



# Test Monitoring Center

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

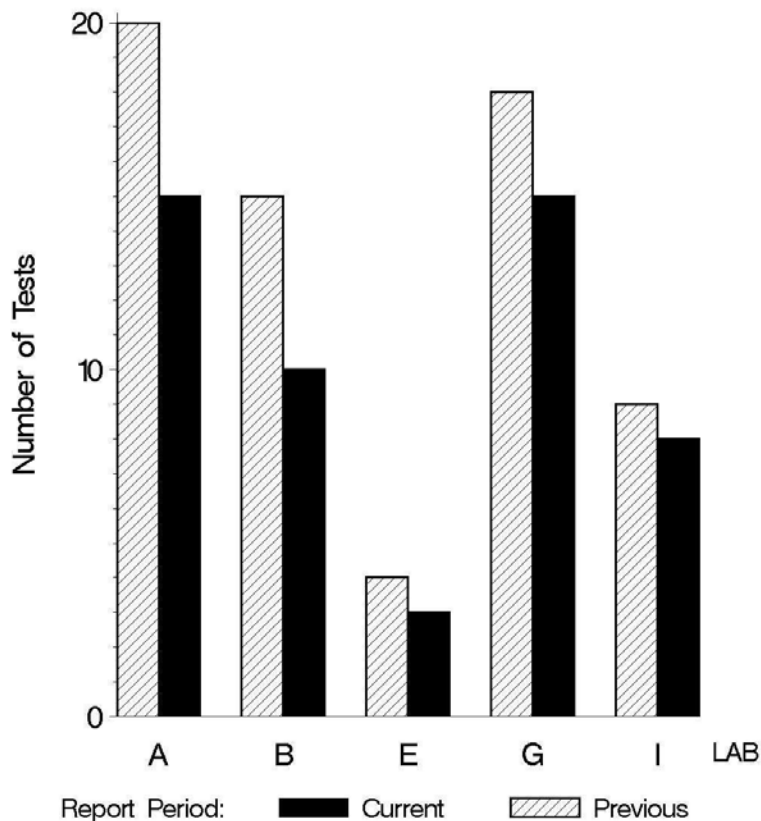
MEMORANDUM: 13-035  
DATE: May 22, 2013  
TO: Mike Birke,  
Chairman, Engine Oil Elastomer Compatibility Surveillance Panel  
FROM: Michael T. Kasimirsky *Michael T. Kasimirsky*  
SUBJECT: LDEOC Testing from October 1, 2012 through March 31, 2013

A total of 255 LDEOC tests were reported to the Test Monitoring Center during the period from October 1, 2012 through March 31, 2013. Following is a summary of testing activity this period.

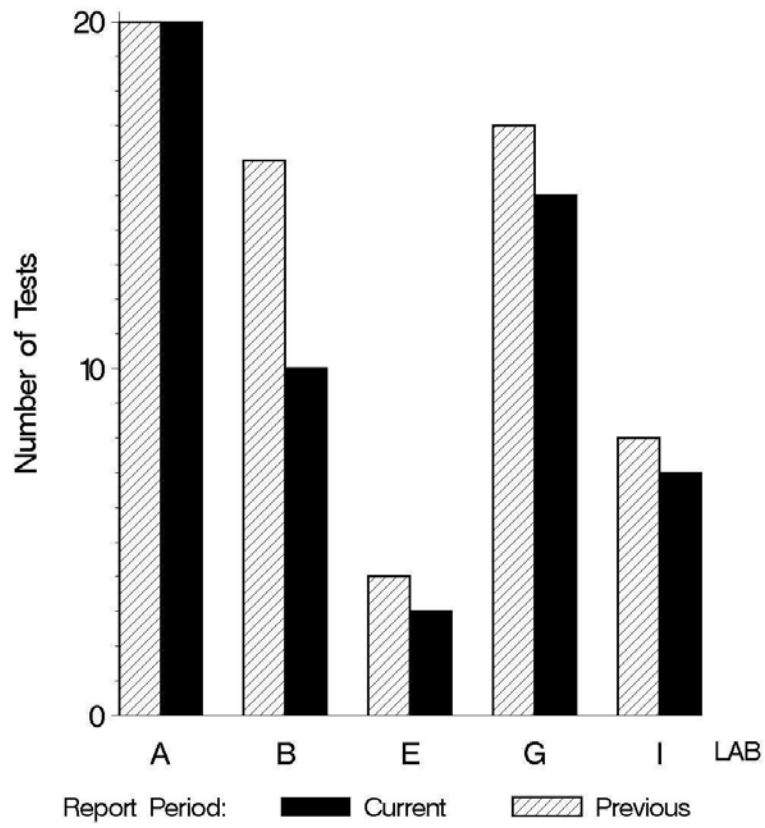
	Reporting Data
Number of Labs	5

Tests reported this period were distributed as shown below:

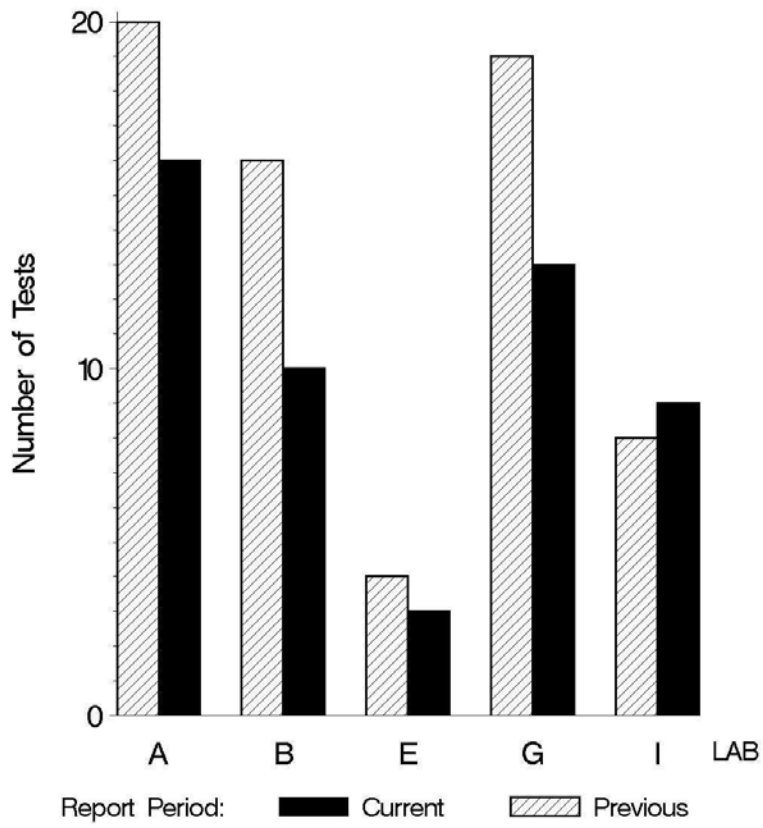
## NUMBER OF FLUOROELASTOMER TESTS REPORTED BY LAB AND REPORT PERIOD



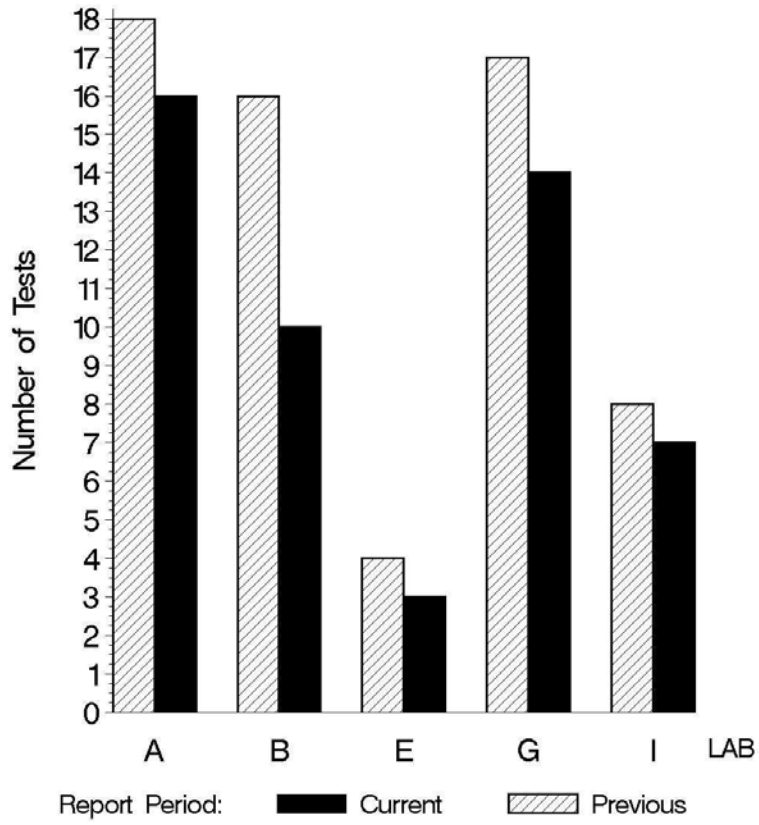
### NUMBER OF NITRILE TESTS REPORTED BY LAB AND REPORT PERIOD



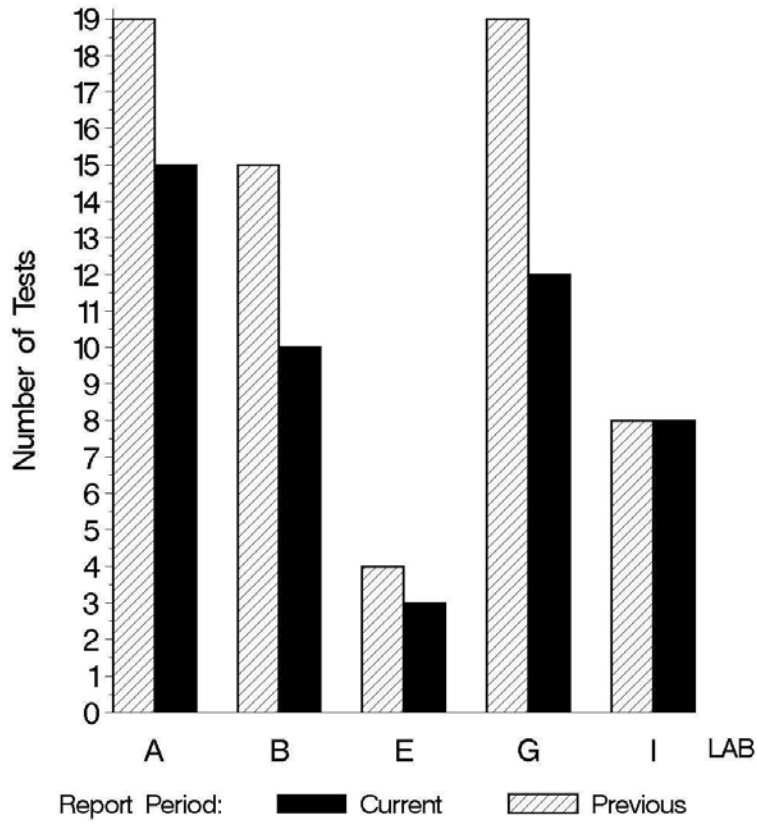
### NUMBER OF POLYACRYLATE TESTS REPORTED BY LAB AND REPORT PERIOD



### NUMBER OF SILICONE TESTS REPORTED BY LAB AND REPORT PERIOD



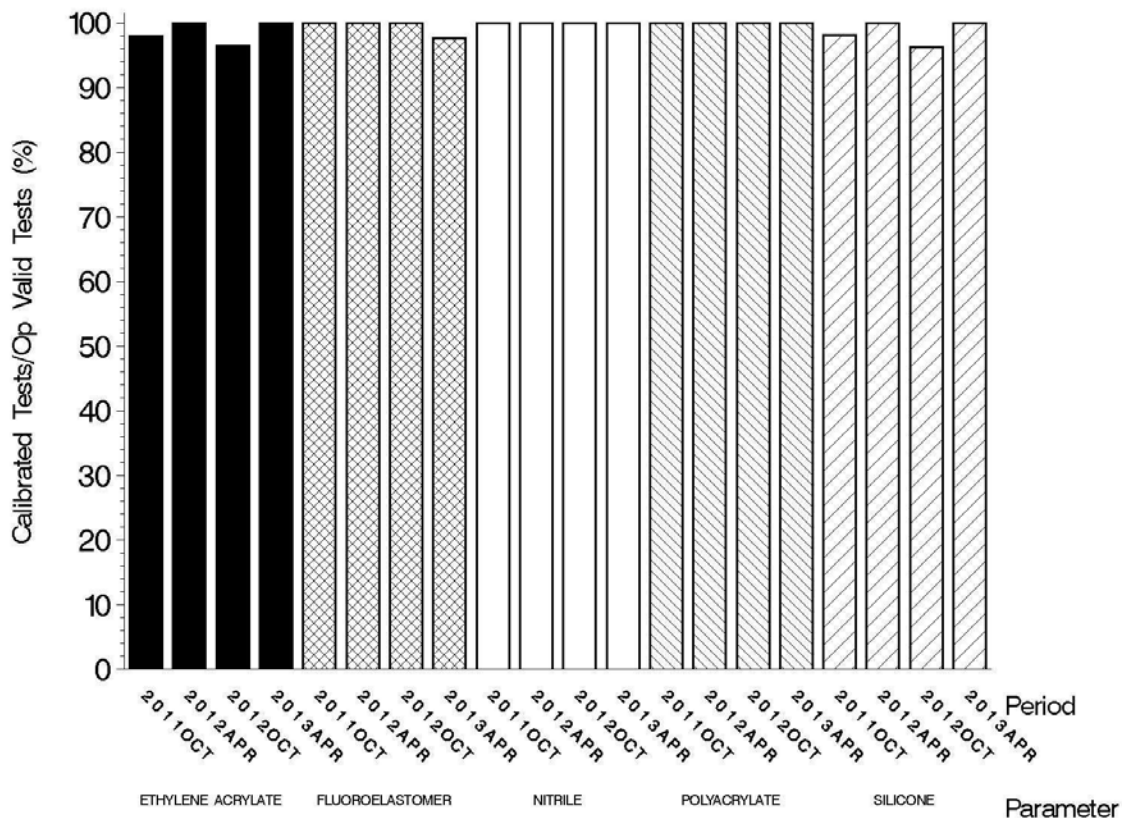
### NUMBER OF ETHYLENE ACRYLATE TESTS REPORTED BY LAB AND REPORT PERIOD



**Test Distribution by Oil and Validity**

		Ethylene Acrylate	Fluoroelastomer	Nitrile	Polyacrylate	Silicone	Totals	
							This Period	Last Period
Accepted for Calibration	AC	38	40	45	41	40	204	271
Rejected	OC	0	1	0	0	0	1	4
Acceptable Donated Test	NI	10	10	10	10	10	50	46
Unacceptable Donated Test	MI	0	0	0	0	0	0	4
Operationally Invalid (lab)	LC	0	0	0	0	0	0	0
Operationally Invalid (lab/TMC)	RC	0	0	0	0	0	0	0
Aborted Calibration	XC	0	0	0	0	0	0	1
<b>Total</b>		<b>48</b>	<b>51</b>	<b>55</b>	<b>51</b>	<b>50</b>	<b>255</b>	<b>326</b>

**OPERATIONALLY VALID TESTS  
MEETING ACCEPTANCE CRITERIA**



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

Lost Tests per Start by Lab and Elastomer Type

Lab	Ethylene Acrylate			Fluoroelastomer			Nitrile			Polyacrylate			Silicone			Total		
	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%
A	0	15	0	0	15	0	0	20	0	0	16	0	0	16	0	0	82	0
B	0	10	0	0	10	0	0	10	0	0	10	0	0	10	0	0	50	0
E	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	15	0
G	0	12	0	0	15	0	0	15	0	0	13	0	0	14	0	0	69	0
I	0	8	0	0	8	0	0	7	0	0	9	0	0	7	0	0	39	0
Total	0	48	0	0	51	0	0	55	0	0	51	0	0	50	0	0	255	0

Lost tests are those that were aborted or operationally invalid.





Average $\Delta$ 's by Lab					
Elastomer	Lab	n	VOLCYI	HARDYI	TENSYI
Ethylene Acrylate	A	13	0.222	-2.317	0.121
	B	8	0.982	-1.038	-0.284
	E	1	-0.416	-2.824	-0.664
	G	10	1.379	0.033	-0.633
	I	6	1.426	-2.275	-0.672
	Industry	38	0.860	-1.436	-0.309
Fluoroelastomer	A	13	-0.528	0.372	-0.667
	B	8	-0.192	-0.342	0.119
	E	1	-0.267	-0.465	-1.585
	G	13	-0.605	-1.303	0.811
	I	6	0.556	-0.135	1.255
	Industry	41	-0.322	-0.393	0.214
Nitrile	A	18	0.511	-0.913	-0.005
	B	8	0.708	-0.259	-0.902
	E	1	0.900	-0.977	0.088
	G	13	0.605	0.880	-0.565
	I	5	0.450	-0.287	0.107
	Industry	45	0.575	-0.211	-0.312
Polyacrylate	A	14	-0.294	-1.276	-0.744
	B	8	0.530	-0.847	-0.830
	E	1	-2.970	-2.065	-0.813
	G	11	0.045	0.651	-0.605
	I	7	-0.245	-0.673	-1.490
	Industry	41	-0.099	-0.592	-0.852
Silicone	A	14	-1.096	-0.636	1.652
	B	8	0.341	0.029	1.121
	E	1	0.094	-0.216	2.237
	G	12	0.821	1.377	1.511
	I	5	-0.713	-0.216	-0.164
	Industry	40	-0.156	0.164	1.291

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

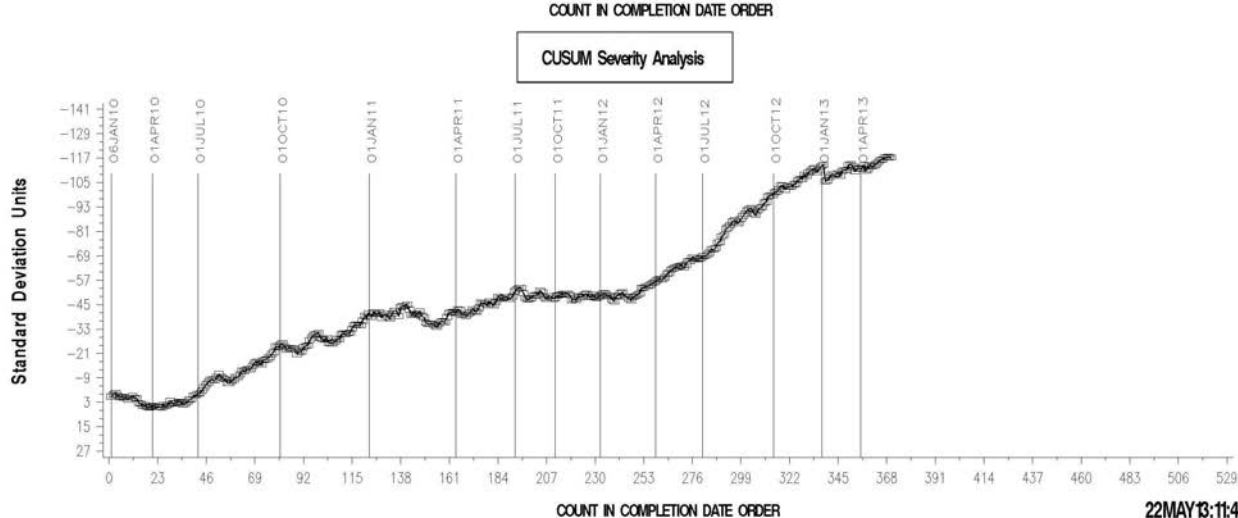
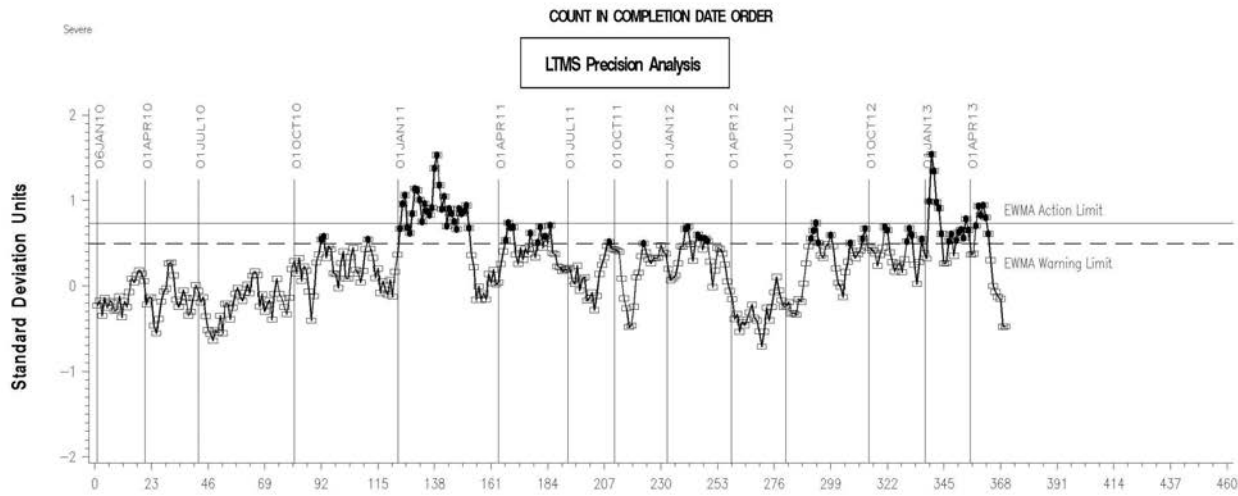
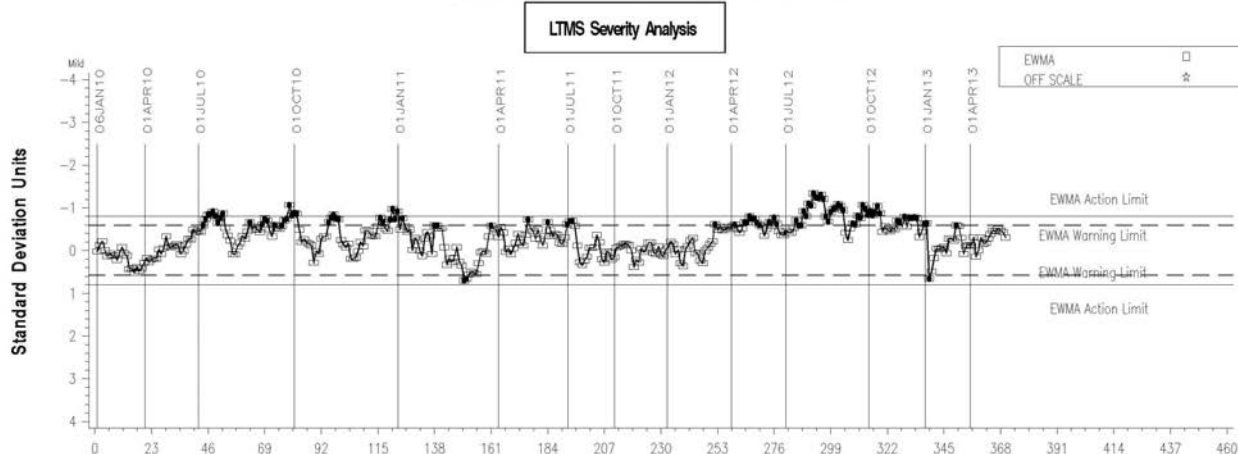
<i>Links to Individual Test Result Data</i>	
<b>Elastomer Type</b>	<b>Web Link to Data</b>
Fluoroelastomer	<a href="ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deocf/data/">ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deocf/data/</a>
Nitrile	<a href="ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deocn/data/">ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deocn/data/</a>
Polyacrylate	<a href="ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deoep/data/">ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deoep/data/</a>
Silicone	<a href="ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deocs/data/">ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deocs/data/</a>
Ethylene Acrylate	<a href="ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deoea/data/">ftp://ftp.astmtmc.cmu.edu/refdata/bench/1deoea/data/</a>

LTMS CONTROL CHARTS

LDEOC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



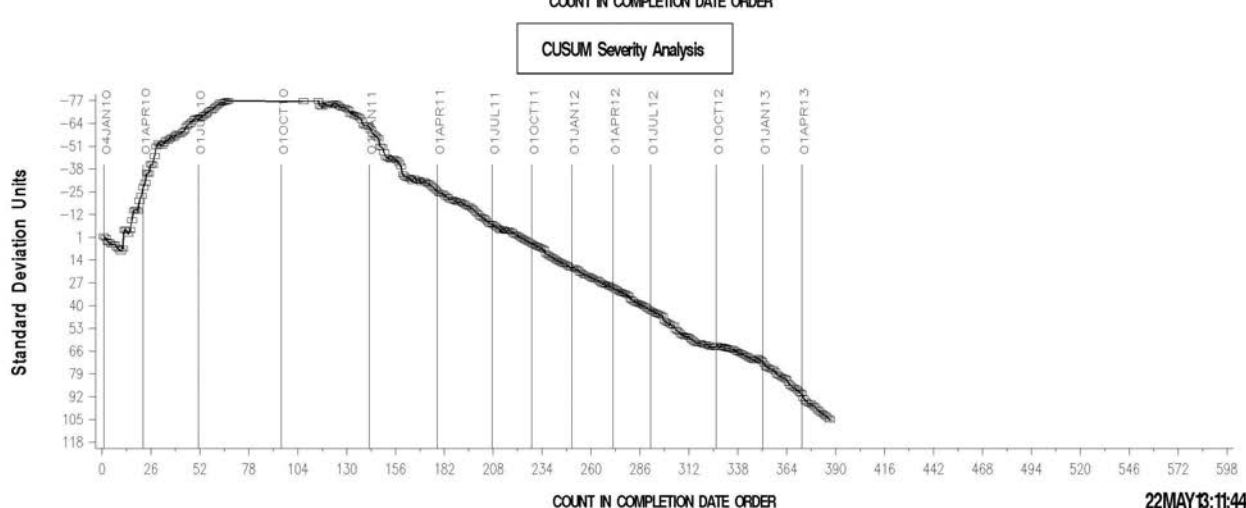
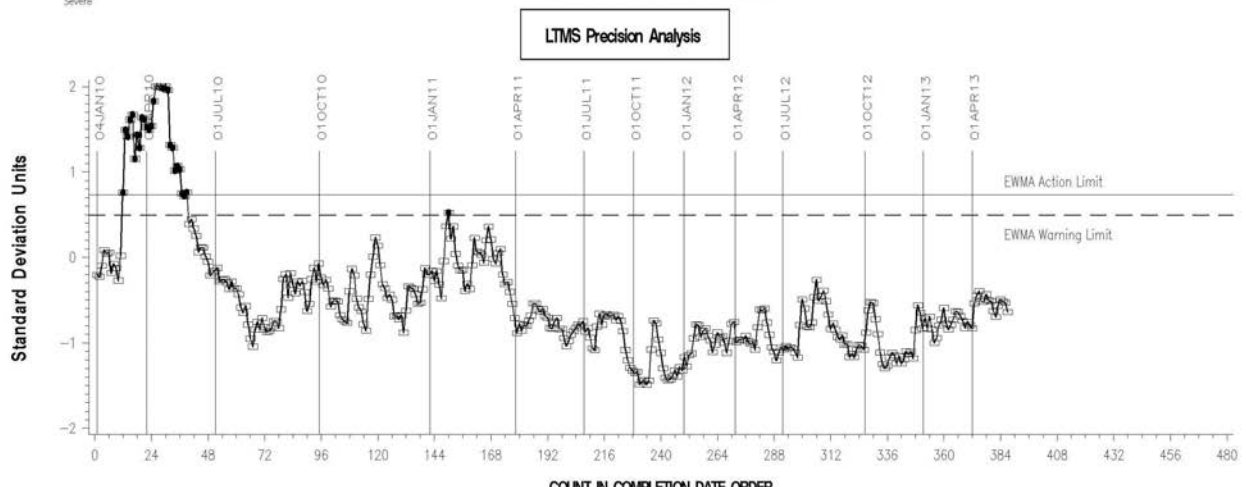
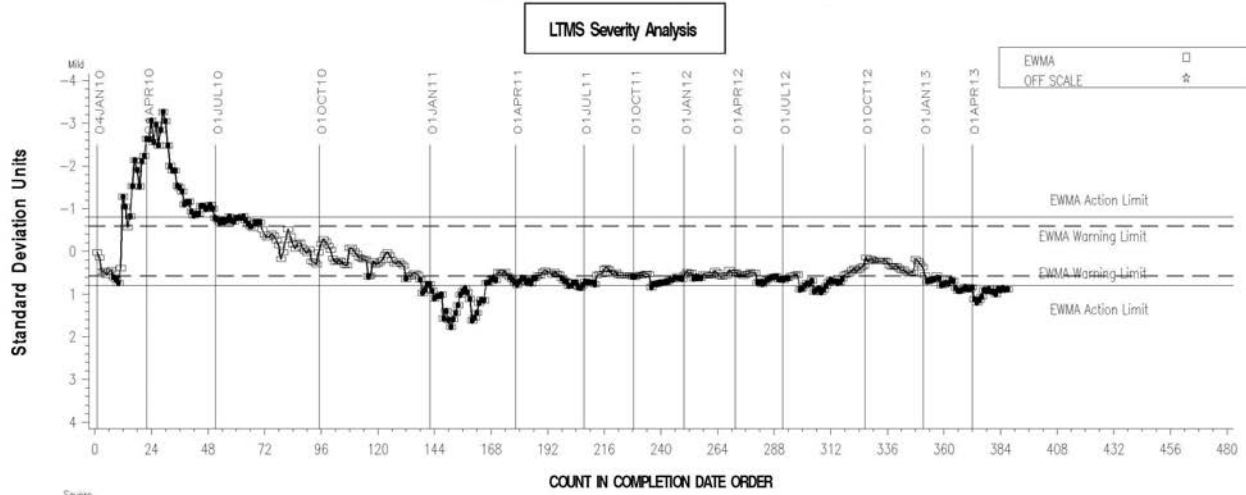
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LDEOC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



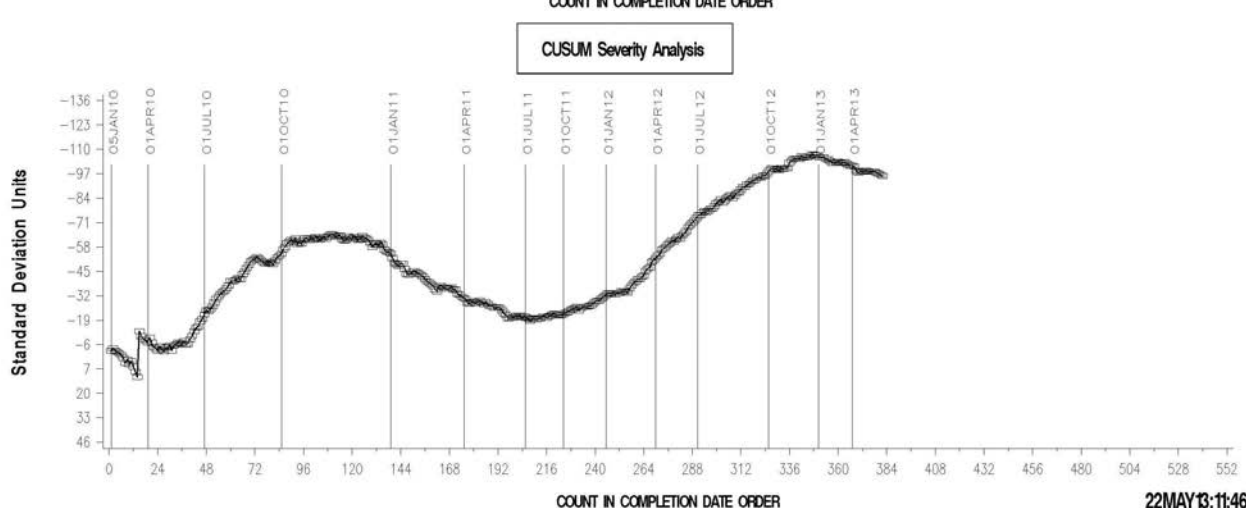
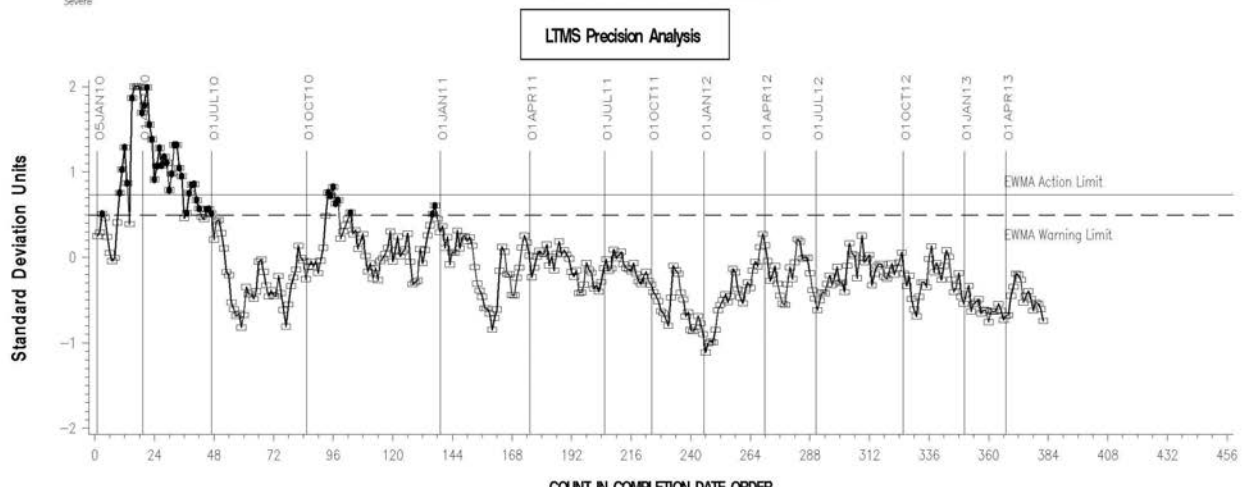
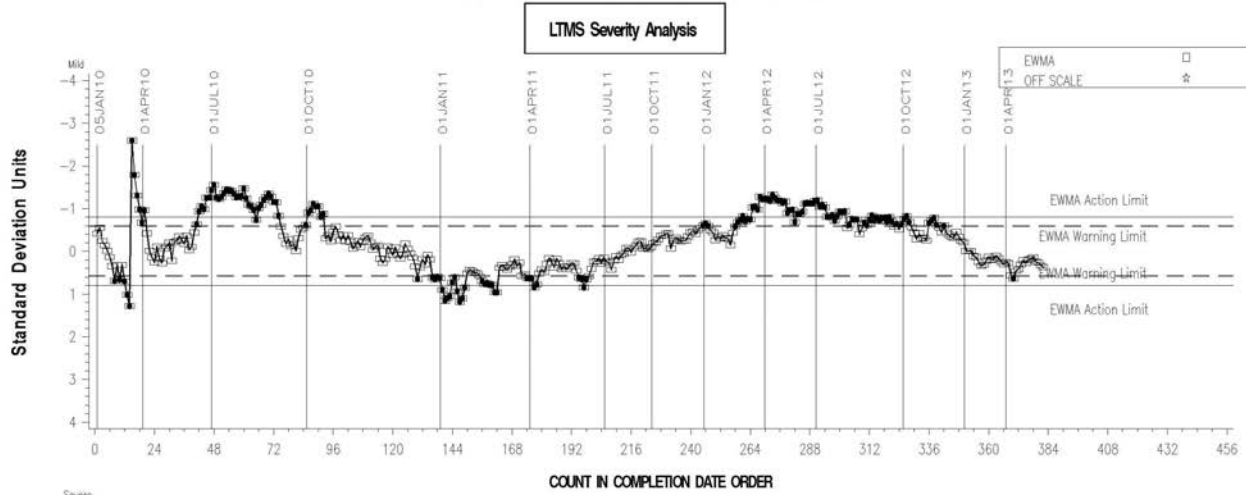
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LDEOC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



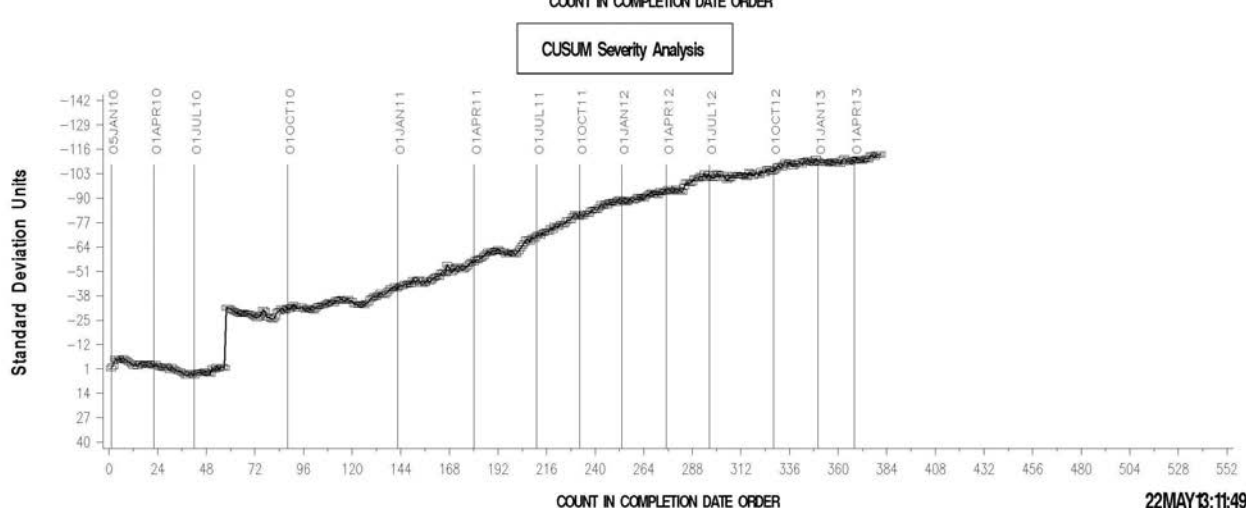
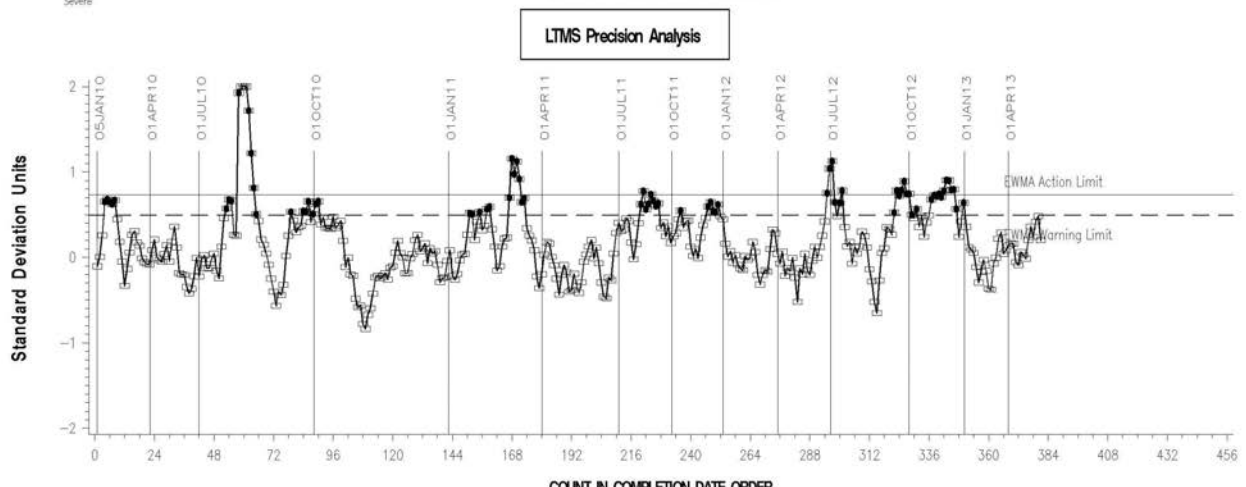
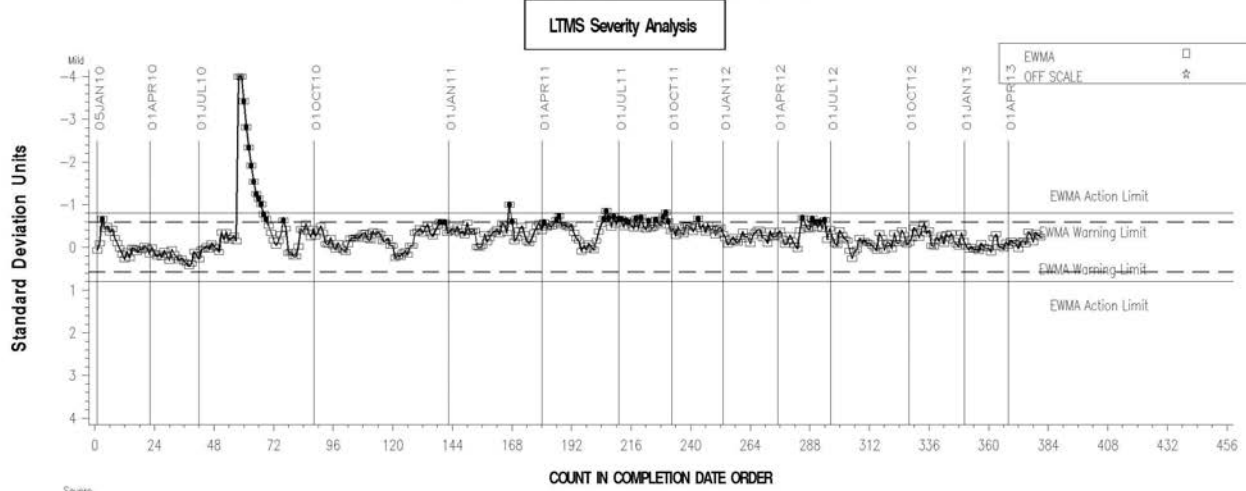
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LDEOC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



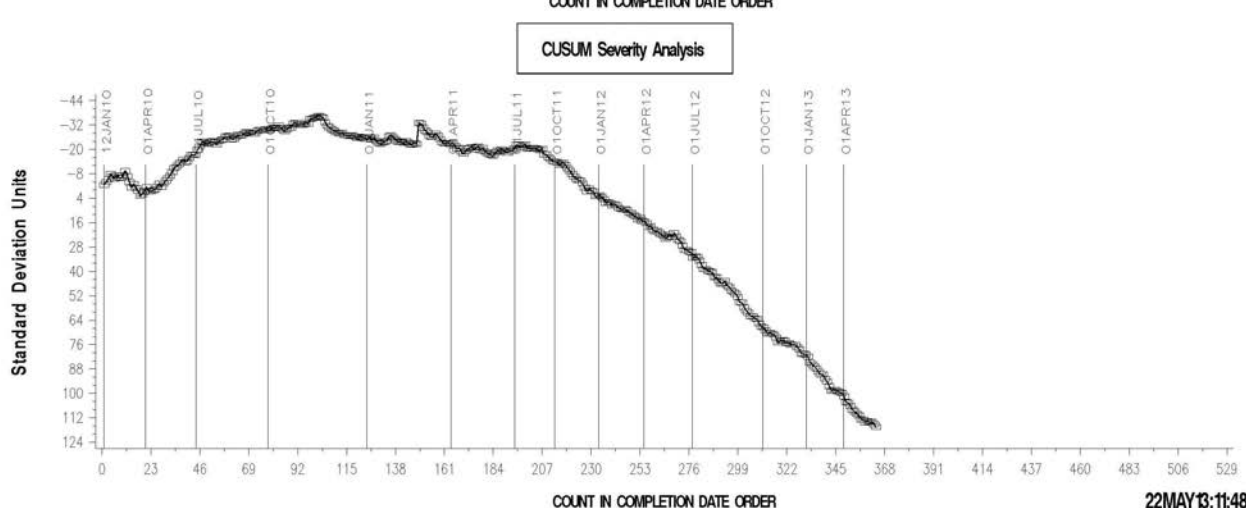
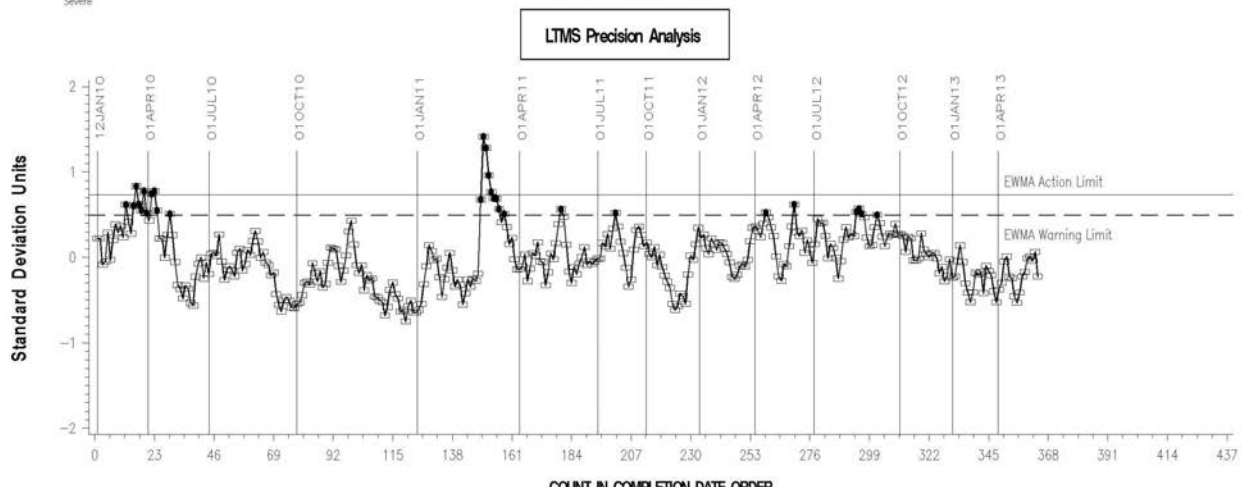
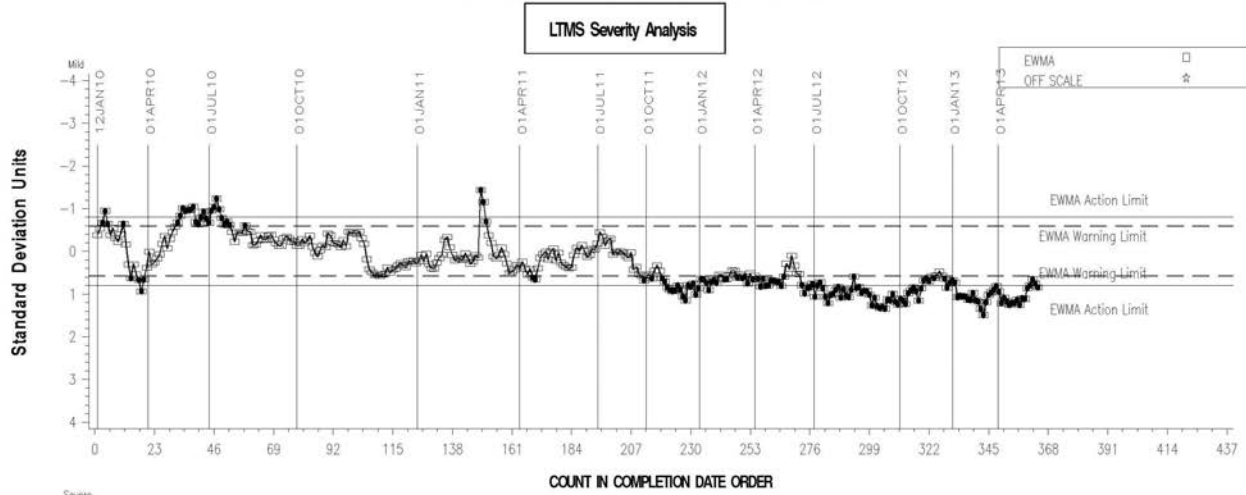
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LDEOC – ETHYLENE ACRYLATE INDUSTRY OPERATIONALLY VALID DATA



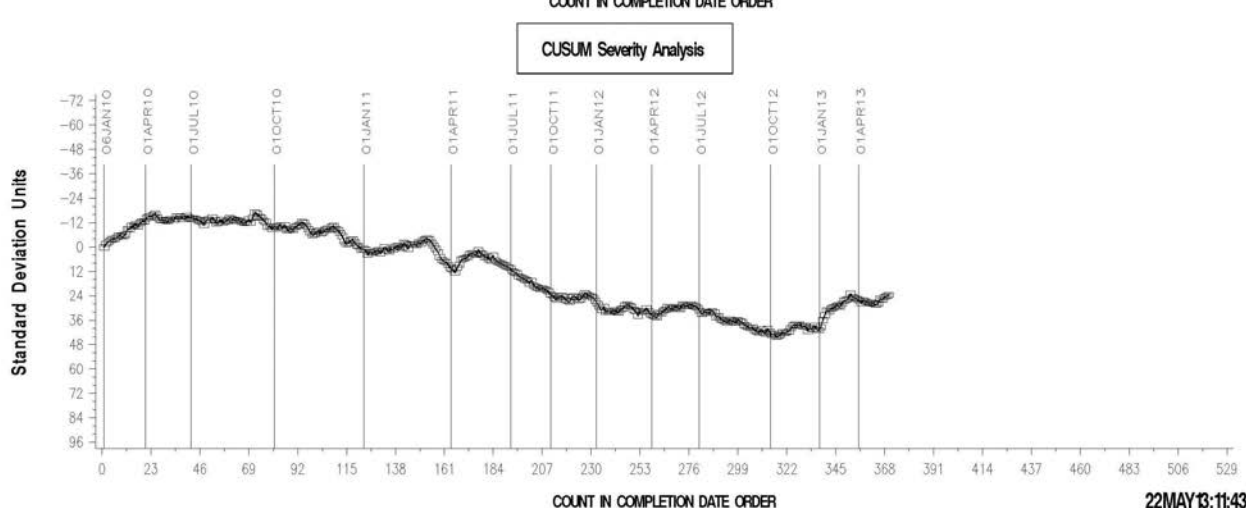
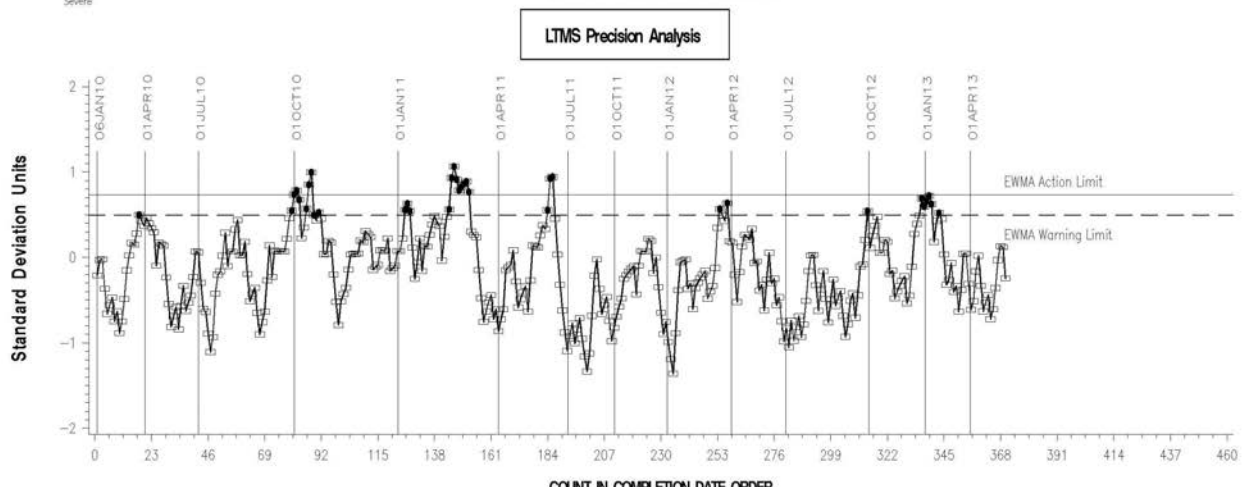
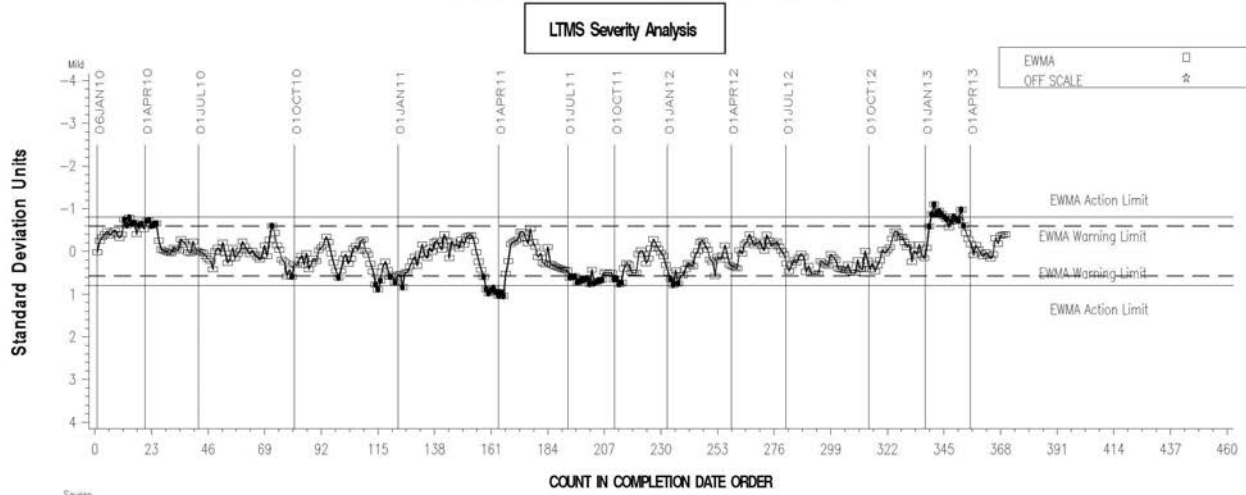
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LDEOC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



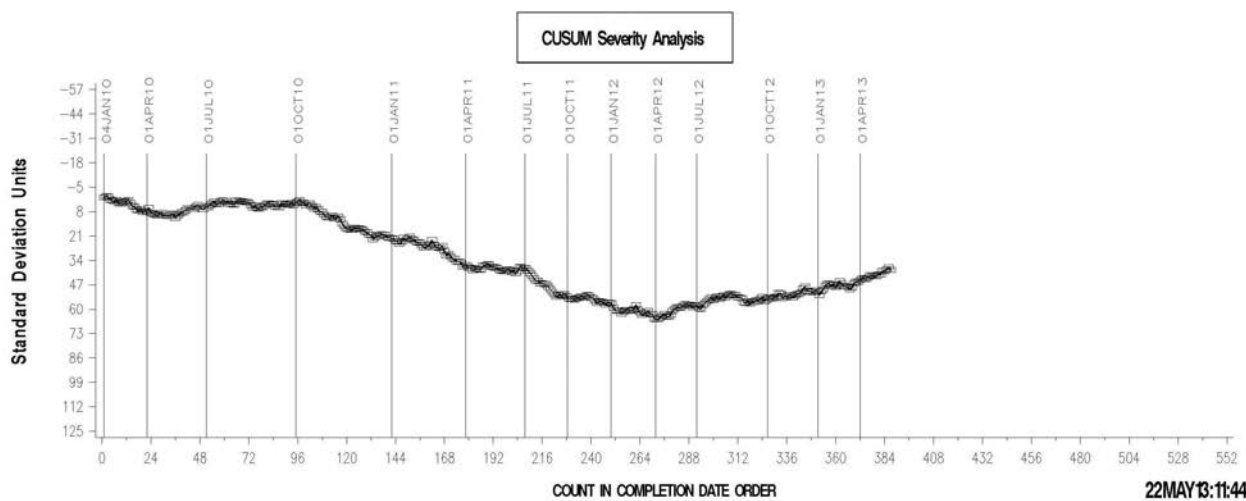
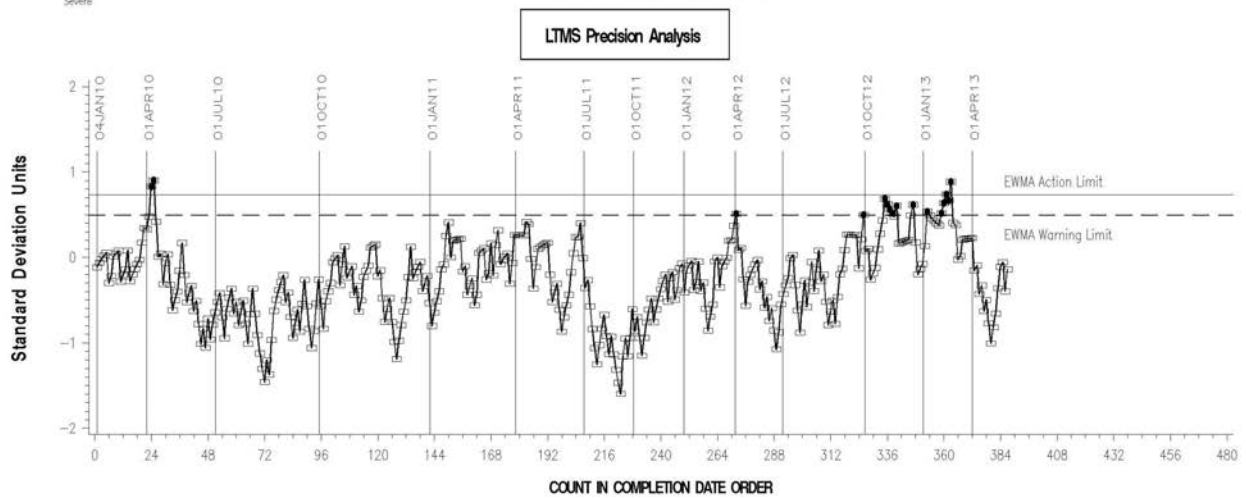
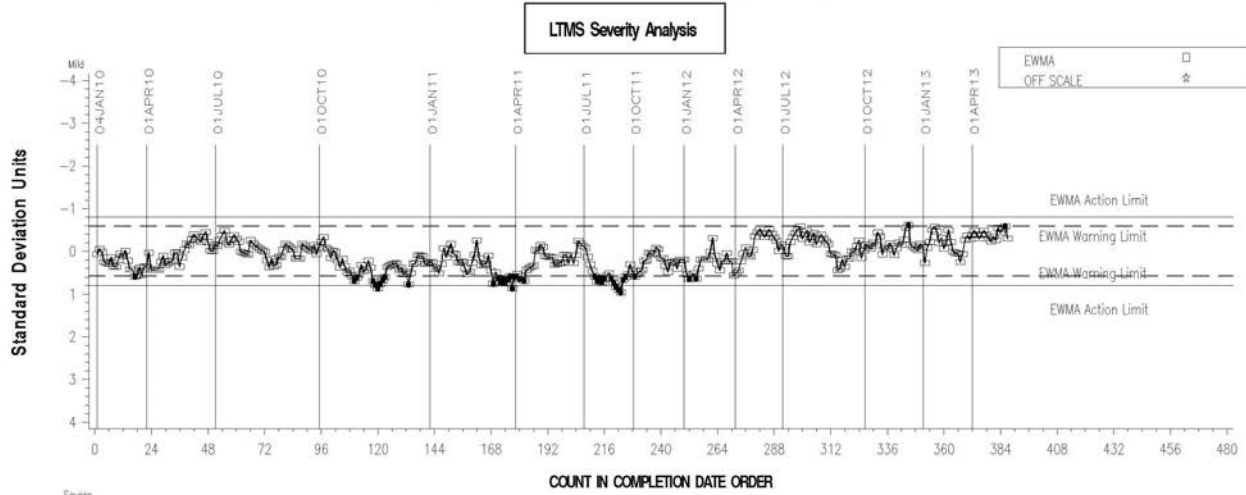
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LDEOC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



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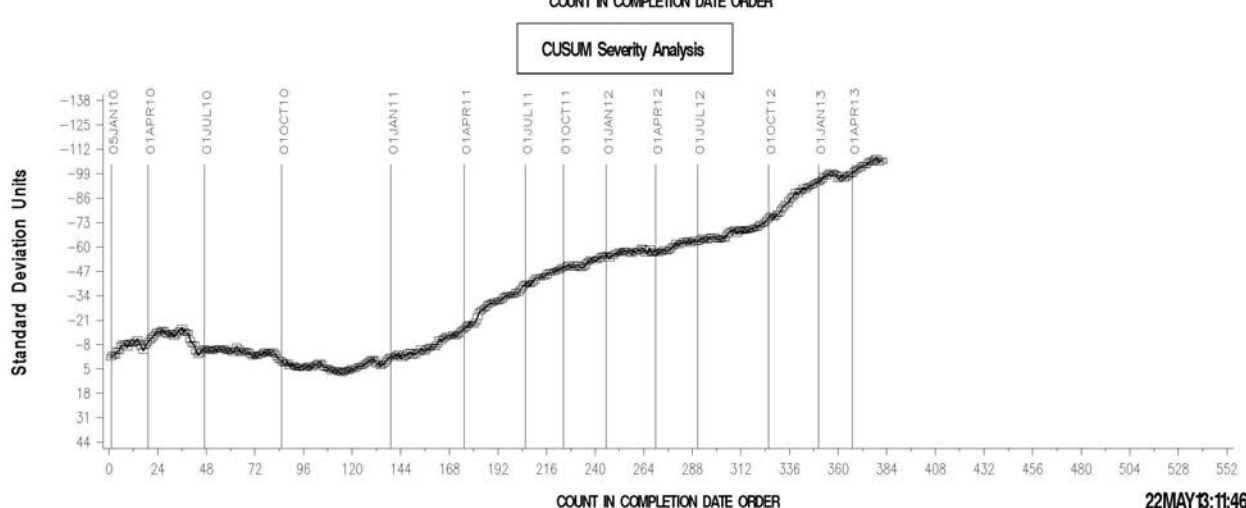
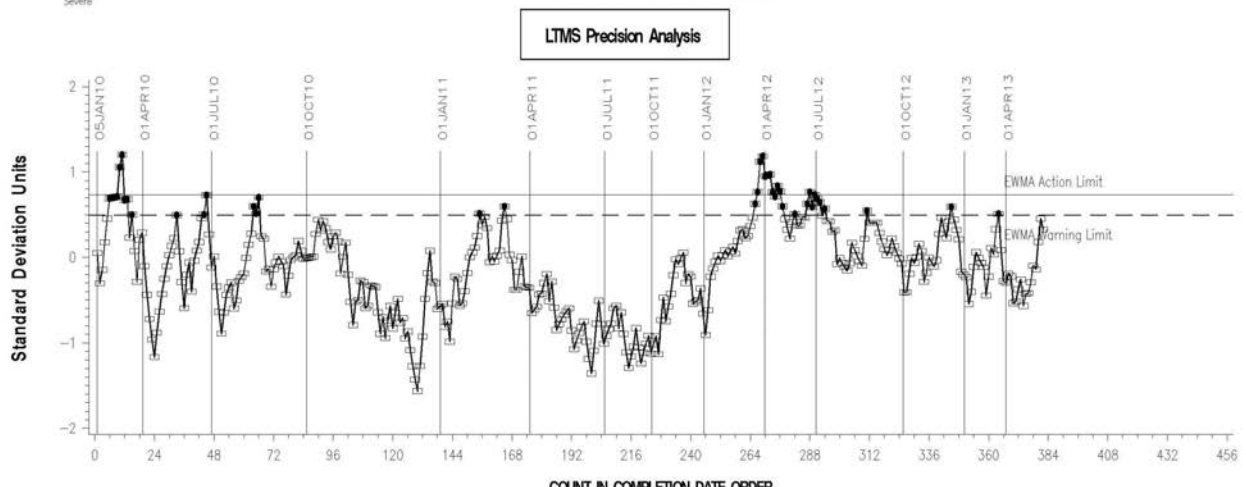
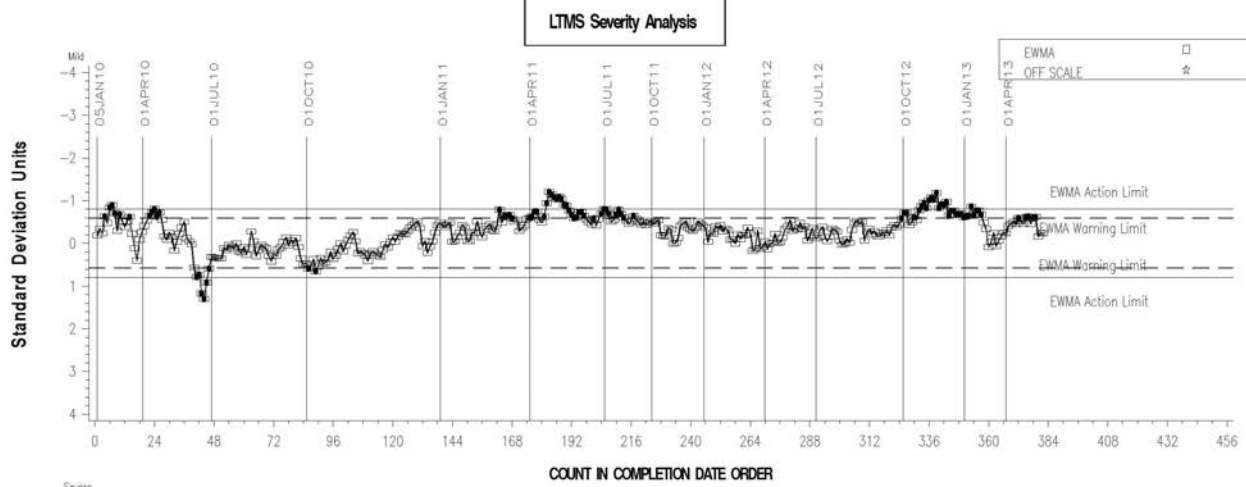




LDEOC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



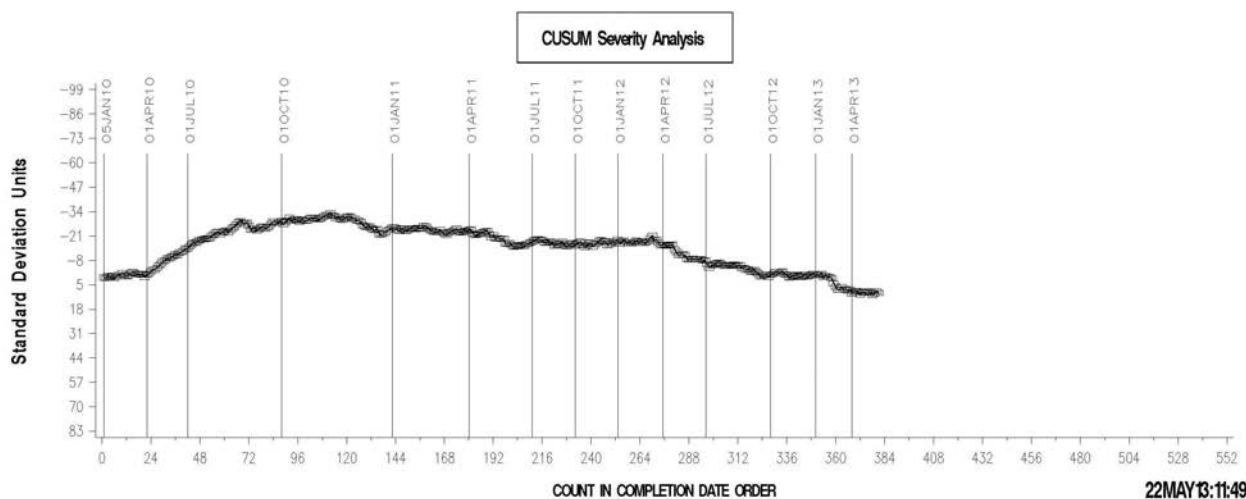
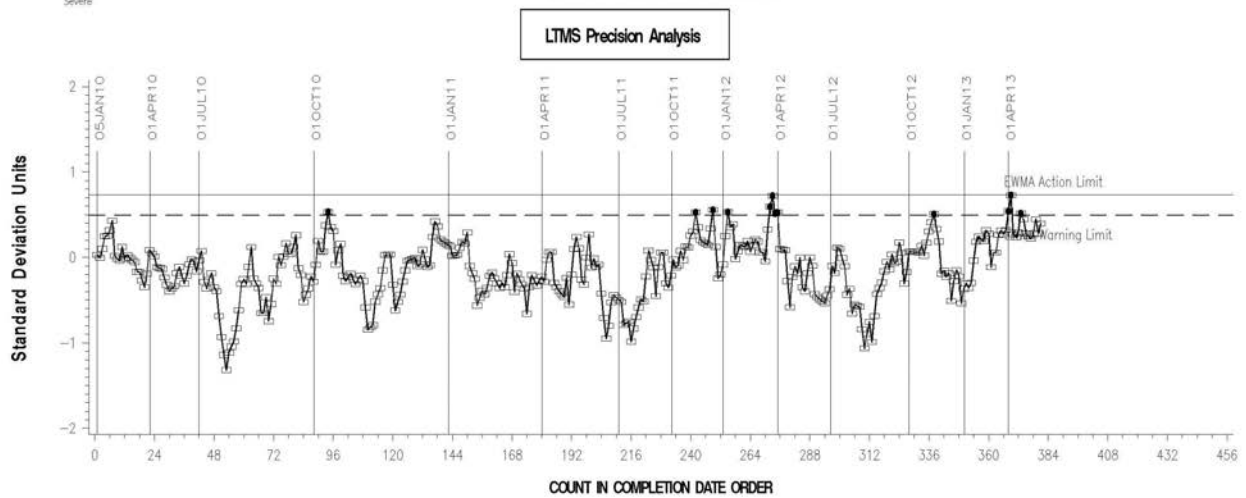
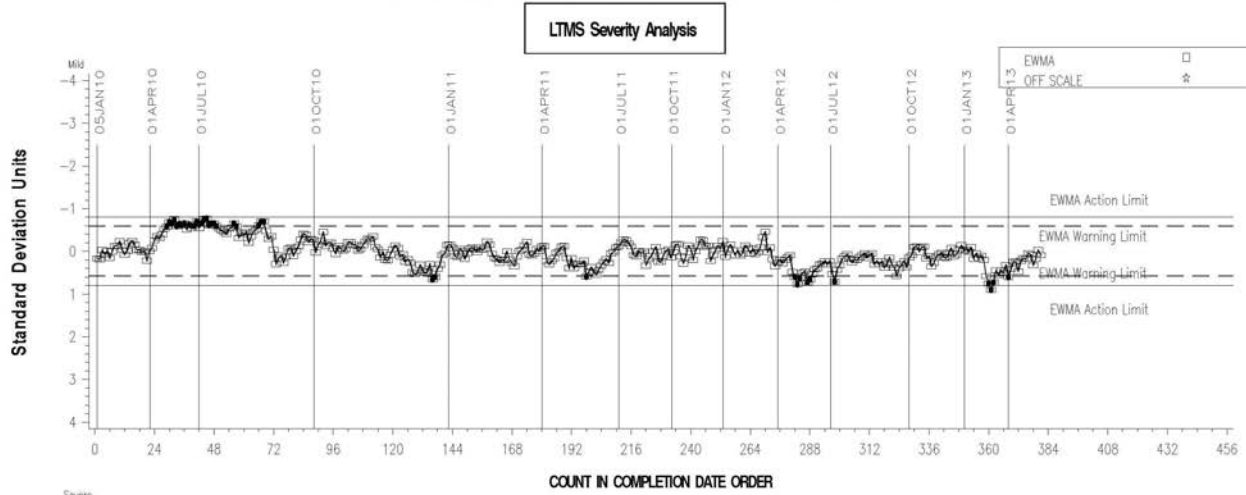
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LDEOC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



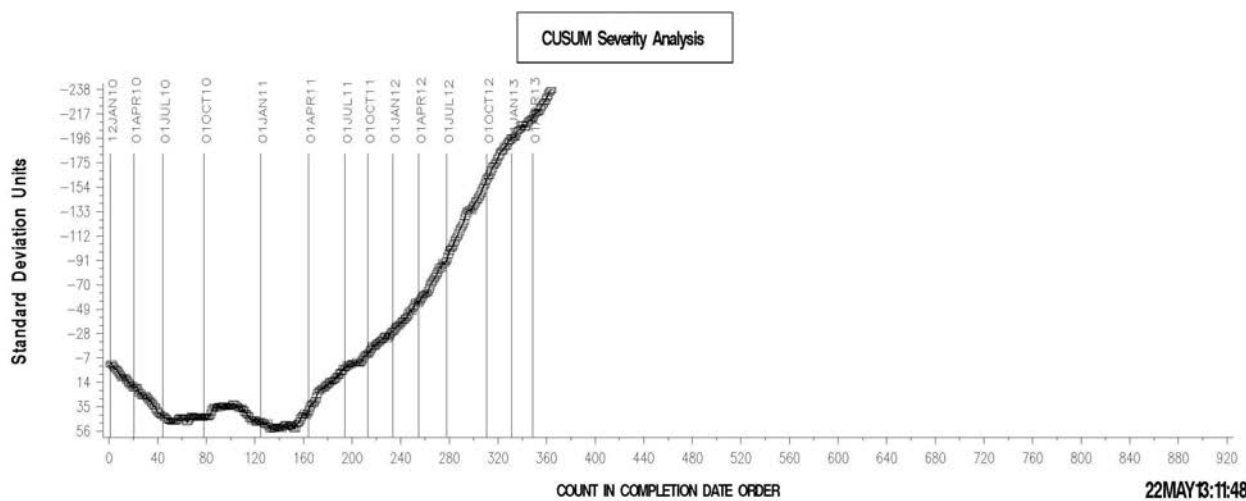
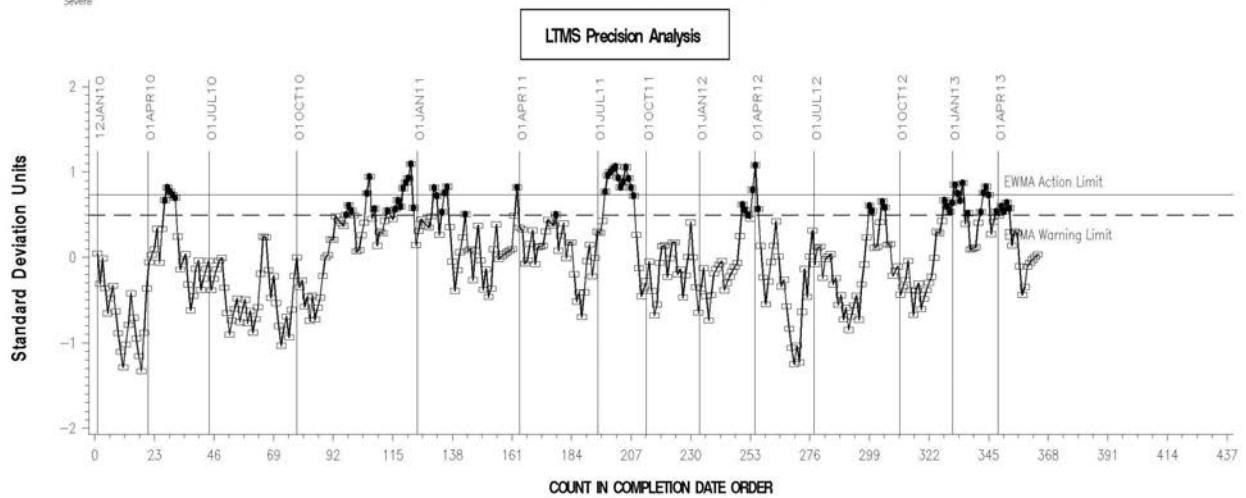
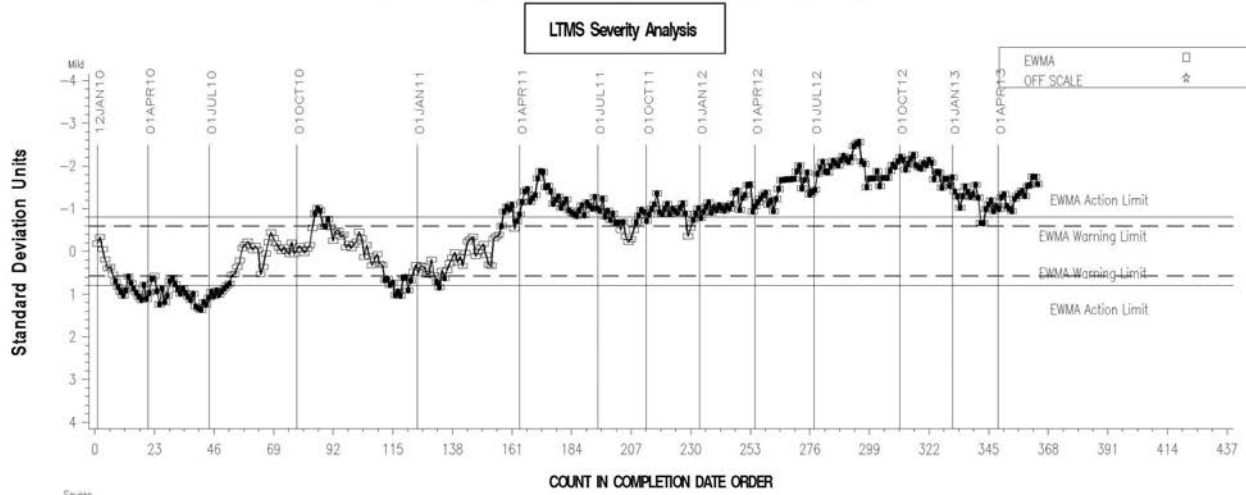
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LDEOC – ETHYLENE ACRYLATE INDUSTRY OPERATIONALLY VALID DATA



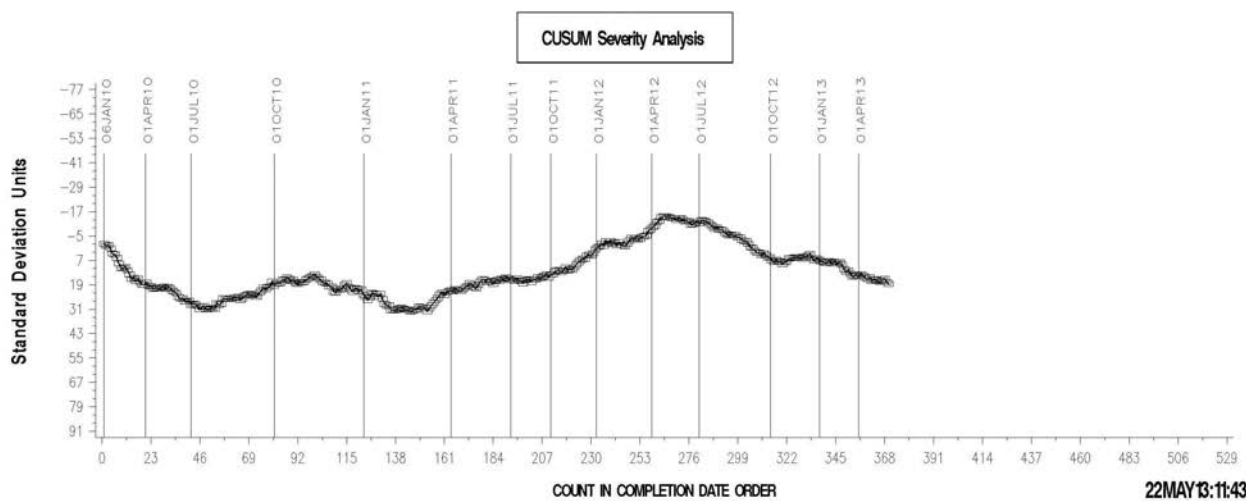
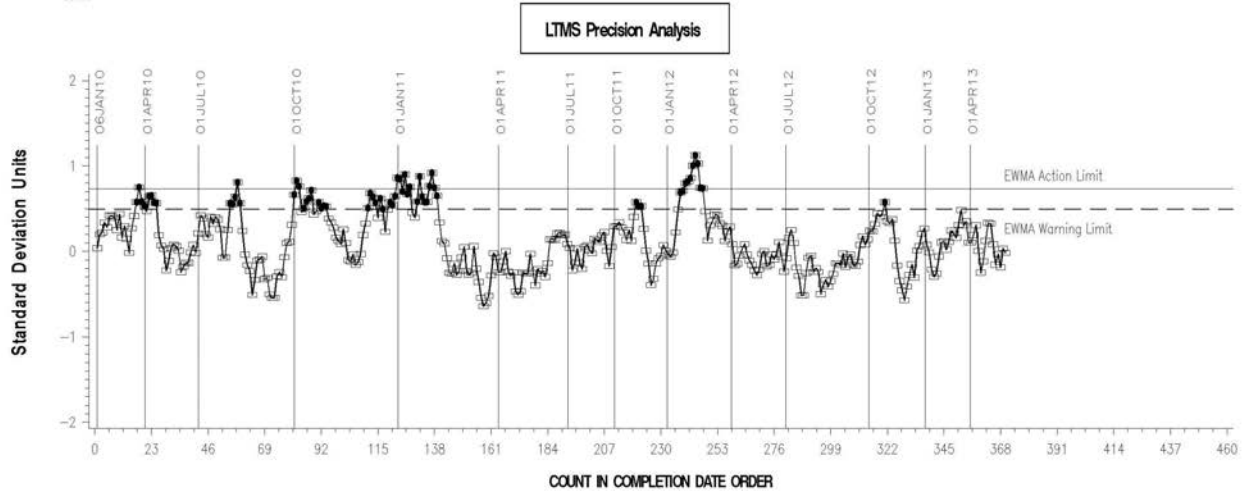
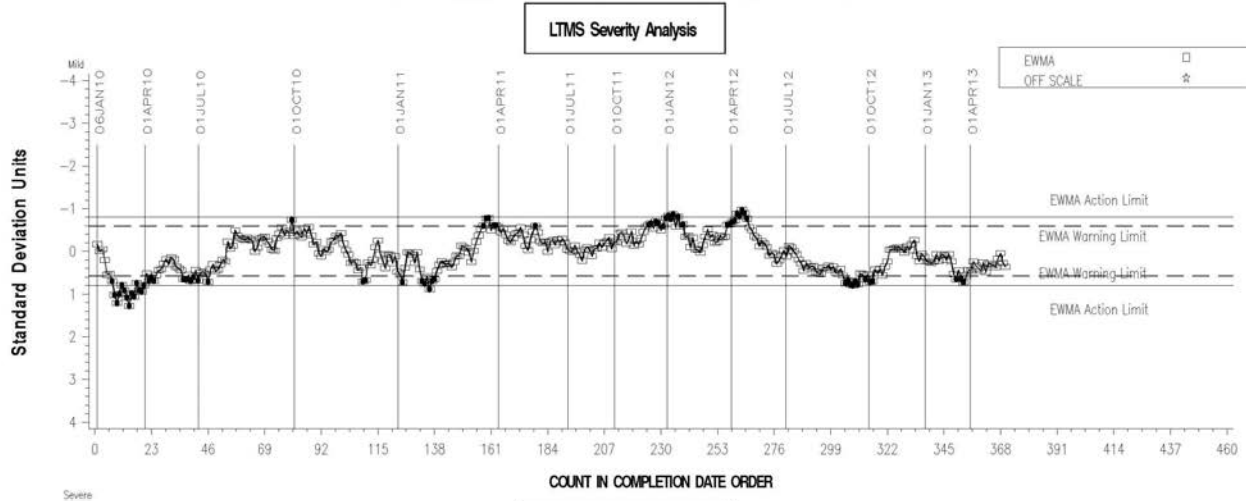
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LDEOC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



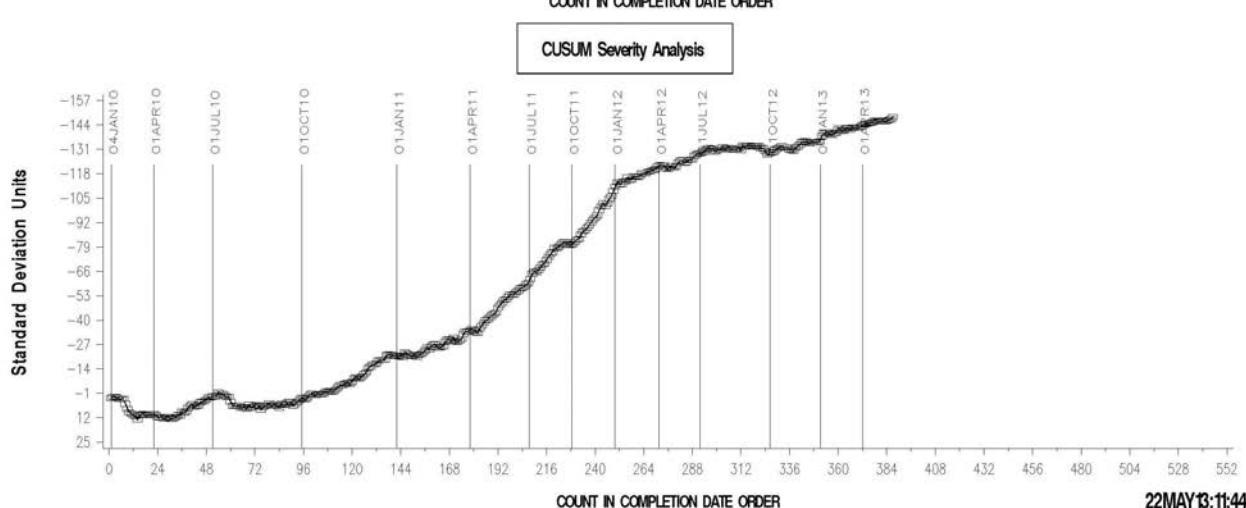
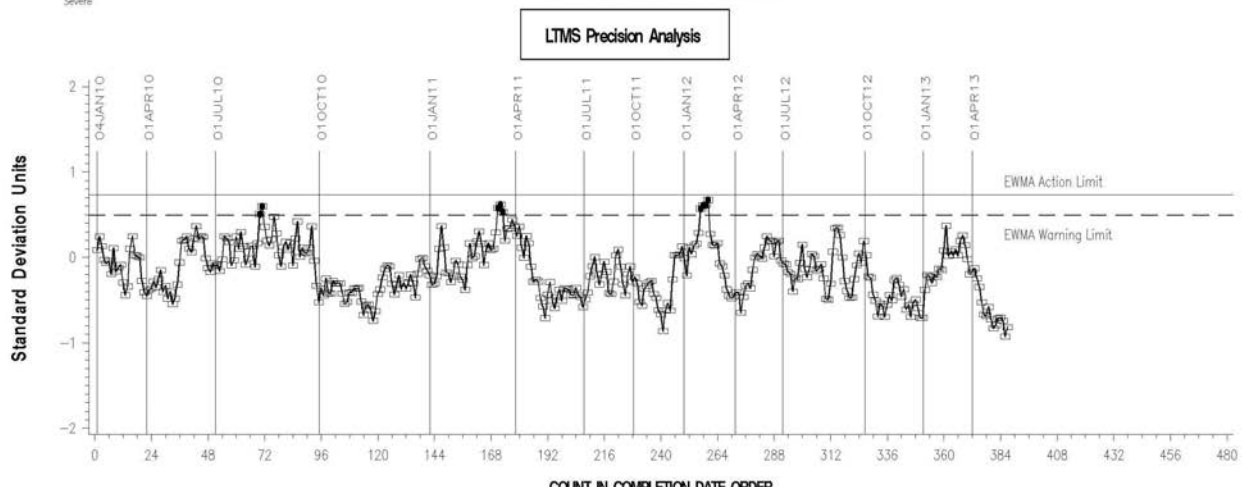
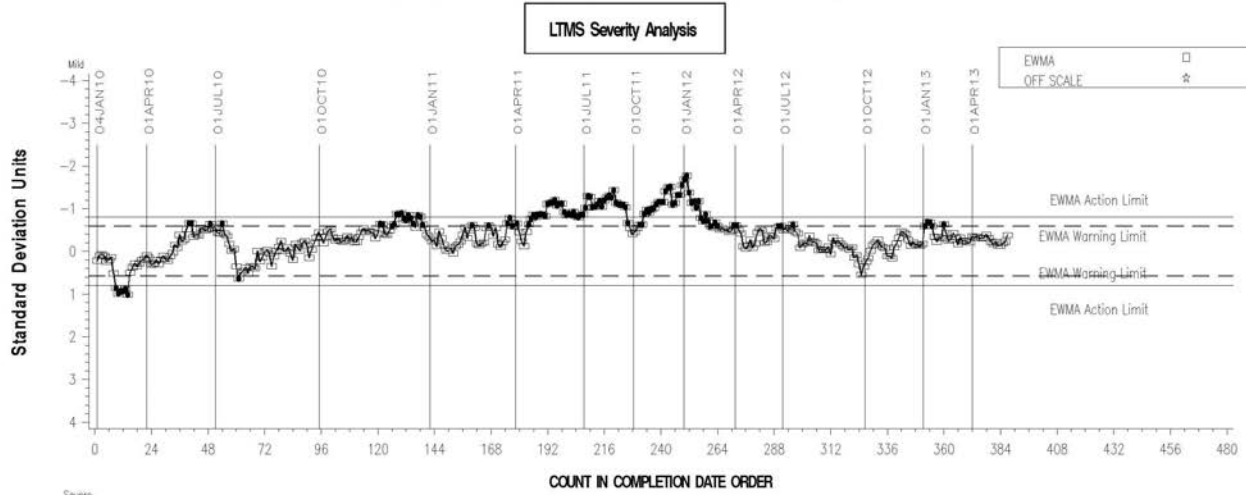
REF FLUORO TENSILE STRENGTH CHANGE AVERAGE



### LDEOC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



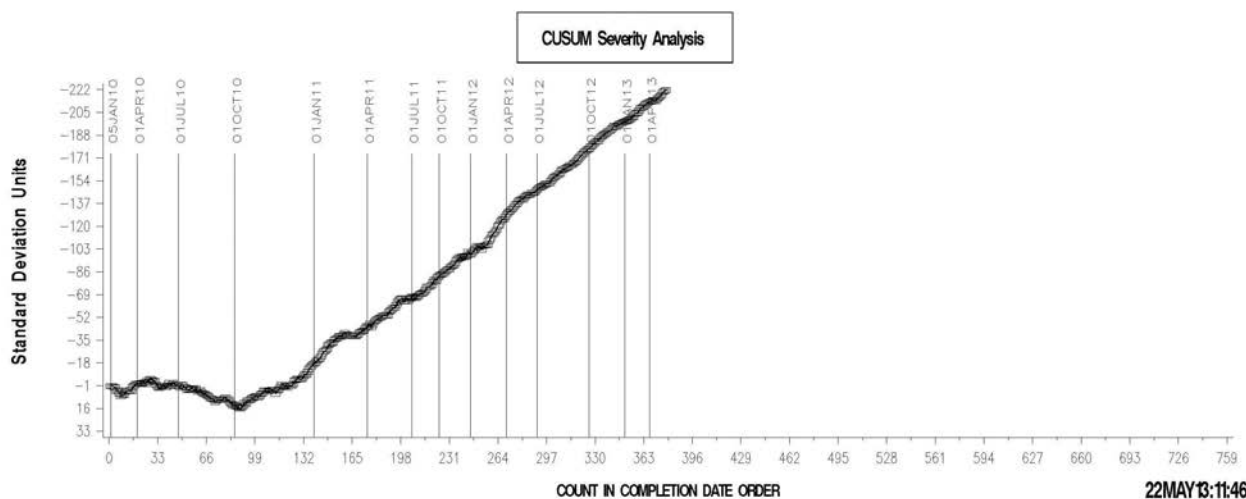
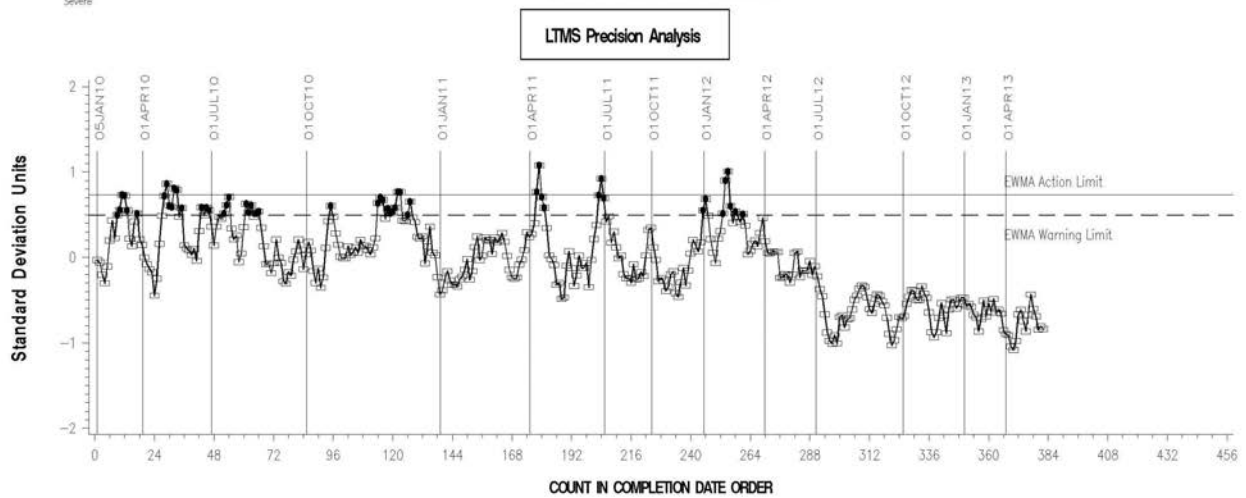
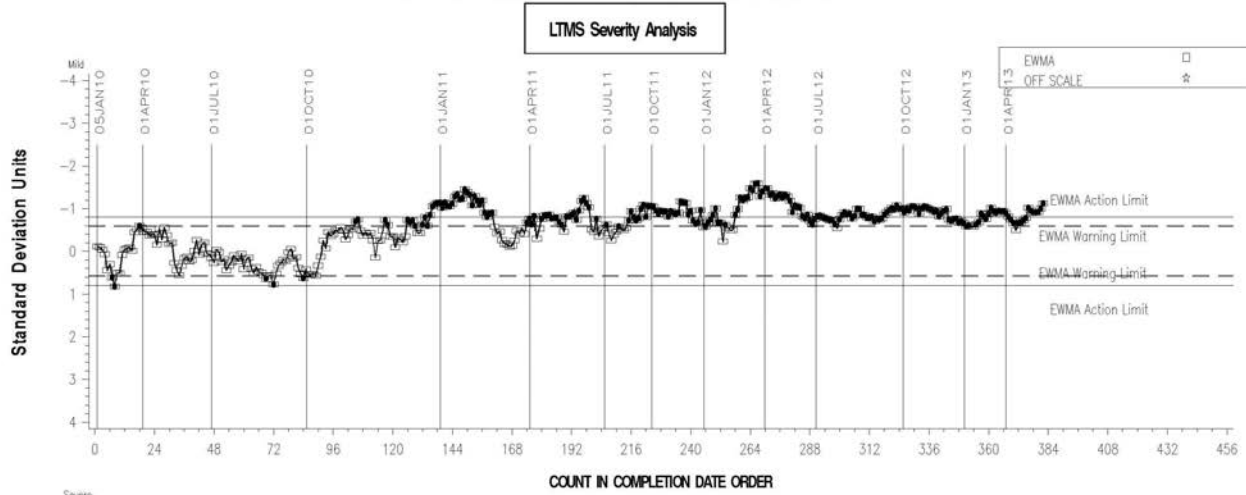
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LDEOC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



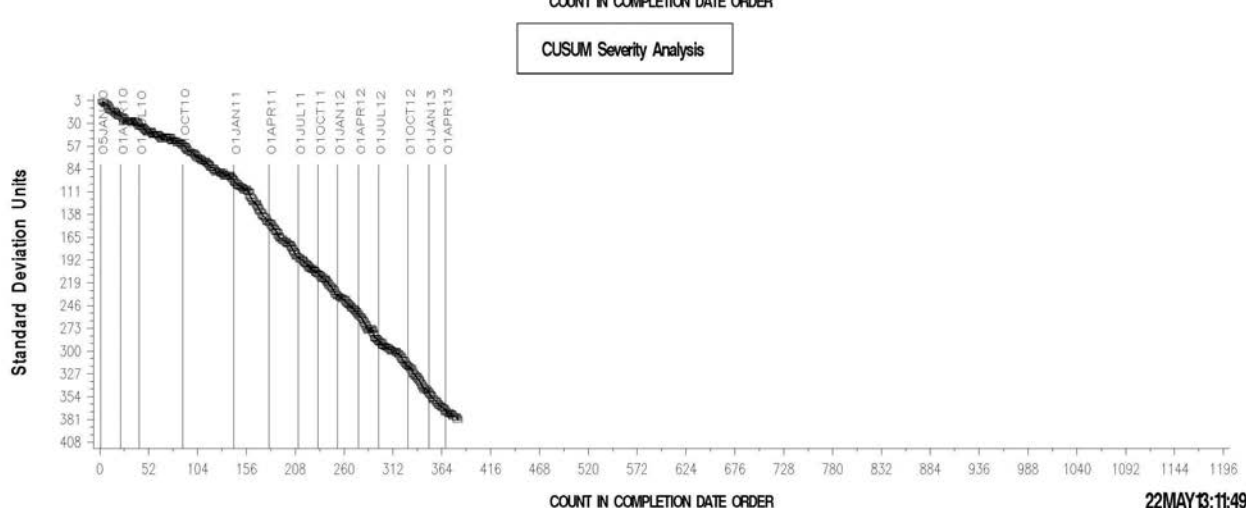
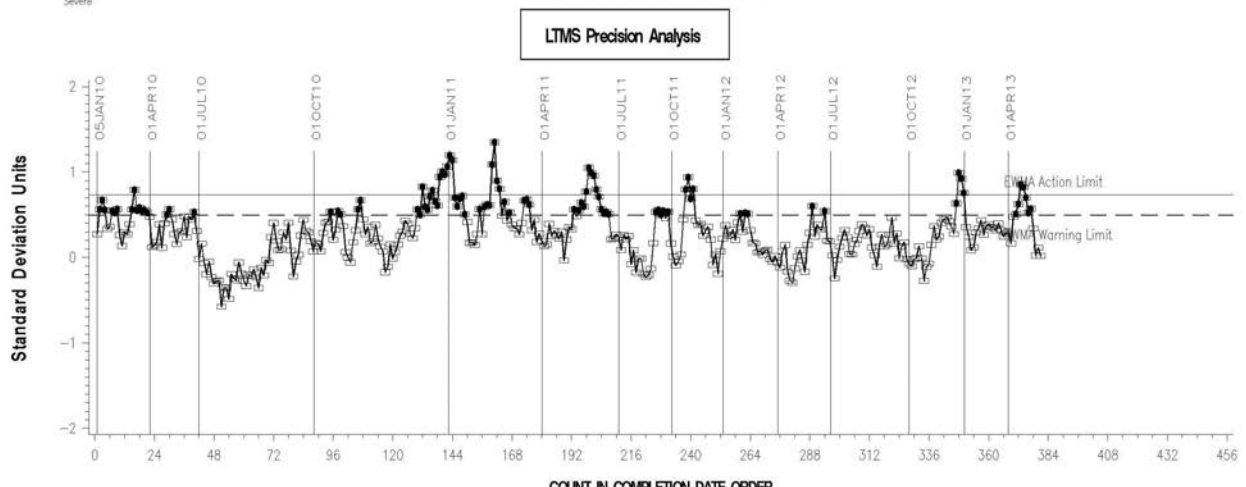
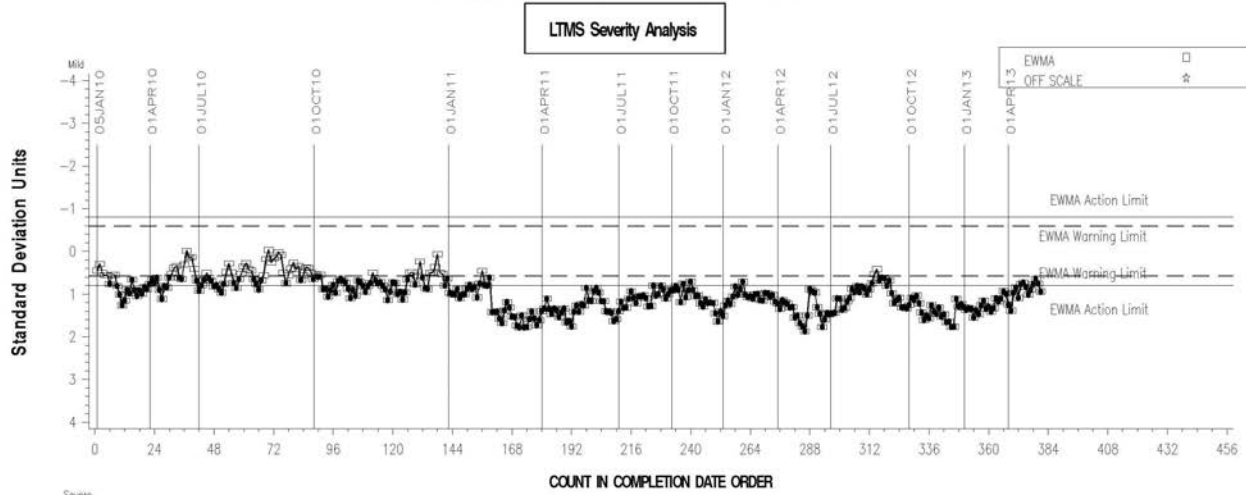
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LDEOC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



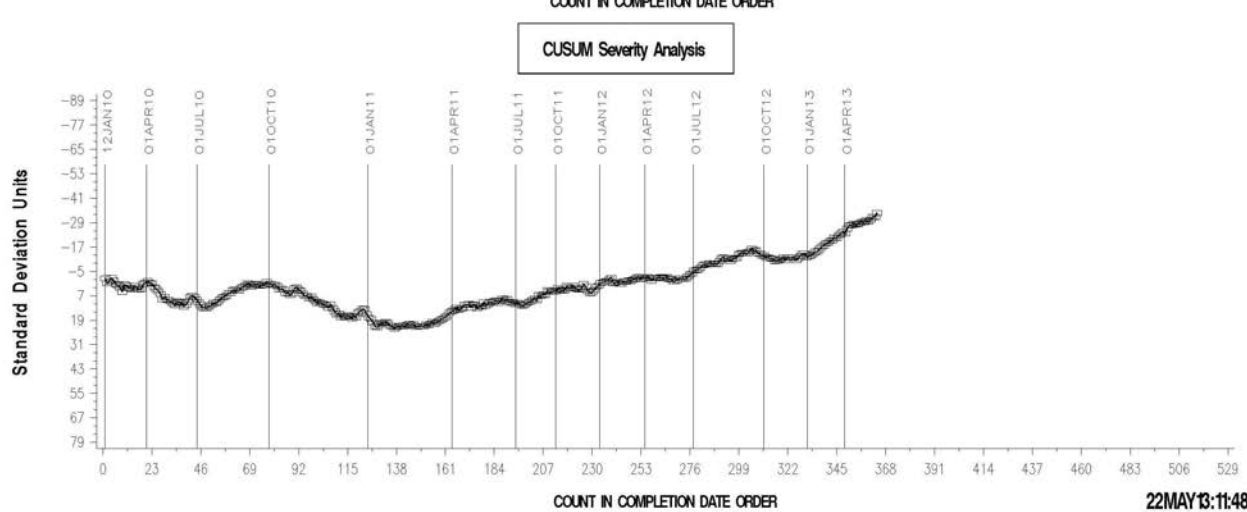
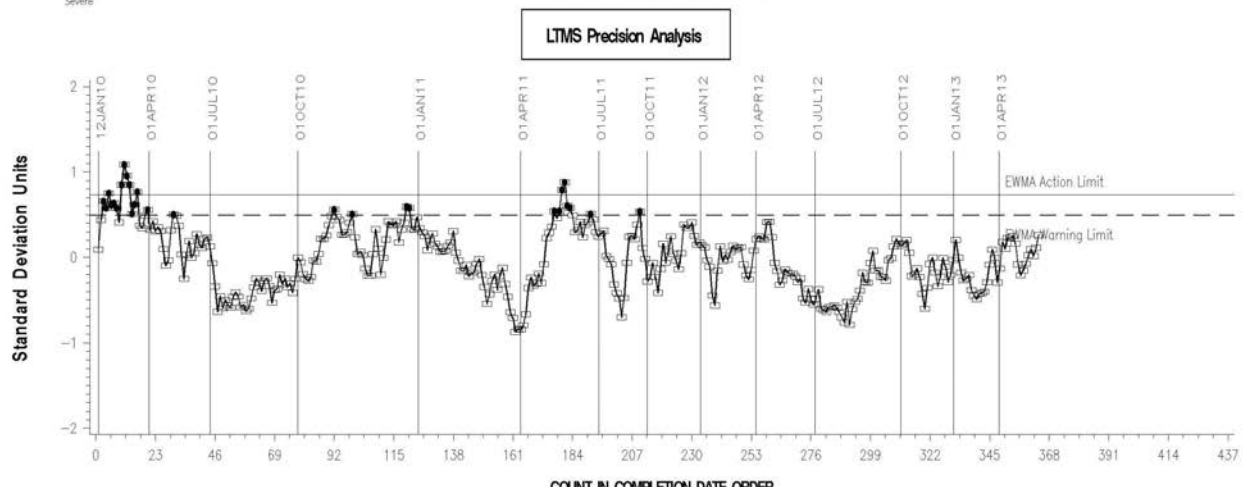
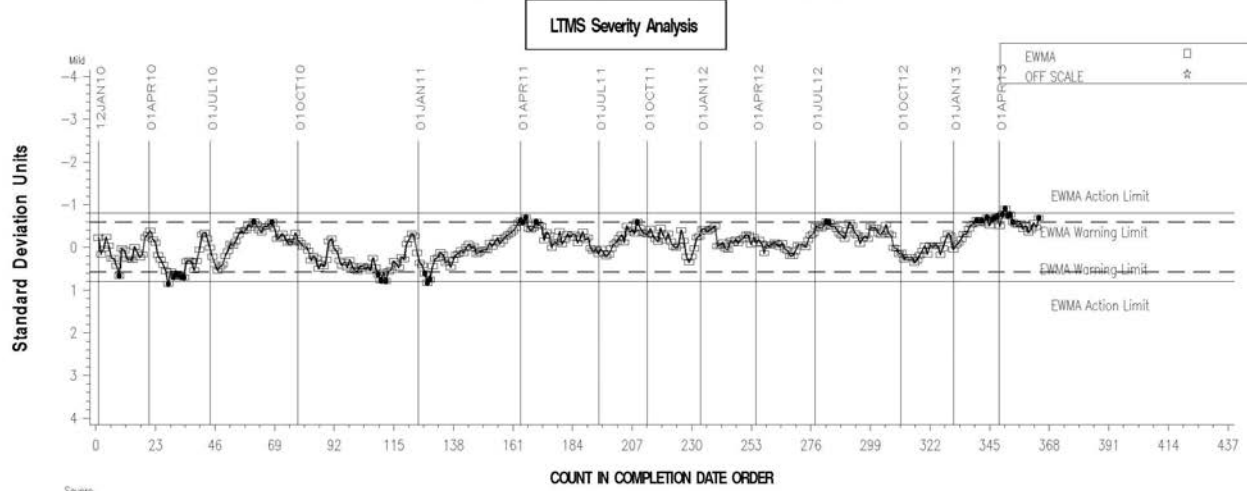
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LDEOC – ETHYLENE ACRYLATE INDUSTRY OPERATIONALLY VALID DATA



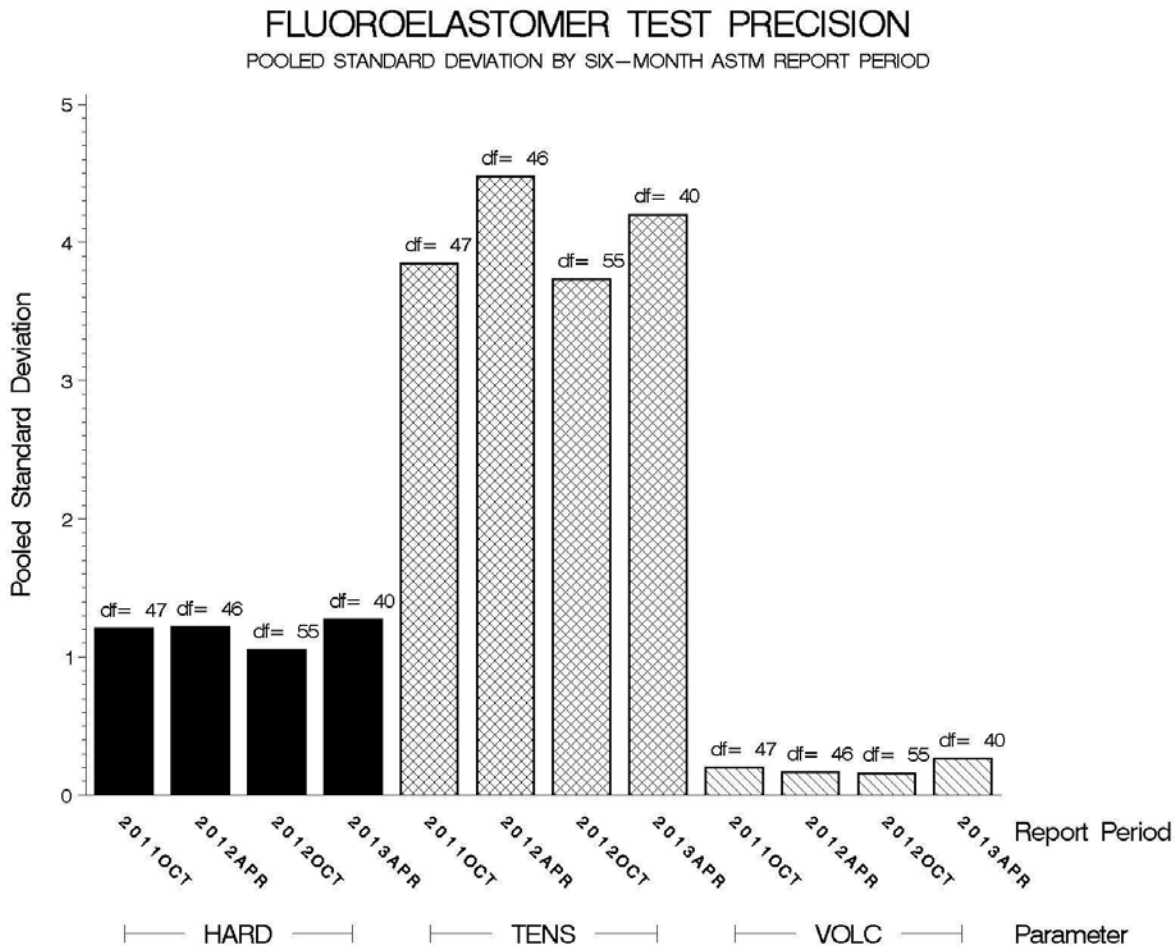
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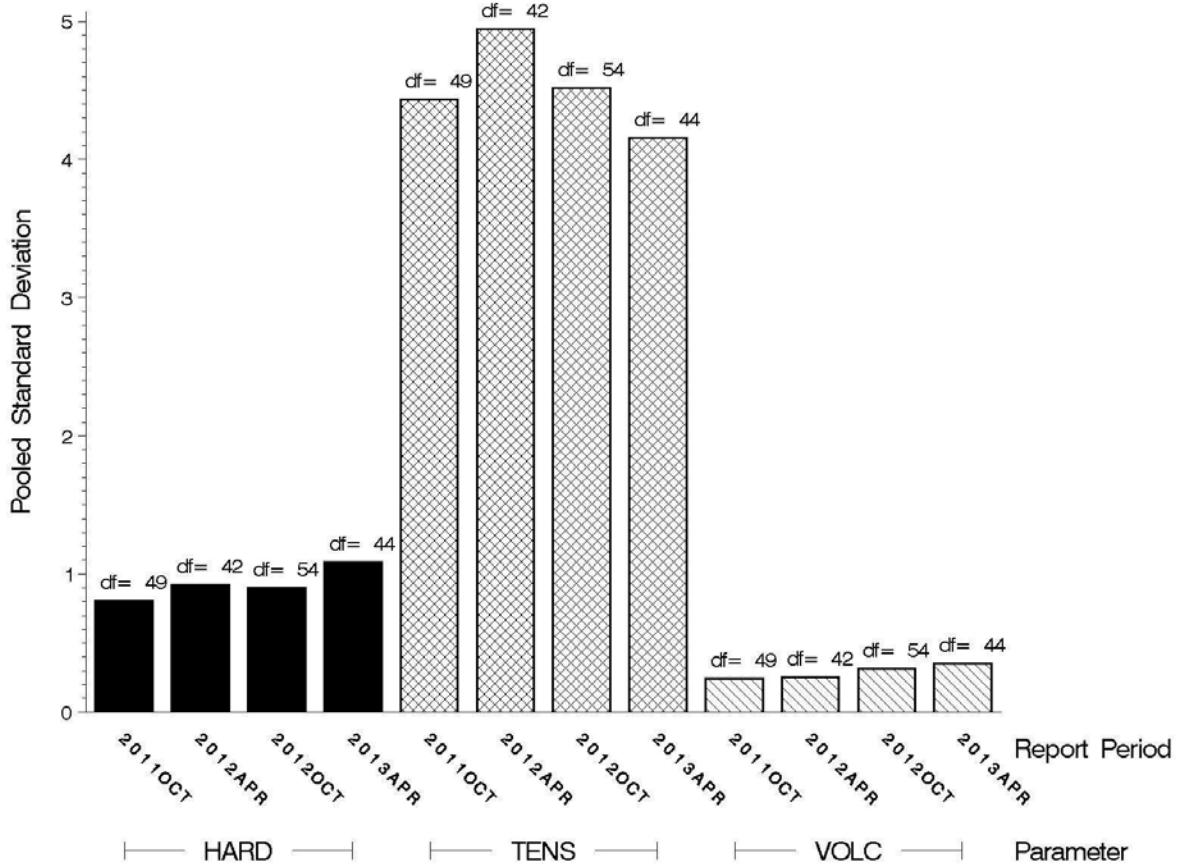
POOLED S:

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



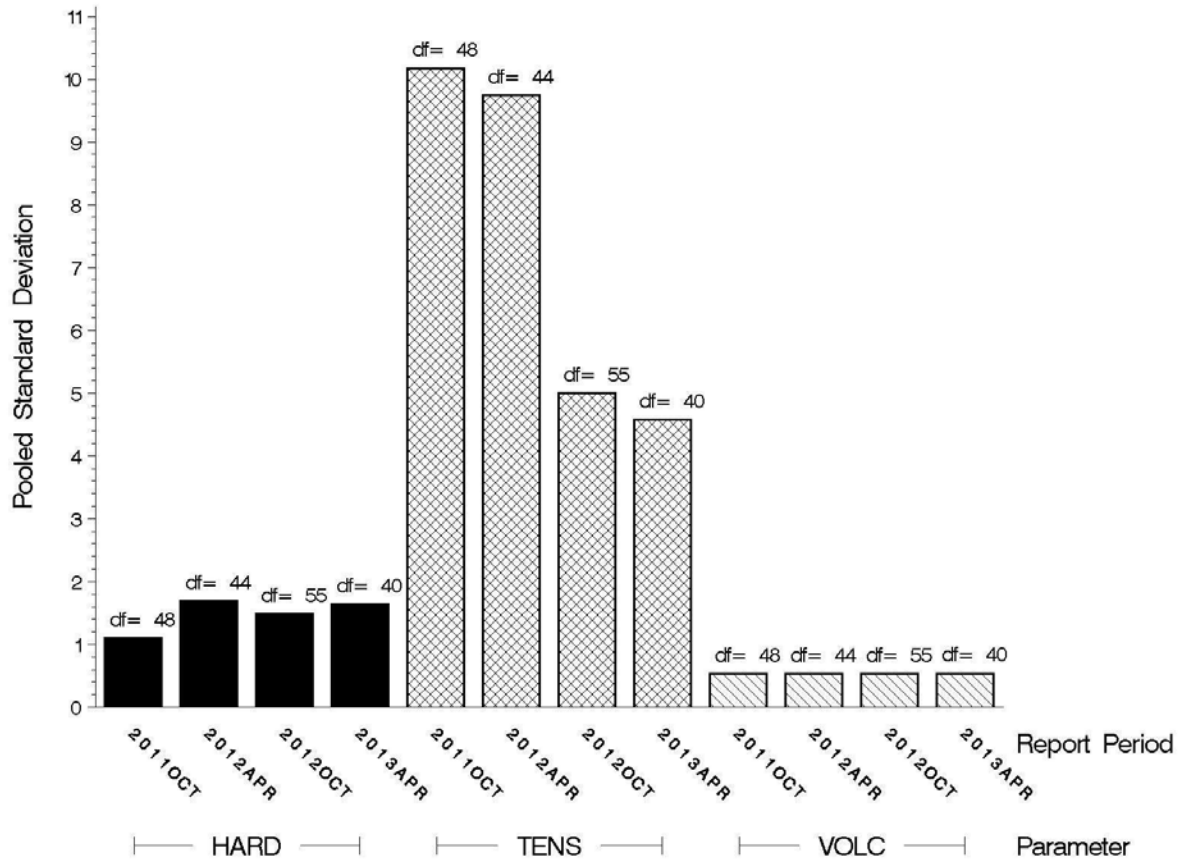
### NITRILE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



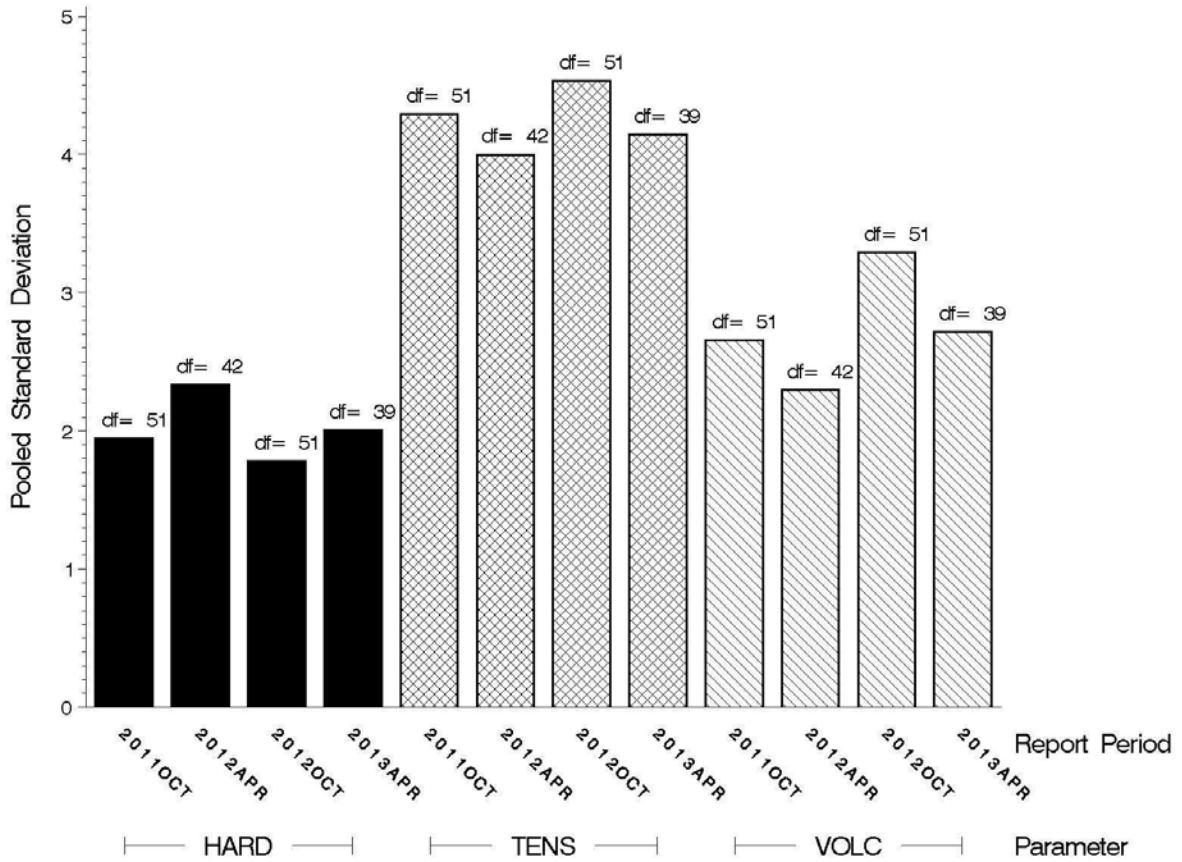
### POLYACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



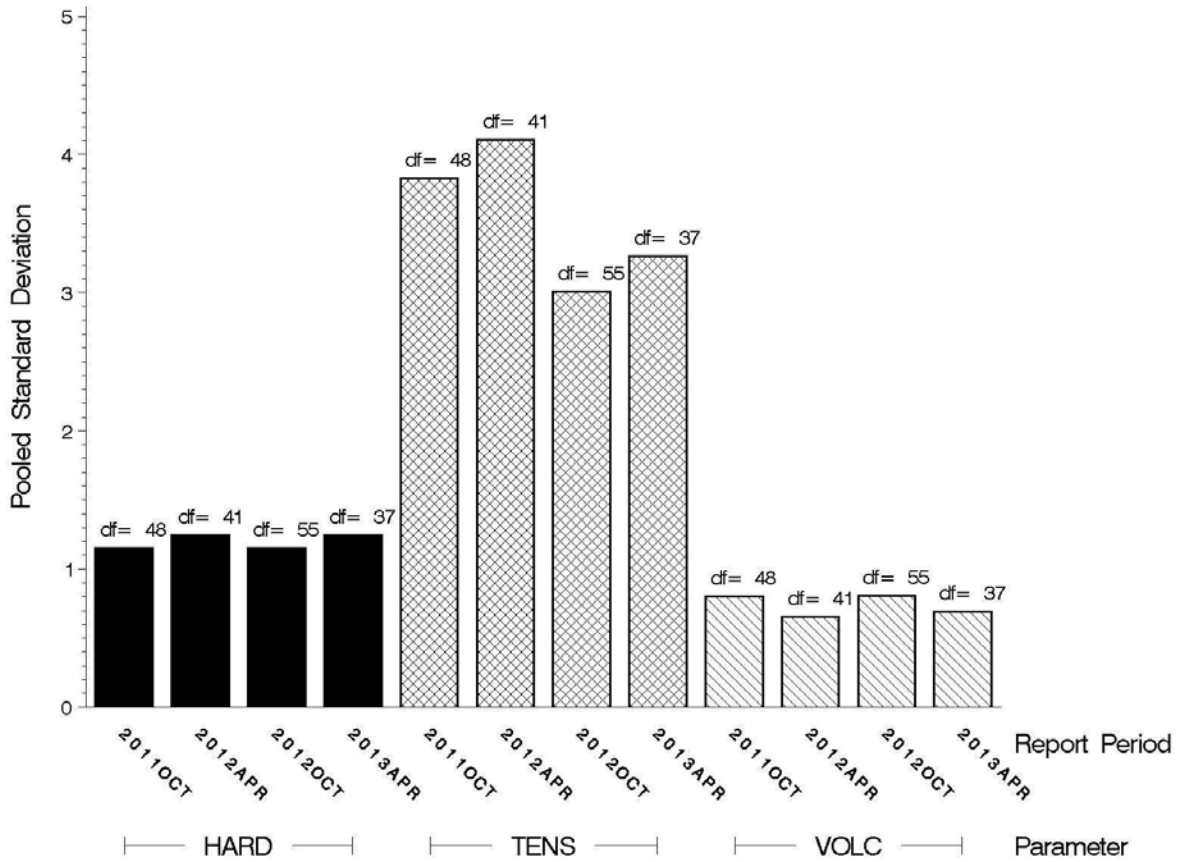
### SILICONE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



### ETHYLENE ACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



STATUS OF REFERENCE OIL SUPPLY:

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

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
1006-1	216	5813	1152
Total	216	5813	1152

Be aware that this table presumes that all of each of these oils is dedicated to the LDOEC 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**

<b>Elastomer</b>	<b>VOLC</b>	<b>HARD</b>	<b>TENS</b>
Fluoroelastomer	Within limits	Within limits	Within limits
Nitrile	<b>Severe</b>	Within limits	Within limits
Polyacrylate	Within limits	Within limits	<b>Mild</b>
Silicone	Within limits	Within limits	<b>Severe</b>
Ethylene Acrylate	<b>Severe</b>	<b>Mild</b>	<b>Mild</b>

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

<b>Elastomer</b>	<b>VOLC</b>	<b>HARD</b>	<b>TENS</b>
Fluoroelastomer	Within limits	Within limits	Within limits
Nitrile	Within limits	Within limits	Within limits
Polyacrylate	Within limits	Within limits	Within limits
Silicone	Within limits	Within limits	Within limits
Ethylene Acrylate	Within limits	Within limits	Within limits

MTK/mtk/astm0413.doc/mem13-035.mtk.doc

c: F. M. Farber  
 J. A. Clark  
 EOEC Surveillance Panel  
[tp://ftp.astmtmc.cmu.edu/docs/bench/Ideoc/semiannualreports/Ideoc-04-2013.pdf](http://ftp.astmtmc.cmu.edu/docs/bench/Ideoc/semiannualreports/Ideoc-04-2013.pdf)

Distribution: email