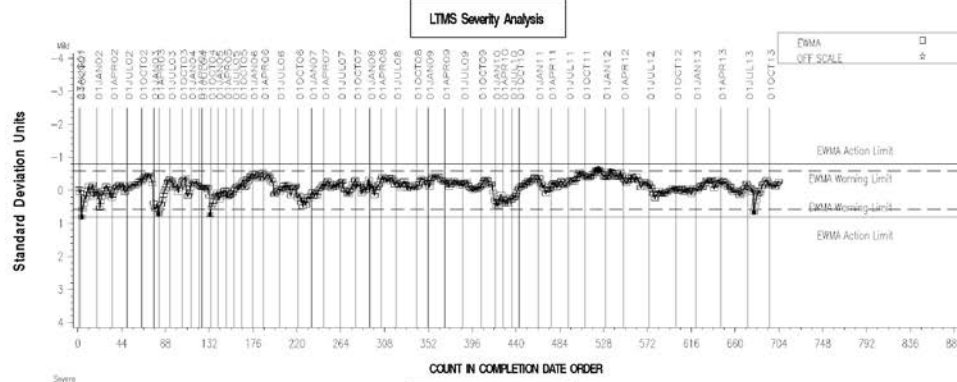


EOEC (D 7216)

EOEC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



FLUOROELASTOMER TENSILE STRENGTH CHANGE



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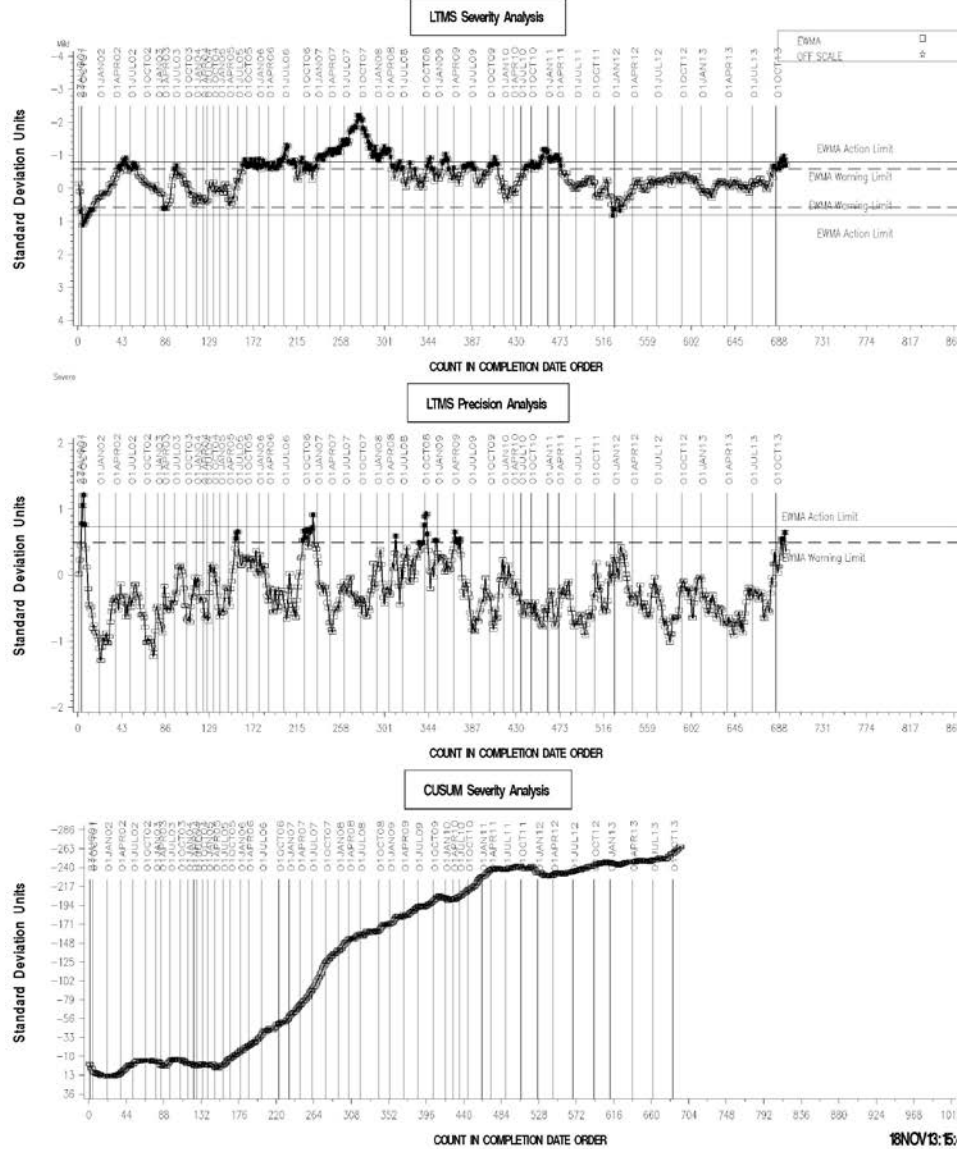
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EOEC (D 7216)

EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE NITRILE TENSILE STRENGTH CHANGE AVERAGE

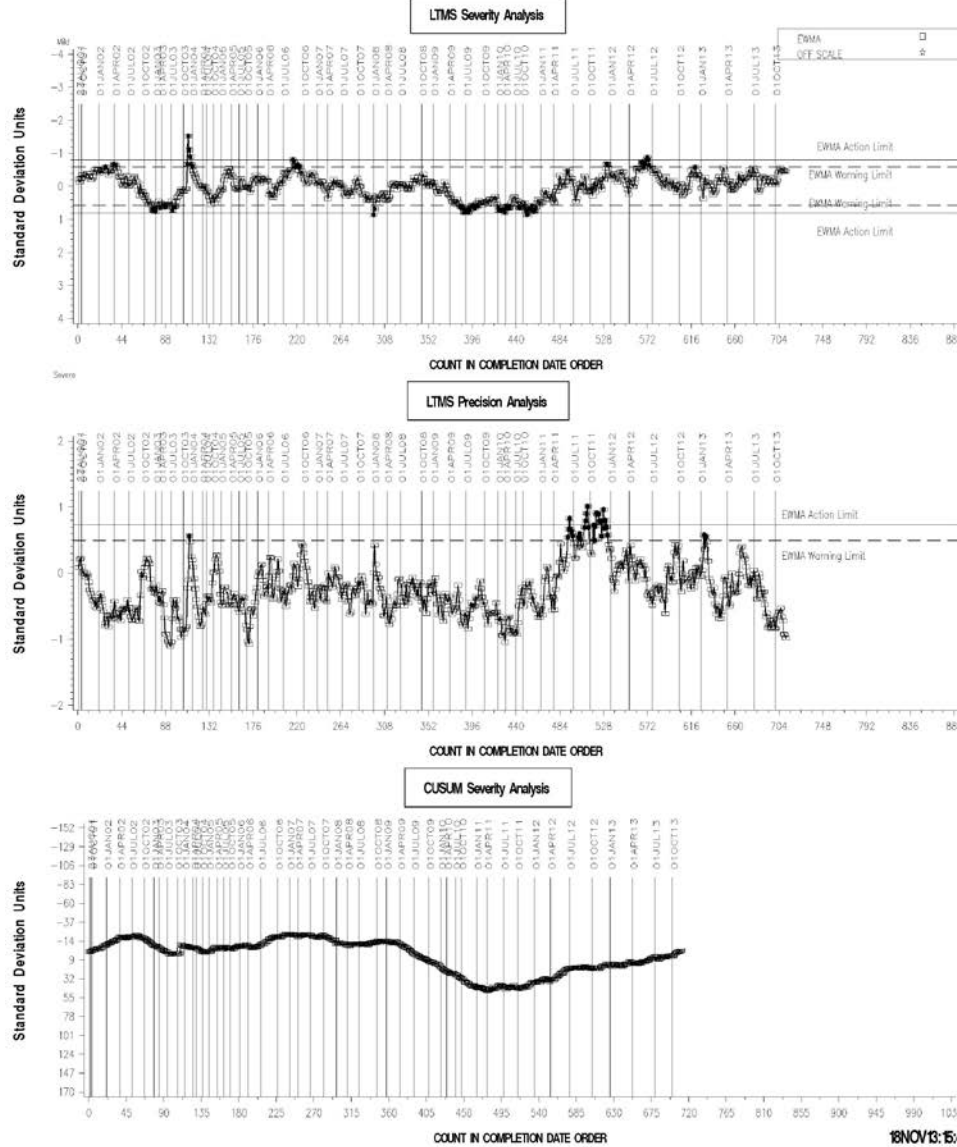


EOEC (D 7216)

EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE POLYACRYLATE TENSILE STRENGTH CHANGE AVE

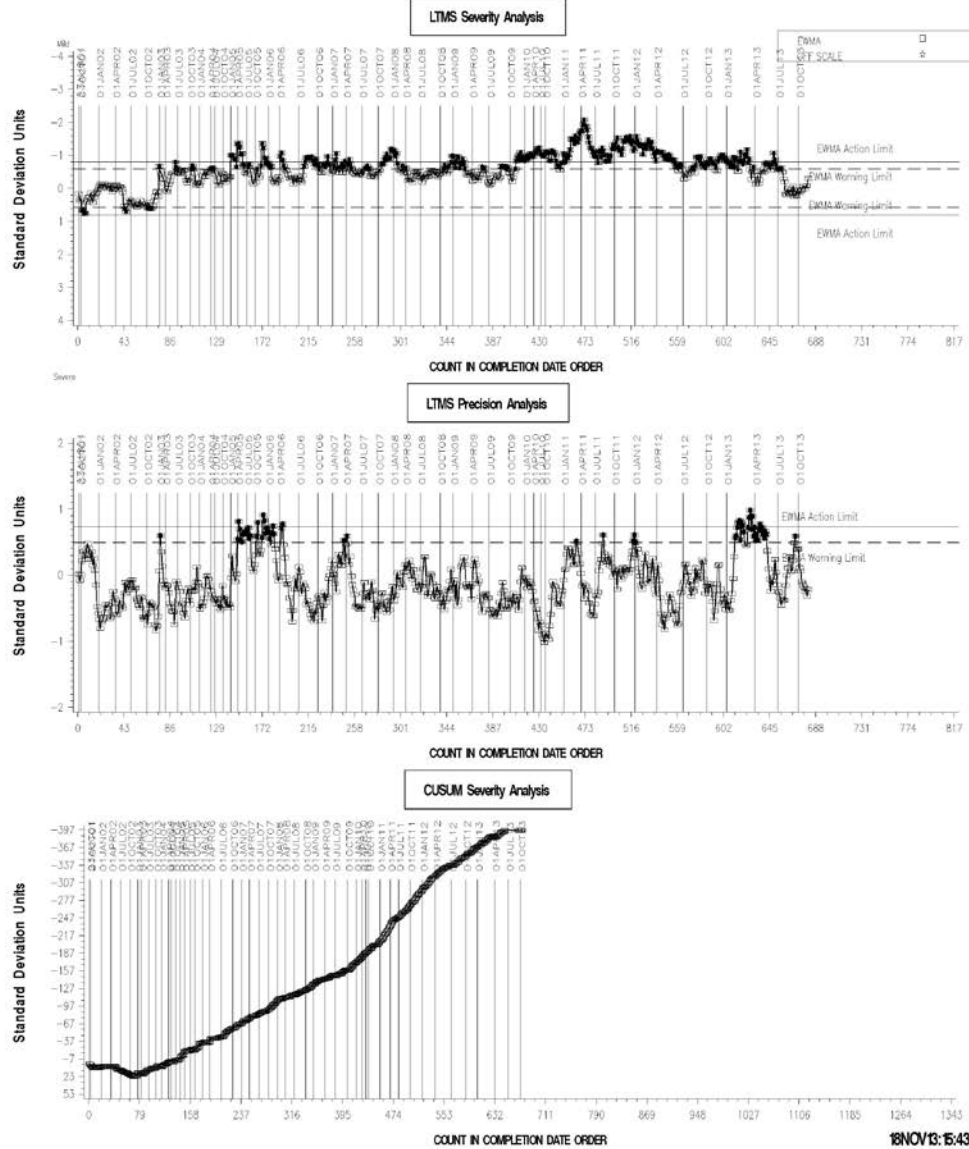


EOEC (D 7216)

EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE SILICON TENSILE STRENGTH CHANGE AVERAGE

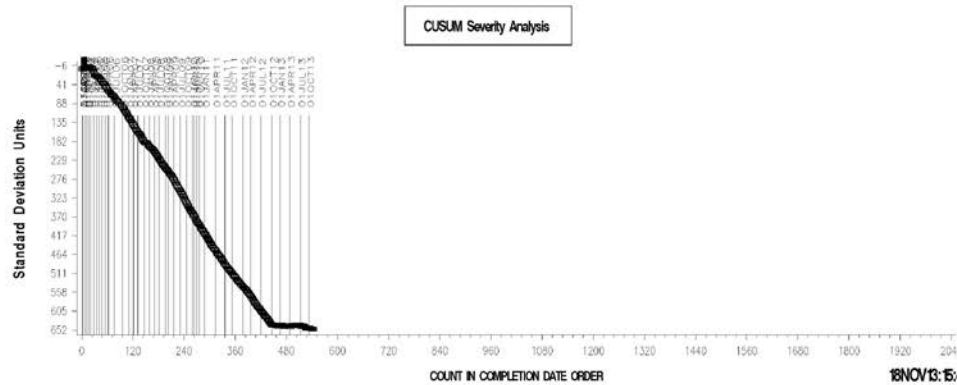
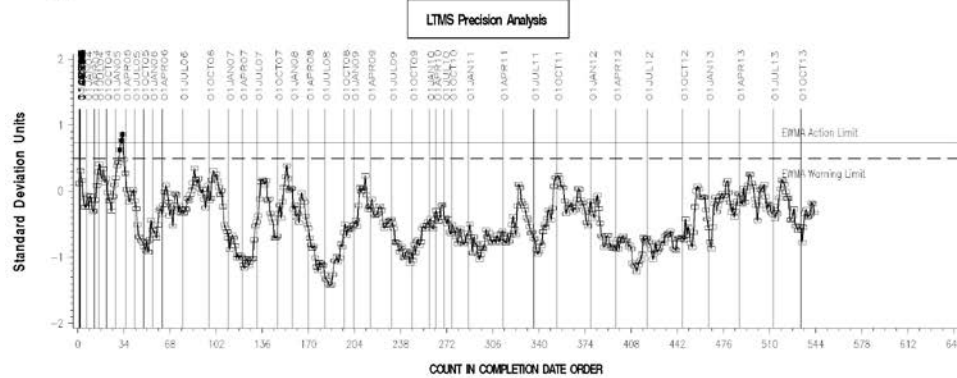
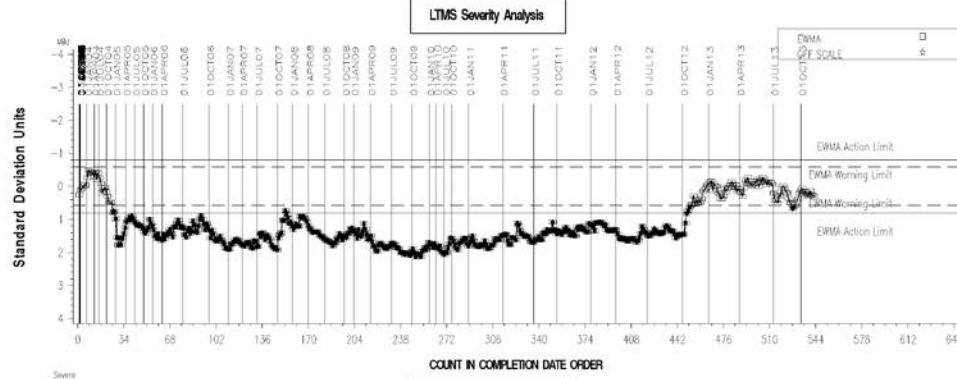


EOEC (D 7216)

EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA



REFERENCE VAMAC G TENSILE STRENGTH CHANGE AVERAGE



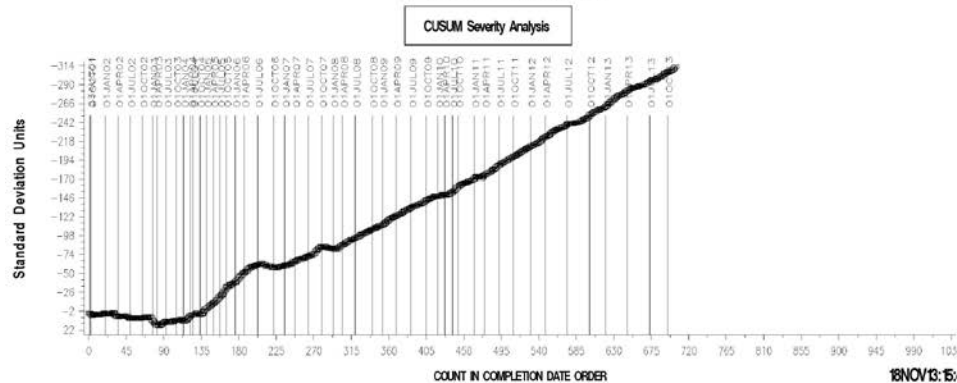
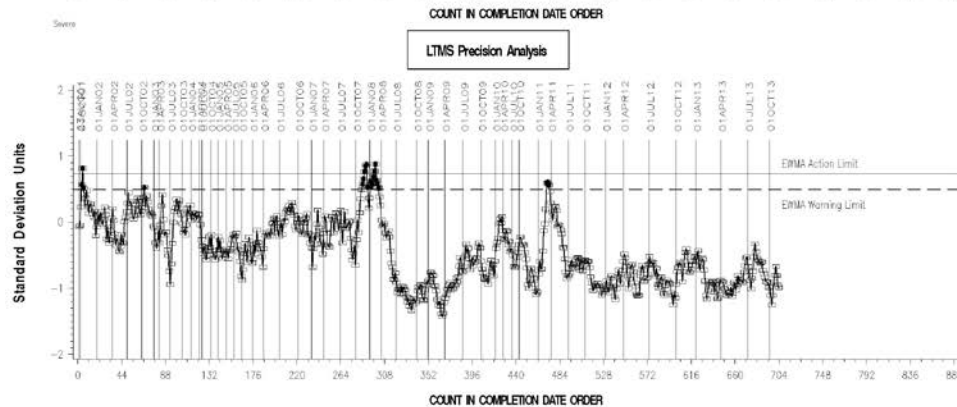
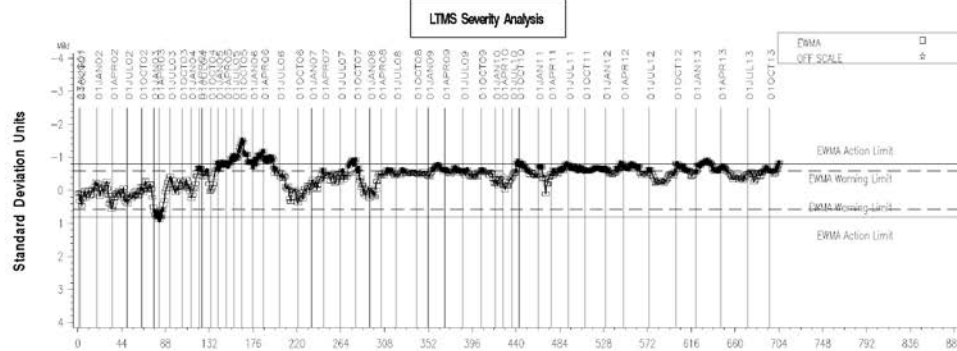
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EOEC (D 7216)

EOEC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



FLUOROELASTOMER ELONGATION CHANGE AVG.

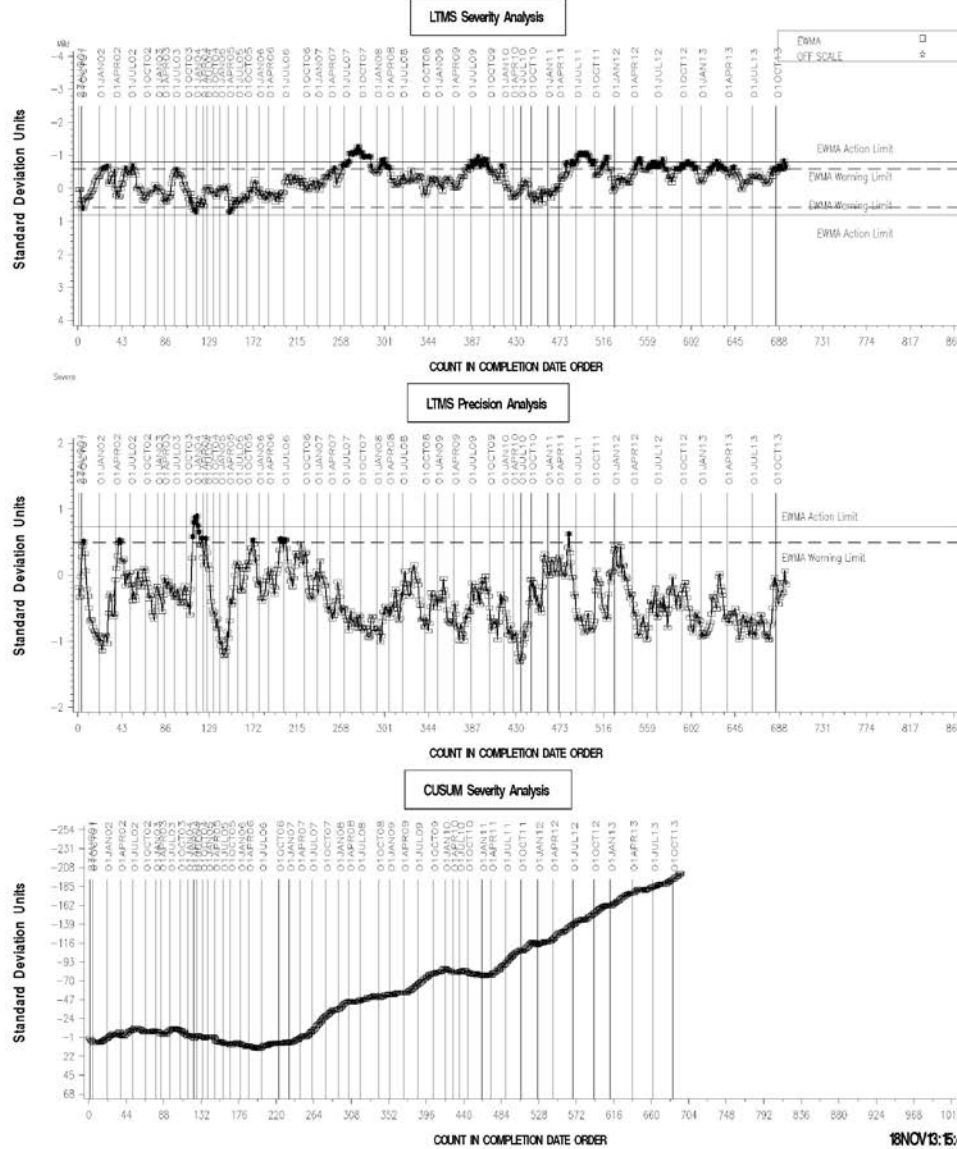


EOEC (D 7216)

EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE NITRILE ELONGATION CHANGE AVERAGE

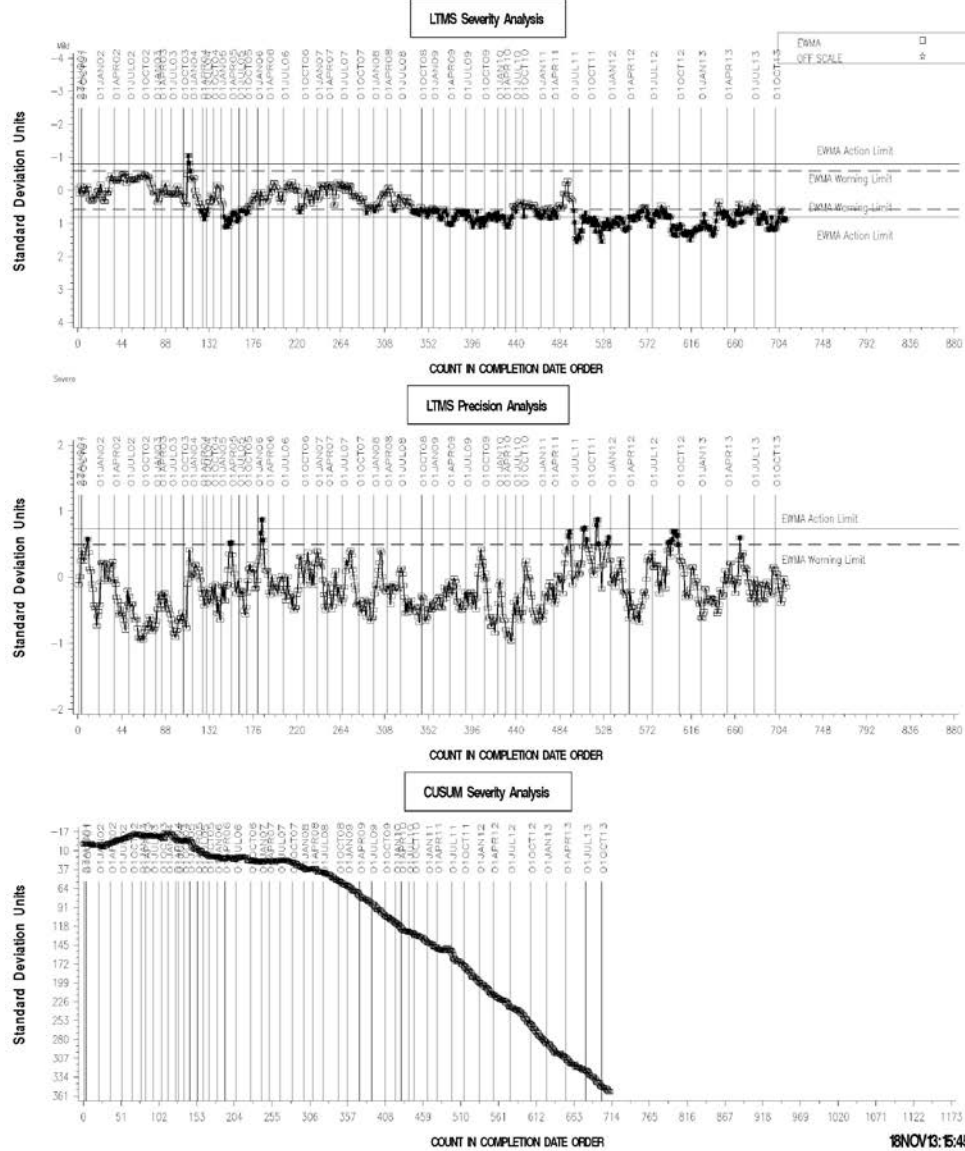


EOEC (D 7216)

EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE POLYACRYLATE ELONGATION CHANGE AVERAGE

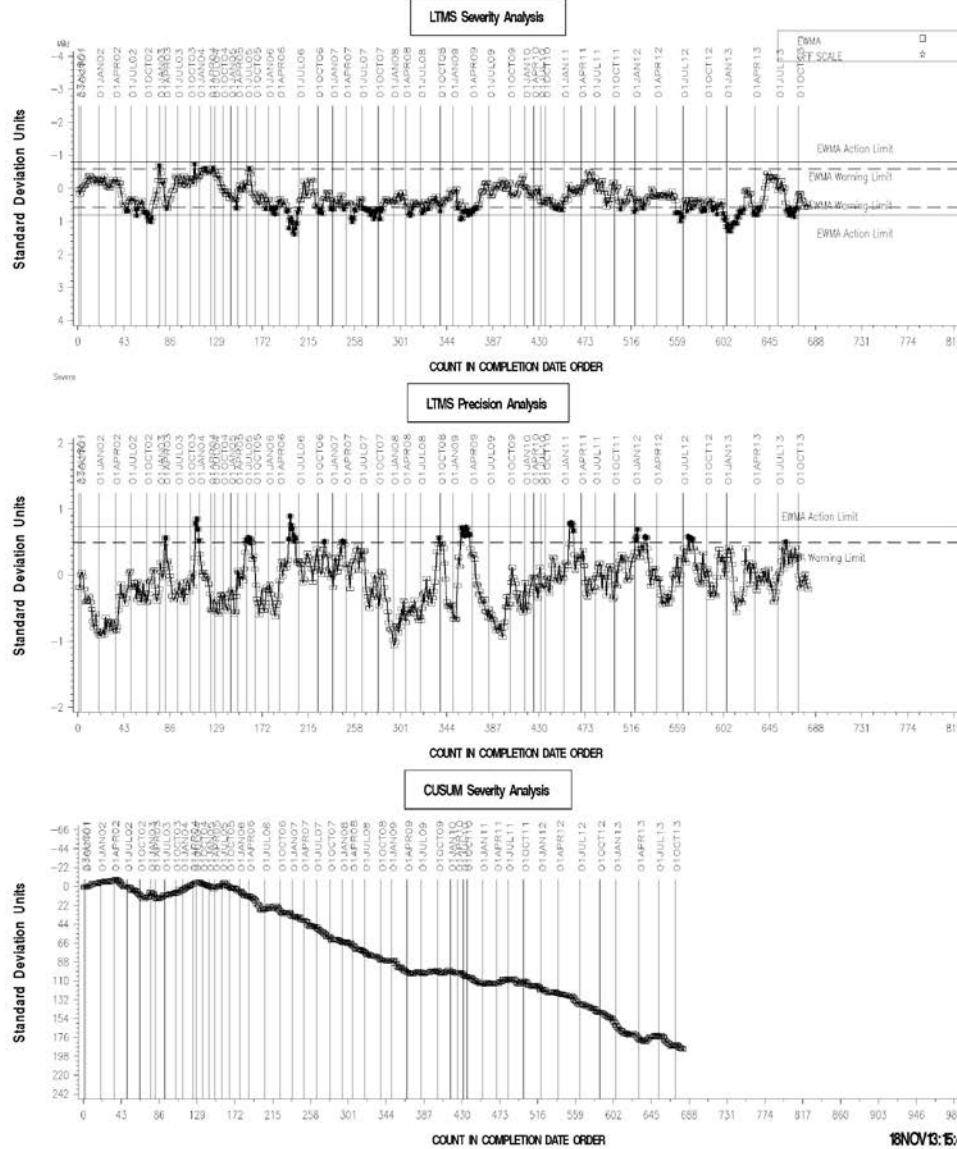


EOEC (D 7216)

EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE SILICON ELONGATION CHANGE AVERAGE

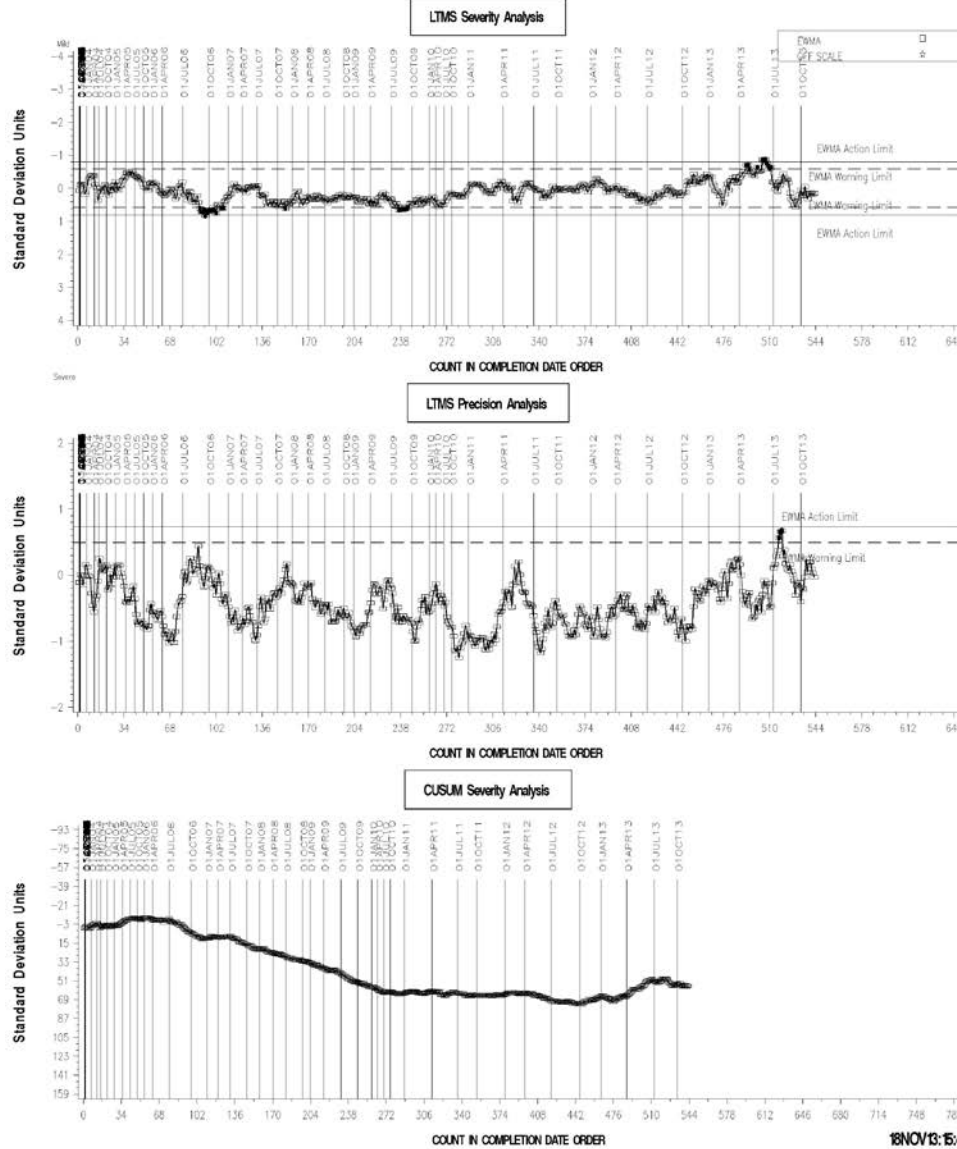


EOEC (D 7216)

EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA



REFERENCE VAMAC G ELONGATION CHANGE AVERAGE



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EOEC (D 7216)

INFORMATION LETTERS

No Information Letters were issued this period.

EOEC (D 7216)

STATUS OF REFERENCE OIL SUPPLY

Oil	Samples @ Labs	@ TMC	
		Samples (750 mL)	Gallons
1006-1	209	5011	993
Total	209	5011	993