



Test Monitoring Center

6555 Penn Avenue
Pittsburgh, PA 15206-4489
(412) 365-1000

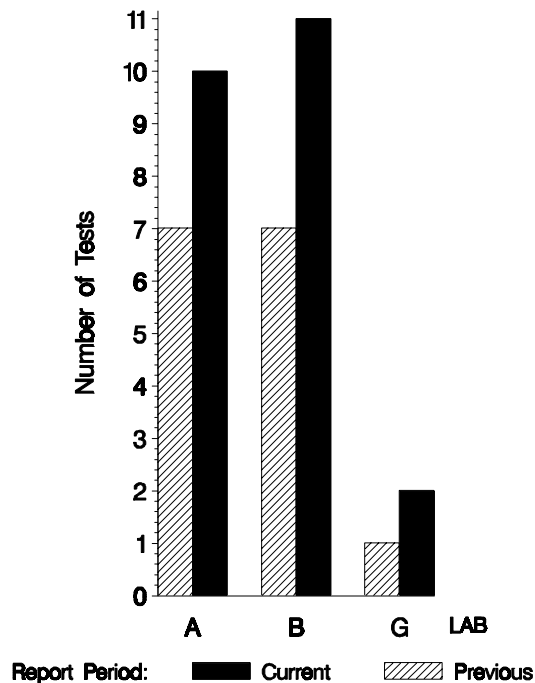
MEMORANDUM: 06-035
DATE: May 23, 2006
TO: Becky Grinfield,
Chairman, Engine Oil Elastomer Compatibility Surveillance Panel
FROM: Scott Parke
SUBJECT: EOEC Testing from October 1, 2005 through March 31, 2006

A total of 107 EOEC tests were reported to the Test Monitoring Center during the period from October 1, 2005 through March 31, 2006. The data from these tests is shown on page 8. Following is a summary of testing activity this period.

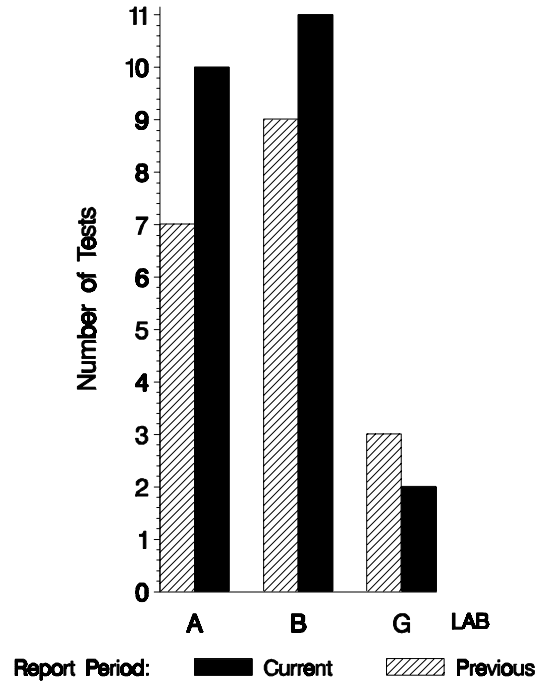
	Reporting Data
Number of Labs	3

Tests reported this period were distributed as shown below:

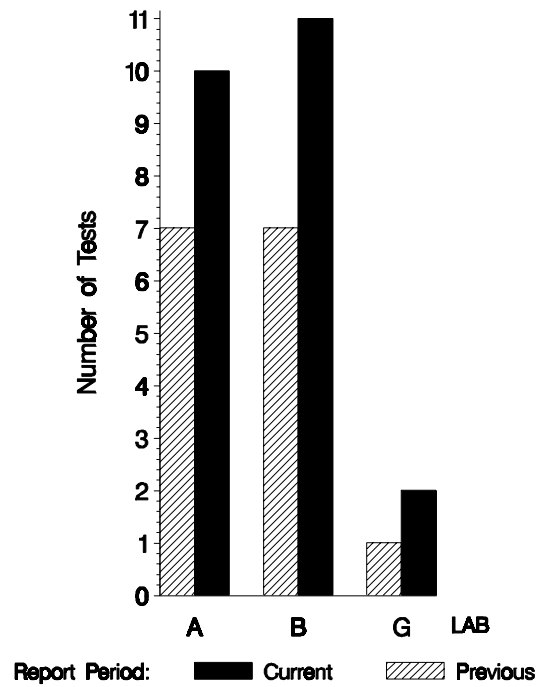
NUMBER OF FLUROELASTOMER TESTS REPORTED BY LAB AND REPORT PERIOD



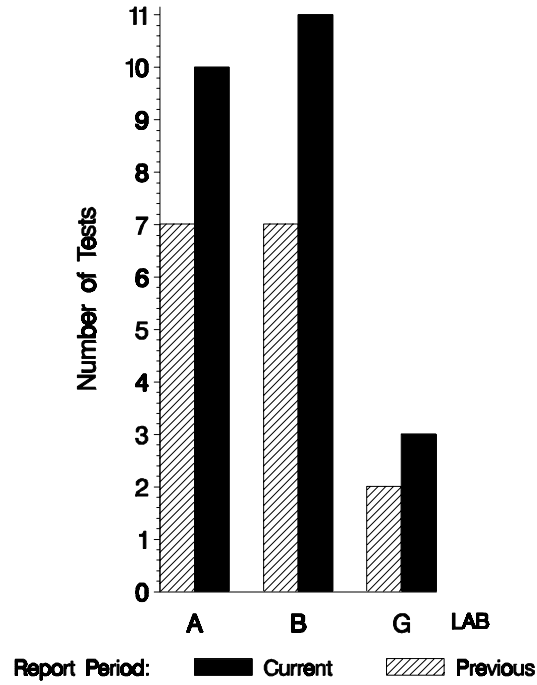
NUMBER OF NITRILE TESTS REPORTED BY LAB AND REPORT PERIOD



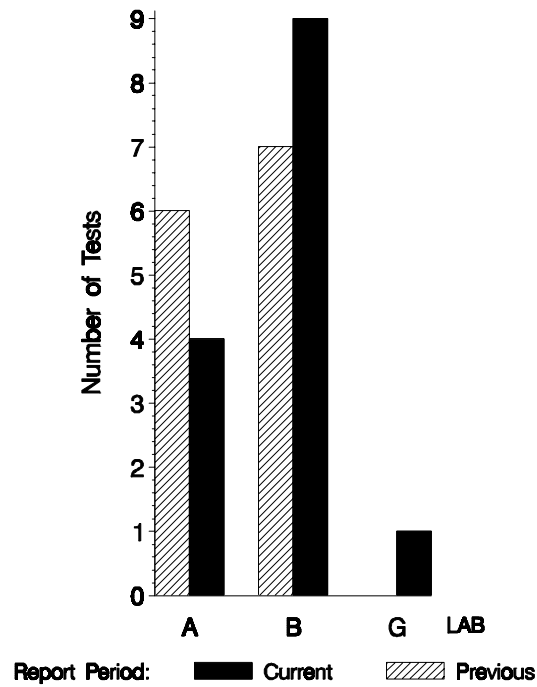
NUMBER OF POLYACRYLATE TESTS REPORTED BY LAB AND REPORT PERIOD



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



**NUMBER OF VAMAC TESTS
REPORTED BY LAB AND REPORT PERIOD**

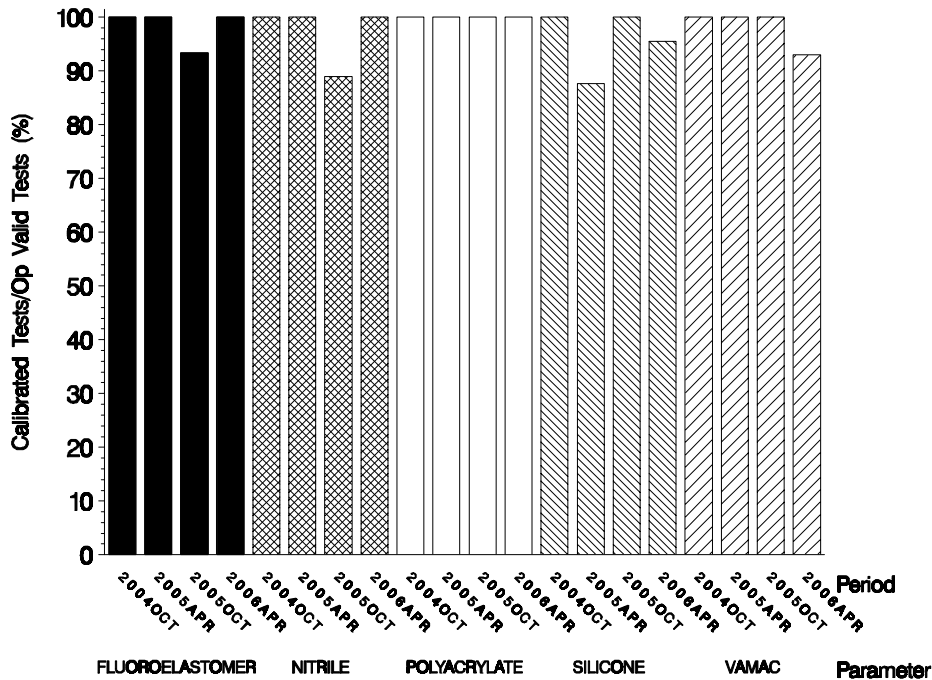


Test Distribution by Oil and Validity

Totals

		Fluoroelastomer	Nitrile	Polyacrylate	Silicone	VAMAC	Last Period	This Period
Accepted for Calibration	AC	22	22	22	21	13	74	100
Rejected Mild	OC	0	0	0	1	1	1	2
Rejected Severe	OC	0	0	0	0	0	2	0
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	1	1	1	2	0	1	5
Total		23	23	23	23	14	78	107

**OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA**



The above chart shows the percentage of accepted operationally valid tests. This period one silicone and one VAMAC 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	10	0	0	10	0	0	10	0	0	10	0	0	4	0	0	44	0
B	1	11	9	1	11	9	1	11	9	2	11	18	0	9	0	5	53	9
G	0	2	0	0	2	0	0	2	0	0	3	0	0	1	0	0	10	0
Total	1	23	4	1	23	4	1	23	4	2	24	8	0	14	0	5	107	5

Lost tests are those that were either aborted, rejected by lab, or operationally invalid.

Causes for Lost Tests

Lab	Cause	Elastomer					Validity			Loss Rate	
		Fluoroelastomer	Nitrile	Polycarbonate	Silicone	VAMAC	LC	RC	XC	Lost	Starts
B	Power failure.	●	●	●	●			●	5	53	9%
	Power failure.				●			●			
	Lost	1	1	1	2	0	0	2	0	0	2
	Starts	23	23	23	24	14	107	107	107	107	107
	%	4%	4%	4%	8%	0%	0%	2%	0%	0%	2%

Average Δ /s by Lab						
Elastomer	Lab	n	VOLCYI	HARDYI	TENSYI	ELONYI
Fluoroelastomer						
	A	10	-1.034	0.182	-0.850	-0.959
	B	10	-0.527	0.318	-0.385	-1.283
	G	2	0.473	-1.500	0.735	0.588
	Industry	22	-0.666	0.091	-0.495	-0.965
Nitrile						
	A	10	-0.092	0.017	-1.332	-0.094
	B	10	0.375	0.582	-0.111	0.564
	G	2	-0.167	-0.661	-0.720	-1.122
	Industry	22	0.114	0.212	-0.721	0.112
Polyacrylate						
	A	10	-1.314	-0.994	-0.466	-0.311
	B	10	-0.729	-0.550	0.146	0.686
	G	2	-0.842	-0.272	-0.571	-0.115
	Industry	22	-1.005	-0.727	-0.198	0.160
Silicone						
	A	10	0.986	-0.687	-0.054	0.157
	B	9	1.297	-0.650	-0.239	0.931
	G	3	0.740	1.063	-3.224	0.353
	Industry	22	1.080	-0.434	-0.562	0.500
VAMAC						
	A	4	-0.736	-1.221	0.839	-0.412
		9	0.900	-0.724	1.894	0.233
	B	1	-0.299	1.147	0.821	0.474
	Industry	14	0.347	-0.732	1.516	0.066

**DATA FROM ALL OPERATIONALLY VALID TESTS REPORTED THIS PERIOD:
FLUROELASTOMER**

LTMS DATE	LAB	VOLC	HARD	TENS	ELON	VOLCYI	HARDYI	TENSYI	ELONYI
20051012	A	0.48	9	-75.8	-78.4	-0.878	0.773	-1.219	-2.192
20051019	B	0.56	8	-72.1	-68.6	-0.338	0.318	-0.527	-1.102
20051021	G	0.70	4	-63.3	-52.8	0.608	-1.500	1.118	0.655
20051026	B	0.47	9	-69.6	-65.9	-0.946	0.773	-0.060	-0.802
20051026	A	0.45	8	-71.0	-67.5	-1.081	0.318	-0.321	-0.980
20051109	A	0.64	7	-78.4	-69.0	0.203	-0.136	-1.705	-1.147
20051117	G	0.66	4	-67.4	-54.0	0.338	-1.500	0.351	0.522
20051122	B	0.66	7	-72.1	-68.6	0.338	-0.136	-0.527	-1.102
20051123	A	0.33	8	-76.2	-65.4	-1.892	0.318	-1.293	-0.746
20051214	B	0.52	7	-71.2	-66.6	-0.608	-0.136	-0.359	-0.880
20051221	A	0.37	7	-75.0	-65.1	-1.622	-0.136	-1.069	-0.713
20060112	A	0.37	8	-71.3	-57.9	-1.622	0.318	-0.378	0.088
20060113	B	0.62	8	-69.1	-73.8	0.068	0.318	0.034	-1.681
20060131	B	0.45	7	-69.1	-71.9	-1.081	-0.136	0.034	-1.469
20060203	A	0.49	8	-71.9	-58.6	-0.811	0.318	-0.490	0.010
20060220	B	0.66	9	-71.4	-75.7	0.338	0.773	-0.396	-1.892
20060223	A	0.66	6	-73.7	-74.2	0.338	-0.591	-0.826	-1.725
20060306	B	0.37	8	-72.6	-68.0	-1.622	0.318	-0.621	-1.036
20060309	A	0.37	8	-72.2	-64.8	-1.622	0.318	-0.546	-0.680
20060314	B	0.46	9	-73.3	-70.0	-1.014	0.773	-0.751	-1.258
20060323	A	0.41	8	-72.8	-72.2	-1.351	0.318	-0.658	-1.503
20060329	B	0.55	8	-72.9	-73.1	-0.405	0.318	-0.677	-1.603

NITRILE

LTMS DATE	LAB	VOLC	HARD	TENS	ELON	VOLCYI	HARDYI	TENSYI	ELONYI
20051006	B	0.89	2	-26.0	-41.9	0.202	0.186	0.201	1.333
20051010	A	1.02	0	-37.2	-53.6	0.357	-0.944	-1.327	-0.408
20051020	B	0.88	2	-29.0	-46.6	0.190	0.186	-0.209	0.634
20051021	G	0.58	0	-35.8	-61.9	-0.167	-0.944	-1.136	-1.643
20051024	A	0.73	2	-39.6	-51.0	0.012	0.186	-1.655	-0.021
20051027	B	0.82	2	-25.1	-44.6	0.119	0.186	0.323	0.932
20051107	A	0.62	2	-34.8	-62.0	-0.119	0.186	-1.000	-1.658
20051117	G	0.58	1	-29.7	-54.9	-0.167	-0.379	-0.304	-0.601
20051121	A	0.72	2	-41.6	-55.9	0.000	0.186	-1.928	-0.750
20051122	B	1.01	2	-27.4	-45.2	0.345	0.186	0.010	0.842
20051215	B	0.93	3	-27.6	-45.0	0.250	0.751	-0.018	0.872
20051219	A	0.53	1	-33.6	-48.5	-0.226	-0.379	-0.836	0.351
20060110	A	0.62	4	-44.1	-53.6	-0.119	1.316	-2.269	-0.408
20060111	B	0.95	3	-24.5	-45.2	0.274	0.751	0.405	0.842
20060201	B	1.31	2	-26.0	-45.0	0.702	0.186	0.201	0.872
20060201	A	0.70	3	-37.2	-48.3	-0.024	0.751	-1.327	0.381
20060221	A	0.54	0	-40.7	-54.4	-0.214	-0.944	-1.805	-0.527
20060223	B	1.22	3	-28.7	-47.6	0.595	0.751	-0.168	0.485
20060307	A	0.63	2	-31.5	-41.8	-0.107	0.186	-0.550	1.348
20060315	B	1.02	3	-33.7	-53.8	0.357	0.751	-0.850	-0.437
20060321	A	0.32	1	-32.0	-45.8	-0.476	-0.379	-0.618	0.753
20060330	B	1.32	5	-34.8	-55.8	0.714	1.881	-1.000	-0.735

POLYACRYLATE

LTMS DATE	LAB	VOLC	HARD	TENS	ELON	VOLCYI	HARDYI	TENSYI	ELONYI
20051011	A	0.07	-4	0.1	-22.6	-1.013	-1.383	-0.092	-0.507
20051017	B	0.21	-2	0.3	-5.8	-0.829	-0.272	-0.071	1.371
20051021	G	0.07	-1	-1.1	-24.5	-1.013	0.283	-0.241	-0.719
20051025	A	-0.21	-4	11.8	-11.0	-1.382	-1.383	1.363	0.791
20051026	B	-0.13	-1	-2.9	-15.7	-1.276	0.283	-0.459	0.268
20051108	A	-0.09	-4	-7.8	-24.6	-1.224	-1.383	-1.075	-0.730
20051117	G	0.33	-3	-6.4	-13.7	-0.671	-0.828	-0.900	0.489
20051122	B	0.49	-3	0.5	-20.1	-0.461	-0.828	-0.041	-0.223
20051122	A	-0.33	-3	-8.9	-21.2	-1.539	-0.828	-1.211	-0.350
20051215	B	0.25	-4	2.9	-13.7	-0.776	-1.383	0.254	0.491
20051220	A	0.03	-3	-6.0	-27.1	-1.066	-0.828	-0.851	-1.010
20060110	B	0.62	-2	8.4	-4.0	-0.289	-0.272	0.942	1.578
20060111	A	-0.25	-3	-2.2	-16.1	-1.434	-0.828	-0.378	0.220
20060131	B	0.08	-3	4.7	-1.8	-1.000	-0.828	0.484	1.821
20060202	A	-0.41	-2	-9.1	-41.5	-1.645	-0.272	-1.236	-2.621
20060221	B	0.41	-2	-0.4	-12.5	-0.566	-0.272	-0.158	0.624
20060222	A	-0.16	-4	0.6	-10.5	-1.316	-1.383	-0.030	0.847
20060307	B	0.54	-2	1.1	-15.4	-0.395	-0.272	0.032	0.295
20060308	A	-0.08	-4	-5.7	-16.5	-1.211	-1.383	-0.813	0.176
20060314	B	0.11	-3	4.8	-7.8	-0.961	-0.828	0.494	1.152
20060322	A	-0.16	-2	-1.9	-17.4	-1.316	-0.272	-0.341	0.075
20060327	B	0.28	-3	0.7	-22.7	-0.737	-0.828	-0.019	-0.519

SILICONE

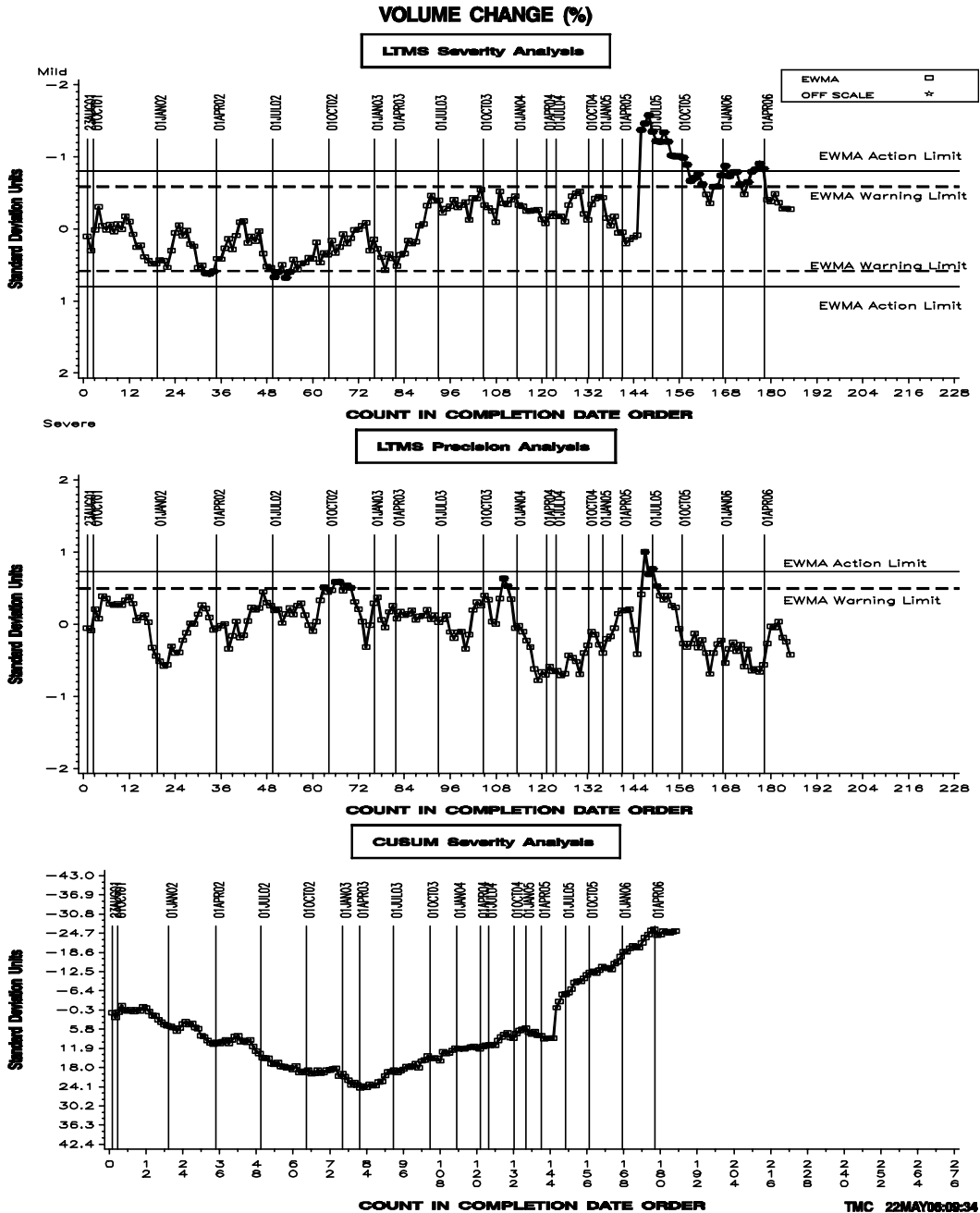
LTMS DATE	LAB	VOLC	HARD	TENS	ELON	VOLCYI	HARDYI	TENSYI	ELONYI
20051013	A	28.06	-18	-10.9	-18.4	0.740	0.229	0.632	0.698
20051021	G	27.89	-16	-25.9	-19.1	0.665	1.063	-2.881	0.597
20051021	B	29.60	-21	-12.1	-16.3	1.419	-1.021	0.351	1.000
20051027	B	28.93	-19	-12.1	-16.9	1.123	-0.187	0.351	0.914
20051027	A	29.76	-20	-16.7	-25.4	1.489	-0.604	-0.726	-0.309
20051110	A	29.09	-22	-23.9	-32.0	1.194	-1.438	-2.412	-1.259
20051117	G	27.69	-16	-35.6	-20.1	0.577	1.063	-5.152	0.453
20051122	B	29.49	-20	-15.7	-20.1	1.370	-0.604	-0.492	0.453
20051124	A	27.75	-20	-10.4	-16.4	0.604	-0.604	0.749	0.986
20051215	B	29.39	-20	-13.0	-8.4	1.326	-0.604	0.141	2.137
20051221	G	28.60	-16	-20.6	-23.2	0.978	1.063	-1.639	0.007
20051222	A	27.04	-19	-12.6	-27.4	0.291	-0.187	0.234	-0.597
20060112	B	28.83	-20	-17.5	-22.4	1.079	-0.604	-0.913	0.122
20060113	A	30.03	-21	-13.4	-13.4	1.608	-1.021	0.047	1.417
20060202	B	28.92	-20	-17.2	-15.1	1.119	-0.604	-0.843	1.173
20060206	A	27.86	-19	-5.6	-18.2	0.652	-0.187	1.874	0.727
20060224	B	29.49	-20	-15.6	-16.7	1.370	-0.604	-0.468	0.942
20060224	A	28.96	-23	-11.7	-14.6	1.137	-1.854	0.445	1.245
20060310	A	29.21	-20	-15.0	-26.5	1.247	-0.604	-0.328	-0.468
20060314	B	29.68	-20	-15.8	-21.1	1.454	-0.604	-0.515	0.309
20060324	A	28.43	-20	-18.1	-29.3	0.903	-0.604	-1.054	-0.871
20060331	B	29.59	-21	-12.6	-14.0	1.414	-1.021	0.234	1.331

VAMAC

LTMS DATE	LAB	VOLC	HARD	TENS	ELON	VOLCYI	HARDYI	TENSYI	ELONYI
20051018	B	19.20	-10	-10.7	-19.3	0.590	-2.011	1.901	0.637
20051027	B	19.77	-9	-12.3	-25.8	0.833	-0.958	1.664	0.107
20051111	A	16.14	-10	-18.3	-28.8	-0.718	-2.011	0.777	-0.137
20051118	G	17.12	-7	-18.0	-21.3	-0.299	1.147	0.821	0.474
20051125	A	16.52	-8	-26.3	-42.7	-0.556	0.095	-0.407	-1.269
20051214	B	20.04	-8	-11.5	-30.1	0.949	0.095	1.783	-0.243
20060105	B	20.44	-9	-12.6	-32.2	1.120	-0.958	1.620	-0.414
20060203	B	19.83	-9	-9.5	-25.0	0.859	-0.958	2.078	0.173
20060207	A	14.48	-9	-7.4	-29.4	-1.427	-0.958	2.389	-0.186
20060222	B	20.54	-7	-9.5	-24.0	1.162	1.147	2.078	0.254
20060228	A	17.25	-10	-19.5	-27.8	-0.244	-2.011	0.599	-0.055
20060308	B	18.64	-8	-7.0	-16.0	0.350	0.095	2.448	0.906
20060314	B	20.26	-8	-13.0	-24.5	1.043	0.095	1.561	0.213
20060328	B	20.61	-11	-10.6	-21.4	1.192	-3.063	1.916	0.466

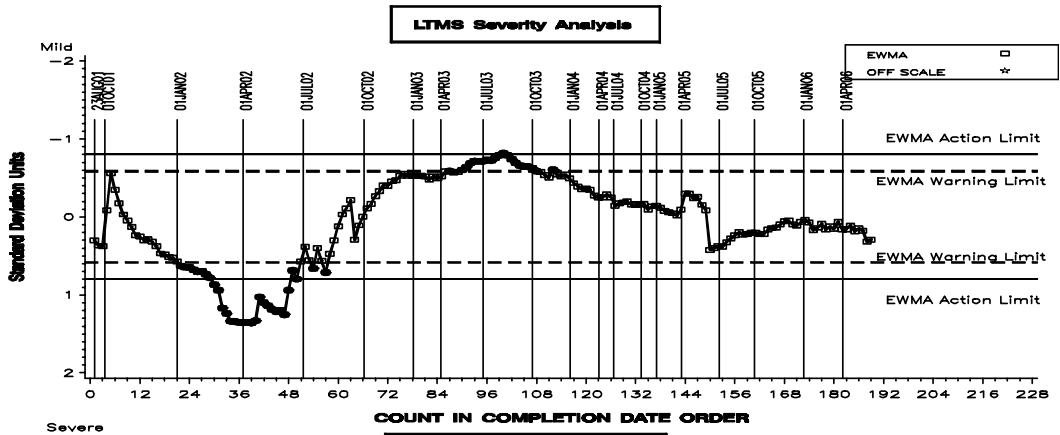
LTMS CONTROL CHARTS

EOEC – FLUROELASTOMER INDUSTRY OPERATIONALLY VALID DATA



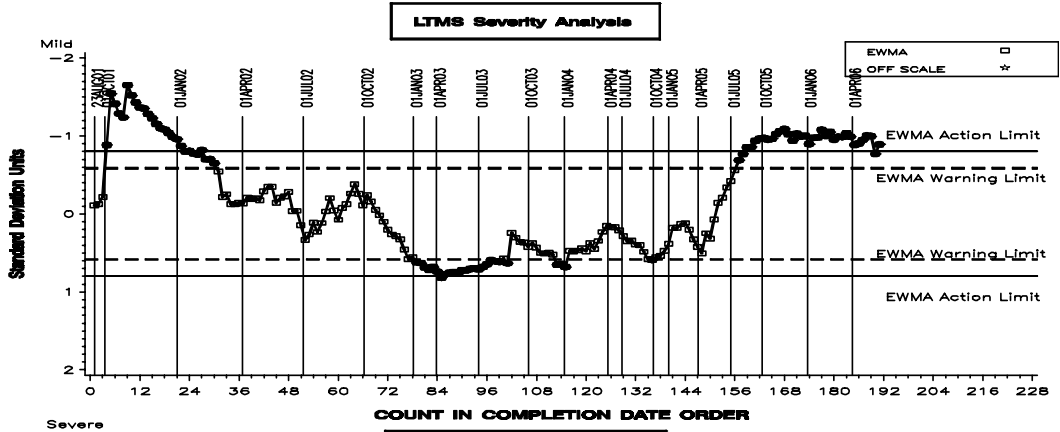
EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA

REFERENCE VOLUME CHANGE (%)

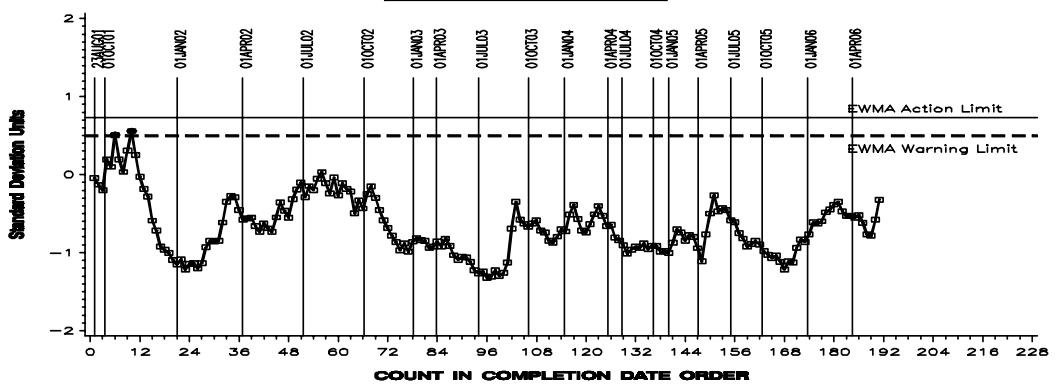


EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA

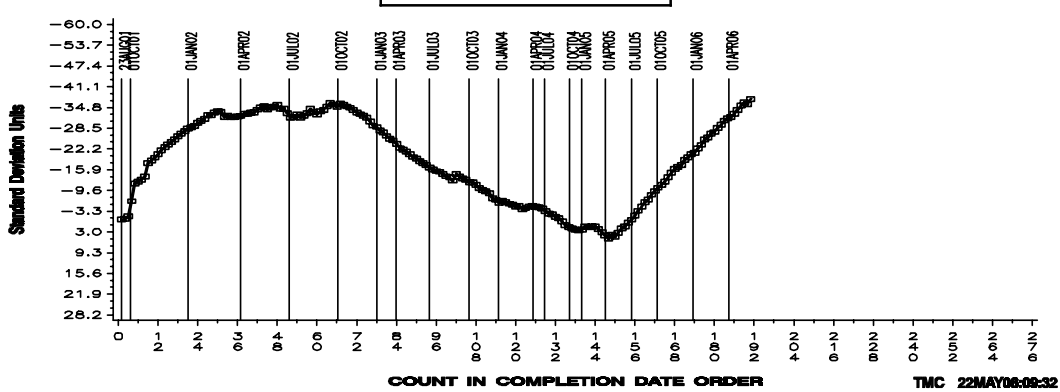
VOLUME CHANGE (%)



LTMS Precision Analysis

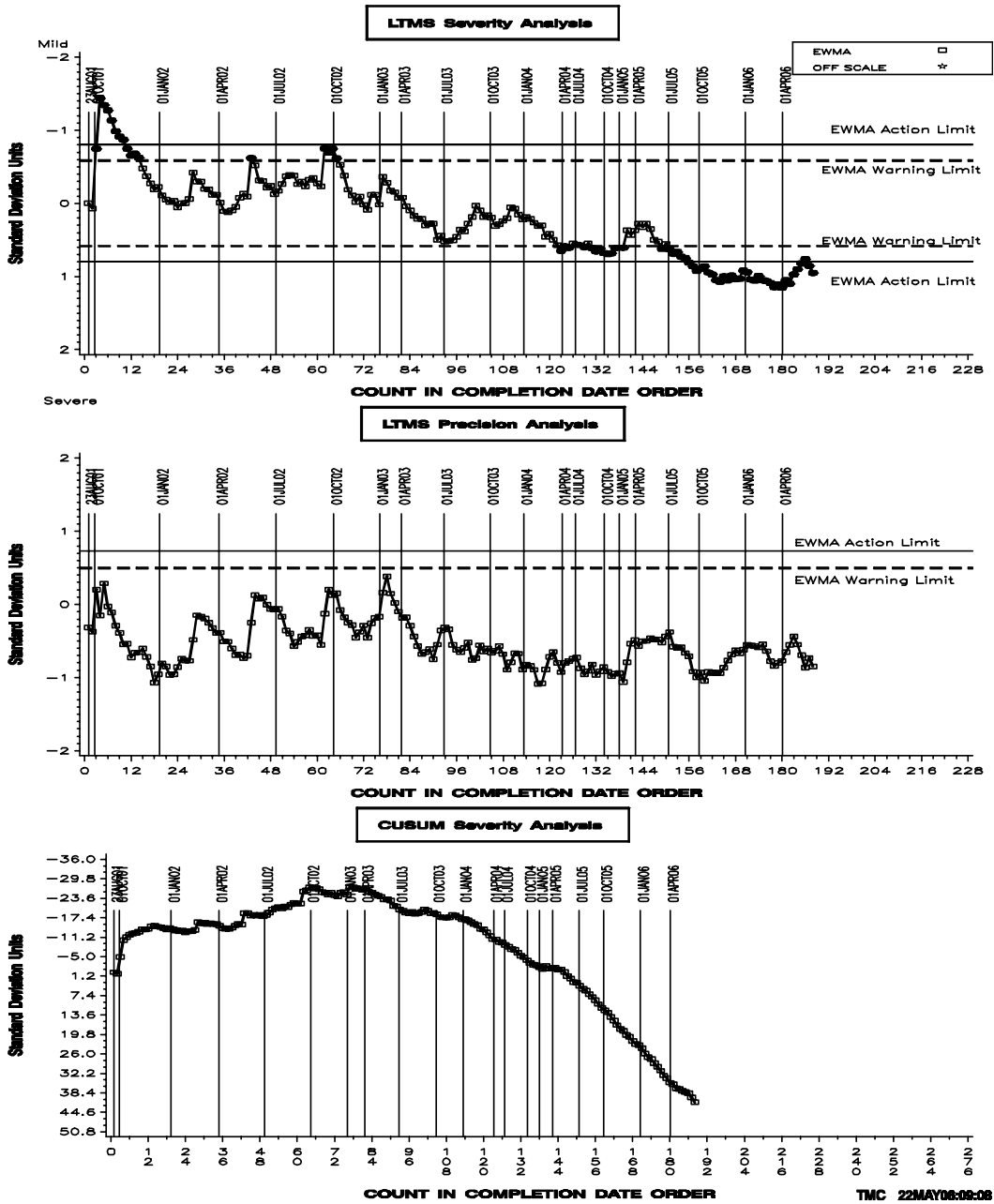


CUSUM Severity Analysis

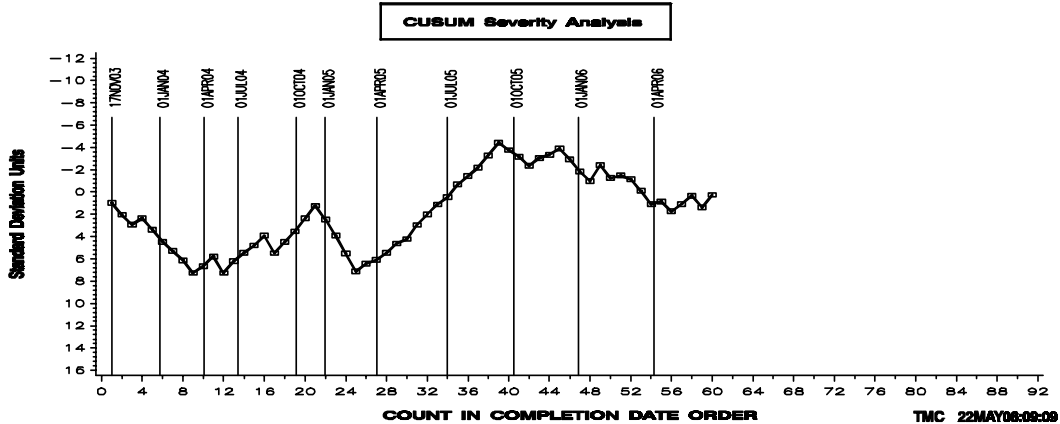
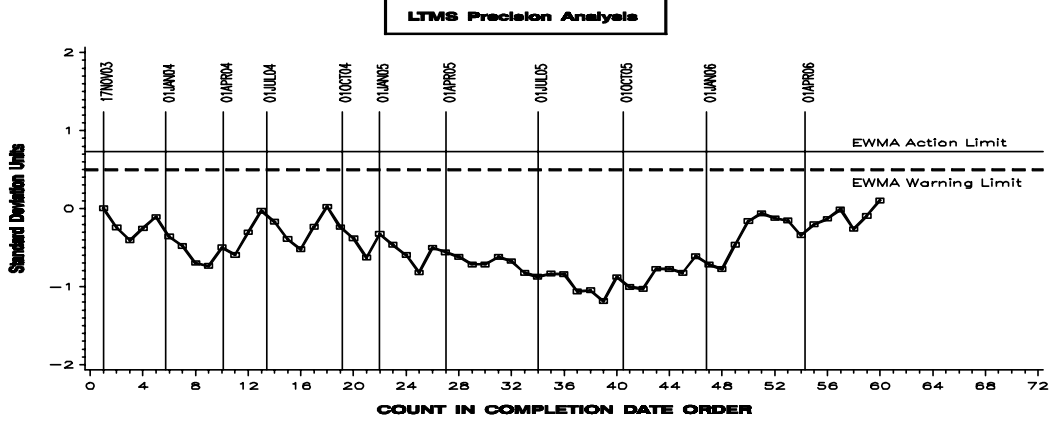
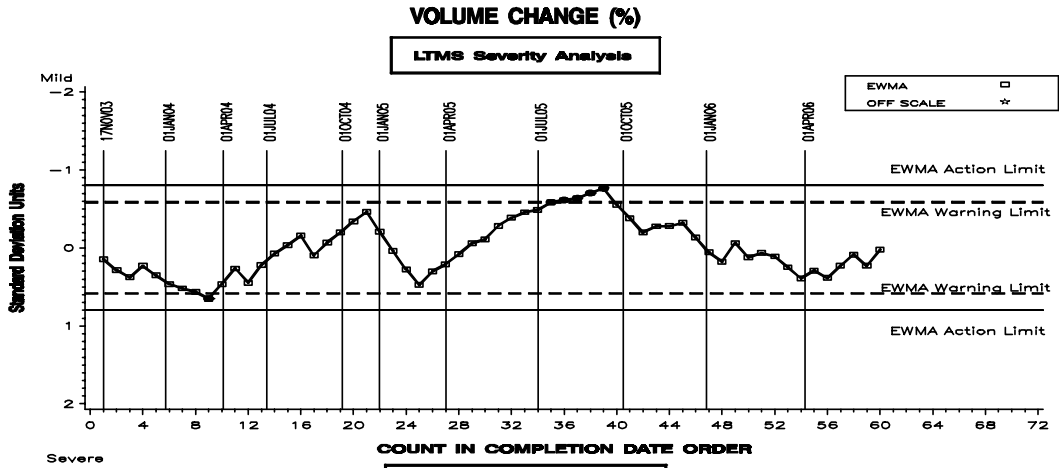


EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA

REFERENCE SILICON VOLUME CHANGE AVERAGE

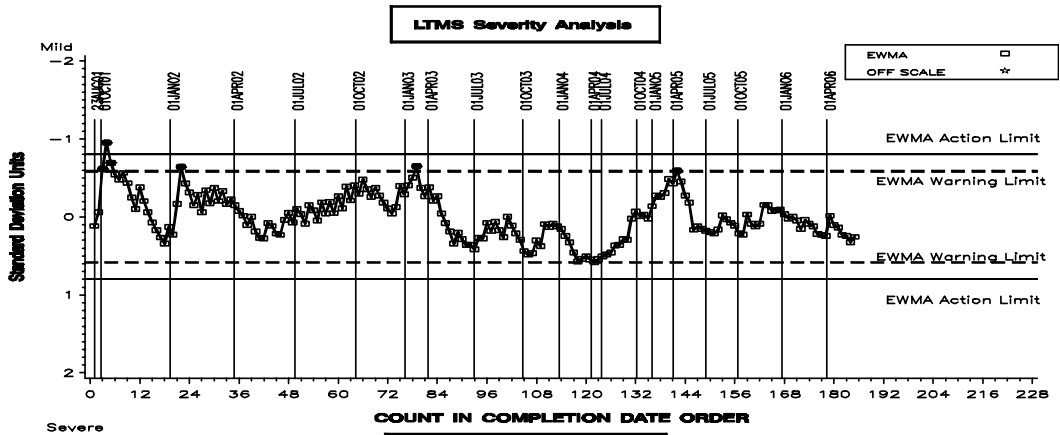


EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA

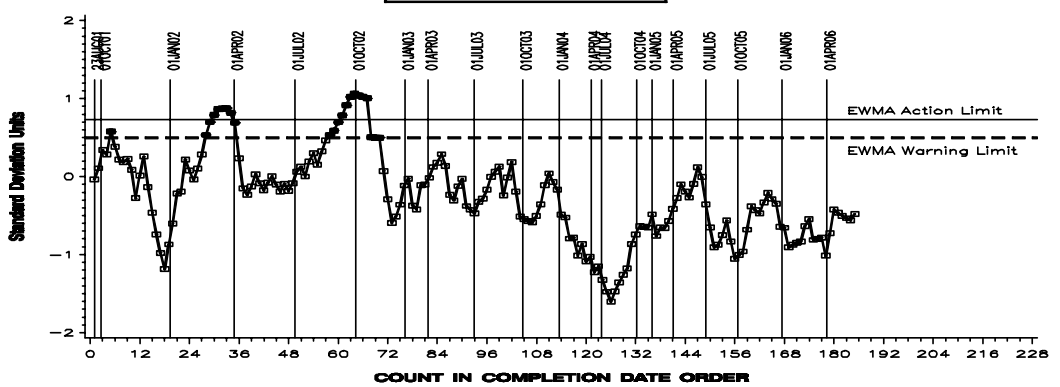


EOEC – FLUROELASTOMER INDUSTRY OPERATIONALLY VALID DATA

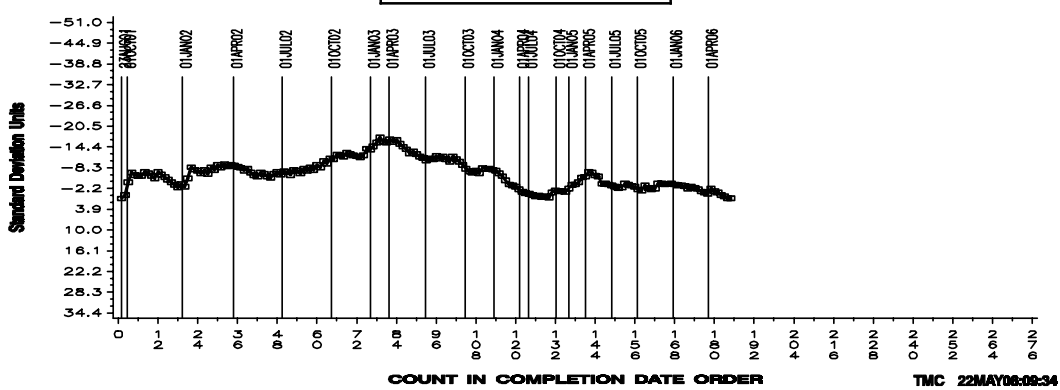
HARDNESS CHANGE (POINTS)



LTMS Precision Analysis

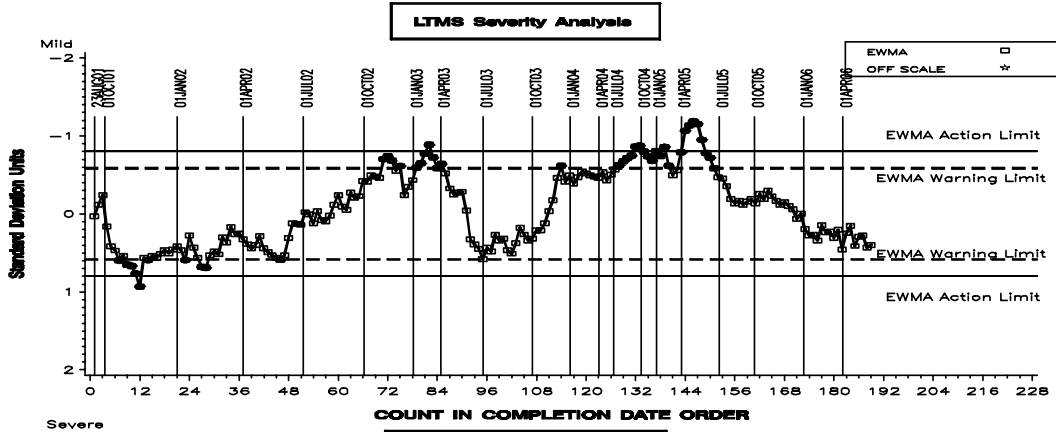


CUSUM Severity Analysis

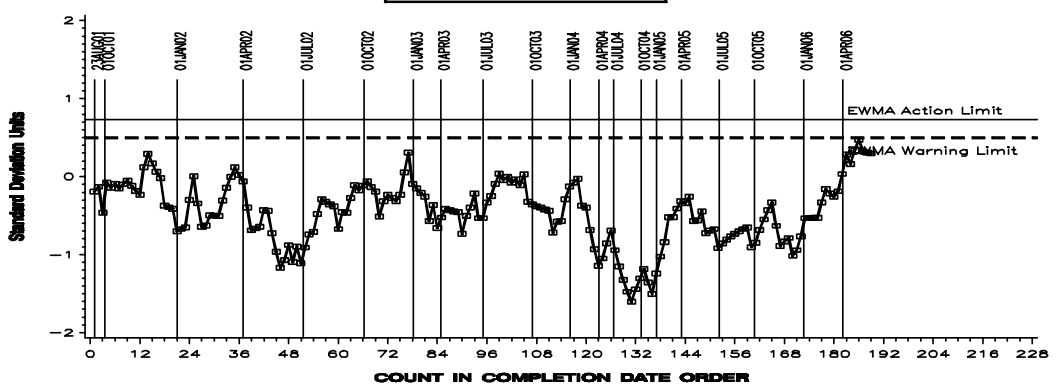


EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA

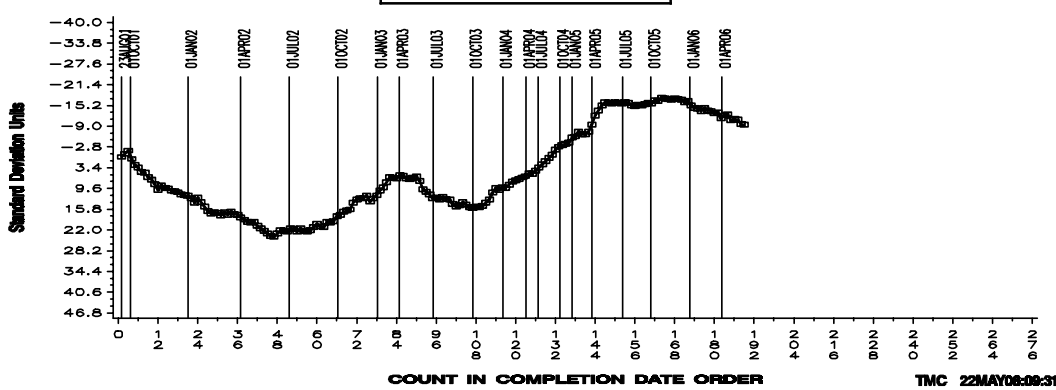
HARDNESS CHANGE (POINTS)



LTMS Precision Analysis

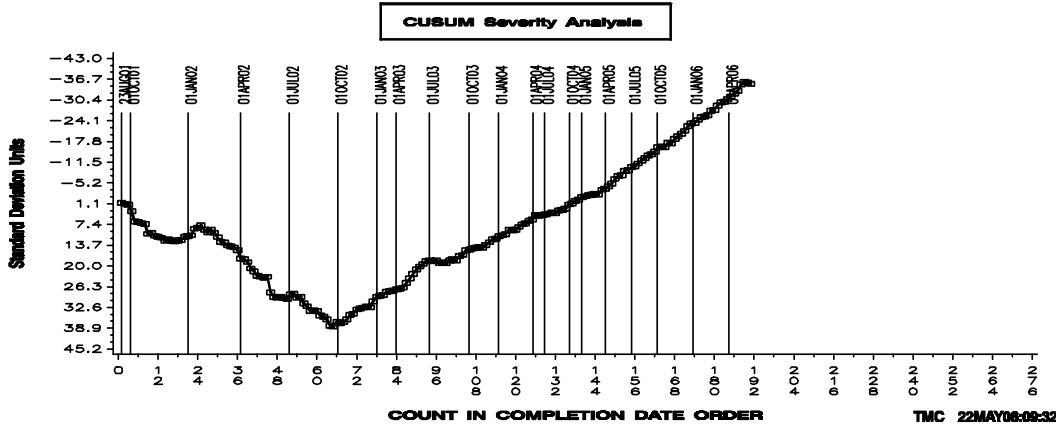
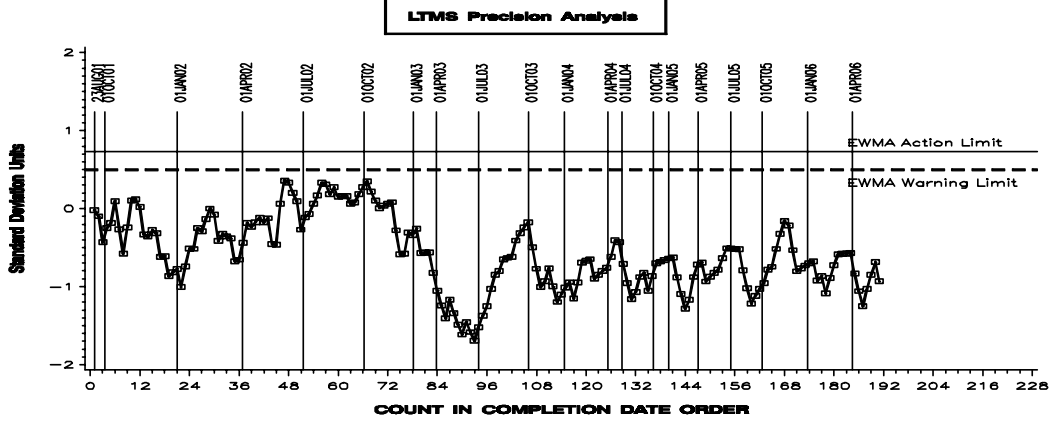
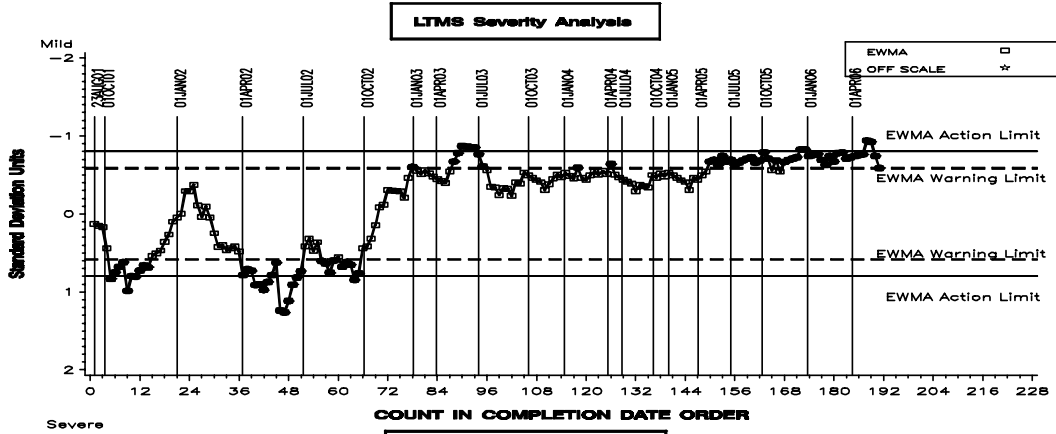


CUSUM Severity Analysis



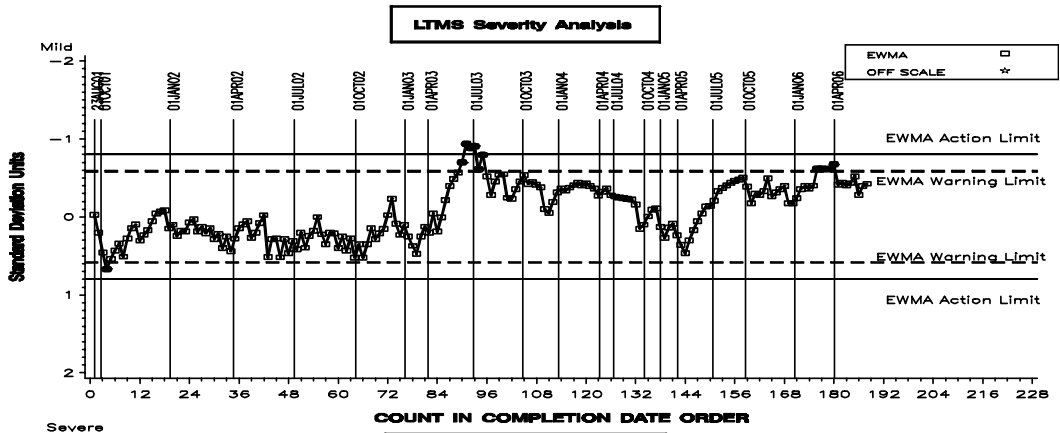
EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA

HARDNESS CHANGE (POINTS)

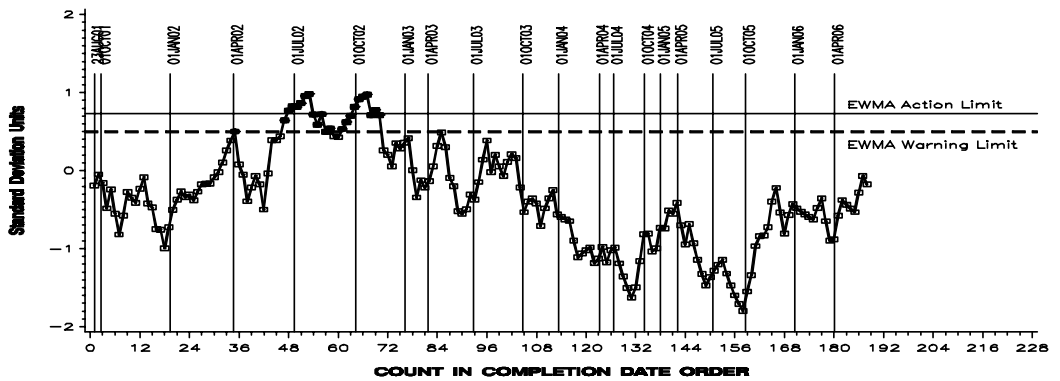


EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA

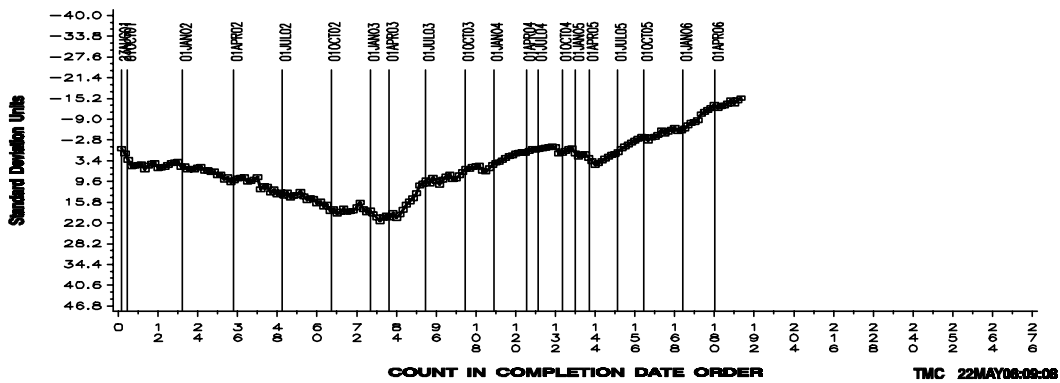
HARDNESS CHANGE (POINTS)



LTMS Precision Analysis

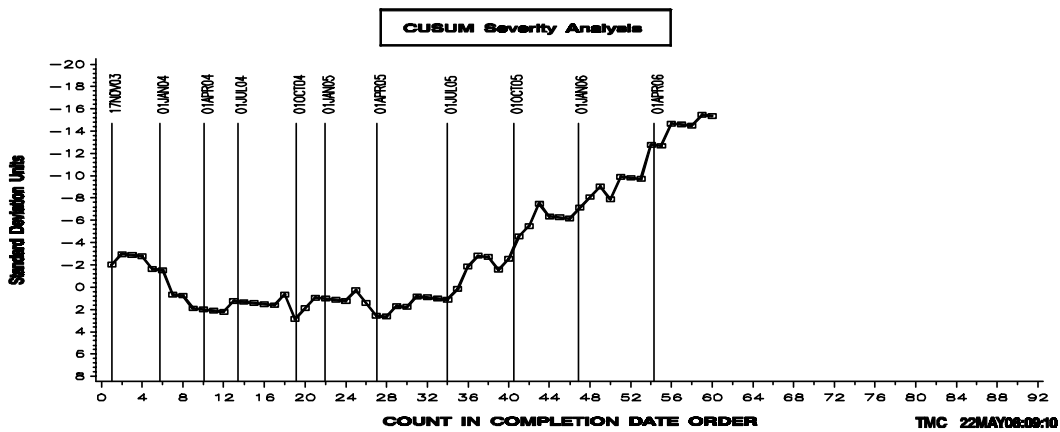
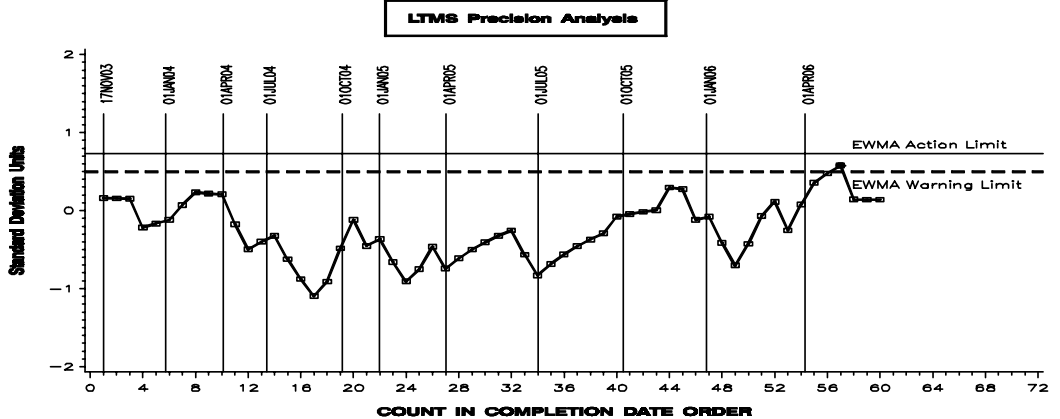
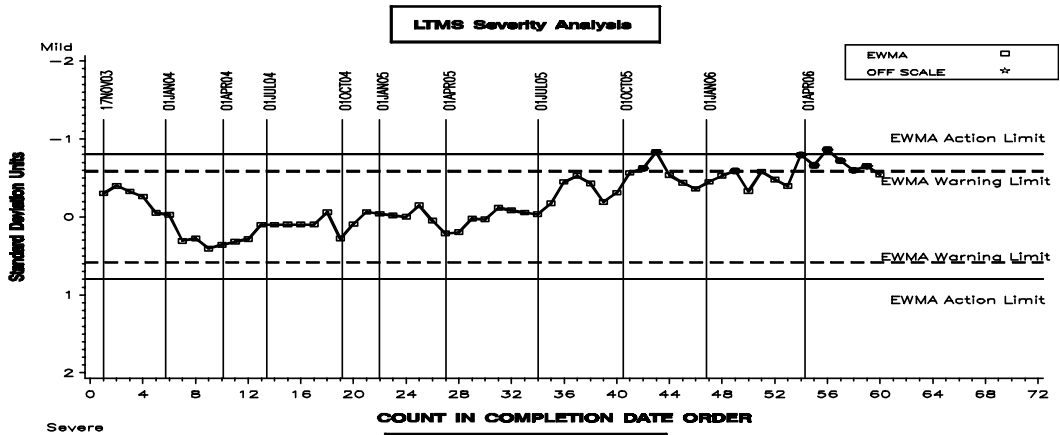


CUSUM Severity Analysis



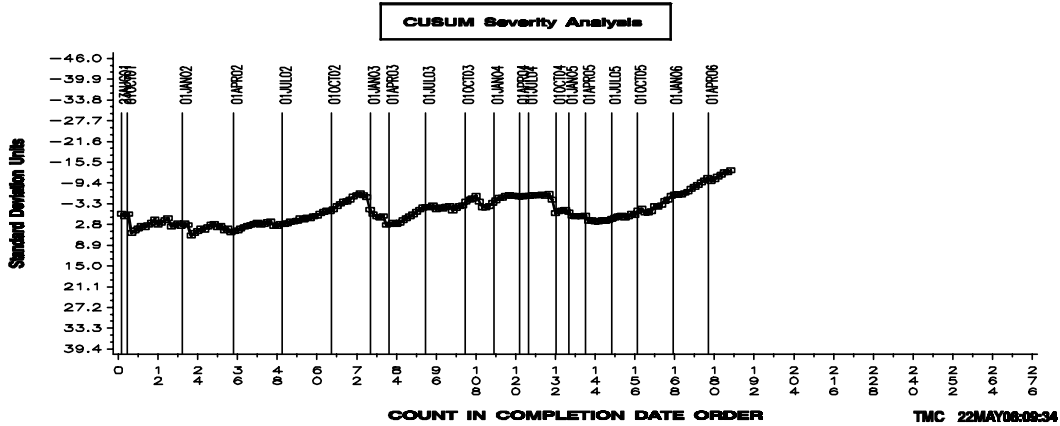
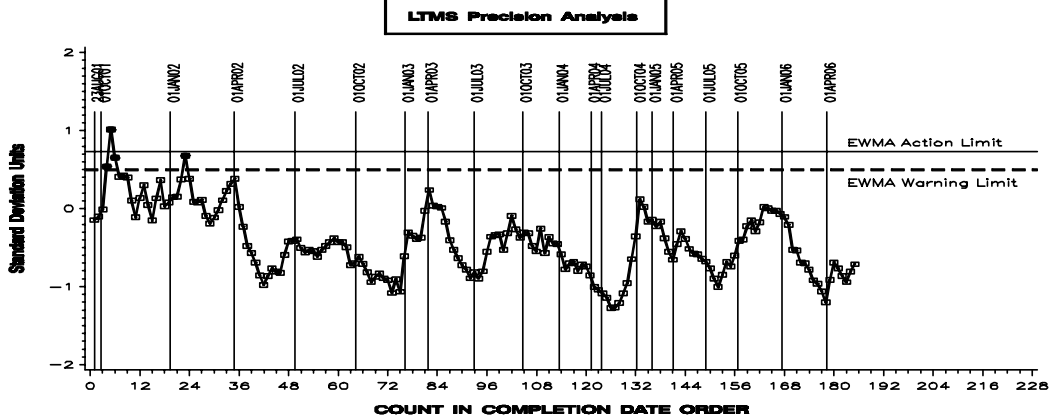
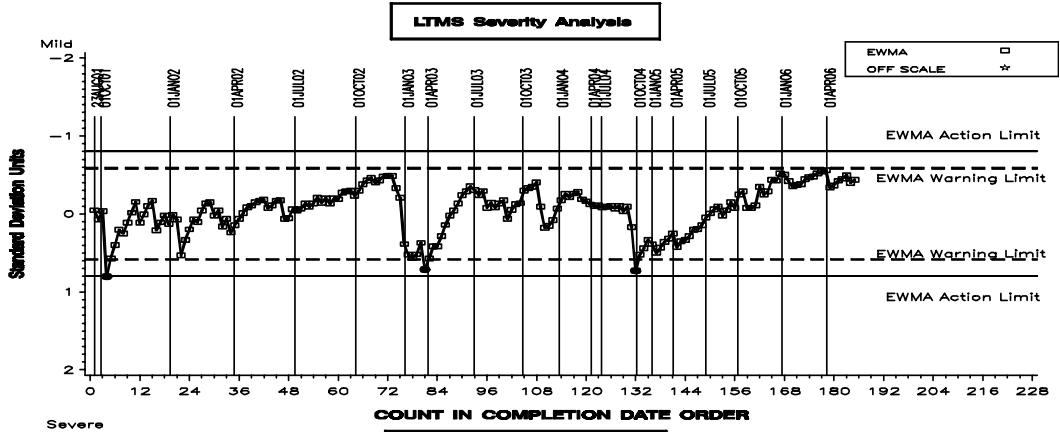
EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA

HARDNESS CHANGE (POINTS)



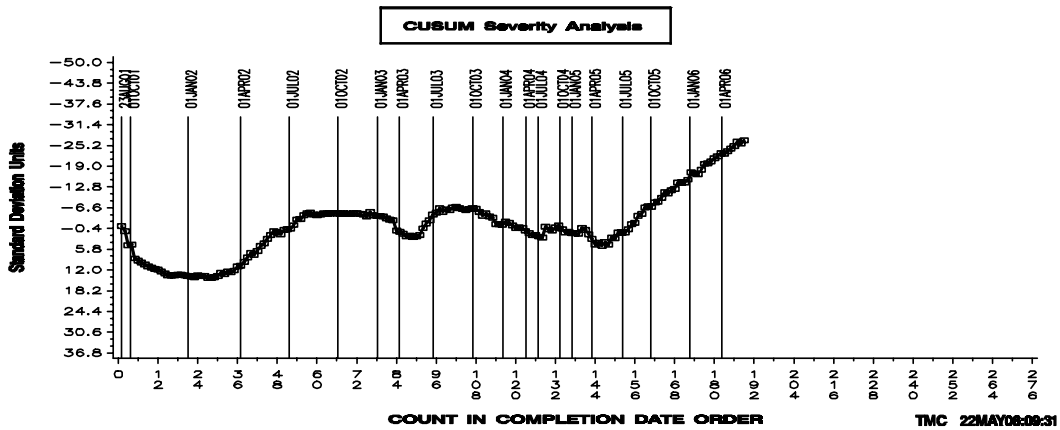
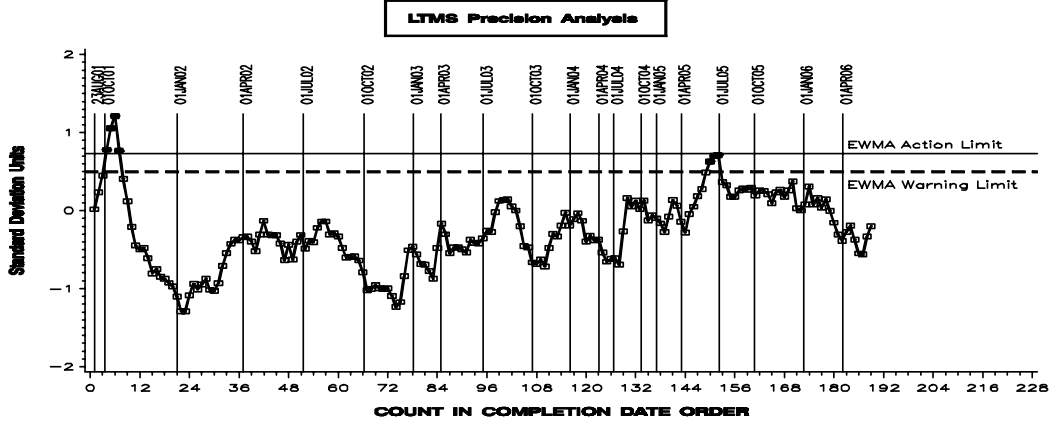
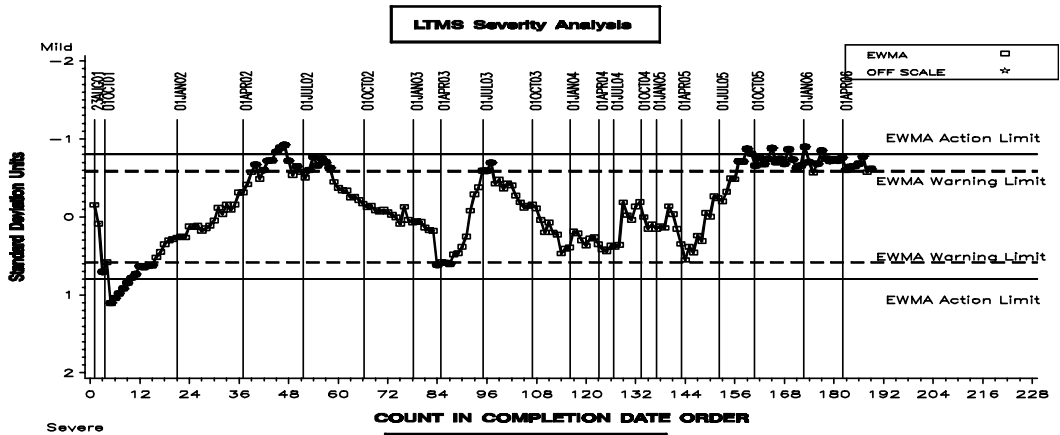
EOEC – FLUROELASTOMER INDUSTRY OPERATIONALLY VALID DATA

TENSILE STRENGTH CHANGE (%)



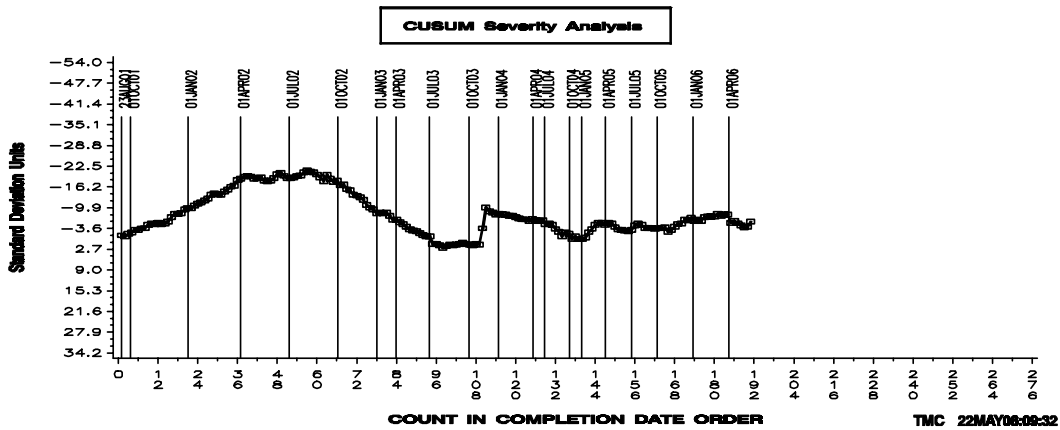
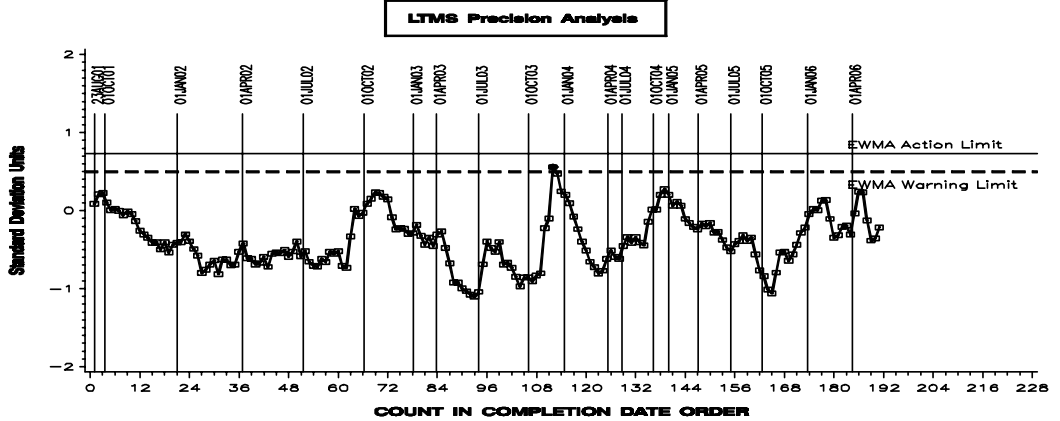
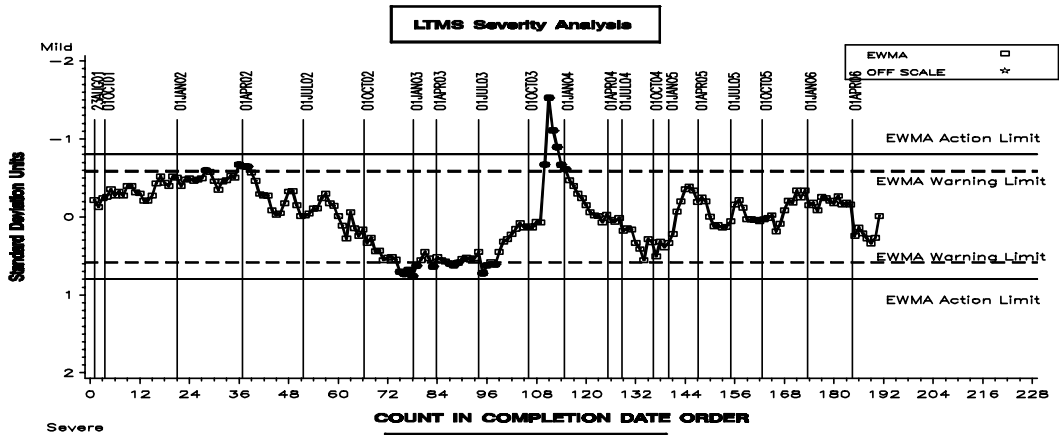
EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA

TENSILE STRENGTH CHANGE (%)



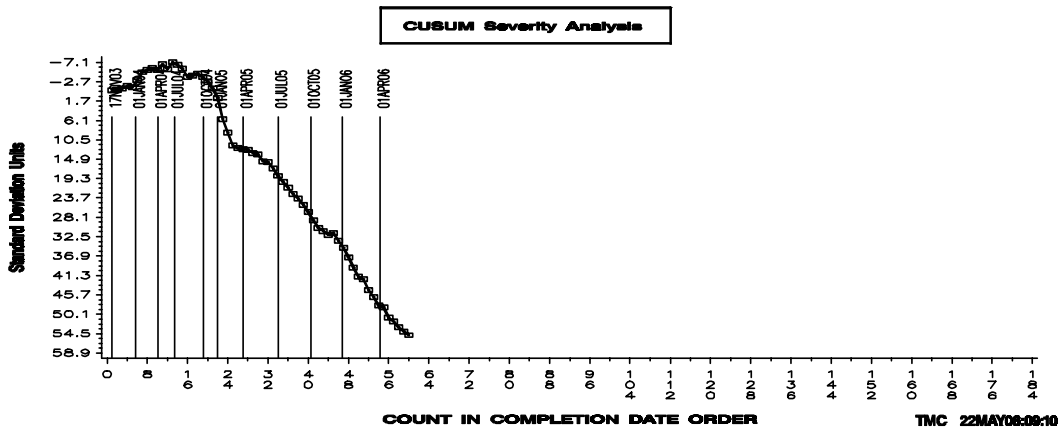
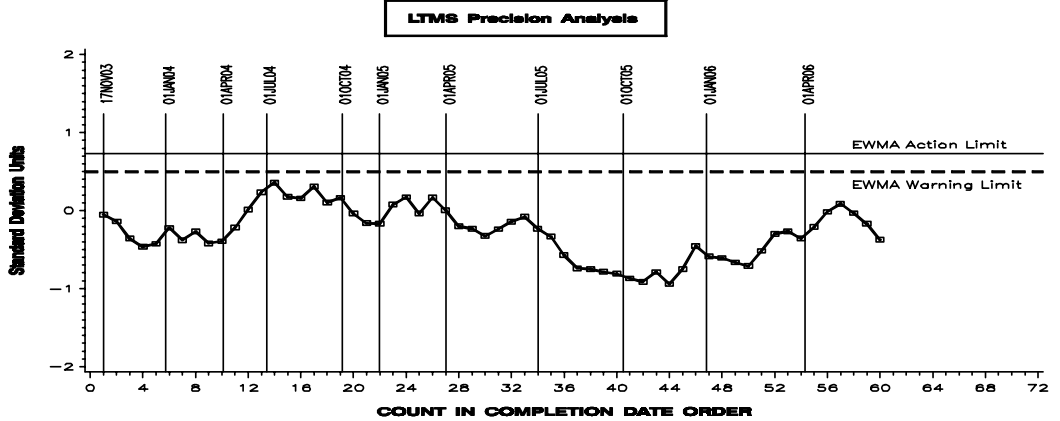
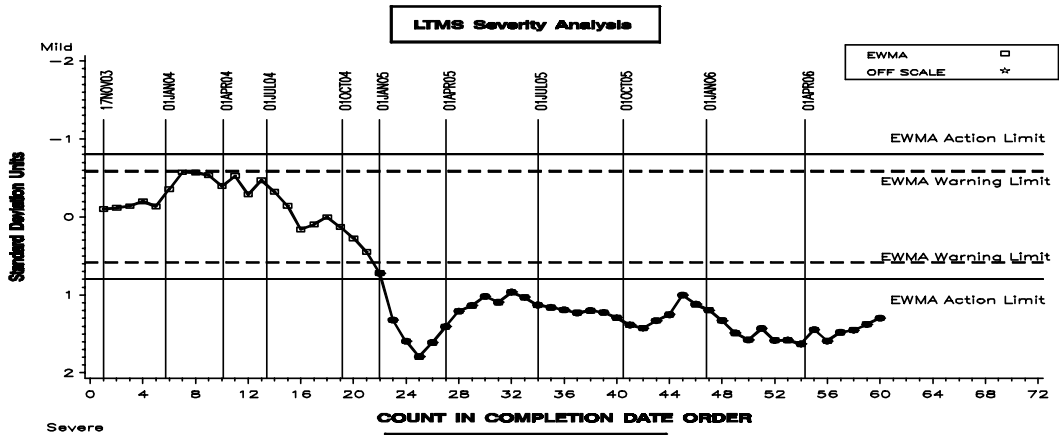
EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA

TENSILE STRENGTH CHANGE (%)

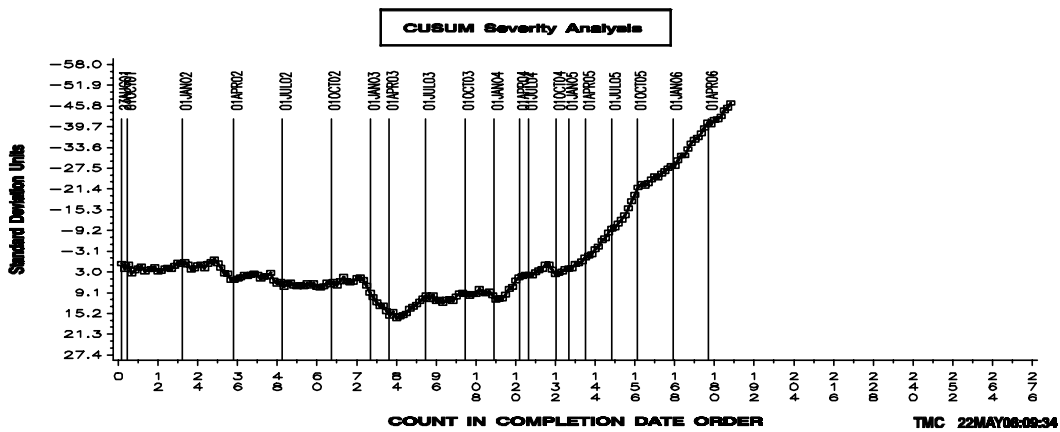
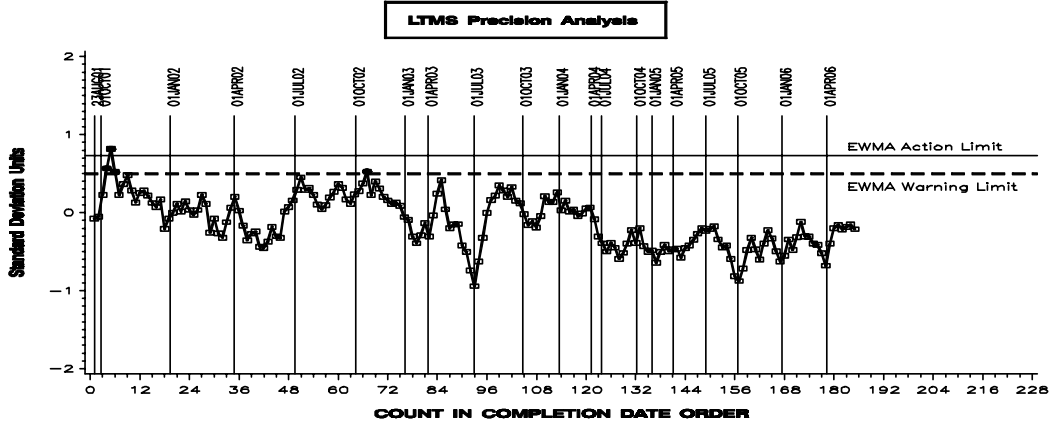
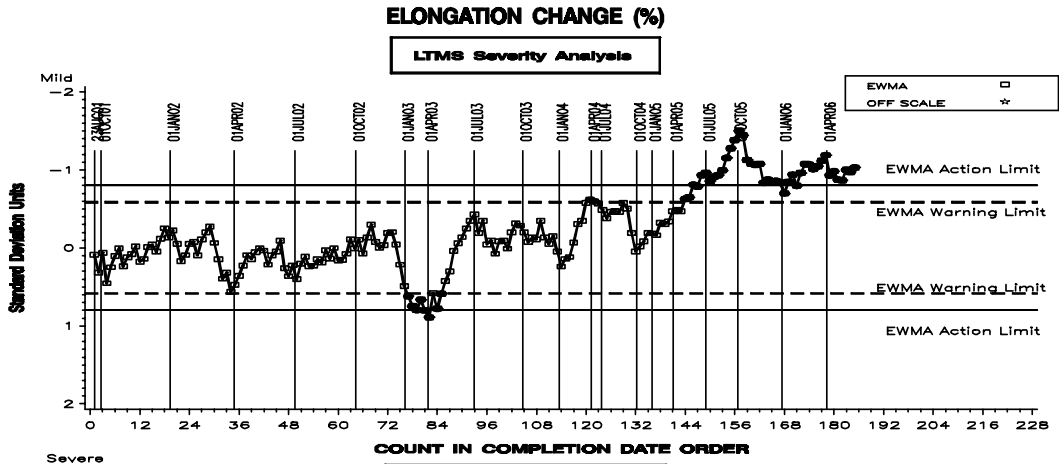


EOEC – VAMAC INDUSTRY OPERATIONALLY VALID DATA

TENSILE STRENGTH CHANGE (%)

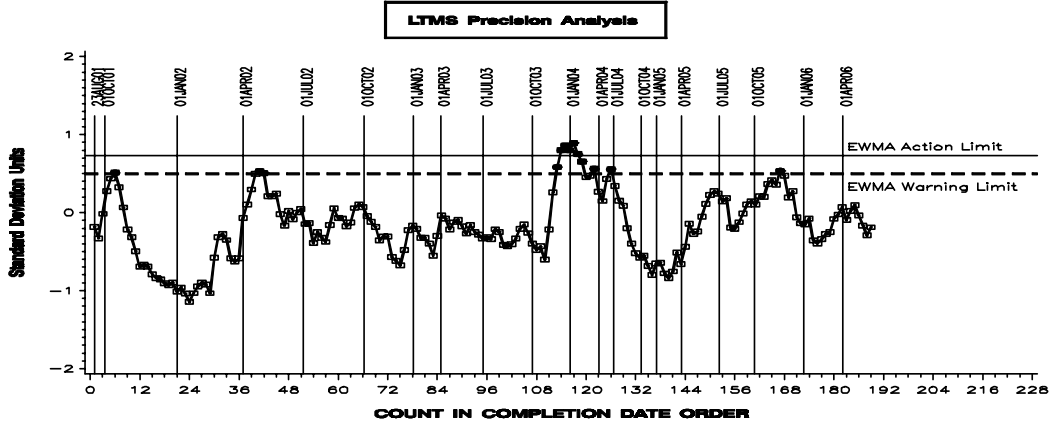
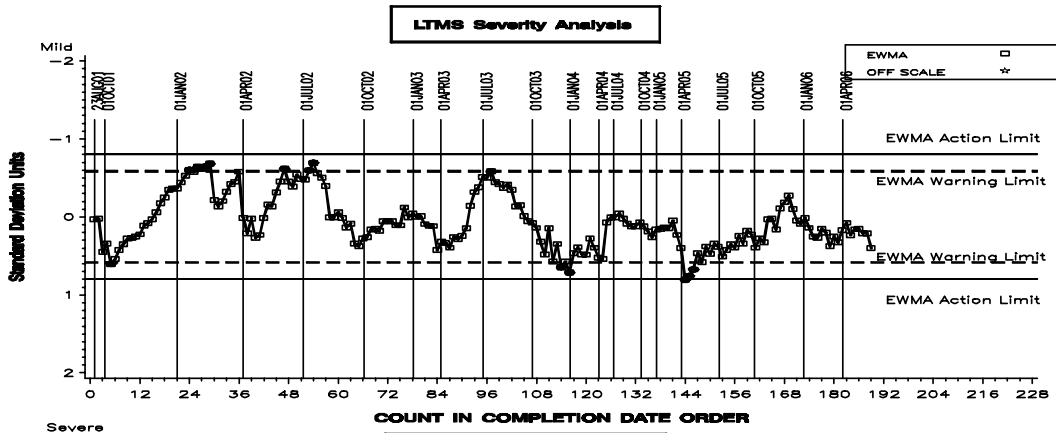


EOEC – FLUROELASTOMER INDUSTRY OPERATIONALLY VALID DATA

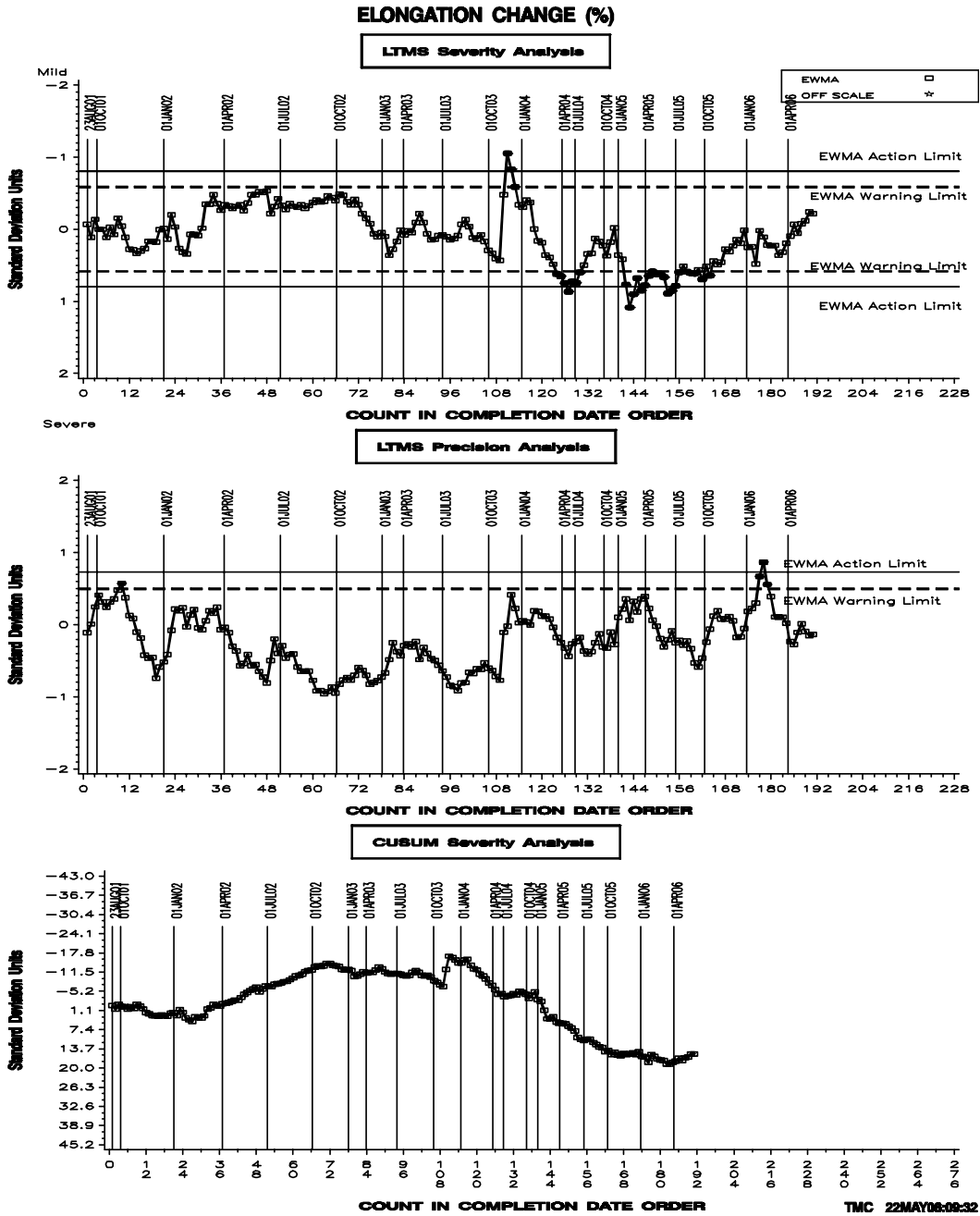


EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA

ELONGATION CHANGE (%)

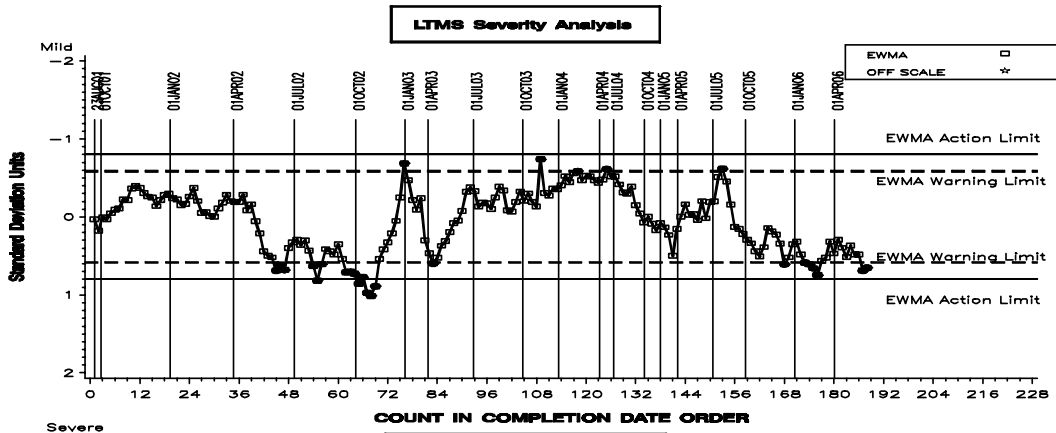


EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA

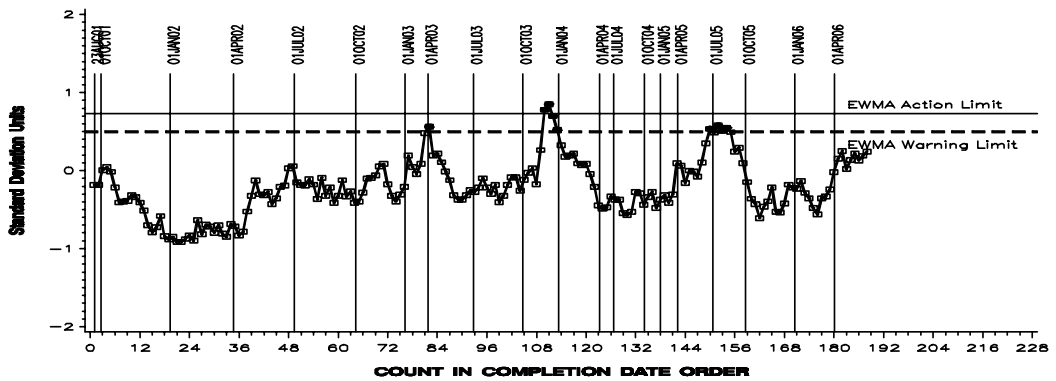


EOEC – SILICONE INDUSTRY OPERATIONALLY VALID DATA

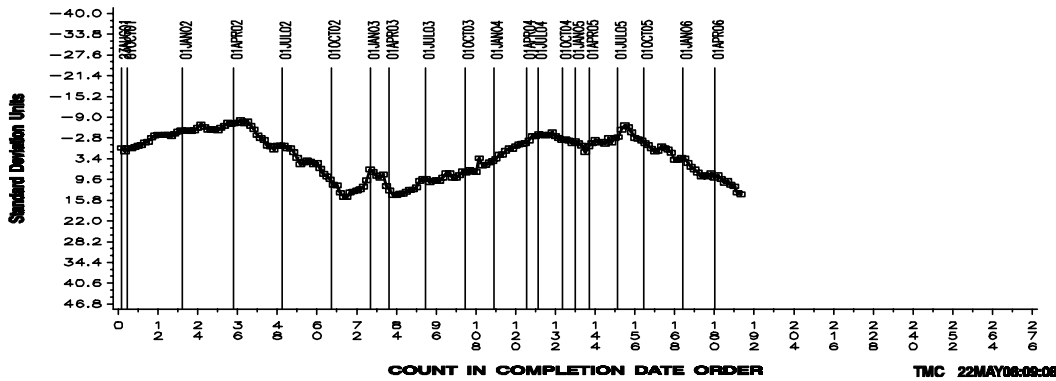
ELONGATION CHANGE (%)



LTMS Precision Analysis

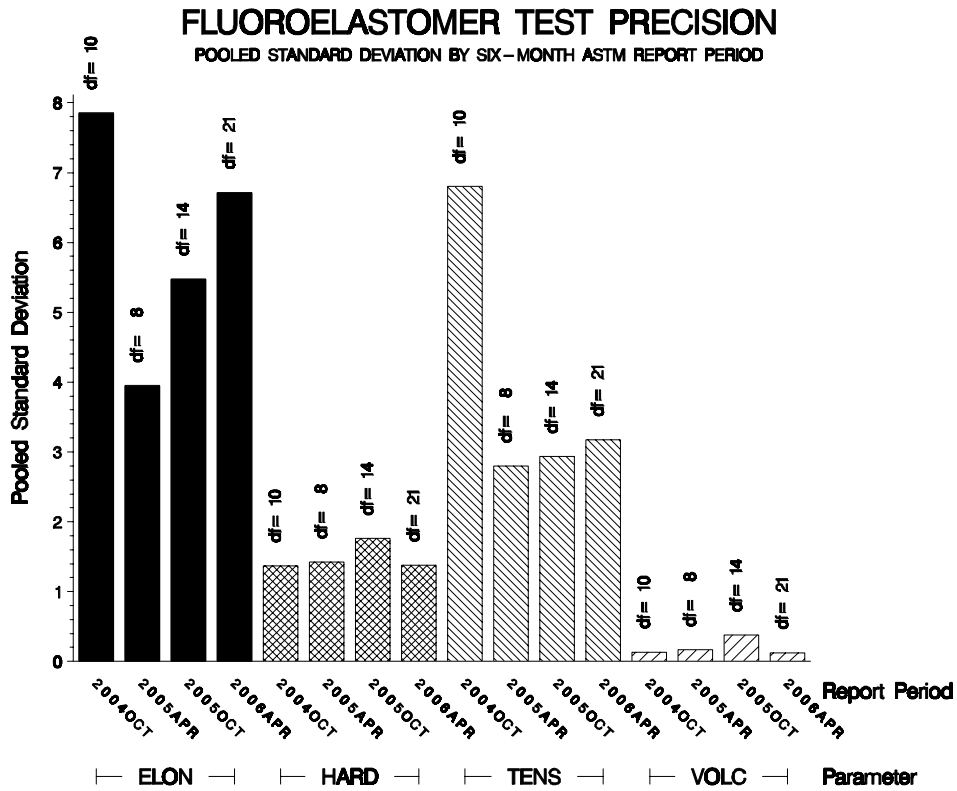


CUSUM Severity Analysis



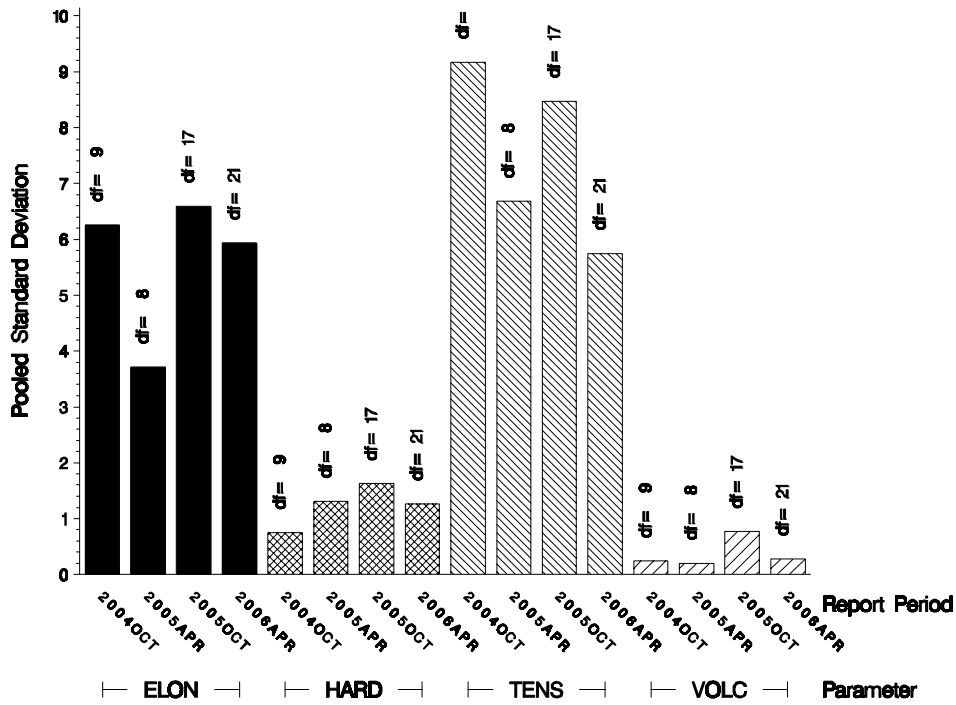
POOLED S:

Shown below are bar charts comparing the pooled s values for the EOEC test parameters over the last four report periods. Where degrees of freedom equal zero, no bars are shown. This will occur where only one test was reported or where multiple tests are reported but all are on different oils. Periods showing no information had no tests reported.



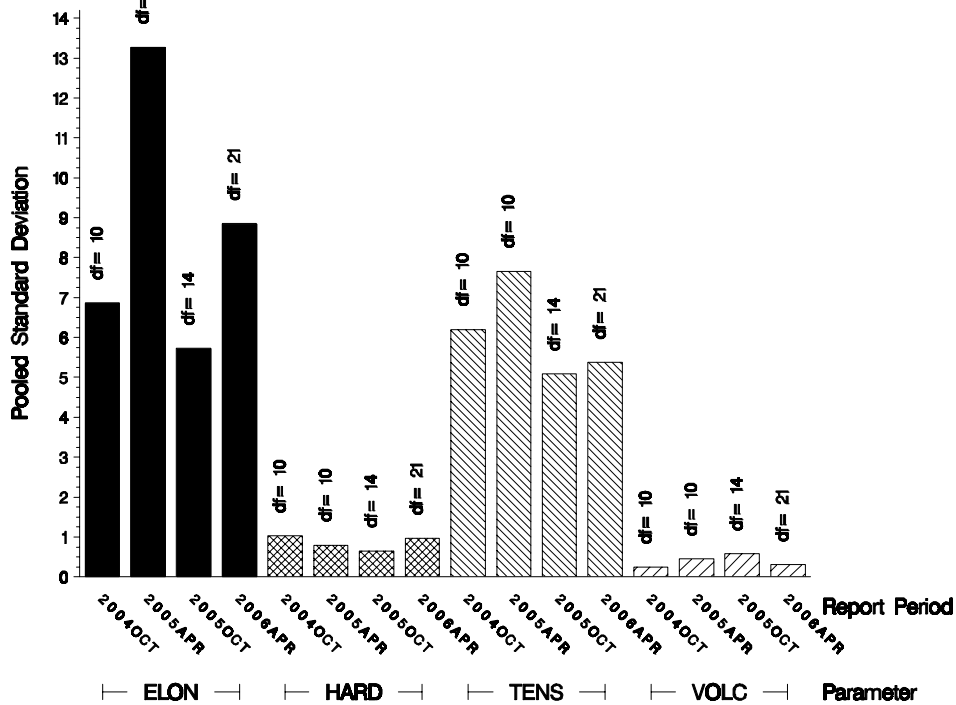
NITRILE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



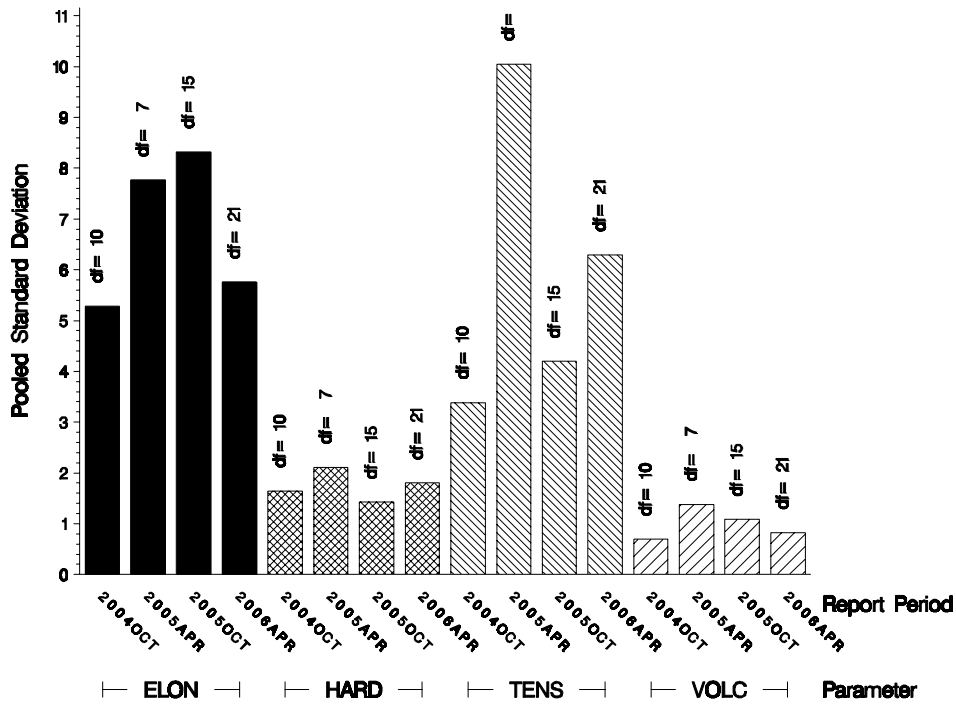
POLYACRYLATE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



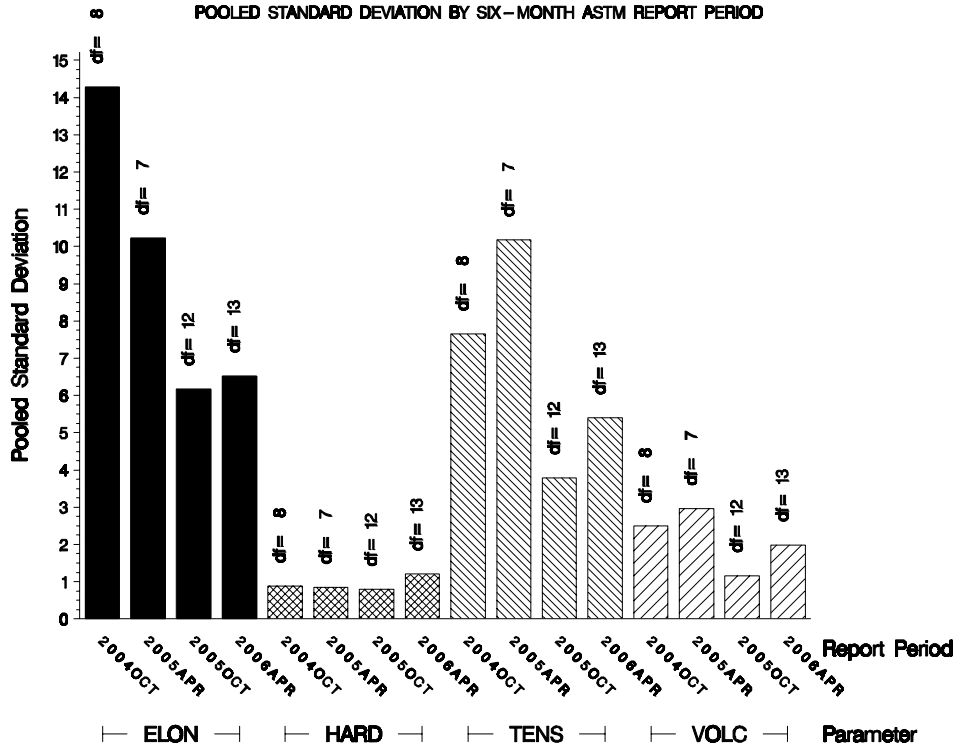
SILICONE TEST PRECISION

POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



VAMAC 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	70	16840	3337
Total	70	16840	3337

* Future reblends of oils marked with an asterisk are not obtainable by TMC.

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; all of these oils are also used in several other test areas.

INFORMATION LETTERS:

No information letters were issued during this report period. The test procedure was released as ASTM standard D7216-05.

SDP/sdp/astm0406.doc/mem06-035.sdp.doc

c: J. L. Zalar

F. M. Farber

EOEC Surveillance Panel

<ftp://ftp.astmtmc.cmu.edu/docs/bench/eoec/semiannualreports/eoec-04-2006.pdf>

Distribution: email