



Test Monitoring Center

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

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

MEMORANDUM: 14-016

DATE: May 28, 2014

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

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

SUBJECT: LDEOC Testing from October 1, 2013 through March 31, 2014

A total of 251 LDEOC tests were reported from 5 labs to the Test Monitoring Center during the period from October 1, 2013 through March 31, 2014.

Please find attached a summary of testing activity this period.

MTK/mtk/mem14-016.mtk.doc

cc: Frank Farber

Jeff Clark

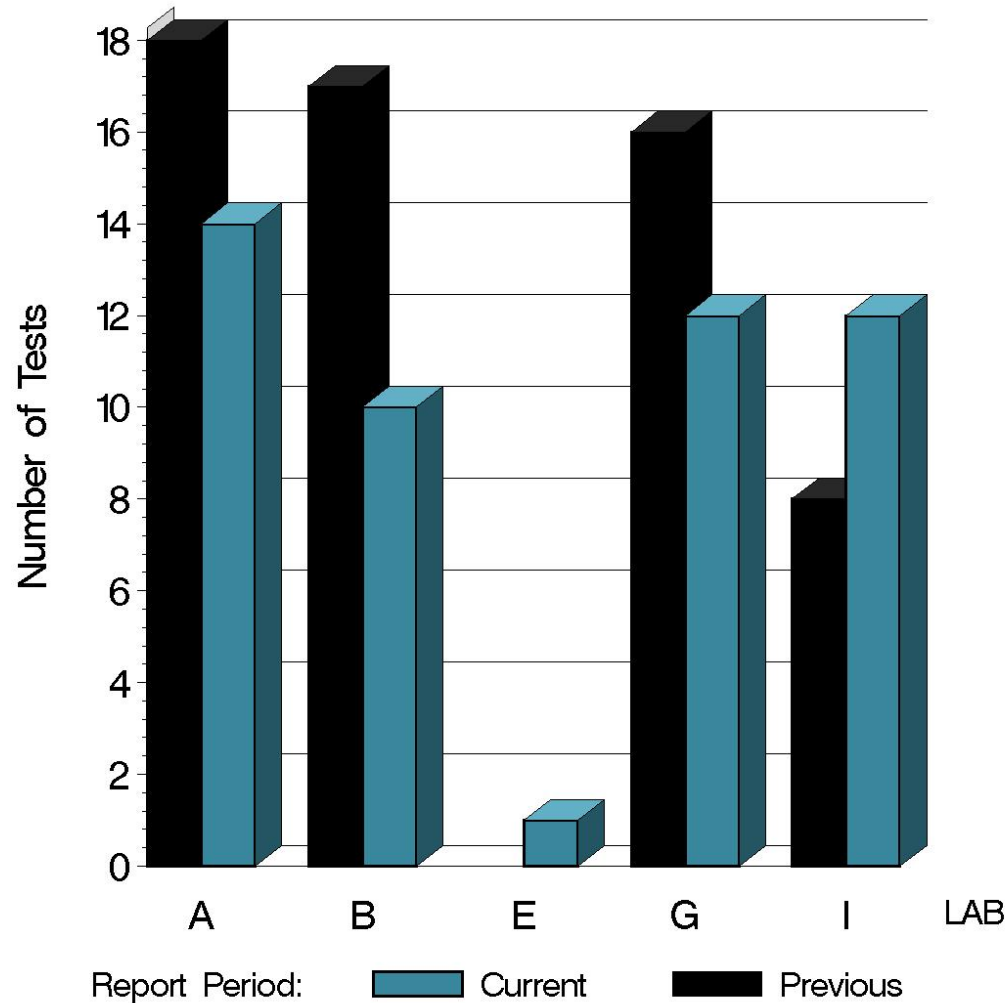
EOEC Surveillance Panel

<ftp://ftp.astmtmc.cmu.edu/docs/bench/ldeoc/semiannualreports/ldeoc-04-2014.pdf>

Distribution: email

LDEOC (D 7216)

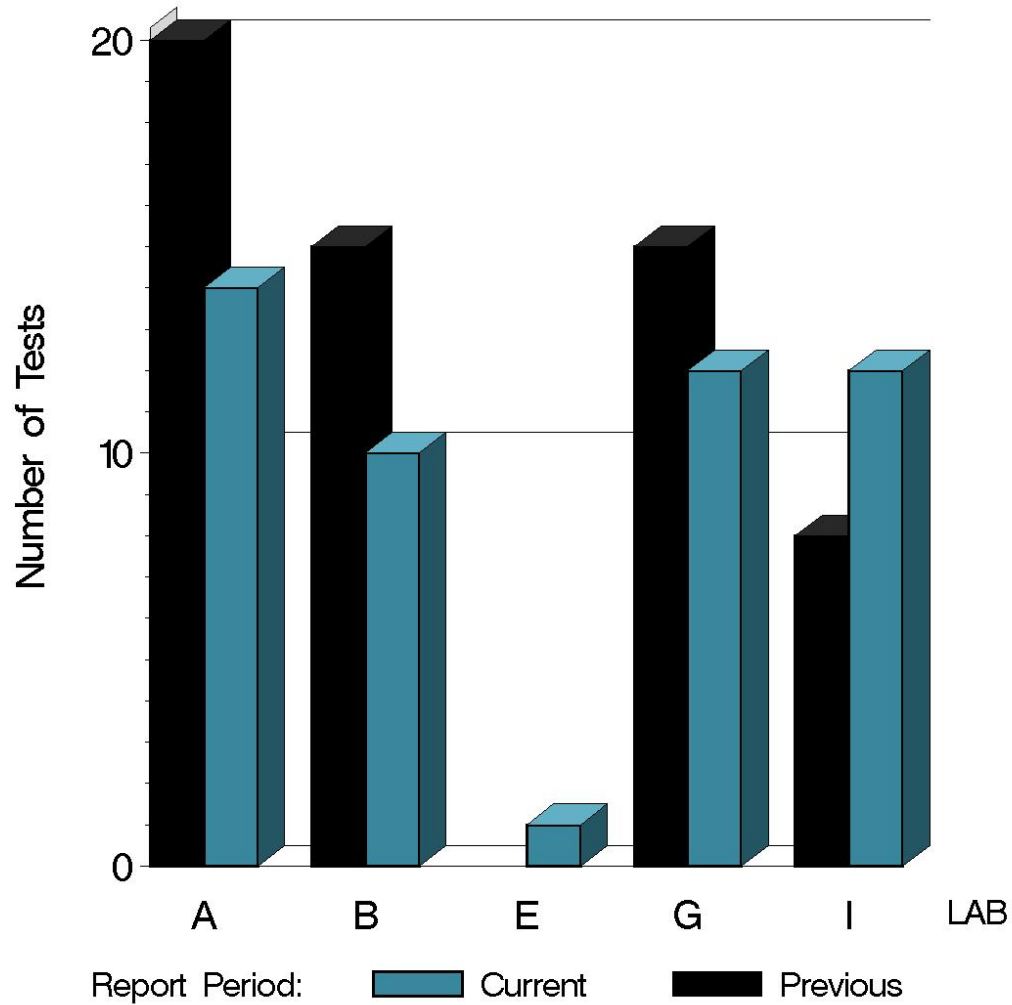
NUMBER OF ETHYLENE ACRYLATE TESTS
REPORTED BY LAB AND REPORT PERIOD



9:58:33 28MAY2014

LDEOC (D 7216)

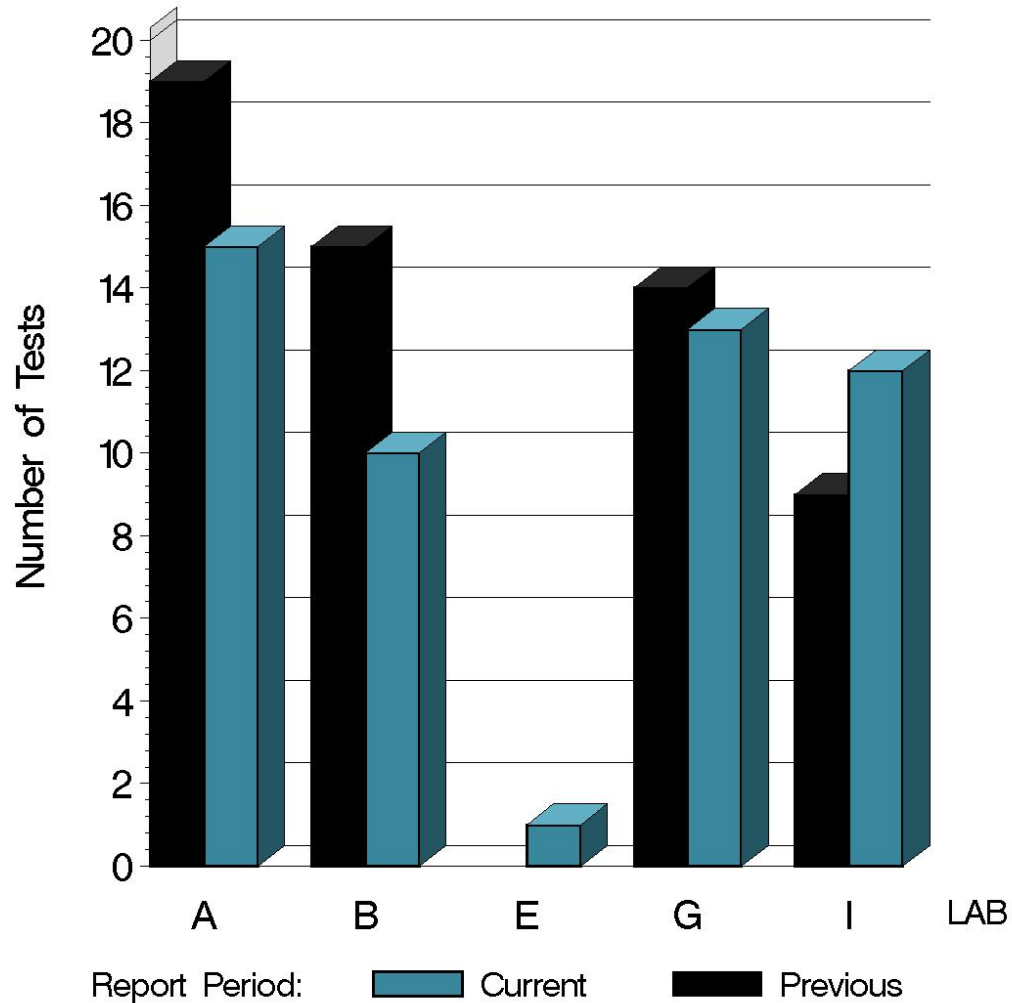
NUMBER OF FLUOROELASTOMER TESTS
REPORTED BY LAB AND REPORT PERIOD



9:58:33 28MAY2014

LDEOC (D 7216)

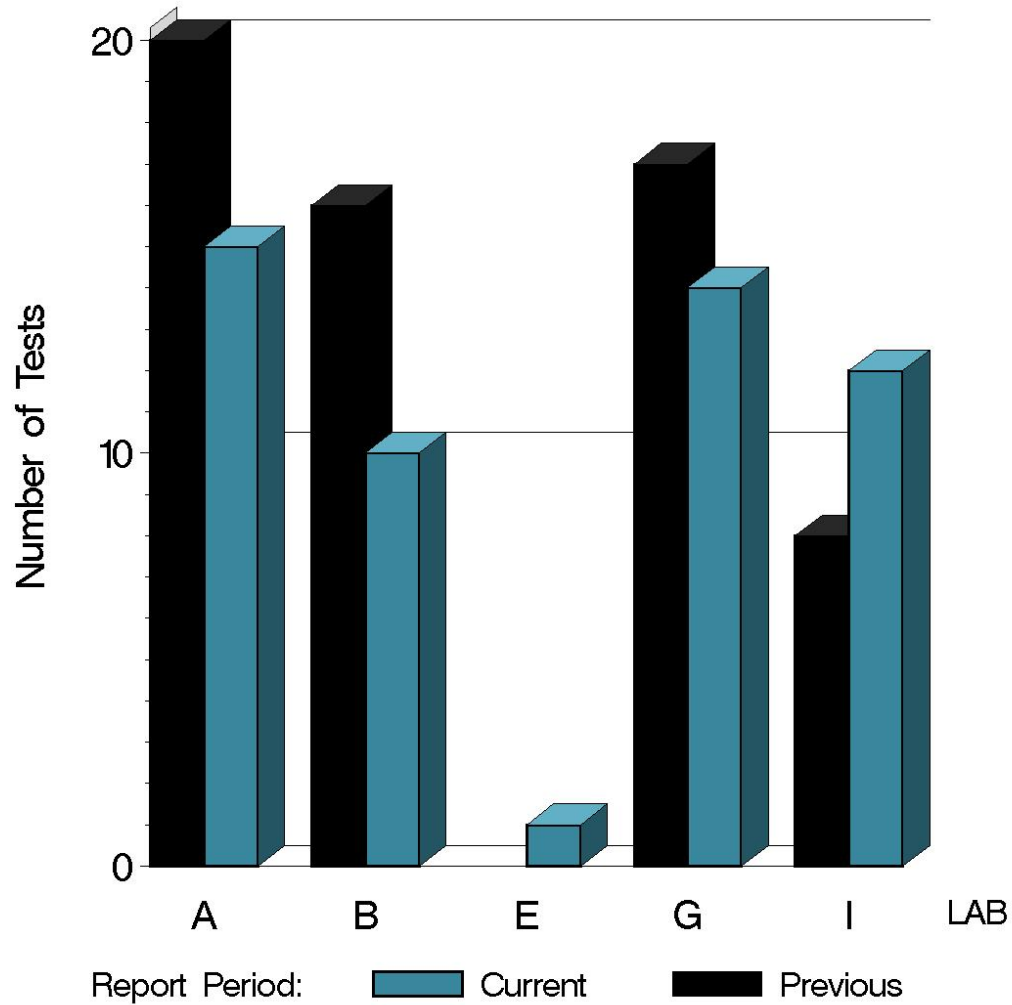
NUMBER OF NITRILE TESTS REPORTED BY LAB AND REPORT PERIOD



9:58:33 28MAY2014

LDEOC (D 7216)

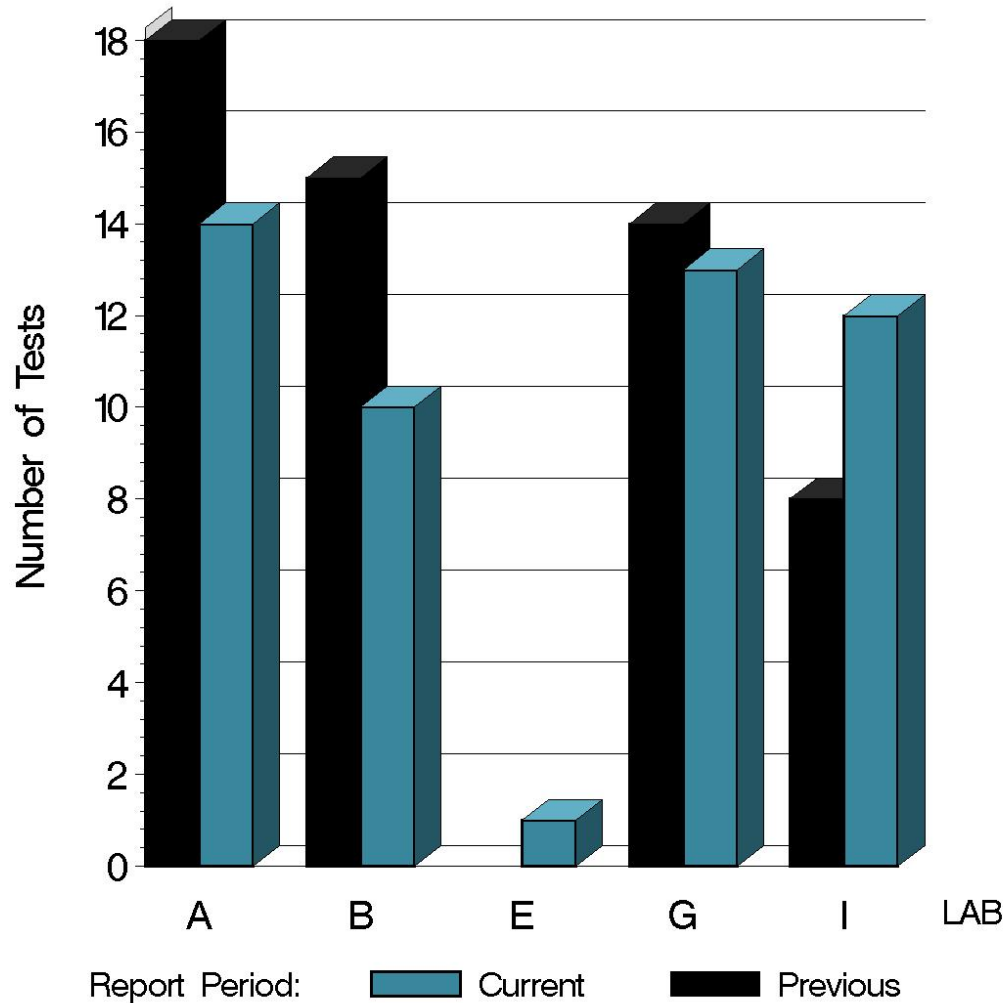
NUMBER OF POLYACRYLATE TESTS REPORTED BY LAB AND REPORT PERIOD



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LDEOC (D 7216)

NUMBER OF SILICONE TESTS
REPORTED BY LAB AND REPORT PERIOD



9:58:33 28MAY2014

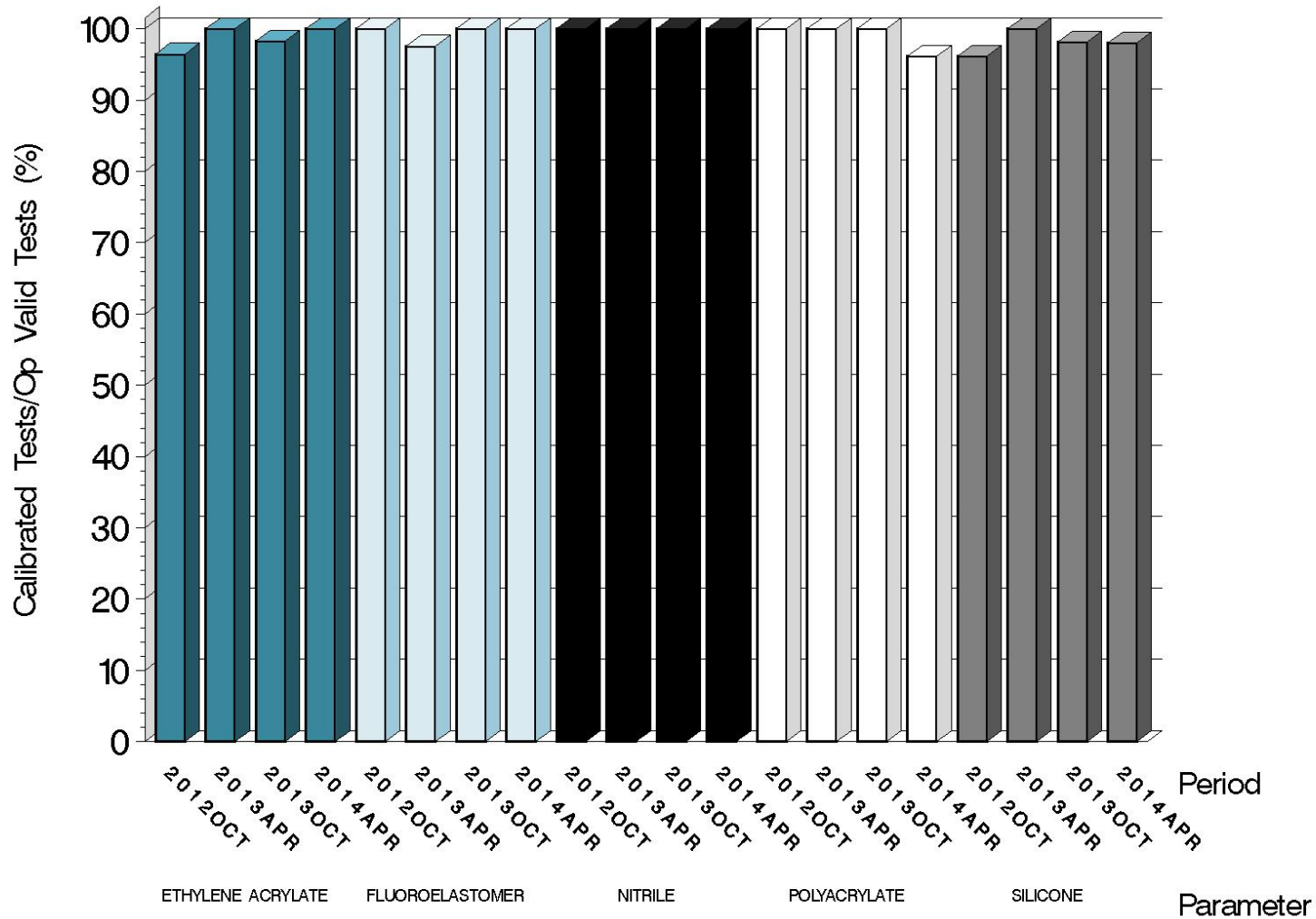
LDEOC (D 7216)

Test Distribution by Oil and Validity

		Ethylene Acrylate	Fluoroelastomer	Nitrile	Polyacrylate	Silicone	This Period	Last Period
Accepted for Calibration	AC	49	49	51	50	49	248	282
Rejected	OC	0	0	0	2	1	3	2
Information Run	NI	0	0	0	0	0	0	0
Operationally Invalid (lab)	LC	0	0	0	0	0	0	1
Operationally Invalid (lab/TMC)	RC	0	0	0	0	0	0	0
Aborted Calibration	XC	0	0	0	0	0	0	5
Total		49	49	51	52	50	251	290

LDEOC (D 7216)

OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA



9:58:33 28MAY2014

LDEOC (D 7216)

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	14	0	0	14	0	0	15	0	0	15	0	0	14	0	0	72	0
B	0	10	0	0	10	0	0	10	0	0	10	0	0	10	0	0	50	0
E	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	5	0
G	0	12	0	0	12	0	0	13	0	0	14	0	0	13	0	0	64	0
I	0	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	60	0
Total	0	49	0	0	49	0	0	51	0	0	52	0	0	50	0	0	251	0

LDEOC (D 7216)

CAUSES FOR LOST TESTS

Lab	Cause	Elastomer					Validity			Loss Rate		
		Ethylene Acrylate	Fluoroelastomer	Nitrile	Polyacrylate	Silicone	LC	RC	XC	Lost	Starts	%
-	No Tests were lost this period									0	251	0
	Lost	0	0	0	0	0	0	0				
	Starts	49	49	51	52	50	251	251	251			
	%	0	0	0	0	0	0	0	0			

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

LDEOC (D 7216)

Average Δ/s by Lab					
Elastomer	Lab	n	VOLCYI	HARDYI	TENSYI
Ethylene Acrylate	A	14	-0.129	-2.275	-0.218
	B	10	0.779	-1.945	-0.506
	E	1	-1.325	-2.824	0.488
	G	12	0.657	-0.443	0.213
	I	12	0.680	-1.908	-0.273
	Industry	49	0.422	-1.680	-0.170
Fluoroelastomer	A	14	-0.419	1.020	-0.470
	B	10	-1.013	-0.267	-0.316
	E	1	-0.333	-0.465	-0.274
	G	12	-0.644	-0.218	0.057
	I	12	0.928	0.195	1.201
	Industry	49	-0.264	0.222	0.104
Nitrile	A	15	1.286	-1.130	0.179
	B	10	1.417	-1.667	-0.407
	E	1	1.333	-0.977	-0.616
	G	13	1.123	0.172	-0.064
	I	12	1.081	-0.881	-0.203
	Industry	51	1.223	-0.842	-0.103
Polyacrylate	A	15	0.040	-1.113	-1.125
	B	10	0.512	-1.610	-1.204
	E	1	0.803	-2.065	-3.290
	G	14	-0.254	0.069	-1.052
	I	12	0.727	-0.604	-1.023
	Industry	52	0.225	-0.791	-1.139
Silicone	A	14	-1.003	-0.391	2.260
	B	10	0.252	-0.559	0.871
	E	1	0.296	1.255	5.282
	G	13	1.375	0.765	0.690
	I	12	-0.801	0.070	0.627
	Industry	50	-0.059	0.020	1.243

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LDEOC (D 7216)

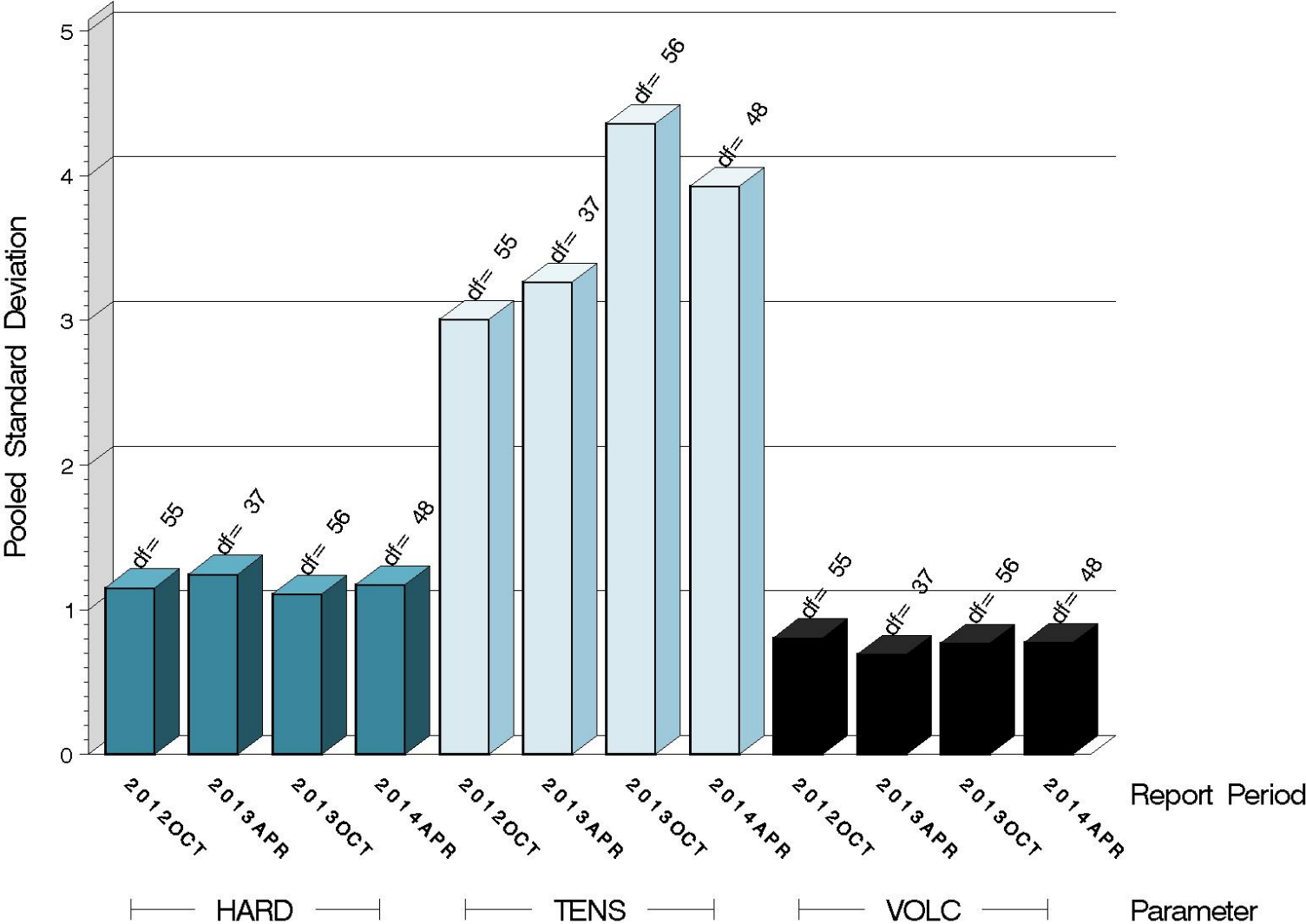
Individual test results can be viewed at the links shown in the following table:

<i>Links to Individual Test Result Data</i>	
Elastomer Type	Web Link to Data
Ethylene Acrylate	ftp://ftp.astmtmc.cmu.edu/refdata/bench/ldeoca/data/
Fluoroelastomer	ftp://ftp.astmtmc.cmu.edu/refdata/bench/ldeocf/data/
Nitrile	ftp://ftp.astmtmc.cmu.edu/refdata/bench/ldeocn/data/
Polyacrylate	ftp://ftp.astmtmc.cmu.edu/refdata/bench/ldeocp/data/
Silicone	ftp://ftp.astmtmc.cmu.edu/refdata/bench/ldeocs/data/

LDEOC (D 7216)

ETHYLENE ACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



10:43:05 28MAY2014

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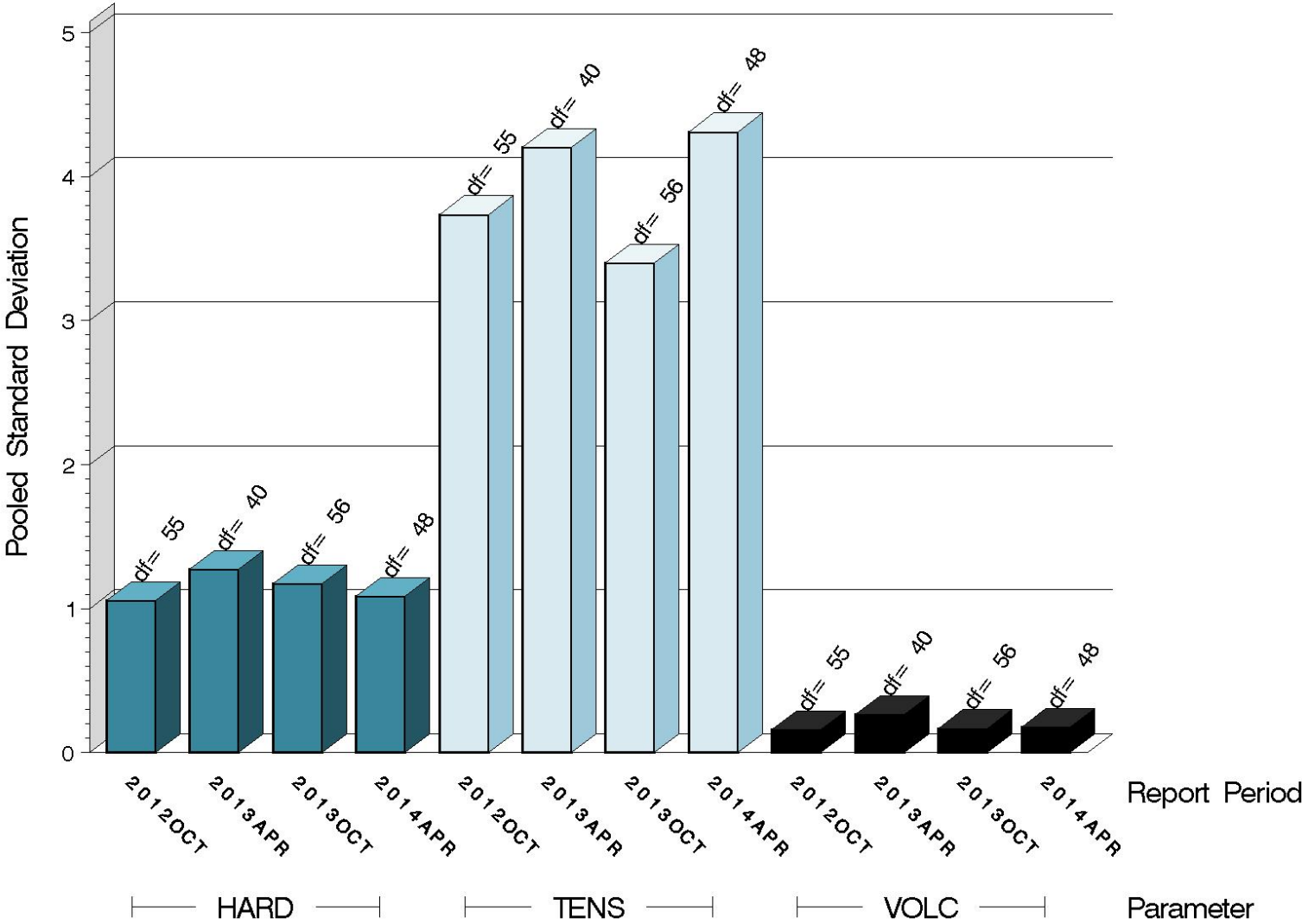


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LDEOC (D 7216)

FLUROELASTOMER TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD

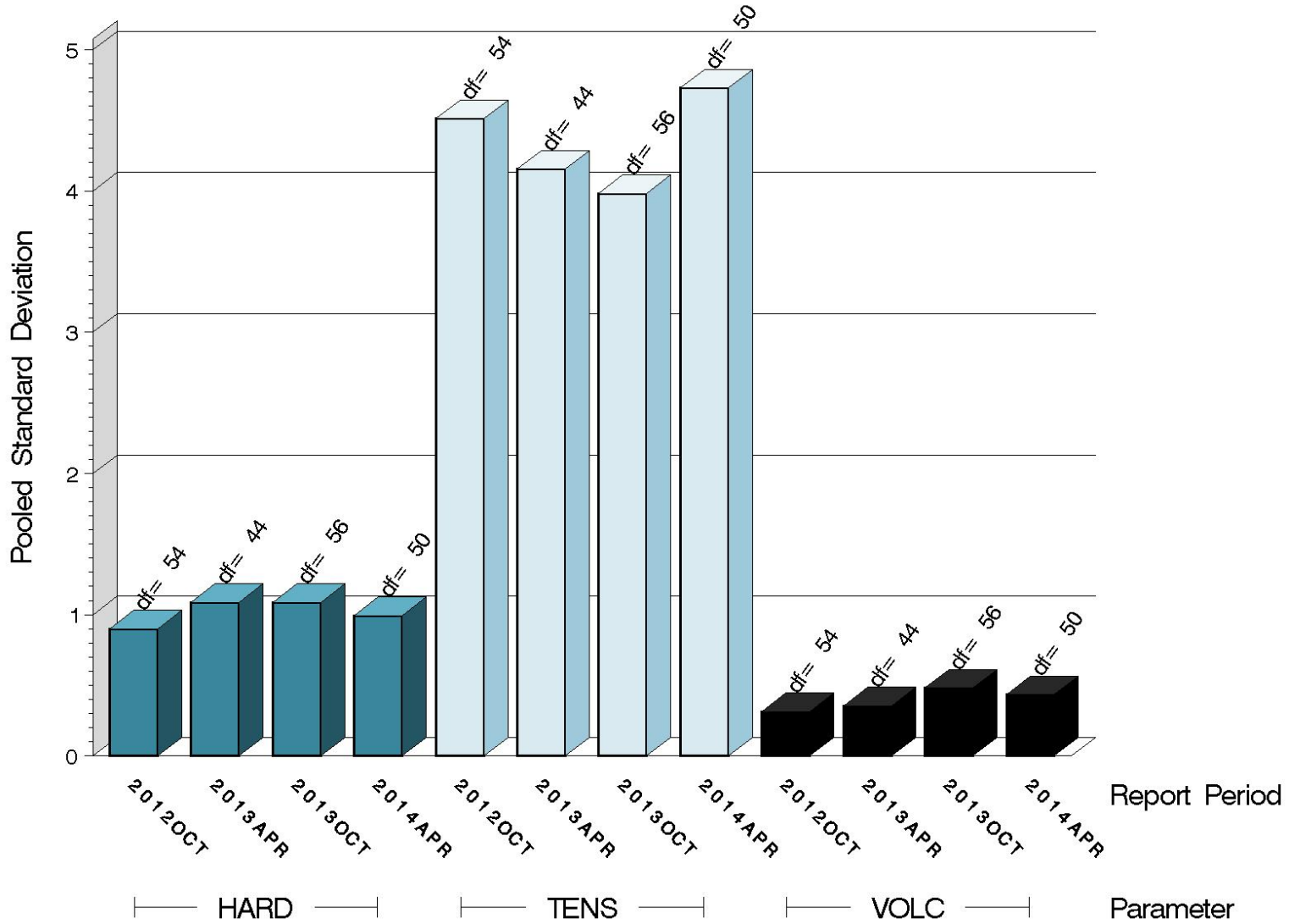


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LDEOC (D 7216)

NITRILE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD

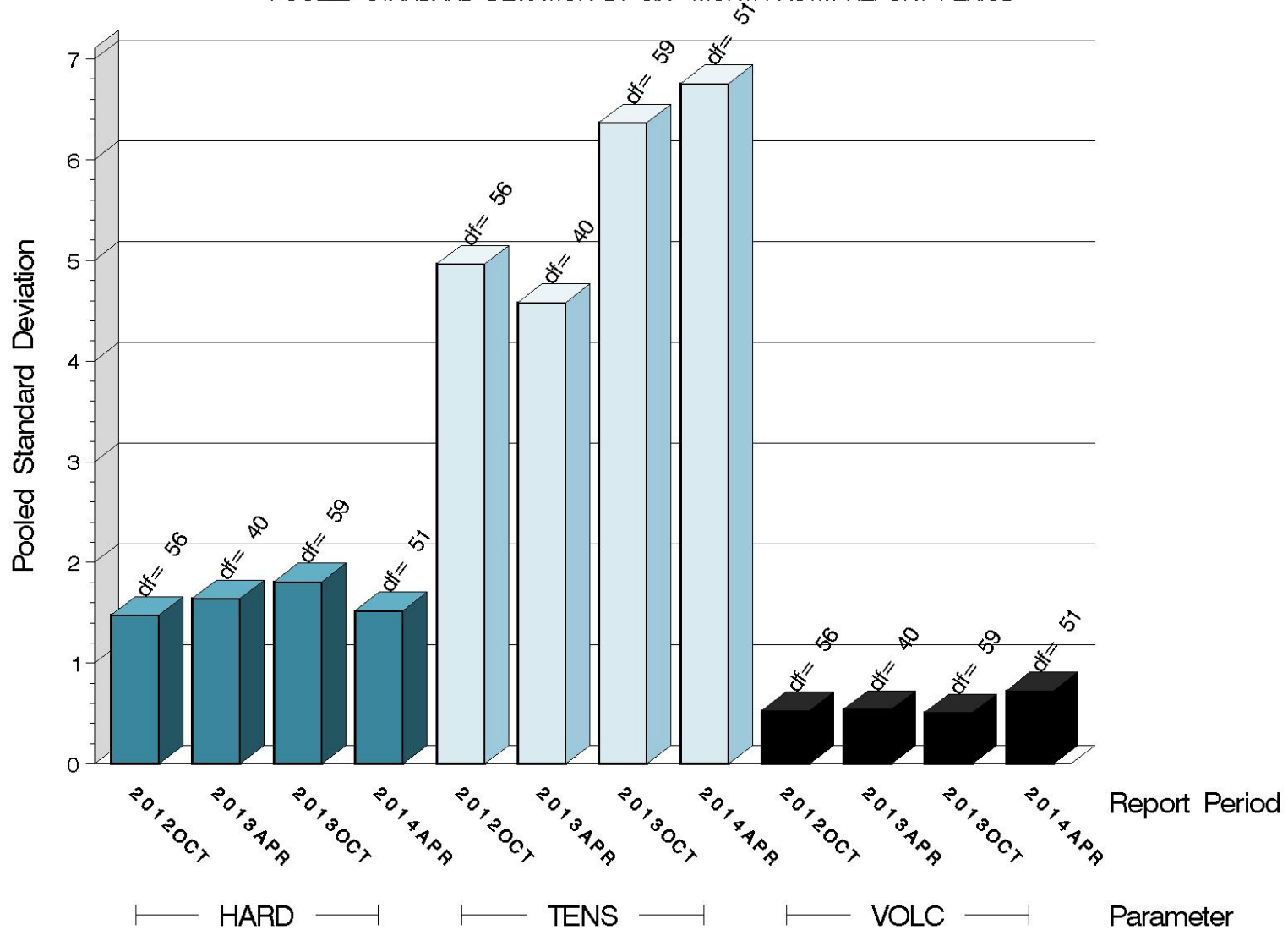


10:43:05 28MAY2014

LDEOC (D 7216)

POLYACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD

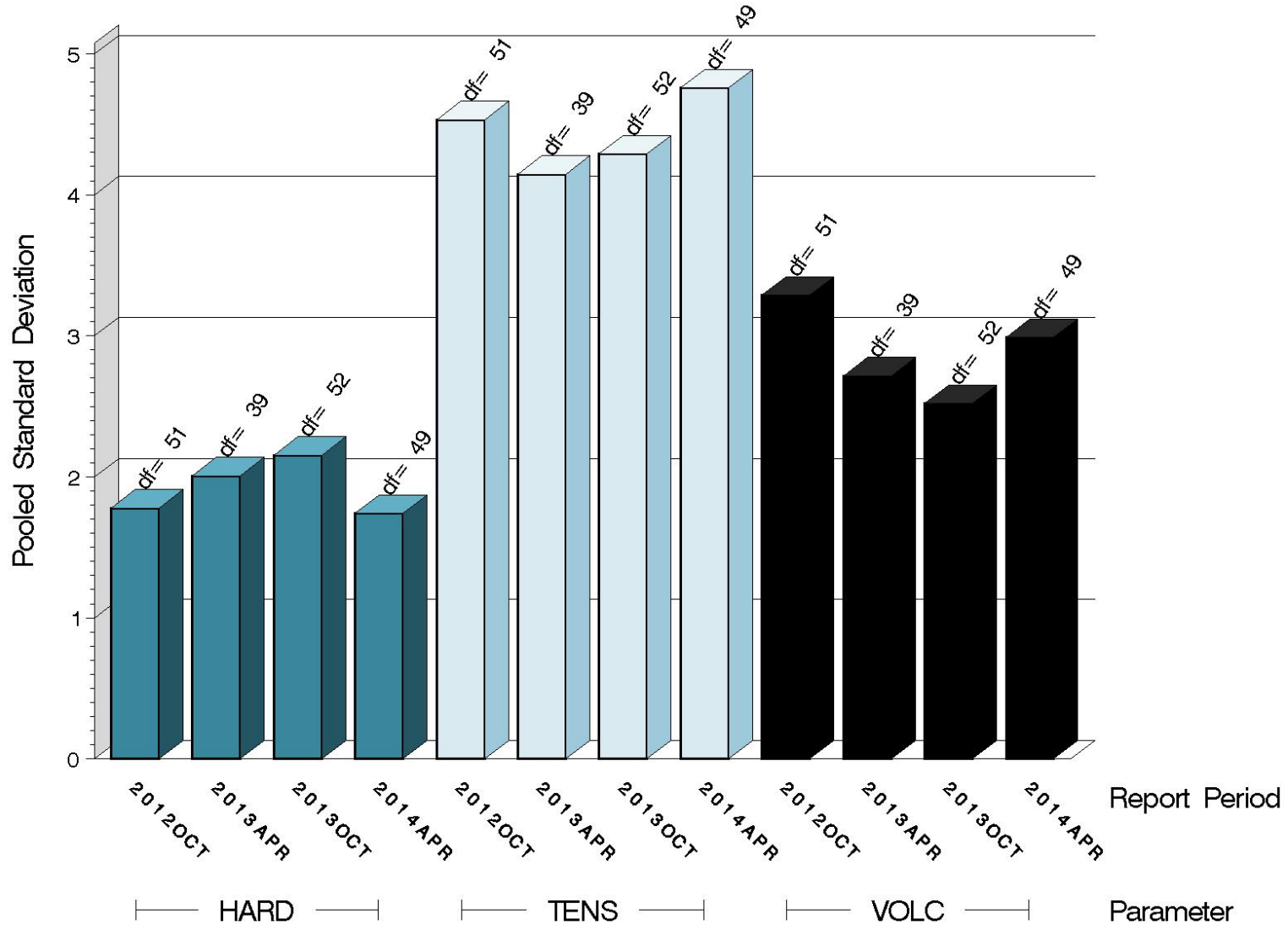


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LDEOC (D 7216)

SILICONE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



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LDEOC (D 7216)

SUMMARY OF SEVERITY & PRECISION

Summary of Severity as Measured by LTMS Control Charting			
Elastomer	VOLC	HARD	TENS
Ethylene Acrylate	Within limits	Mild	Within limits
Fluoroelastomer	Within limits	Within limits	Within limits
Nitrile	Severe	Within limits	Within limits
Polyacrylate	Severe	Within limits	Mild
Silicone	Within limits	Within limits	Severe

LDEOC (D 7216)

SUMMARY OF SEVERITY & PRECISION (continued)

Summary of Precision as Measured by LTMS Control Charting			
Elastomer	VOLC	HARD	TENS
Ethylene Acrylate	Within limits	Warning	Within limits
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

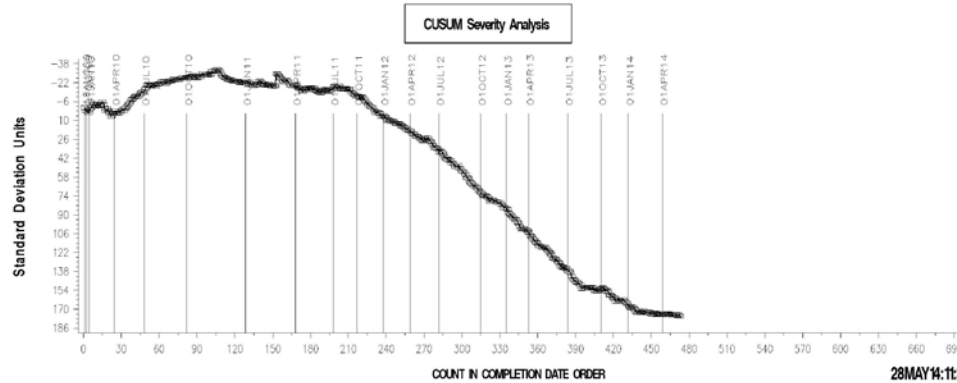
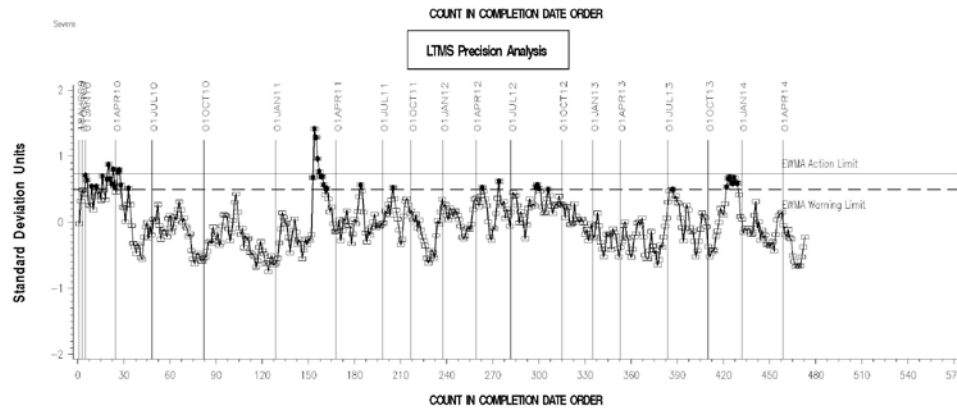
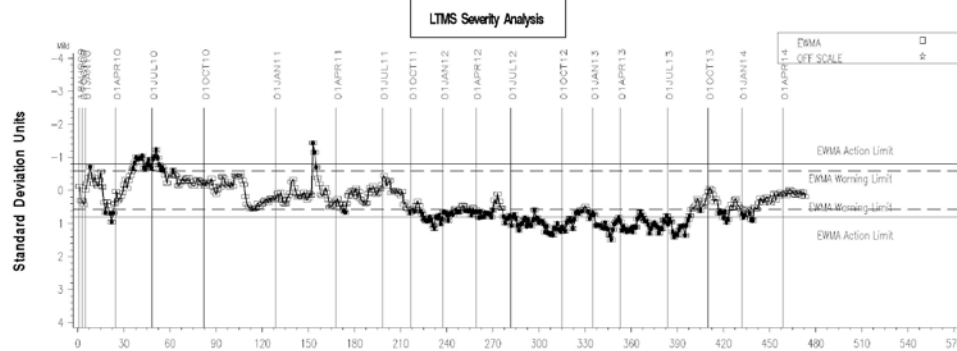
Industry control charts follow.

LDEOC (D 7216)

LDEOC – ETHYLENE ACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REF ETH ACRYLATE VOLUME CHANGE AVERAGE



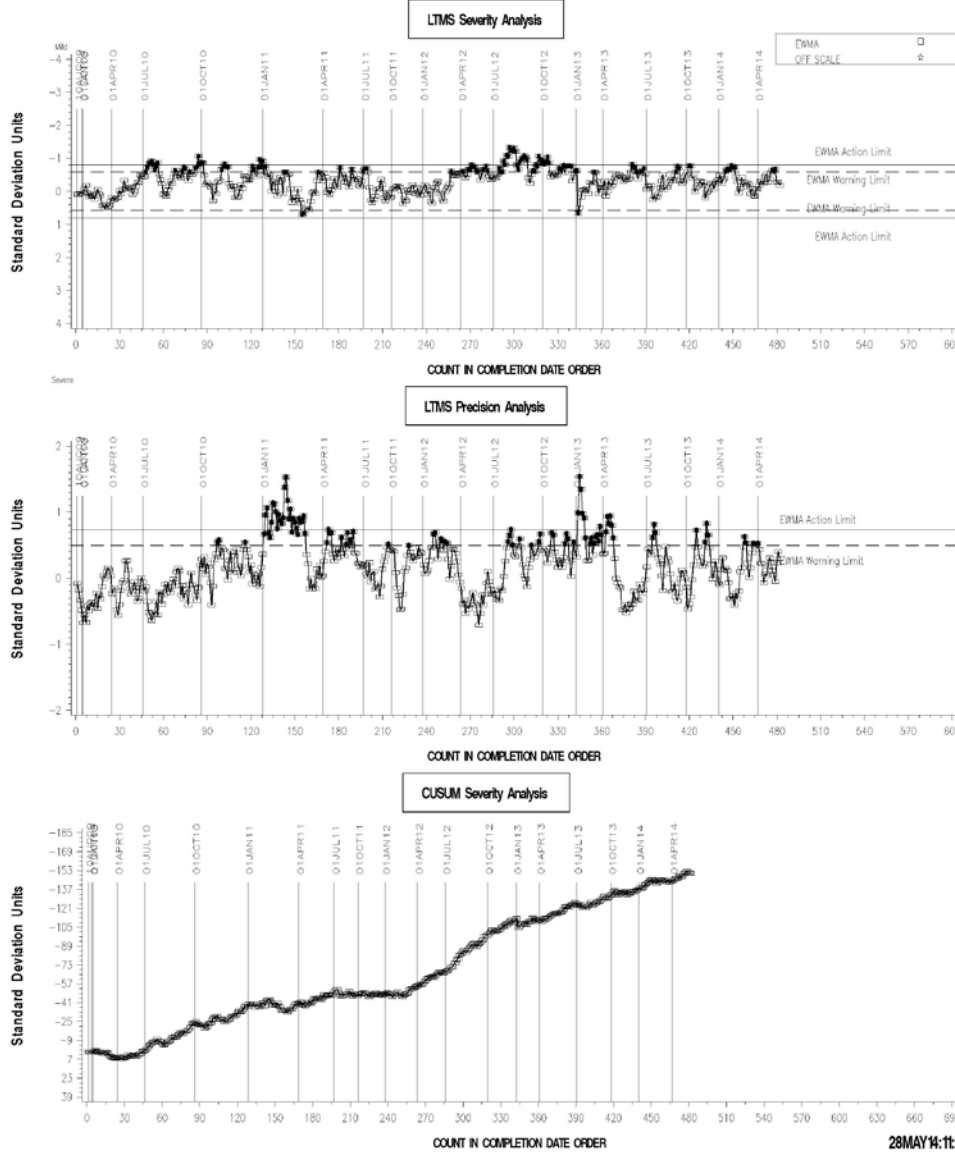
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LDEOC (D 7216)

LDEOC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



REF FLUOROELASTOMER VOLUME CHANGE AVERAGE

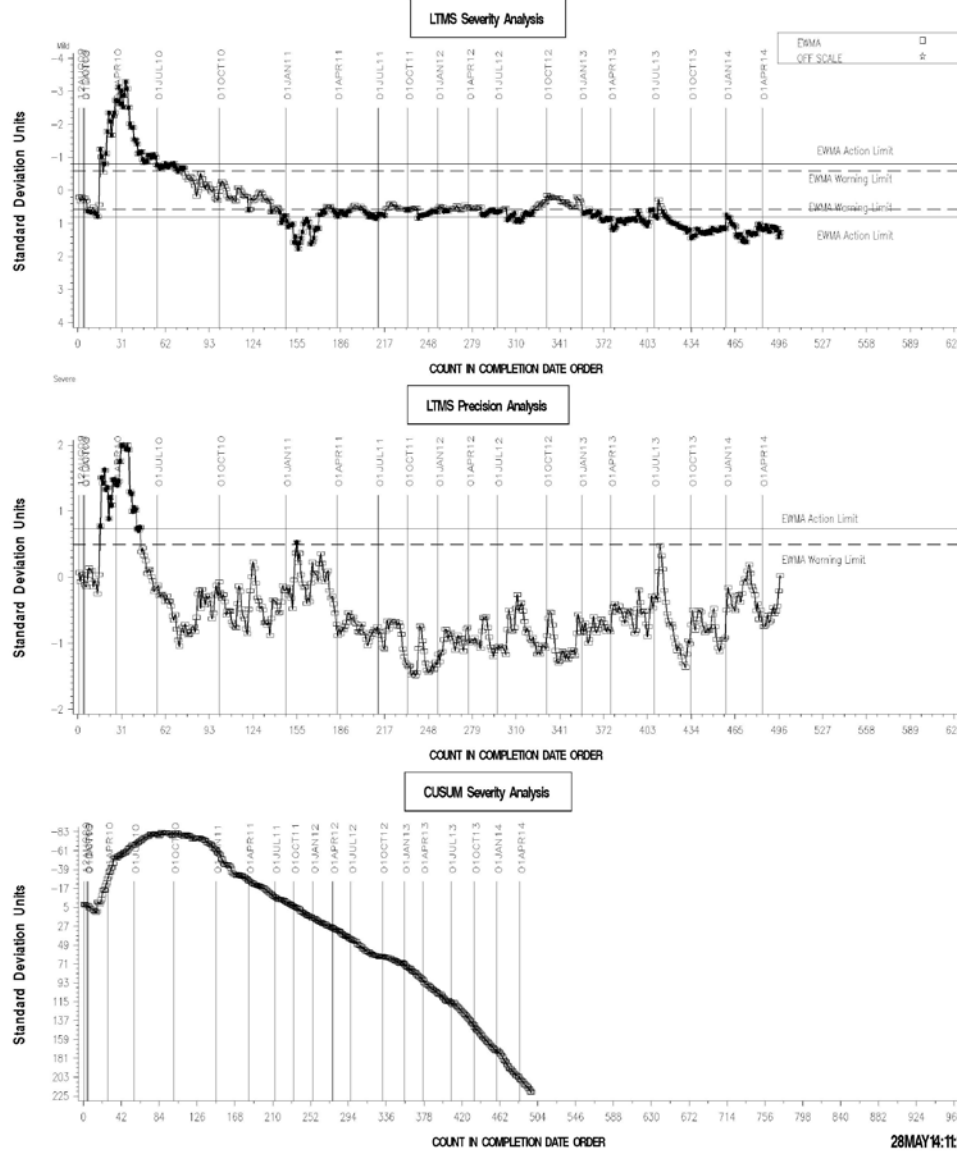


LDEOC (D 7216)

LDEOC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE NITRILE VOLUME CHANGE AVERAGE

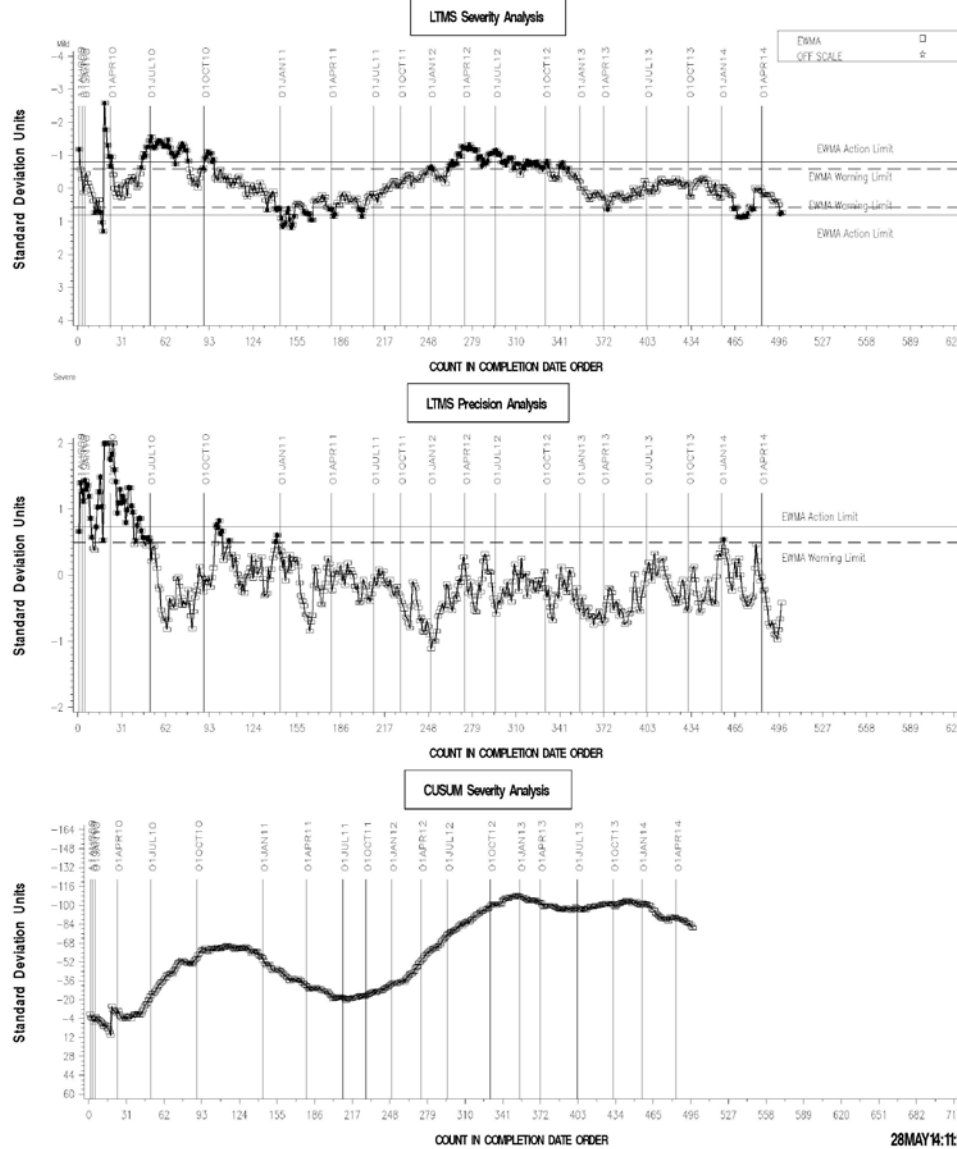


LDEOC (D 7216)

LDEOC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REF POLYACRYLATE VOLUME CHANGE AVERAGE

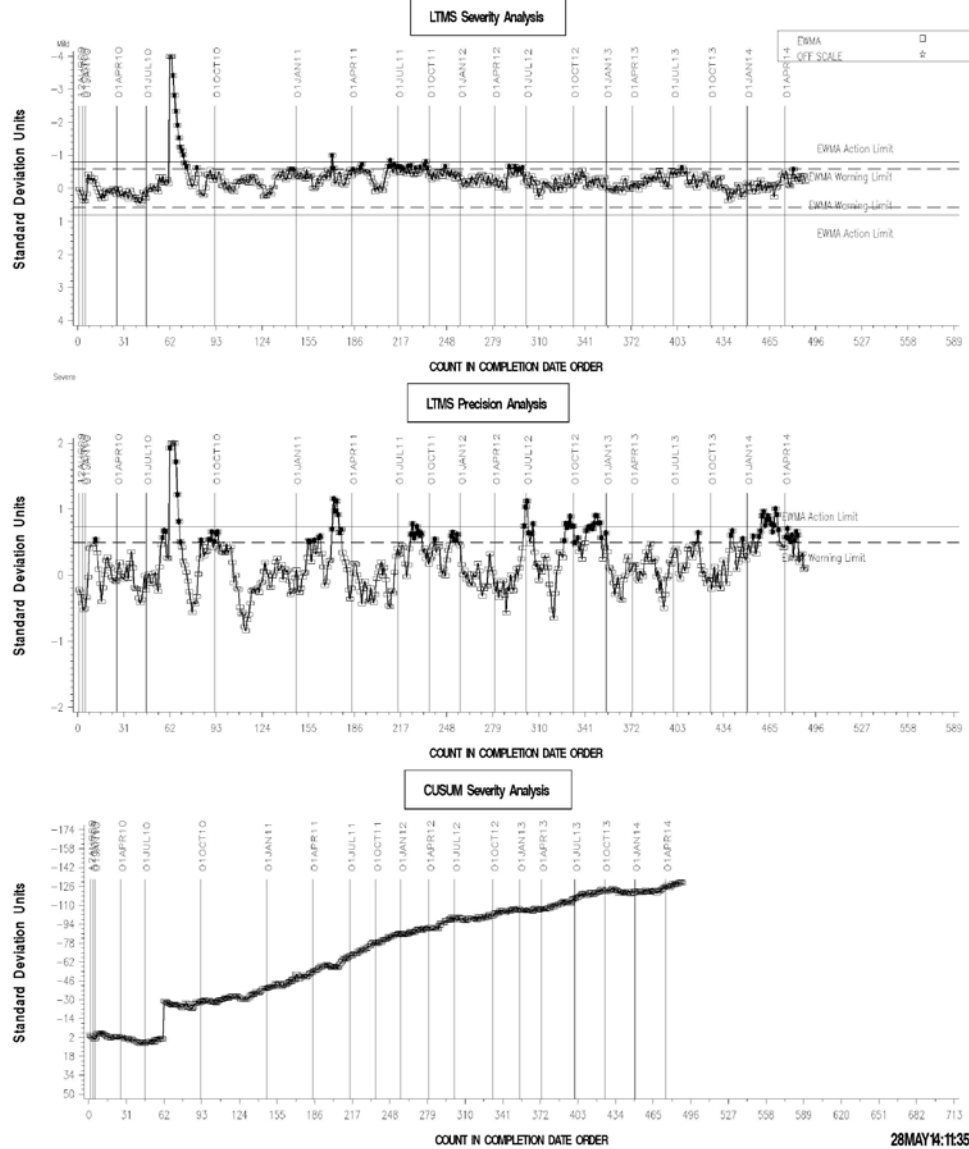


LDEOC (D 7216)

LDEOC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REFERENCE SILICON VOLUME CHANGE AVERAGE

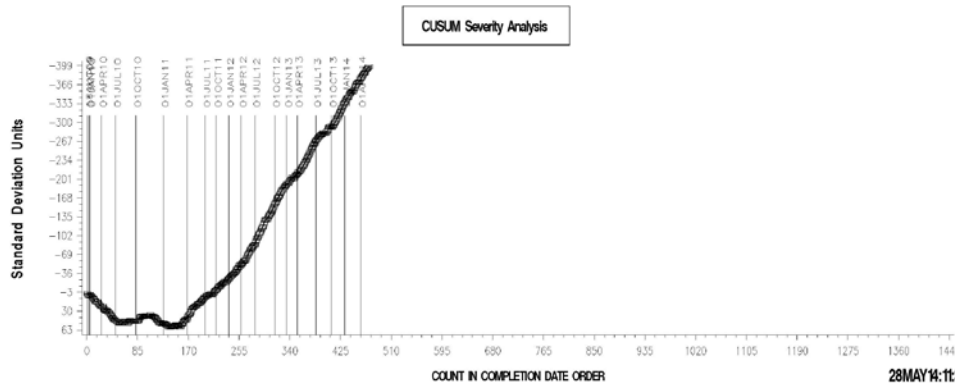
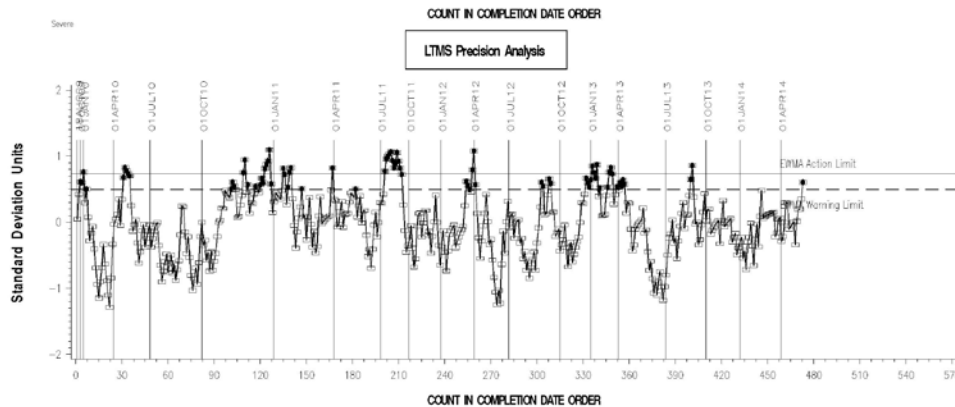
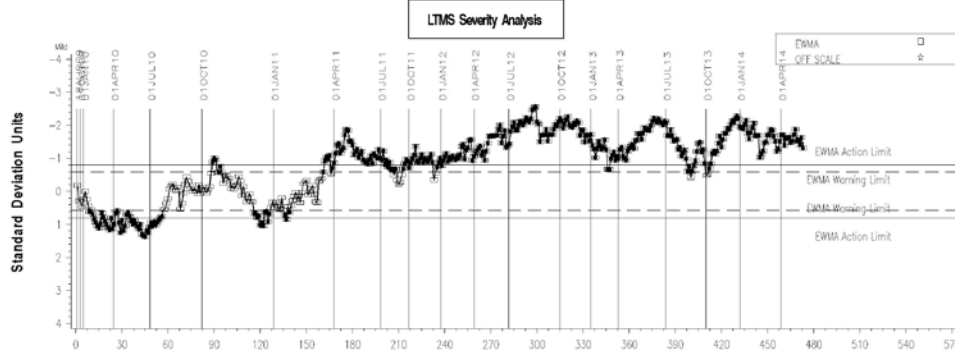


LDEOC (D 7216)

LDEOC – ETHYLENE ACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REF ETH ACRYLATE POINTS HARDNESS CHANGE AVG



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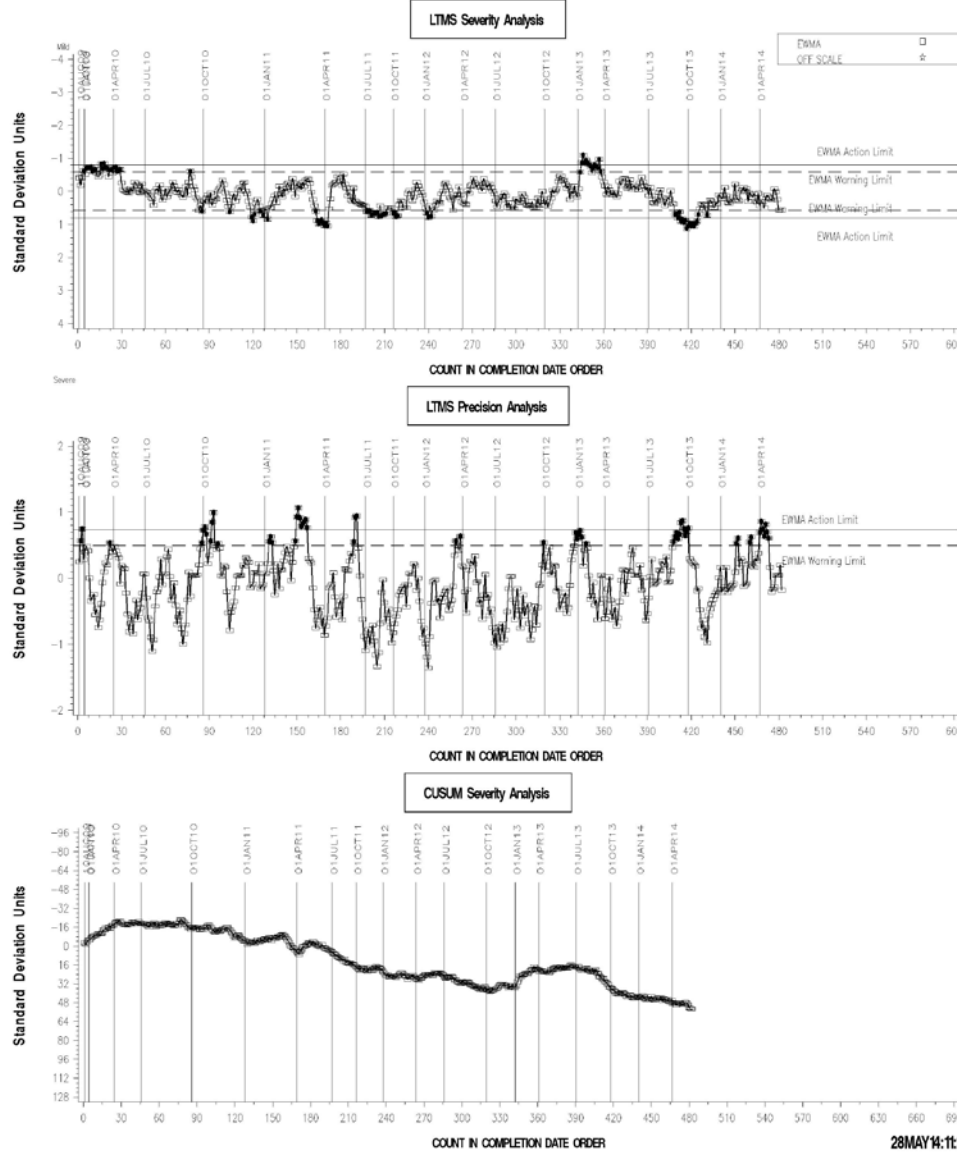
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LDEOC (D 7216)

LDEOC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



REF FLURO POINTS HARDNESS CHANGE AVERAGE

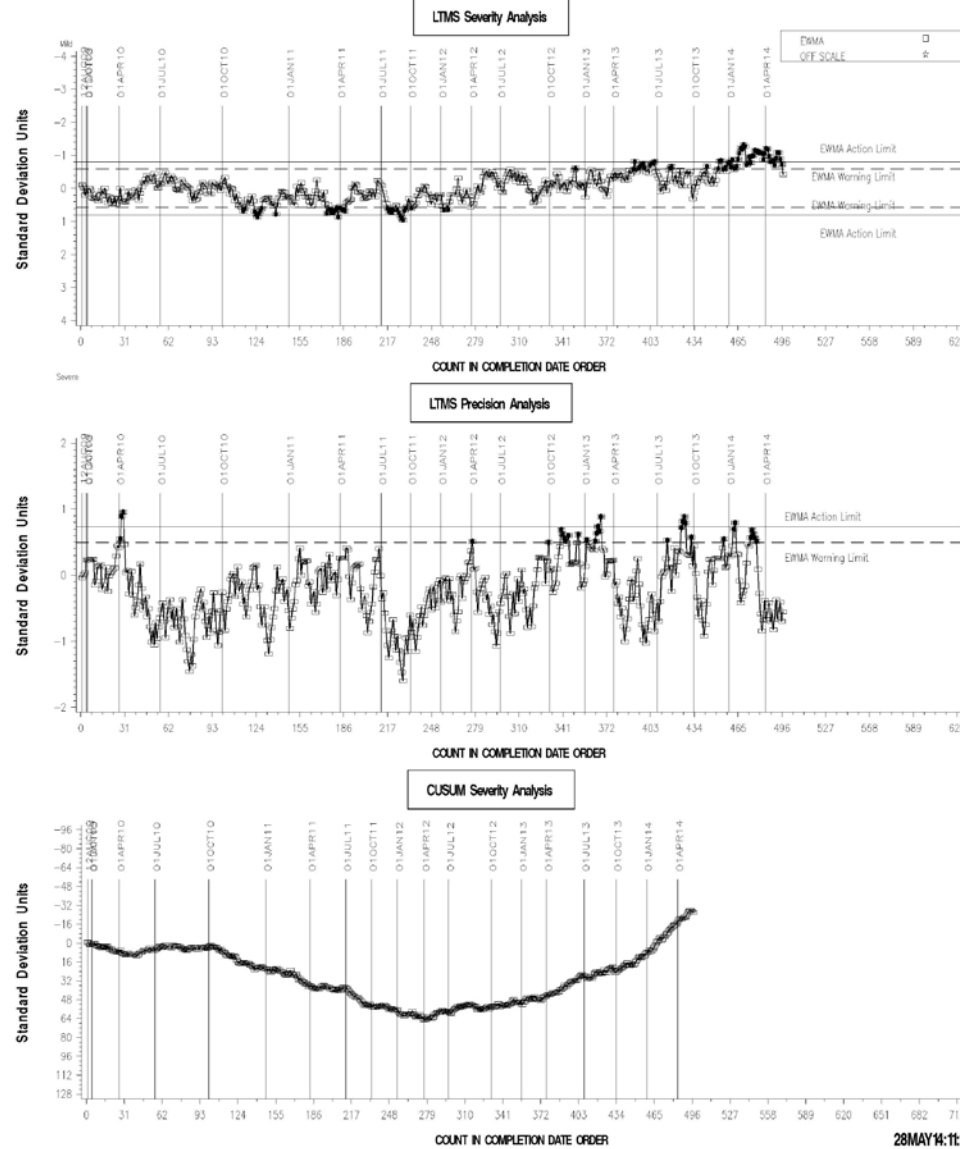


LDEOC (D 7216)

LDEOC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



REF NITRILE POINTS HARDNESS CHANGE AVERAGE

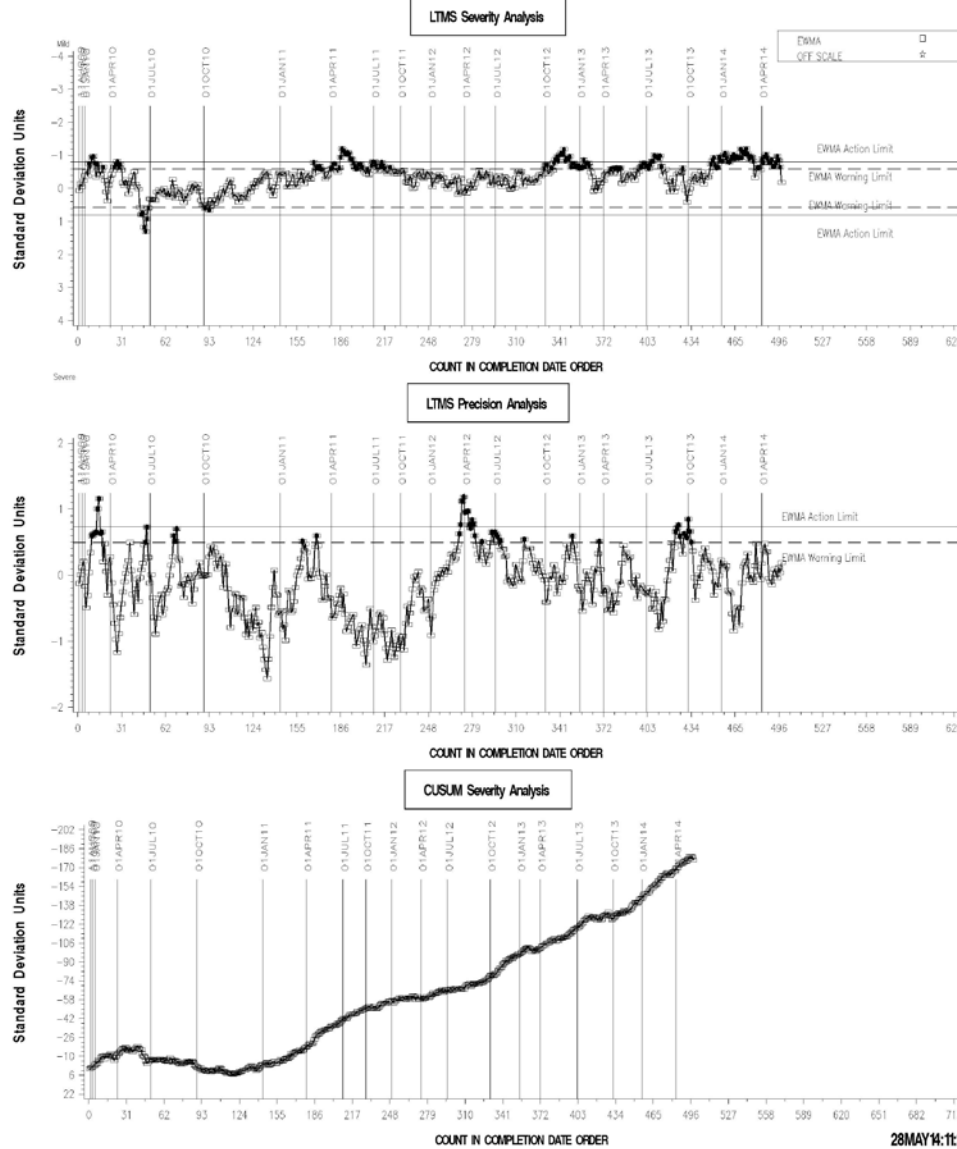


LDEOC (D 7216)

LDEOC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REF POLYACRYLATE POINTS HARDNESS CHG AVG

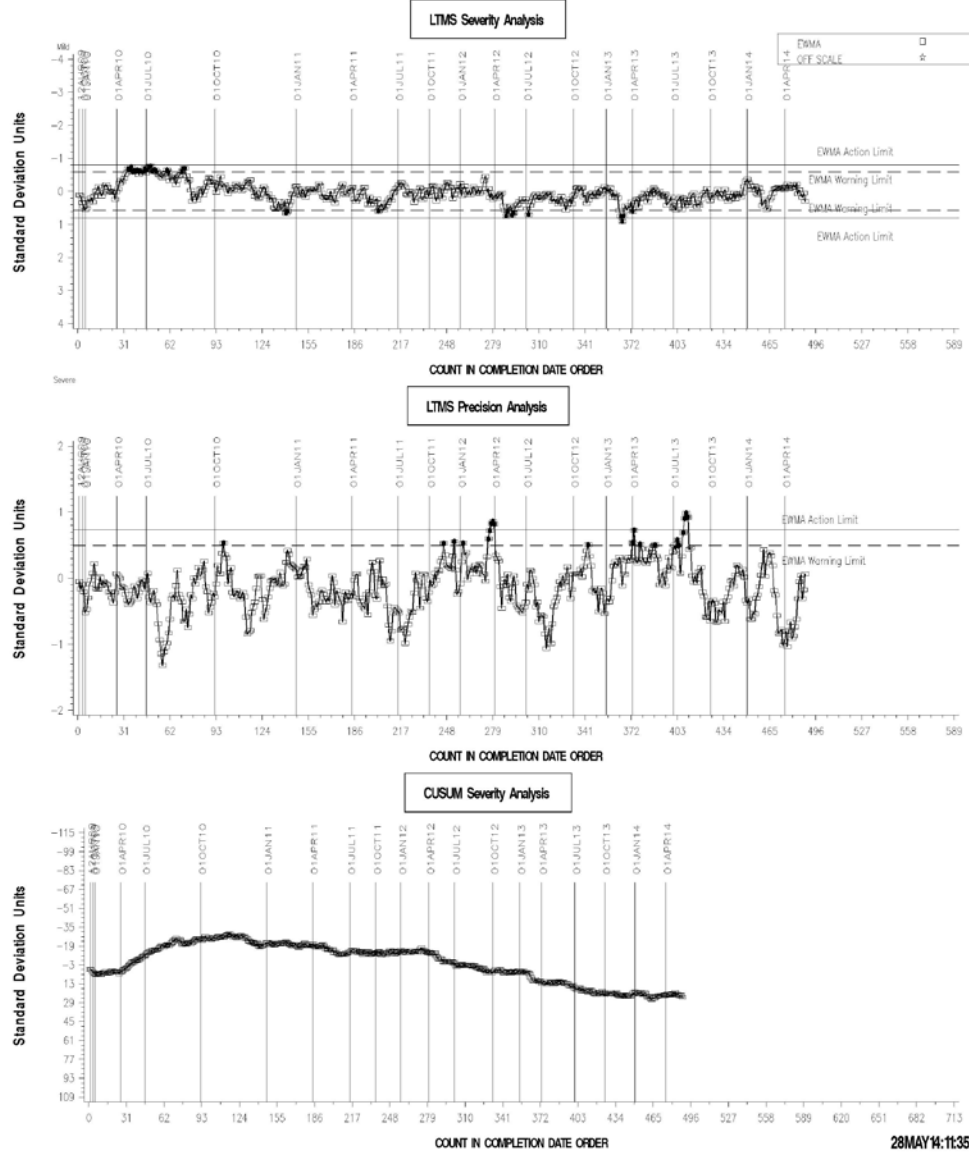


LDEOC (D 7216)

LDEOC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REF SILICON POINTS HARDNESS CHANGE AVERAGE

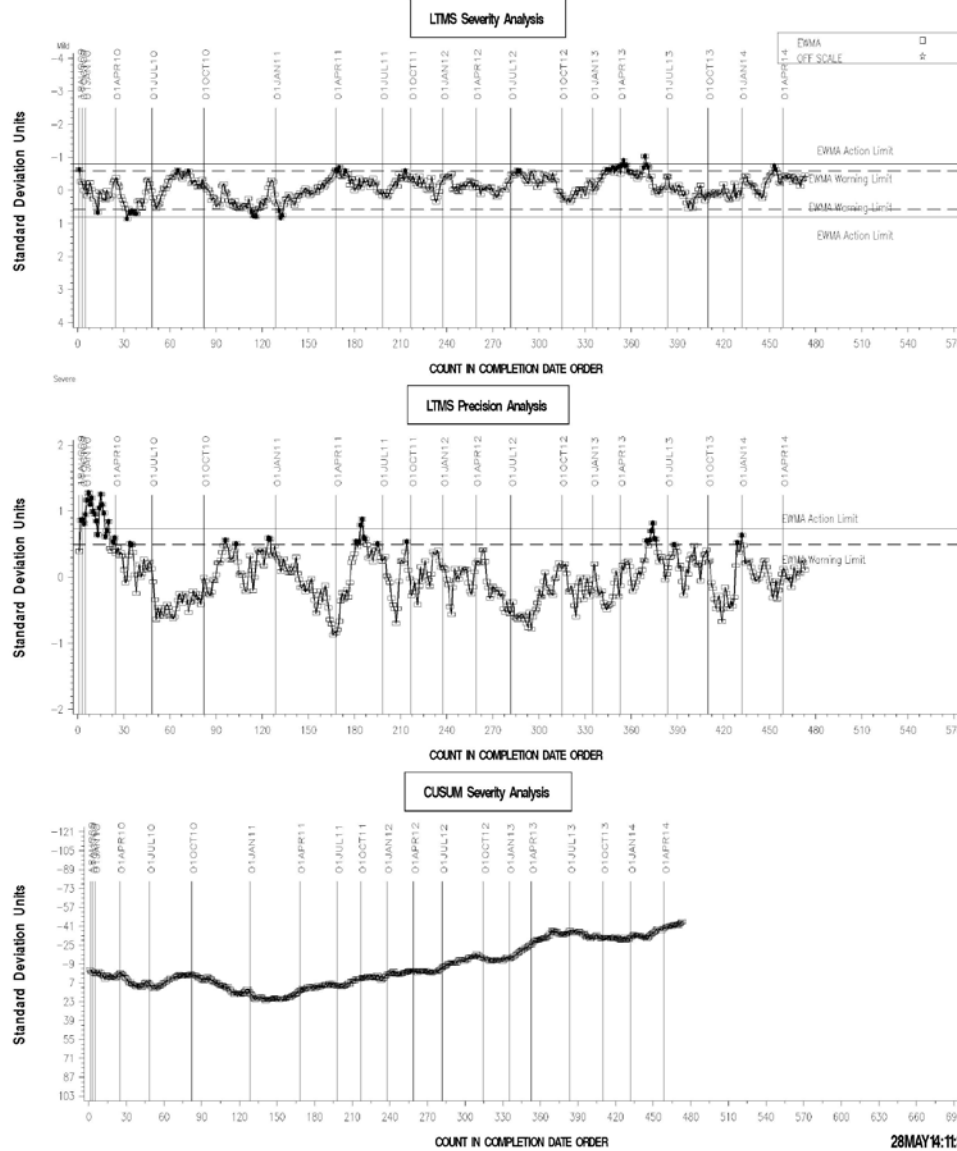


LDEOC (D 7216)

LDEOC – ETHYLENE ACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REF ETH ACRYLATE TENSILE STRENGTH CHANGE AVG

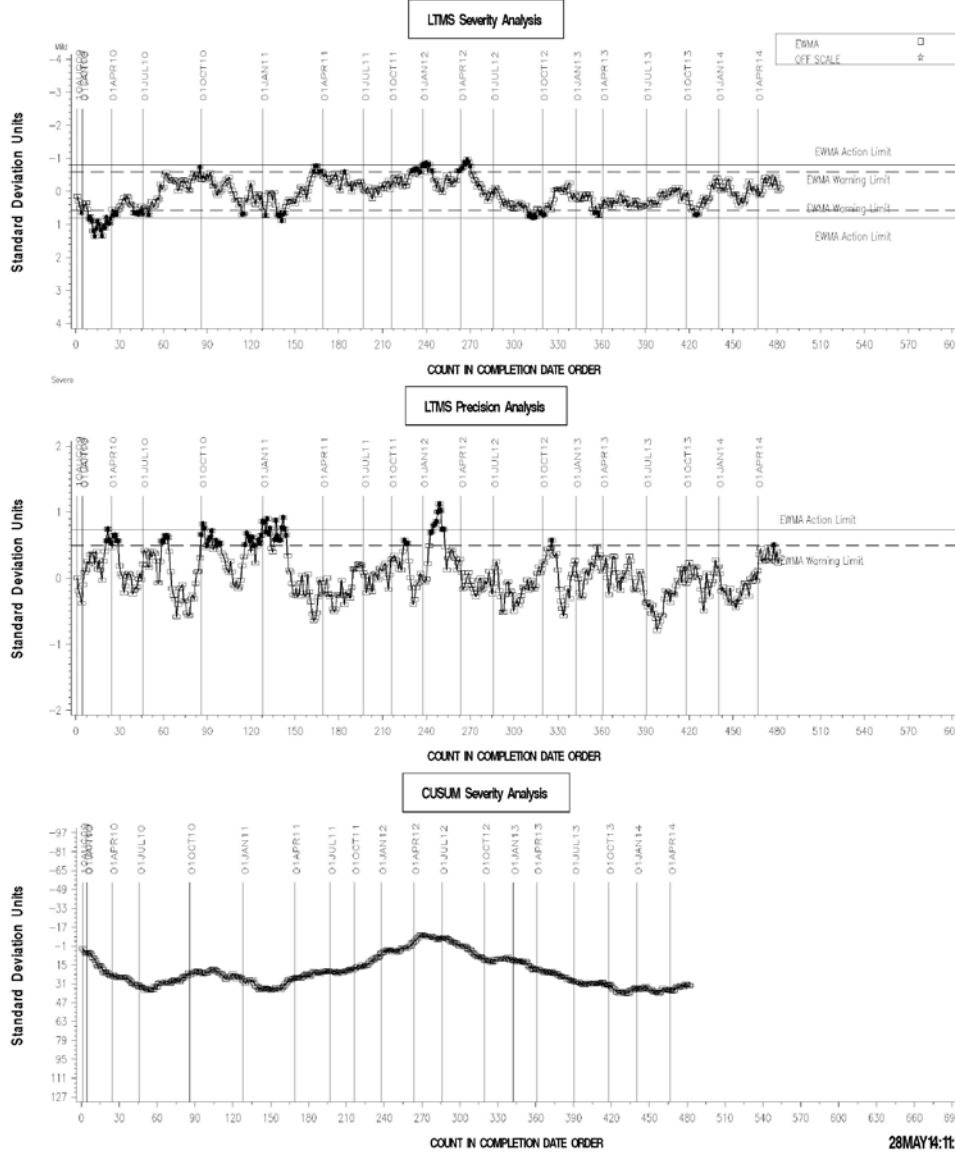


LDEOC (D 7216)

LDEOC – FLUOROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



REF FLURO TENSILE STRENGTH CHANGE AVERAGE

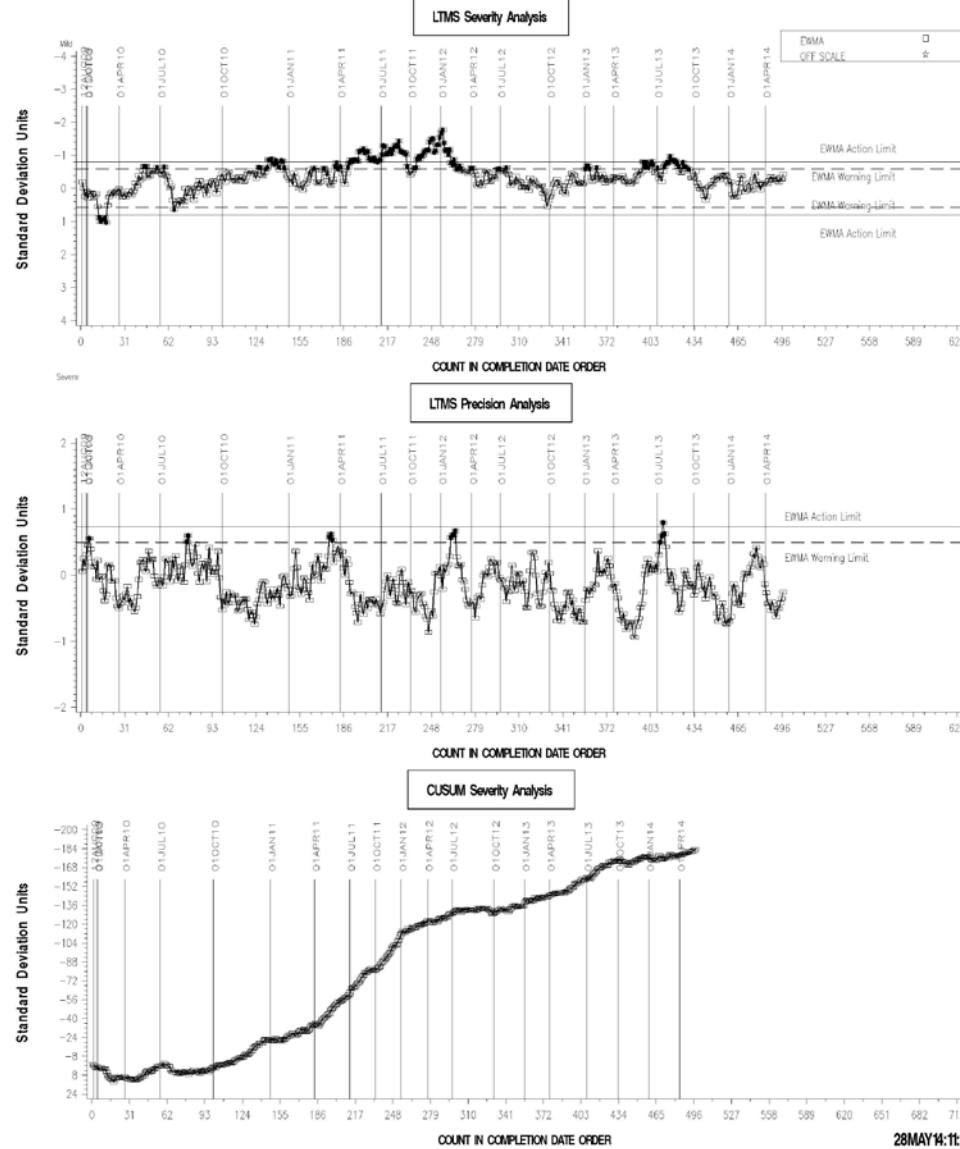


LDEOC (D 7216)

LDEOC – NITRILE INDUSTRY OPERATIONALLY VALID DATA



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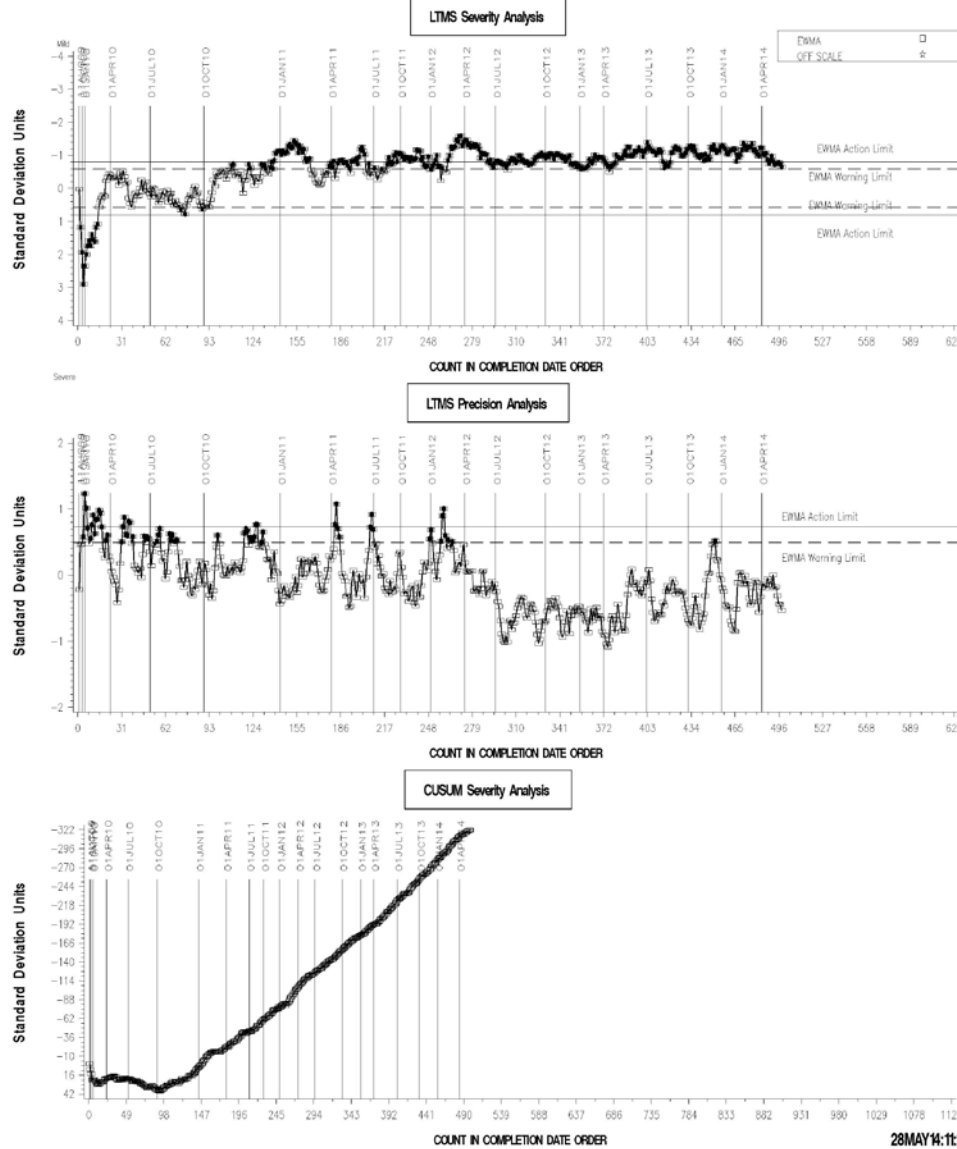


LDEOC (D 7216)

LDEOC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA



REF POLYACRYLATE TENSILE STRENGTH CHG AVG

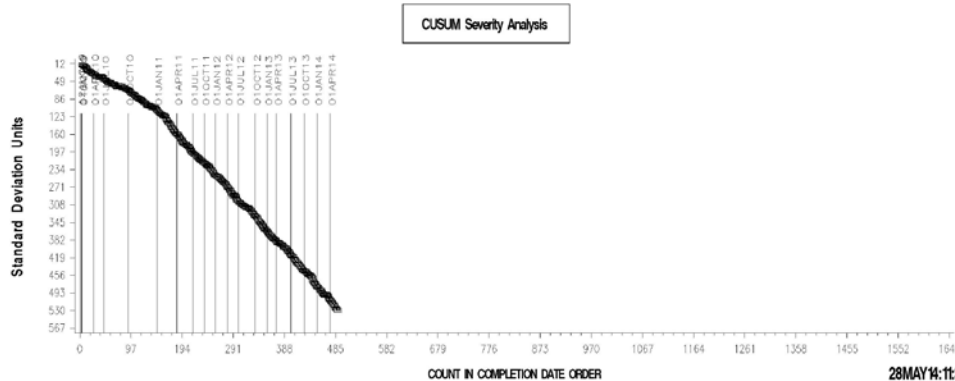
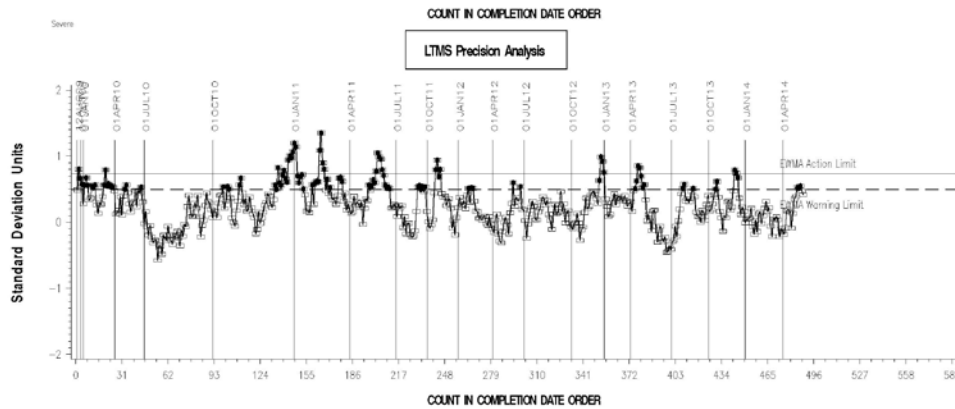
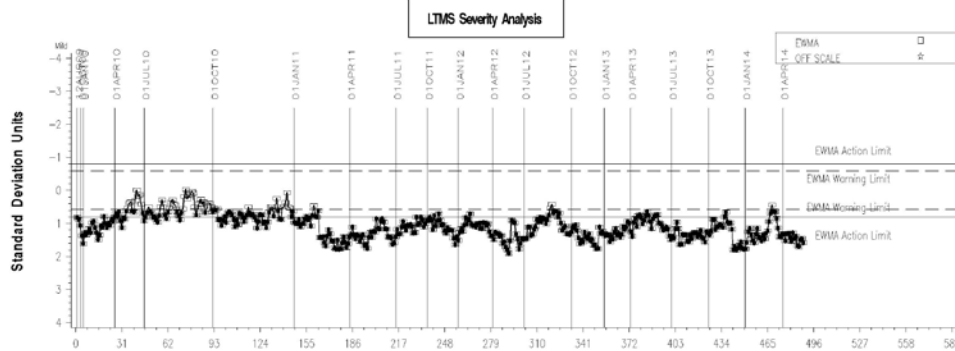


LDEOC (D 7216)

LDEOC – SILICONE INDUSTRY OPERATIONALLY VALID DATA



REF SILICON TENSILE STRENGTH CHANGE AVERAGE



28MAY14:11:35



LDEOC (D 7216)

INFORMATION LETTERS

No Information Letters were issued this period.

LDEOC (D 7216)

STATUS OF REFERENCE OIL SUPPLY

Oil	Samples @ Labs	@ TMC	
		Samples (750 mL)	Gallons
1006-1	298	4047	802
Total	298	4047	802